

**Proceedings of the National Forum on “New
Partnership with Local Authorities for the
Environmentally Sound Management of Hazardous
and Other Wastes in Urban Areas”**

**10-11 August, 2004
Qingdao, China**

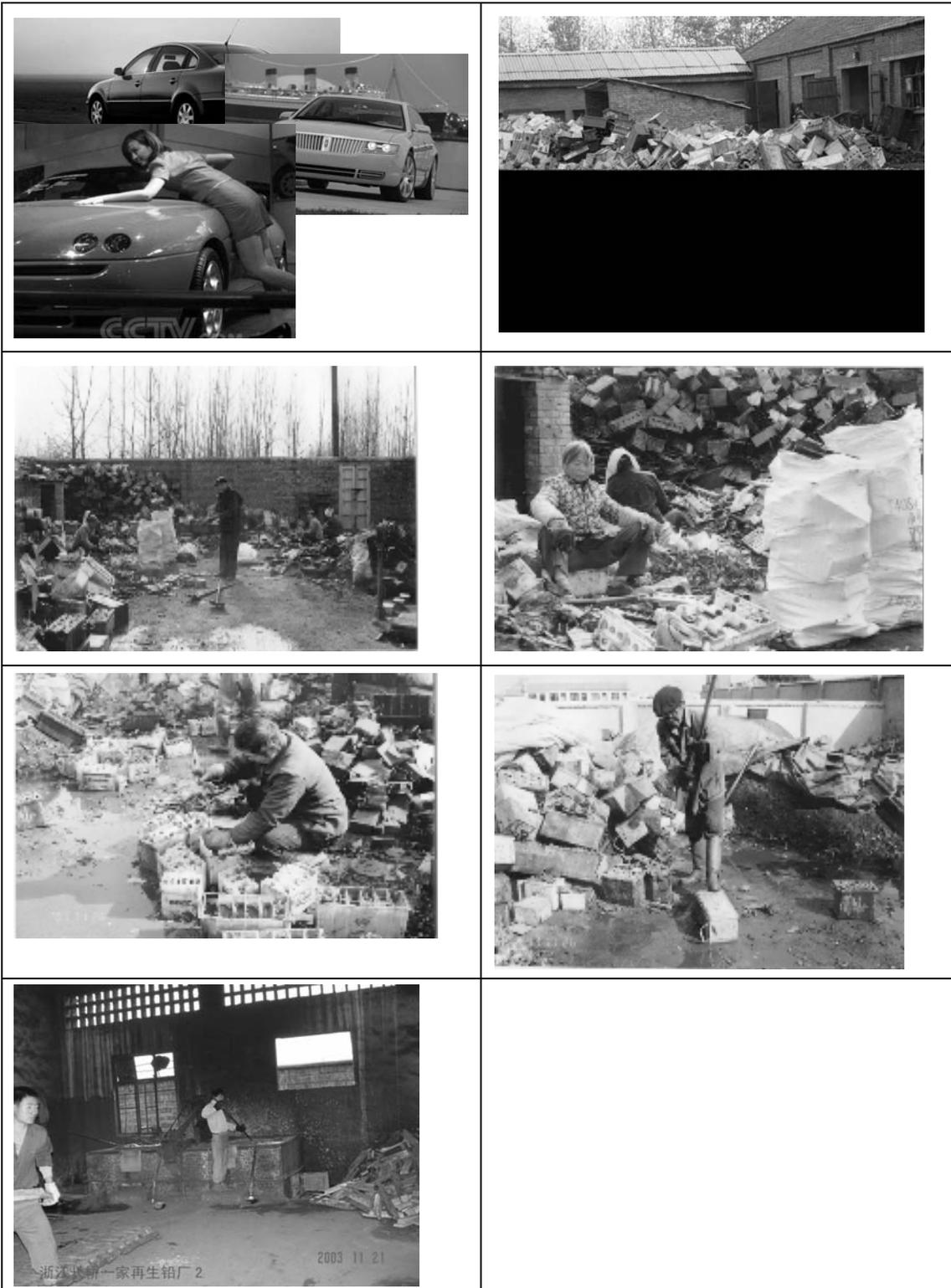


**Asia-Pacific Regional Centre for Hazardous Waste
Management Training and Technology Transfer**



Qingdao Environmental Protection Bureau

22 August 2004



Enhance the basic work

(1). Enhance the construction of management institutes and panel

The lack of management ability is one of the important factors that hold the neck of HW management. The country and the province should set up solid waste

6. Treated and disposed HW

All the hazardous waste in the list except polychlorinated biphenyl
Except radioactive waste

7. System integration

- Caption and transport Sector
- Pretreatment sector
- Integrated Reuse system
- Combustion
- Stabilization/Solidification
- Safety Landfill
- Testing Laboratory
- Automatic control System
- Waste water treatment system

8. Integrated reuse

- Area: 1200m² (Floor area: 1200m²)
- Solid Waste Exchange Centre
- Reclamation Workshop
- Heavy Metal Reclamation
- Rare Metal Reclamation
- Organic Solvent Reclamation
- Research and Development Centre

9. Storage

- Floor Area: 3000m²
- Standard of Design: “Pollution Control Standard of Hazardous Waste Storage” (GB18597-2001)
- Operating Now

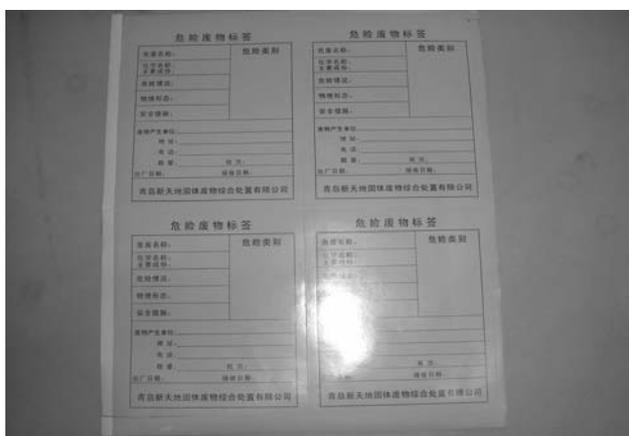
10. Distant view of storage



11. Interior view of storage



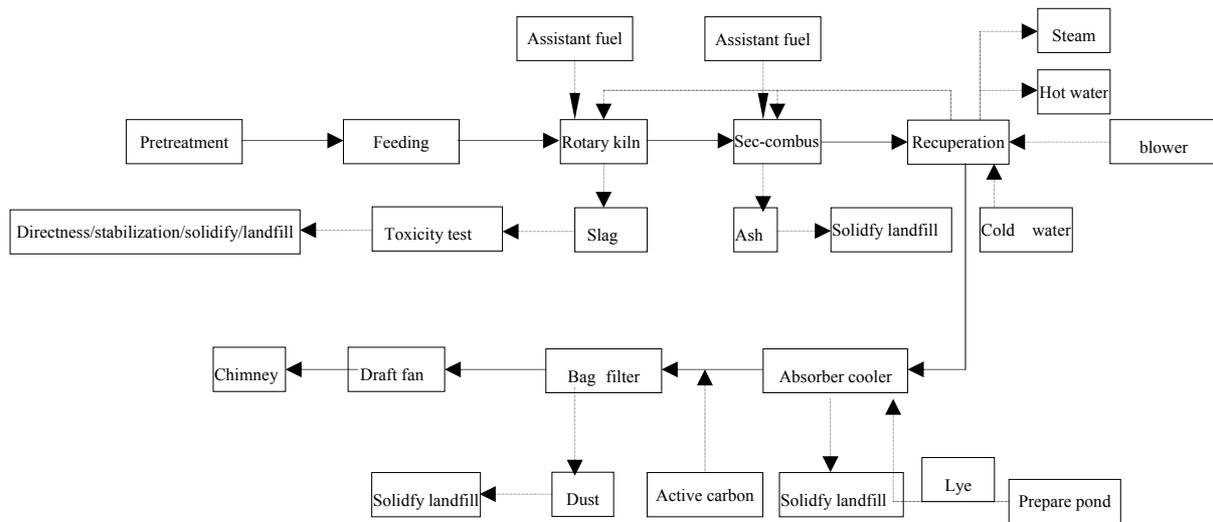
12. Label of hazardous waste



13. Incinerator

- Design Treatment Scale : 30t/d;
- Floor area: 3500m²;
- Rotary Kiln and Secondary combustor
- Semi-Stem Absorber and Cooler Bag filter
- Recuperation: Waste-heat Boiler, Steam and hot water, Air Heating, Sludge Dewatering.
- Present Status of Hazardous Combustion in Qingdao: Qingdao Kailian.

14. Combustion process flow



15. Safety landfill

- Floor Area: 40000m²;
- Height: 8m;
- Design age limit: 20a;
- Storage Capacity: 20×104m³;
- Type of Landfill: Rigid Safety Landfill;
- Nine Braid, 12 cell in one Braid
- Dimension of Cell: 15×15×8m
- Present Status of Safety Landfill in Qingdao: No Safety Landfill. Our treatment center is the only safety landfill in China.

16. Progress of disposal centre

- Finished Work: Land expropriation, Environmental Assessment, Building of Storage

17. Present status of operation

- Collection, Transportation and Storage has processed.
- Oil paint Residue, Organic Liquid(compose Cadmium and Plumbum) , Printing and Dying Sludge, Phenolic Aldehyde Organic Solvent, Discarded Hazardous Chemicals(Ligroin, Carbon Tetrachloride)

18. Oil paint residue



19. Labeled hazardous waste



20. Organic solvent container



21. Discarded chlorine and sulfide pot



22. Handling



23. Fixation



24. Leakage indicator ammonia



25. Building owner

- Building Owner: Qingdao New World Solid Waste treatment Co.,Ltd
- Special solid waste resource reuse and treatment/Disposal Corporation
- Enrolled Capital: 30 million Chinese Yuan
- More than 30 million Chinese Yuan has been invested in the project of non-hazardous industrial solid waste

26. Non-hazardous industrial solid waste Landfill





27. Personnel

- Technical personnel: 25, Senior Engineer 5, Engineer 10, two have doctor degree, three have master degree.
- Special: Environmental Engineering/Chemical Engineering/Mechanical Engineering
- Experience: Personnel from government/chemical plant/Enterprise
- Focus: on academic degree/professional rank, more on experience and disposition.

Foreword

With aim to implement the Strategy Plan of the Basel Convention, the Asia-Pacific Regional Centre for Hazardous Waste Management Training and Technology Transfer (the Basel Convention Regional Centre in China (BCRC China)) launched the project entitled “the new partnership with local authorities for the environmentally sound management of hazardous wastes and other wastes in urban areas”. The national forum on new partnership for the environmentally sound management of urban hazardous wastes, was held in Qingdao, Shangdong, P.R.China in 10-11 August 2004, which is one of the main activities of the project supported by Qingdao Environmental Protection Bureau (Qingdao EPB) and Department of Pollution Control and International Cooperation of State Environmental Protection Administration (SEPA). The forum was attended by 51 participants from the SEPA, academies, department of scientific research, local authorities of environmental management, enterprises of hazardous waste disposal and press media.

Mr. Yue Ruisheng, Deputy Director General, and Ms. Wang Qian, Chief, Department of International Cooperation of SEPA, and Mr. Zhong Bin, Official, Department of Pollution Control of SEPA attended the forum and addressed. Mr. Zhong Bin made the technical presentation of hazardous waste management in China. Mr. Song Chunkang, Vice Director, Qingdao EPB, spoke in the opening of the forum.

The representatives from BCRC China and Qingdao Solid Waste Management Centre as well as the experts specially made the presentations focused on the hazardous waste management in the urban areas and had valuable arguments on how to address the current issues according to the agenda.

The representatives from the local environmental protection bureaus and private sectors addressing hazardous waste disposal shared them past experiences and discussed on how to address hazardous waste management and disposal on environmentally sound management.

The subjects provided from the speakers were as follow:

- The Basel Convention and its Strategic Plan as well as the activities of BCRC China;
- Case study of public-private partnership for environmental sustainable development implementing by ACCA 21;
- Hazardous waste management in China;
- Solid waste management in Qingdao;
- Theories and practices of survey on the hazardous waste generation;
- Constructions and situations of disposal facilities for hazardous wastes in Qingdao;

- Theories and practices of constructions for hazardous waste disposal facilities in the urban areas;
- Technical aspects to control the pollution of fly-ash released from the incinerators of solid wastes.

Now, if you have any questions please feel free to contact with us by E-mail: jinhui@tsinghua.edu.cn.

Website: www.bcrc.cn

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Agenda of the National Forum on
“New Partnership with Local Authorities for the Environmentally Sound
Management of Hazardous and Other Wastes in Urban Areas
Qingdao, China
10-11 August 2004

Tuesday 10th August 2004		
A.M. : 8:00-13:00		
<i>Time</i>	<i>Content</i>	<i>Participants</i>
8:00-9:30	Registration of participants	All Participants
9:00-10:00	The kinescope of the management of hazardous wastes	BCRC China
Emcee: BCRC in China		
10:00-10:20	Welcome address	SEPA Shandong Solid Waste Management Centre Qingdao EPB
10:20-10:40	Take pictures	All Participants
10:40-11:00	Introduction of purpose, contents and progresses of the project for a partnership agreement	BCRC China
11:00-11:30	Introduction of the “Basel Convention”	BCRC China
11:30-12:00	Activities of the Administrative Centre for China’s Agenda 21 (ACCA 21)	ACCA 21 BCRC China
12:00-13:00	Situation of hazardous waste management in Qingdao	Qingdao EPB
13:00-14:00	Lunch	
P.M. 14:00-18:45		
<i>Time</i>	<i>Content</i>	<i>Participants</i>
Emcee: Qingdao EPB		
14:30-15:30	The management of hazardous wastes in China	Department of Pollution Control SEPA

15:30-17:00	Survey on generation source of hazardous wastes	Chinese Research Academy of Environmental Sciences
17:00-18:45	Present status of centralized disposal facility in Qingdao	Qingdao New World Solid Waste Treatment Co., Ltd.
18:45-20:30	Dinner party	All participants
Thursday 11th August 2004		
A.M. : 8:00-13:00		
<i>Time</i>	<i>Content</i>	<i>Participants</i>
	Introduction and activities to deal with hazardous and other wastes in Qingdao	Qingdao EPB
8:30-13:00		All participants
13:00-14:00	Lunch	All participants
8:20-8:50	Introduction of current situation to deal with hazardous and other wastes in China	SEPA
P.M. 14:00-18:45		
<i>Time</i>	<i>Content</i>	<i>Participants</i>
Emcee: BCRC China		
14:30-15:30	Plan for construction of hazardous waste disposal facilities in Beijing -research and practices-	Chinese Research Academy of Environmental Sciences
15:30-16:30	Technology and policy for pollution control of fly-ash generated from solid waste incinerators	Tsinghua University/BCRC China
16:30-17:10	Situations of hazardous wastes in local cities	local SEPB
17:10-17:45	Discussing	All participants
17:45-18:00	Closing address	SEPA

**Welcome Address in the National Forum on “New Partnership with Local
Authorities for the Environmentally Sound Management of Hazardous and
Other Wastes in Urban Areas**

Mr. Yue Ruisheng
Deputy Director of the Department of International Cooperation, SEPA
Qingdao, August 10, 2004

Ladies and gentlemen,

Good morning. I am honored to be on the behalf of China State Environmental Protection Administration to welcome the experts and all the delegates for this meeting. I also express devout thanks to Asia-Pacific Regional Centre for Hazardous Waste Management Training and Technology Transfer, Qingdao Environmental Protection Bureau, and the solid management center of Qingdao to undertake this meeting.

Basel Convention is a widely adopted agreement in the scope of international hazardous waste transfer management and treatment convention. At present, there are 162 parties. China is one of the parties firstly joining this convention. In order to improve the hazardous waste management in regional level, Basel Convention has 13 management and training centers in regional level, China is the administrative organizer of Asia-Pacific Regional Center.

Hazardous waste environmentally sound management is the important content of the Basel Convention. We need to strengthen the control and the management of the process of hazardous waste producing, collecting, storage, transport, comprehensive utilization, treatment and the finally disposal. We should carry out special management to the key hazardous wastes, due to urgent need to protect the ecological environment and people's health in our country and responsibility for the implementation of international convention of our country too.

The past practical experiences indicated that it was necessary to promote the environmentally sound management for hazardous wastes through the common effort of social issues. The development of “partnership” is implemented by the cooperation between governmental and private sectors. This kind of public-private partnership reflects such various effects as the mobilizations of financial resource and technology, undertaking the common issues by both sectors, encouraging much cooperation between governmental, non-governmental and private organizations. This partnership has become recently one of the most effective measures to implement the environmentally sound management of hazardous wastes.

Asia-Pacific Regional Centre developed project on new partnership with local authorities for environmentally sound management of hazardous and other wastes in urban areas. Through the persistent efforts of state delegacy and Asia-Pacific Regional Centre, this project is authorized by Basel Convention, and the project has been included the Strategy Plan of the Basel Convention in 2003. It is as the demonstrational project with aim to share and introducing the experience gained in this forum in Asia-Pacific regional.

Today, it is a very good chance for all the delegates to communicate with each other. I hope that the participants should cherish the opportunity to further communication, study and analyze the current situation and suggest new policies, put forward the new measures aiming at the environmentally sound management of hazardous waste in our country.

Background and Objectives of the New Partnership with Local Authorities for the Environmentally Sound Management of Hazardous and other Wastes in Urban Areas Project in the Framework of Basel Convention Strategy Plan

(Edit according to PPT)
Jinhui Li, BCRC in Beijing, China
August 4, 2004
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Strategy Plan for the Basel Convention

Implement the Strategy Plan for the Basel Convention (2000-2010)

The Strategic Plan built on and used the framework of the 1999 Ministerial Basel Declaration on Environmentally Sound Management, as it identifies and describes those activities considered achievable by the Parties in partnership with all concerned and interested stakeholders within the agreed 10-year timetable.

The Strategic Plan took into account existing regional plans, programmes or strategies, the decisions of the Conference of the Parties and its subsidiary bodies, ongoing project activities and processes of international environmental governance and sustainable development.

Implement the Strategic Plan Framework for the Basel Convention

The Strategic Plan is composed of a strategic text and Action Table comprised of short (2003-2004) and mid-to-long term activities (2005-2010).

The Aims of the Basel Convention

The fundamental aims of the Basel Convention are as follows:

- Control and reduction of transboundary movements of hazardous and other wastes that subject to the Basel Convention;
- The prevention and minimization of the hazardous and other wastes generation;
- The environmentally sound management for such wastes;
- The active popularize on application and transfer of cleaner technologies.

The Strategies of the Basel Convention

(a) To involve experts in designing communication tools for creating awareness at the highest level to promote the aims of the Basel Declaration on environmentally sound management and the ratification and implementation of the Basel Convention, its amendments and protocol with the emphasis on the short-term activities;

(b) To engage and stimulate a group of interested Parties to assist the secretariat in exploring fund raising strategies including the preparation of projects and in making full use of expertise in non-governmental organizations and other institutions in joint projects;

- (c) To motivate selective partners to bring added value to making progress in the short-term;
- (d) To disseminate and make information easily accessible through the Internet and other electronic and printed materials on the transfer of know-how, in particular through the BCRC;
- (e) To undertake periodic review of activities in relation to the agreed indicators;
- (f) To collaborate with existing institutions and programmes to promote better use of cleaner technology and its transfer, methodology, economic instruments or policy to facilitate or support capacity-building for the environmentally sound management of hazardous and other wastes;
- (g) To promote and support regional initiatives such as the Environmental Initiative of the New Partnership for Africa's Development aimed at the environmentally sound management of hazardous and other wastes.

The Activities for 2003-2004 supporting the aims of the Basel Declaration on the environmentally sound management

Field (a) Prevention, minimization, recycling, recovery and disposal of hazardous and other wastes subject to the Basel Convention, taking into account social, technological and economic concerns

Field (b) Active promotion and use of cleaner technologies and production, with the aim of the prevention and minimization of hazardous and other wastes subject to the Basel Convention

And

Field (c) Improvement and promotion of institutional and technical capacity-building, as well as the development and transfer of environmentally sound technologies, especially for developing countries and countries with economies in transition

- Development of waste prevention and minimization programmes and tools
 - Assistance in the development and implementation of national legislation and institutional and policy frameworks, including a legal base for enforcement and for the conduct of inventories and related activities, such as waste audits
 - Development and enhancement of national capacity for the preparation and conduct of detailed inventories as well as waste audits for priority waste streams to assist in disposal/recovery operations and in the prevention and minimization of such wastes

- Development of enhanced capacity for the environmentally sound recycling or recovery of hazardous wastes

Field (d) Further reduction of transboundary movements of hazardous and other wastes subject to the Basel Convention, taking into account the need for efficient management, the principles of self-sufficiency and proximity and the priority requirement of recovery and recycling

And

Field (e) Prevention and monitoring of illegal traffic

- Assessment of the transboundary movements of hazardous and other wastes with a view to reducing export and import of such wastes consistent with their environmentally sound and efficient management

Field (f) Further development of the Basel Convention Regional Centres for training and technology transfer

- Development of tools for resource mobilization to support regional delivery functions of the Basel Convention Regional Centres
- Development of joint activities with UNEP/UNIDO National Cleaner Production Centres, interim secretariats of the Stockholm and Rotterdam Conventions

Field (g) Enhancement of information exchange, education and awareness-raising in all sectors of society

- Promotion of awareness and outreach of the Basel Convention, its amendment and protocol
- Enhancement of hazardous waste information through national education system

Field (h) Cooperation and partnership at all levels between countries, public authorities, international organizations, the industry sector, non-governmental organizations and academic institutions

- Promotion of effective sustainable partnership with major stakeholders and opportunities for joint for environmentally sound management activities emphasizing waste minimization and the strengthening of capacity building

- Strengthening of cooperation with Multilateral Environmental Agreements and development of joint initiatives in support of capacity building, science, technology, training, awareness and mobilization of resources to facilitate and assist in fulfilling the aims of the Basel Convention

Field (i) Development of mechanisms for compliance with and for the monitoring and effective implementation of the Convention and its amendments

- Establishment of an effective mechanism to assist Parties in facilitating their actions to implement the Basel Convention effectively and promoting their compliance with the provisions of the Convention

The Project under the Basel Convention Framework

BCRC China

New Partnership with Local Authorities for the Environmentally Sound Management of Hazardous and other Wastes in Urban

Title of Project: New Partnership with Local Authorities for the Environmentally Sound Management of Hazardous and other Wastes in Urban

Cost of project: the Trust Fund to Basel Convention

Implementation: SBC, SEPA, Qingdao EPB (local environmental government)

Geographical Scope: Asia-Pacific region

The Project Objectives

- The conclusion and collection of information in the field of hazardous and other waste management between non-governmental type of alliances involving local authorities, central government authorities and the private sector in urban areas;
- The environmentally sound management of hazardous and other wastes in urban areas (the best environmental practices, technologies, etc.) ;
- The development of public information and communication policies on hazardous and other wastes environmentally sound management in urban areas;
- To implement the demonstration project through assistance provided to local authorities in Qingdao, and non-governmental type of alliances, private sector and other entities, in the field of hazardous and other wastes environment management.

Outputs

- Three decision supportive tools — — Development of public-private partnerships; Successful techniques and technologies for hazardous waste

management in urban areas; Awareness raising and sensitization campaigns for local communities;

- One bilateral city-to-city collaboration project, between a city of a developing country and a city of a developed country on the issue of ESM of urban hazardous and other wastes (under the situation of one city having a cooperating desire);
- One local non-governmental type of alliance (type 2) signed involving the private sector, or other non-governmental partner in the field of hazardous and other waste management in a local city;
- Local mechanism set up for ESM of E-waste, electronic waste, medical wastes or batteries, etc., in a local city;
- Dissemination of the decision supportive tools, training materials, distributed and presented to a number of cities through the parties to the Basel Convention and the Basel Convention Regional Centres.

Survey and Analysis on the Management of Electronic and Electric Wastes which in Typical Countries of Asia.

- Title of Project: Survey and Analysis on the Management of Electronic and Electric Wastes in Typical Countries of Asia
- Cost of project: the Trust Fund to Basel Convention
- Implementation: SBC, SEPA, the focal point of the parties of the Basel Convention
- Geographical Scope: Asia-Pacific region

Through collection and compilation the interrelated datum, the following actions were taken:

- To investigation the transboundary situation and waste of computers and TV sets;
- To organize a national workshop to delivery the survey results;
- To provide the complementary materials to the producer of the electronic and electric product to issue one report on seasonal evaluation of the waste life and provide the foundation to work in future.

Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal

(Edit according to PPT)

Jinhui Li,

BCRC in Beijing, China

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1. The framework of the Basel Convention

Preamble

Article 1 Scope of the Convention

Article 2 Definitions

Article 3 National Definitions of Hazardous Wastes

Article 4 General Obligations

Article 5 Designation of Competent Authorities and Focal Point

Article 6 Transboundary Movement between Parties

Article 7 Transboundary Movement from a Party through States which are not Parties

Article 8 Duty to Re-import

Article 9 Illegal Traffic

Article 10 International Co-operation

Article 11 Bilateral, Multilateral and Regional Agreements

Article 12 Consultations on Liability

Article 13-19

Transmission of Information, Financial Aspects, Conference of the Parties, Secretariat, Amendment of the Convention, Adoption and Amendment of Annexes, Verification, Settlement of Disputes, Signature, Ratification, Acceptance, Formal Confirmation or Approval, Accession, Right to Vote, Entry into Force, Reservations and Declarations, Withdrawal, Depository, Authentic texts.

The main content

- Foreword, mission and aims
- The waste control under the Basel Convention
- Control system
- Hazardous waste environmentally sound management
- Implement strategy
- Supportive tools

Foreword

Unregulated trans-boundary movements of hazardous wastes between countries, in particular, from “developed countries” to “developing countries or countries with economies in transition”

The process of adoption of the Basel Convention

- 1985 Preliminary work of UNEP
- 1987 Adoption of the “Cairo Guidelines”
- 1989 Adoption of the Basel Convention
- 1992 Entry into force, 5th May 1992
- 1998 Ban Amendment of Basel Convention
- 1999 Adoption of Basel Protocol on Liability and Compensation
- 2004 162 Parties
- As of 2004, 49 Parties ratified the Ban Amendment of the Basel Convention;
- at least, 62 parties accept it can enter into force;
- There have 13 parties were agreement on the convention, 3 parties are ratification it.(Botswana, Ethiopia and, Togo)

Mission of the Convention

Preamble

Determined to protect, by strict control, human health and environment against the adverse effects which may result from the generation and management of hazardous wastes and other wastes.

The Main Object of the Basel Convention

- To reduce trans-boundary movements of hazardous wastes to a minimum consistent with their environmentally sound management
- To treat and dispose of hazardous wastes as close as possible to their sources of generation
- To minimize generation of hazardous wastes in terms of quantity and hazards

Pillars of the Basel Convention

- Regulation of the Transboundary Movements of Hazardous Wastes
- Environmentally Sound Management of Hazardous Wastes and other Wastes

2. Wastes Controlled under the Basel Convention

Hazardous waste:

- Article 1.1a of the Convention (Annex I and Annex III)
- Article 1.1b of the Convention (nationally defined hazardous wastes)
- Articles 1.2 of the Convention (Annex II , other wastes)
- Annex VIII and Annex IX of The Convention

The following wastes that are subject to transboundary movement shall be "hazardous wastes" for the purposes of this Convention:

(a) Wastes that belong to any category contained in Annex I, unless they do not possess any of the characteristics contained in Annex III; and

(b) Wastes that are not covered under paragraph (a) but are defined as, or are considered to be, hazardous wastes by the domestic legislation of the Party of export, import or transit.

Wastes that belong to any category contained in Annex II that are subject to transboundary movement shall be "other wastes" for the purposes of this Convention.

Annex I

Categories of wastes to be controlled

Waste Streams

Y1 Clinical wastes from medical care in hospitals, medical centers and clinics

Y2 Wastes from the production and preparation of pharmaceutical products

Y3 Waste pharmaceuticals, drugs and medicines

Y4 Wastes from the production, formulation and use of biocides and phytopharmaceuticals

Y5 Wastes from the manufacture, formulation and use of wood preserving chemicals

Y6 Wastes from the production, formulation and use of organic solvents

Y7 Wastes from heat treatment and tempering operations containing cyanides

Y8 Waste mineral oils unfit for their originally intended use

Y9 Waste oils/water, hydrocarbons/water mixtures, emulsions

Y10 Waste substances and articles containing or contaminated with polychlorinated biphenyls (PCBs) and/or polychlorinated terphenyls (PCTs) and/or polybrominated biphenyls (PBBs)

Y11 Waste tarry residues arising from refining, distillation and any pyrolytic treatment

Y12 Wastes from production, formulation and use of inks, dyes, pigments, paints, lacquers, varnish

Y13 Wastes from production, formulation and use of resins, latex, plasticizers, glues/adhesives

Y14 Waste chemical substances arising from research and development or teaching activities which are not identified and/or are new and whose effects on man and/or the environment are not known

Y15 Wastes of an explosive nature not subject to other legislation

Y16 Wastes from production, formulation and use of photographic chemicals and processing materials

Y17 Wastes resulting from surface treatment of metals and plastics

Y18 Residues arising from industrial waste disposal operations Wastes having as constituents:

Y19 Metal carbonyls

Y20 Beryllium; beryllium compounds

Y21 Hexavalent chromium compounds

Y22 Copper compounds

Y23 Zinc compounds

- Y24** Arsenic; arsenic compounds
- Y25** Selenium; selenium compounds
- Y26** Cadmium; cadmium compounds
- Y27** Antimony; antimony compounds
- Y28** Tellurium; tellurium compounds
- Y29** Mercury; mercury compounds
- Y30** Thallium; thallium compounds
- Y31** Lead; lead compounds
- Y32** Inorganic fluorine compounds excluding calcium fluoride
- Y33** Inorganic cyanides
- Y34** Acidic solutions or acids in solid form
- Y35** Basic solutions or bases in solid form
- Y36** Asbestos (dust and fibres)
- Y37** Organic phosphorus compounds
- Y38** Organic cyanides
- Y39** Phenols; phenol compounds including chlorophenols
- Y40** Ethers
- Y41** Halogenated organic solvents
- Y42** Organic solvents excluding halogenated solvents
- Y43** Any congener of polychlorinated dibenzo-furan
- Y44** Any congener of polychlorinated dibenzo-p-dioxin
- Y45** Organohalogen compounds other than substances referred to in this Annex (e.g. Y39, Y41, Y42, Y43, Y44).

Annex III

List of hazardous characteristics

UN Class Code Characteristics

1 H1 Explosive

An explosive substance or waste is a solid or liquid substance or waste (or mixture of substances or wastes) which is in itself capable by chemical reaction of producing gas at such a temperature and pressure and at such speed as to cause damage to the surroundings.

3 H3 Flammable liquids

The word "flammable" has the same meaning as "inflammable." Flammable liquids are liquids, or mixtures of liquids, or liquids containing solids in solution or suspension (for example, paints, varnishes, lacquers, etc., but not including substances or wastes otherwise classified on account of their dangerous characteristics) which give off a flammable vapour at temperatures of not more than 60.5E C, closed-cup test, or not more than 65.6EC, open-cup test. (Since the results of open-cup tests and of closed-cup tests are not strictly comparable and even individual results by the same test are often variable, regulations varying from the above figures to make allowance for such differences would be within the spirit of this definition.)

4.1 H4.1 Flammable solids

Solids, or waste solids, other than those classed as explosives, which under conditions

encountered in transport are readily combustible, or may cause or contribute to fire through friction.

4.2 H4.2 Substances or wastes liable to spontaneous combustion Substances or wastes which are liable to spontaneous heating under normal conditions encountered in transport, or to heating up on contact with air, and being then liable to catch fire.

4.3 H4.3 Substances or wastes which, in contact with water emit flammable gases Substances or wastes which, by interaction with water, are liable to become spontaneously flammable or to give off flammable gases in dangerous quantities.

5.1 H5.1 Oxidizing

Substances or wastes which, while in themselves not necessarily combustible, may, generally by yielding oxygen cause, or contribute to, the combustion of other materials.

5.2 H5.2 Organic Peroxides

Organic substances or wastes which contain the bivalent-O-O- structure are thermally unstable substances which may undergo exothermic self-accelerating decomposition.

6.1 H6.1 Poisonous (Acute)

Substances or wastes liable either to cause death or serious injury or to harm health if Swallowed or inhaled or by skin contact.

6.2 H6.2 Infectious substances

Substances or wastes containing viable micro-organisms or their toxins which are known or suspected to cause disease in animals or humans.

8 H8 Corrosives

Substances or wastes which, by chemical action, will cause severe damage when in contact with living tissue, or, in the case of leakage, will materially damage, or even destroy, other goods or the means of transport; they may also cause other hazards.

9 H10 Liberation of toxic gases in contact with air or water

Substances or wastes which, by interaction with air or water, are liable to give off toxic gases in dangerous quantities.

9 H11 Toxic (Delayed or chronic)

Substances or wastes which, if they are inhaled or ingested or if they penetrate the skin, may involve delayed or chronic effects, including carcinogenicity.

9 H12 Ecotoxic

Substances or wastes which if released present or may present immediate or delayed adverse impacts to the environment by means of bioaccumulation and/or toxic effects upon biotic systems.

9 H13 Capable, by any means, after disposal, of yielding another material, e.g., leachate, which possesses any of the characteristics listed above.

Annex VIII

LIST A

Wastes contained in this Annex are characterized as hazardous under Article 1, paragraph 1 (a), of this Convention and their designation on this Annex does not preclude the use of Annex III to demonstrate that a waste is not hazardous.

A1 Metal and metal-bearing wastes A1010-A1180

A2 Wastes containing principally inorganic constituents, which may contain metals and organic materials A2010-A2060

A3 Wastes containing principally organic constituents, which may contain metals and inorganic materials A3010-A3190

A4 Wastes which may contain either inorganic or organic constituents A4010-A4160

Annex IX

LIST B

Wastes contained in the Annex will not be wastes covered by Article 1, paragraph 1 (a), of this Convention unless they contain Annex I material to an extent causing them to exhibit an Annex III characteristic.

B1 Metal and metal-bearing wastes B1010-B1240

B2 Wastes containing principally inorganic constituents, which may contain metals and organic materials B2010-B2120

B3 Wastes containing principally organic constituents, which may contain metals and inorganic materials B3010-B3140

B4 Wastes which may contain either inorganic or organic constituents B4010-B4030

The waste in control of Convention

Categories of wastes requiring special consideration

Y46 - Wastes collected from households

Y47 - Residues arising from the incineration of household wastes

Exclusion from the scope of this Convention

Wastes which, as a result of being radioactive, are subject to other international control systems, including international instruments, applying specifically to radioactive materials are excluded from the scope of this Convention.

Wastes which derive from the normal operations of a ship, the discharge of which is covered by another international instrument, are excluded from the scope of this Convention.

3. The control system of transboundary movements

The Control System of the Convention

- Responsibility to notify
- Prior written consent procedure
- Re-import obligations
- Prohibitions and restrictions
- Definition and control of illegal traffic
- Documentation: notification, movement document
- Contract between the exporter and the disposer
- Insurance/financial guarantees
- International transport rules and regulations
- Environmentally sound management of wastes

Prohibitions and restrictions

- Movements between Parties only; Article 11 agreement with non-parties
- National prohibitions of export to parties having an import prohibition
- Obligations of environmentally sound management
- Export for disposal to the area of 60° South latitude

The Ban Amendment adopted at the COP3 in 1995 in Geneva

The Ban Amendment confirmed at the 12th Meeting of the Standing Committee of the Ninth National People's Congress. (31.10.99)

Article 4A (adopted in 1995)

- Prohibit export of hazardous wastes destined for final disposal from states members to the Annex VII to States not listed in Annex VII.
- Prohibit export of hazardous wastes destined for recovery and recycling from states members to the Annex VII to States not listed in Annex VII (31.12.97)
- Annex VII: Parties and other States which are members of OECD, EC, and Liechtenstein

The Notification Procedures are as follows:

- Generator/exporter to notify in writing through CA of exporting State its intention of export
- State of import evaluates the notification and ensure a contract exist between exporter and importer
- State of import and transit to issue written consents
- State of export issues export permit to the generator/exporter
- General notification is also allowed for multiple shipments valid for 1 year

The Movement Document

- Should accompany the shipment from the point the movement commences to the point of disposal (Art. 4, para. 7 (c))
- Contains information of exporter, generator, disposer, carrier, dates the movement started, means of transport, general description of the waste, special handling requirements including emergencies, type of packaging, quantity, declaration by exporter and disposer

Each Party is required to submit annual report to Basel Secretariat giving:

- Details of each transboundary shipment of Basel controlled wastes;
- Disposal methods;
- Countries of import and transit;
- Accidents;
- Efforts to reduce transboundary movements of hazardous wastes and other wastes.

4. Environmentally sound management of hazardous waste

"Environmentally sound management of hazardous wastes or other wastes" means taking all practicable steps to ensure that hazardous wastes or other wastes are managed in a manner which will protect human health and the environment against the adverse effects which may result from such wastes;

Each Party shall require that hazardous wastes or other wastes, to be exported, are managed in an environmentally sound manner in the State of import or elsewhere; Technical guidelines for the environmentally sound management of wastes subject to this Convention shall be decided by the Parties at their first meeting.

Furthermore, each Party shall:

(a) Prohibit all persons under its national jurisdiction from transporting or disposing of hazardous wastes or other wastes unless such persons are authorized or allowed to perform such types of operations;

Annex IV

Disposal Operations

A. Operations which do not lead to the possibility of resource recovery, recycling, reclamation, direct re-use or alternative uses.

Section A encompasses all such disposal operations which occur in practice.

D1 Deposit into or onto land, (e.g., landfill, etc.)

D2 Land treatment, (e.g., biodegradation of liquid or sludgy discards in soils, etc.)

D3 Deep injection, (e.g., injection of pumpable discards into wells, salt domes of naturally occurring repositories, etc.)

D4 Surface impoundment, (e.g., placement of liquid or sludge discards into pits, ponds or lagoons, etc.)

D5 Specially engineered landfill, (e.g., placement into lined discrete cells which are capped and isolated from one another and the environment, etc.)

D6 Release into a water body except seas/oceans

D7 Release into seas/oceans including sea-bed insertion

D8 Biological treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations in Section A

D9 Physical chemical treatment not specified elsewhere in this Annex which results in final compounds or mixtures which are discarded by means of any of the operations in Section A, (e.g., evaporation, drying, calcination, neutralization, precipitation, etc.)

D10 Incineration on land

D11 Incineration at sea

D12 Permanent storage (e.g., emplacement of containers in a mine, etc.)

D13 Blending or mixing prior to submission to any of the operations in Section A

D14 Repackaging prior to submission to any of the operations in Section A

D15 Storage pending any of the operations in Section A

B. Operations which may lead to resource recovery, recycling, reclamation, direct re-use or alternative uses

Section B encompasses all such operations with respect to materials legally defined as or considered to be hazardous wastes and which otherwise would have been destined for operations included in Section A

R1 Use as a fuel (other than in direct incineration) or other means to generate energy

R2 Solvent reclamation/regeneration

R3 Recycling/reclamation of organic substances which are not used as solvents

R4 Recycling/reclamation of metals and metal compounds

R5 Recycling/reclamation of other inorganic materials

R6 Regeneration of acids or bases

R7 Recovery of components used for pollution abatement

R8 Recovery of components from catalysts

R9 Used oil re-refining or other reuses of previously used oil

R10 Land treatment resulting in benefit to agriculture or ecological improvement

R11 Uses of residual materials obtained from any of the operations numbered R1-R10

R12 Exchange of wastes for submission to any of the operations numbered R1-R11

R13 Accumulation of material intended for any operation in Section B

5. Strategies for the implementation of the Convention

- Designation of Focal Points and Competent Authorities (Art. 5)
- International co-operation (Art.10)
- Regional centres for training and technology transfers (Art. 14)
- Transmission of information (Art.13)
- Mechanisms for fulfilment of obligations
- Technical assistance
- Emergency fund (decision of COP5)

6. Support Tools

- Manuals and guidelines
 - Model legislation on control and management of hazardous wastes
 - Implementation Manual
 - Instruction Manual on the Control system
 - Technical Guidelines
- The Basel Convention Regional Centres
- The Basel Secretariat Web Site

Recognition to the Basel Convention

- The object of the Basel Convention also included the environmentally sound management of the hazardous waste and other waste.
- Under the frame of the Convention, the treatment of hazardous waste and other waste must be permitted.
- Basel Convention is one parts of our law system and it permitted by the Standing Committee of the National People's Congress

For More Information

Basel Convention web;

<http://www.basel.int>

BCRC China web:

<http://www.bcrc.cn>

The Development and Origin of the Partnership

(Edit according to PPT)

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Cooperation partnership was put forward on the global environment and development conference in Brazil in 1992, at present it also looks as the new mechanism on sustainable development.

South Africa is 2002 Summit Meeting of Sustainable Development put forward the new broad participation mechanism to encourage interests groups in many ways to develop partnership and to participate in implementing sustainable development, which has got extensive approval and active response. More than 250 partnership developing proposals to implement sustainable development have been originally put forward during the meeting.

As the economic system of socialist market of our country is set up tentatively and government's function is further changed, in a lot of places of our country, the running mechanism of the market is also introduced actively. Furthermore, the government and private department have launched their partnership in the fields of the infrastructure and public service.

What is the Public Private Partnership?

The public private partnership is the framework relation under which public industry and the private industry help each other and make joint efforts and mutual benefits in order to solve the social concerns in the community. The framework of PPP is, on one hand, to combine public strength, utilize private resources on the other hand; both sides of the government- private undertake the risk together. Under the background of public utilities services, we define the government - private partnership any risk through which the public industry and private industry go in order to develop cooperatively together, build, run, maintain and invest in public utilities.

Form	Description	Best applying field
Service Contract	This kind of contract is to let the private enterprise be engaged in the concrete technological task --Install or check the appearance of reading,	This kind of government- the private partnership relation form is the most suitable to a certain public utilities which had been

	collect account, etc. Usually time limit of 1 or 2 years	managed perfectly and can already develop independently in business. It can't be applied in those utilities with such problems as low management efficiency or poor cost resume ability.
Management Contract	In this kind of partner's form, operation and responsibility of maintenance of the state-owned enterprise are undertaken by the private enterprise. Usually time limit of 3-5 years	This form is applied in those occasions where the main goal is to improve the technological ability of core and efficiency of public utilities rapidly. If there needs an arrangement of a transition to prepare for the entry of more extensive private enterprise.
Rental System	Under rental system, a private enterprise rents the assets of public utilities from government, need to bear and provide service and safeguard the responsibility of the assets. Usually time limit of 8-15 years	If there are very large profits without needing to make too great new investment in running the result, that rental system should be the best choice.
Chartered Right	The chartered right means that a private cooperative partner has the right of operating and safeguarding the assets of a certain item of public utilities, it is also obligated to make the investment to this public utilities. The ownership of the assets belongs to the government. Usually time limit of 25-30 years.	It is most suited to those occasions where there needs a large amount of investment to expand coverage or improve situation of service quality.
BOT	Under this situation, the private part is allowed to operate a power plant, a water treatment factory or garbage disposal factory, time limit is 20-30 years, after time limit is full, all property belongs to the government. The government can only generally buy the quantity of output of the minimum	This is most suitable for this situation in which existing public utilities are unable to meet the social demand, or demand increases sharply in future, exceed the ability to bear of existing public utilities greatly.
Risk Cooperation	Under this situation, the government and private enterprise jointly have a certain item of public utilities , either through selling some shares of	This most suitable situation is: The private enterprise has strategic eyes very much, and the government can monitor every

	existing public utilities , or through establishing a new public utilities	activity of the private enterprise closely , and there is right to speak in the everyday control of this public utilities
Forcible Deprival	It means that the government deprives forcibly the ownership to public utilities through selling assets or the shares, or through wholly buying.	This most suitable situation is: there needs to make the investment in order to increase supply or there is a large profit in running efficiency. The private industry is not usually regarded as an industry with strategic significance in the government's eyes.

PPP participant's purpose

1. Government

Main purpose: The government's main purpose is usually to meet the demand of improving public utilities service in the presidial area;

Secondary purpose: In addition, purpose of the government is to appease the opposition faction probably---- The opposition faction may say that they have better measures to residents in their presidial area and they can also try to please the multilateral, bilateral organization or the debtor through removing the regulations for service field of public utilities. Moreover, it can also even give in to the elite in the society stratum, in order to get the advantage while controlling from removing.

2. Private enterprise:

Main purpose: Usually, a private investor, while considering a certain project, thinks that the profit or repayment after investment is the most important factor of consideration.

Secondary purpose: When PPP appears as a kind of transition mechanism, different forms of the individual enterprises participation are becoming too. One big advantage that the individual enterprise can obtain is to increase inherent knowledge and experience. This kind of knowledge will be helpful to participate in competition and bid of different forms not only for companies but also for other communities or countries. It is useful for the individual enterprises which lack of experience of participating in public utilities construction in developing country to obtain this kind of experience. It should be worth the whistle that the secondary purpose could be changed into the main purpose too in some concrete cases.

PPP participant's expectation:

1. Government:

- Improve the service, expand the range
- The interests are mediated

2. Private enterprise:

- Consumers' will and ability for paying
- Transparency
- Independence
- Future possibility
- Obtain information and information source
- The mechanism of conflict solving

3. Consumer:

- Improvement of service quality
- Improvement of the welfare
- Acquisition of the new service

Expressly conference 7

13st -15st Feb, 2002, Colombia, Covenas

Global Ministerial Environment Forum

UNEP, Sustainable development

The contribution of World Summit Conference

The partnership for development of Africa (NEPAD)

- ◆ The new companionate relationship of Africa will be an important framework for achieving the development goal of Africa, and will embody the corporate foresight of Africa continent of leader in Africa. This is a peace and prosperous foreground based on good civicism, decreasing poverty, continuable development, increasing economy; strengthen region unifying, preventing AIDS, and information revolution.
- ◆ The core of new companionate relationship of Africa is promises of leaders of every country of Africa in conquering poverty and increasing civicism capability. This proposal affirms that absence of good municipal management will deepen poverty, and the cause of privative poverty and human rights absolutely is policy action of every country in Africa. The improvement of exterior environment can lighten this situation, but this improvement can't instead of the revolution in home.
- ◆ The environmental factors in new companionate relationship of Africa confirm that a health and productive environment is precondition of continuable rise in Africa. The framework confirmed in new companionate relationship of Africa affirms that problems related to environmental basic culture are comprehensive and complex, and it is absolutely necessary for establishing coherent environmental alternative to systemically implement every integrated countermeasure. So, choice must be made, and every problem must be arranged in priority. The core goal of environmental proposal must reduce poverty, and develop economy in Africa.

- ◆ 8 decided priority factors are preventing hungriness, protecting marsh, foreign immerge species, coastal region management, global temperature increase, span-border protect region and environmental management and finance.
- ◆ The world mugwump conference for continuable development was hold in Johannesburg, South Africa from August 26 to September 4, 2002. In this conference, thousands of people and many mugwumps congregated and consulted to solve the biggest global problem, and planned a better future for global people.
- ◆ International council of local environmental protection (ICLEI) and primary local government association together favor the local government joined this conference.
- ◆ In the world mugwump conference for continuable development, except ‘continuable development’, the most frequent mention word is ‘activity’, ‘timetable’ and ‘companionate relationship’. The 3 words reflected the main idea in the conference: to achieve the global continuable development, activities must be made through setting up idiographic timetable and companionate relationship.
- ◆ The so-called companionate relationship is cooperation between governments, governments and nongovernmental organizations, and enterprises and to implement idiographic continuable development item.
- ◆ ‘Companionate relationship’ has positive meanings, for most of problems in continuable development cannot be solved only by government and need all circles to join in.
- ◆ Central government agreed to specially encourage at the same time the building of companionate relationship between local authorities, local government and all other levels government, local government and stakeholders, promoting continuable development.
- ◆ The so-called second sort proposal involved the participant of local government to promote activities in watering public sanitary government management, traffic and transit, local public materials stocking and environmental management.
- ◆ The ‘second sort’ companionate relationship/proposal is freewill and self-organize.
- ◆ The ‘second sort’ companionate relationship can be initiated by governments, international organizations and central group. They can be arranged by any companionate combination, including government, region group, nongovernmental actor, international organizations and private sector companion. They should include the important actor in a special field at best. They must be in a true participant form to make all companions hold initiative right.
- ◆ The ‘second sort’ companionate relationship/proposal should establish interior plan to monitor the actual development.
- ◆ The ‘second sort’ companionate relationship should have definite goals and establish idiographic index and time limit for this goal.

The ‘companionate relationship’ development in our country

- ◆ January 31 to February 1, 1997, the ‘promote China environmental sound technology development international seminar’ undertook by China 21century agendum management central was held in Beijing.
- ◆ The intentions of this conference are through consulting specialist abroad and home and concern organization, further perfect the framework design and action plan of ‘environmental sound technology transfer central’, discuss the useful approach of international cooperation in the environmental sound technology field, drive the transfer and application of environmental sound technology in China, and contribute to establish environmental sound technology companionate relationship in Asia and the Pacific.

Establish companionate relationship between Hong Kong environmental protection office and industry

- ◆ Hong Kong environmental protection office has already established companionate relationship with many industries, encouraging industries to promote environmental protection behavior and decreasing indictments about pollution.
- ◆ Hong Kong environmental protection office has already successively established companionate relationship with construction industry; dietetic industry and car maintain industry, which are main objects to citizen indictments. Recently, it established the fourth companionate relationship with material management industry to control noise, waste, dust and the other pollution arose by fitment work.

Cooperation and companionate relationship training seminar between government and civil institution

- ◆ From August 29 to 30, 2000, the ‘Cooperation and companionate relationship training seminar between government and civil institution’ undertook by China 21century agendum management central and environmental sound technology transfer center was held in Beijing.
- ◆ At the same time, the training class was a component of local 21 century agendum capability item which was implementing, the ‘Cooperation and companionate relationship between governments and civil institutions (PPP)’ included: questionnaire about PPP, holding training class faced to local government official, industry governors and researchers, screening items can be implemented by PPP, packing and promoting this items. PPP is a large scope which concerns all fields of continuable development. This training class focused in the field of city environmental infrastructure and operation. The main content of this training included the theory and practice of PPP, the PPP analysis abroad and home, and the primary screen of PPP. The training goals were made up of introducing the theory and practice of PPP in the field of environmental infrastructure and service (especially in city water supply, sewage treatment and garbage treatment), describing the goal and requirement of main participant of

PPP-government, civil institution and investor respectively, introducing the possible fund channel and preparing the potential PPP items.

Cooperation Partnership ----Implementation the New Mechanism on Sustainable Development

Sizhen, Peng

The director of the Centre for Environmentally Sound Technology Transfer
ACCA21

In order to open up the technological cooperation and fund of the sustainable development field, South Africa is 2002 Summit Meeting of Sustainable Development put forward the new broad participation mechanism to encourage interests groups in many ways to develop partnership and to participate in implementing sustainable development, which has got extensive approval and active response. More than 250 partnership developing proposals to implement sustainable development have been originally put forward during the meeting. A large amount of investment fund has been raised in a short period. So far many partnerships are still in developing and more partners will be mobilized to participate in the fund building. It can be predicted that in the near future more and more money will be invested in sustainable developing. Otherwise, the concept of partnership is drawing most risk investors' interest. As the economic system of socialist market of our country is set up tentatively and government's function is further changed, in a lot of places of our country, the running mechanism of the market is also introduced actively. Furthermore, the government and private department have launched their partnership in the fields of the infrastructure and public service. Combine the new opportunity of the extensive partnership of sustainable development approved of international community, give full play to the initiative and dynamic role of the partnership, and then we can unquestionably utilize the international advanced technology and fund , make greater contribution for the sustainable development of our country.

What is Public Private Partnership?

The public private partnership is the framework relation under which public industry and the private industry help each other and make joint efforts and mutual benefits in order to solve the social concerns in the community. The framework of PPP is, on one hand, to combine public strength, utilize private resources on the other hand; both sides of the government- private undertake the risk together. Under the background of public utilities services, we define the government - private partnership any risk through which the public industry and private industry go in order to develop cooperatively together, build, run, maintain and invest in public utilities. So, one management contract about managing the supply of water treatment is one public-private partnership relation, namely one “build-operate-transfer” contract relation. The advantage of this definition is, it won't makes people consider the government - private partnership relation with a kind of mode. The government and private industry have very huge room to choose and can carry on suitable selecting

according to the concrete situation. Also, they can make choice creatively and utilize several kinds of forms gradually or at the same time, so that they can achieve their purpose.

The form of Public Private Partnership

The public- private partnership concerns a very large range. The partnership that is suitable for a certain condition depends on to a great extent whether the publicly-owned undertaking will fail, the aim of the service supply of the government and whether the partnership is permanent or not. Other factors may function too such as partiality of the community, etc. The following table detailedly shows the choice range of public-private partnership and how ownership and the risk structure change in this range and corresponding change that the government functioned and brought among them.

Figure 1: Description of different partnership

Form	Description	Best applying field
Service Contract	This kind of contract is to let the private enterprise be engaged in the concrete technological task --Install or check the appearance of reading, collect account, etc. Usually time limit of 1 or 2 years	This kind of government-the private partnership relation form is the most suitable to a certain public utilities which had been managed perfectly and can already develop independently in business. It can't be applied in those utilities with such problems as low management efficiency or poor cost resume ability.
Management Contract	In this kind of partner's form, operation and responsibility of maintenance of the state-owned enterprise are undertaken by the private enterprise. Usually time limit of 3-5 years	This form is applied in those occasions where the main goal is to improve the technological ability of core and efficiency of public utilities rapidly. If there needs an arrangement of a transition to prepare for the entry of more extensive private enterprise.
Rental System	Under rental system, a private enterprise rents the assets of public utilities	If there are very large profits without needing to make too great new

	<p>from government, need to bear and provide service and safeguard the responsibility of the assets. Usually time limit of 8-15 years</p>	<p>investment in running the result, that rental system should be the best choice.</p>
Chartered Right	<p>The chartered right means that a private cooperative partner has the right of operating and safeguarding the assets of a certain item of public utilities, it is also obligated to make the investment to this public utility. The ownership of the assets belongs to the government. Usually time limit of 25-30 years.</p>	<p>It is most suited to those occasions where there needs a large amount of investment to expand coverage or improve situation of service quality.</p>
BOT	<p>Under this situation, the private part is allowed to operate a power plant, a water treatment factory or garbage disposal factory, time limit is 20-30 years, after time limit is full, all property belongs to the government. The government can only generally buy the quantity of output of the minimum</p>	<p>This is most suitable for this situation in which existing public utilities are unable to meet the social demand, or demand increases sharply in future, exceed the ability to bear of existing public utilities greatly.</p>
Risk Cooperation	<p>Under this situation, the government and private enterprise jointly have a certain item of public utilities , either through selling some shares of existing public utilities , or through establishing a new public utilities</p>	<p>This most suitable situation is: The private enterprise has strategic eyes very much, and the government can monitor every activity of the private enterprise closely , and there is right to speak in the everyday control of this public utilities</p>
Forcible Deprive	<p>It means that the government deprives forcibly the ownership to public utilities through</p>	<p>This most suitable situation is: there needs to make the investment in order to increase supply or</p>

	selling assets or the shares, or through wholly buying.	there is a large profit in running efficiency. The private industry is not usually regarded as an industry with strategic significance in the government's eyes.
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The stakeholders of government- private partnership relation (abbr. as PPP) include governments at all levels, private public utilities service provider, debt-credit organization, consumer, labor organization and multilateral or bilateral organization. However, the most important stakeholders are the implementers of the governments at all levels, consumer, labor organization and private project. PPP makes those who have different view, purpose, expect, attention, method and ability of bargain go to together.

PPP participant's purpose

1. Government

Main purpose: The government's main purpose is usually to meet the demand of improving public utilities service in the presidial area;

Secondary purpose: In addition, purpose of the government is to appease the opposition faction probably---- The opposition faction may says that they have better measures to residents in their presidial area and they can also try to please the multilateral, bilateral organization or the debtor through removing the regulations for service field of public utilities. Moreover, it can also even give in to the elite in the society stratum, in order to get the advantage while controlling from removing.

2. Private enterprise

Main purpose: Usually, a private investor, while considering a certain project, thinks that the profit or repayment after investment is the most important factor of consideration.

Secondary purpose: When PPP appears as a kind of transition mechanism, different forms of the individual enterprises participation are becoming too. One big advantage that the individual enterprise can obtain is to increases inherent knowledge and experience. This kind of knowledge will be helpful to participate in competition and bid of different forms not only for companies but also for other communities or countries. It is useful for the individual enterprises which lack of experience of participating in public utilities construction in developing country to obtain this kind

of experience. It should be worth the whistle that the secondary purpose could be changed into the main purpose too in some concrete cases.

PPP participant's expectation:

1. Government

Improve the service, expand the range: The governments of developing countries all expect, the participation of the individual enterprise will offer services of high quality and at a reasonable more price to citizen finally. Though this will not happen within shorter time, set against under the pressure sent in the public and politics, this will always come. So, a kind of mechanism can be created to intervene to the affairs of the private company of public utilities. In addition government expect participation itself of individual enterprise make society each public utilities of aspect be served and be improved also, the range will be expanded. If totally responsible for running, management and investment by the individual enterprise, the situation is especially like this. The government may not realize that without feasible regulation and control means and monitor system, participation of the individual enterprise can not improve the public utilities service and expand the range. This, especially like this to poor persons in the society, because they even depriving the qualification of participating in PPP.

The mediated interests: Government expect individual enterprise should pay attention to between citizen and sensitive response and political meaning of producing from this, public utilities of service cost usually. So, the government expects the individual enterprise to take this factor into consideration while investing in considering, bring the goal of the profit down to the level lower than the developed country or the market.

2. Private enterprise

Consumers' desirability and ability for paying: Private investors will make the appropriate response to market demand and then can make money. That is to say, they must consider the demand; desirability and ability of paying while offering a kind of goods or the service. In developing countries, the demand is definite, but payment will and solvency are not exactly so. It is also easy to assess for solvency to go bankrupt, pay will right away getting different. If consumers are unwilling to pay too much in serving all the time, or the serious information problem appears because of operation efficiency is low inside enterprises, that situation is especially so. Any motions in the individual enterprise must consider that and be able to offer the answer solved. The payment will of consumers --- especially consumers of the secondary city ---for service quality and level to different public utilities must be considered. This may require that there must be investigations while carrying on overall feasibility research.

Sometimes, the capital source can be obtained through multilateral development bank or other concrete organization of developed country.

Transparency: During the process of obtaining the project and in negotiating the course, the transparency is very important for establishing investor's confidence. The individual enterprise expects: a signing of PPP contract should be carried on the very professional basis; the contract should be signed with best bidder.

Independence: The individual enterprise hopes: once the contract has already been approved by both sides, it can make the business decision independent of government, so long as this kind of behavior does not violate contract terms. Certainly, it may be necessary to brief government their adopted draft action (because it may influence some important things, price for instance). But it should be paid attention to at the same time that any action will be considered in terms of commerce. Even in a government- the private cooperative enterprise, private investors hope that only need to state the necessities of these business decisions or the impact on interests to their public cooperative partner, because the government's representatives have participated in assessing and decision-making process. If any mechanism (for example the government's pricing mechanism) has no clause to guarantee to give investors certain repayment (for example replenish through the government), will reduce the appeal to individual enterprise of a certain PPP project

Future possibility: One of investors' is expected importantly, more chances appear because of enlargement of the scale of a certain project, or because there is possibility of the future chance in the same country or other areas of the province.

Obtain information and information source: The decision of investment depends in the information obtained. The quality of information is very important, and information should be obtained unrestricted. Investors hope to obtain the sources of information and the information. If the quality of this information can make information gathering and function of analyzing on face value at first. So, it is very necessary for the government to utilize the famous company in the world in the course of information gathering. In addition, the information collected should be let investors know, in order to draw the appropriate method and analysis skill.

The mechanism of conflict solving: It is one of the expectations of the individual enterprise to solve the conflict fairly and reasonably. Behavior clause or provisional constitution are often displayed in the contract that is signed with government, those who do not observe or terminate the contract will be punished. Since the government is the party of the contract, then, if let the district court solve the conflict, the individual enterprise will not feel comfortable (though district court is the independent organization, but may be considered as the government's tool). Investors are usually willing to let the independent party carry on the arbitration between world or between the more place.

3. Consumer

Improvement of service quality: This concludes quality of the public utility that is supplying; improving the dependability of supply; Reduce the public utilities company the number of times of reply complaining; the prompt, accurate announcement to relevant situations. They can reduce the distance through transferring to the recent public utility place in those areas in which pass through the technological service of the network.

Improvement of the welfare: The individual enterprise participates in public utilities construction, no matter or on long terms since a short time, will contribute to the improvement of the welfare. Because of the treatment, transport and hygiene of water are all improved, the disease that a lot of sources were born in water will all be eliminated from the living environment , thus make the sanitary condition of the whole community improved.

Acquisition of the new service: Most people are hopeful to be served.

Common interests: Consumers expect introducing a set of PPP modes to improve serving for everybody. However, this may not be feasible in practice. If dividing the market in the community into the rich district and the poor district, then, the individual enterprise which implements PPP mode may have no enough motive force to seek the interests for the poor district actively. So, it must be guaranteed while making the policy that the disequilibrium of resource and welfare that PPP mode can't be aggravated in the community further distributing.

Innovating in Practicing, Developing by Communicating

Promote the Hazardous Waste Management in the Whole City into a New Stage

Yanqiu, Wu

Director, Qingdao Solid Waste Management Centre

Hello, Every representative participating in the conference!

Now, I will make the brief introduction of the hazardous waste management and the building and running of treatment facilities for hazardous waste in Qingdao at present.

1. To set up organization and staff and establish hazardous waste management system

Before the hazardous waste management were paid enough attention to in Qingdao city, a large amount of hazardous waste discharged into the environment, which had caused abominable influence in the environment. In 2002, approved by Organizing Committee in Qingdao, the solid waste management center was established. It is public institution of straight department level subject to Qingdao Environmental Protection Agency. It is the special management organizations of industrial solid wastes and hazardous waste in Qingdao with 15 staffs.

With "rigorous style, highly disciplined, enforces the law strictly, works seriously" as the working principle, the centre has the main function: to organize the infrastructure construction, the comprehensive utilization and the development and popularization of new disposal technology for the protection and treatment of the industrial solid waste and hazardous waste all over the city; to manage the generation, transportation, storage, treatment and disposal of the industrial solid waste and hazardous waste in the process of "from cradle to grave"; to implement the regulations for the permit system and manifest system; to provide technical guidance and carry out supervision for the facilities that generate, utilize, treat and dispose industrial solid waste and hazardous waste; to enforce the report and register regulations on industrial solid waste and hazardous waste; to make the plan of the protection and disposal of industrial solid waste and hazardous waste in the whole city; to develop the international communication and cooperation on solid waste management. With aim to reducing, recycling and environmental sound management, the center will improve the relevant regulations gradually, perfect infrastructure construction, strengthen environmental supervision and management, and implement the regulations of hazardous waste report, medical waste centralized disposal, hazardous waste operating permits and manifest system, special law enforcement inspection and so on to realize the standardization of the hazardous waste management in Qingdao.

2. To seriously fulfill the management regulations of declaration and register and find out the status of the generation and disposal of hazardous waste

With the development of social economy, more and more hazardous wastes are discharged from industry increasingly. The hazardous waste generated in Qingdao mainly includes medical waste, printing and dyeing waste, phosphorous waste residue, waste mineral oil, plating sludge and waste acid and alkali etc. The gross amount of generation is 120,000 tons in 2004 and shows the increasing tendency year by year.

Accurate and comprehensive declaration and registration is the prerequisite of carrying on effective management of hazardous waste. For the enforcement of “Management Regulation of the Declaration and Registration for Discharged Pollutants” issued by SEPA and the comprehensive insight to the situation of hazardous waste generation, utilization and disposal in Qingdao, we carried out the activities of hazardous waste declaration and registration in the city in the first half year of 2004. The relevant training courses were also held and some well-known experts in the field were invited to make lectures for hazardous waste managers and employees. Through collecting a lot of management and technical data and information, we compiled the “Solid Waste Management Work Guidance” that was helpful to direct the work of those who are engaged in waste management and disposal. Many efficient methods are adopted such as regular inspection, irregular selective examination and so on to guarantee the authenticity of the content of the declaration and registration. We strictly controlled the data verifying, made a detailed research on conditions of the generation and disposal of the industrial solid waste and especially of the hazardous waste in the whole city, and accurately grasped the generation, utilization, disposal and discharging status, which establish a stable groundwork for the setting of hazardous waste producing source recording files and hazardous waste dynamic database and for the further improvement of the management work of hazardous waste in the whole city. By the analysis research to the distributing status of hazardous waste producing source and categories of those hazardous waste that are likely to generate, we has set about to make the protection and disposal plan, set the immediate, medium-term and long-term objectives and set up the mechanism of management of long result of the hazardous waste in the whole city progressively.

3. To strengthen the institutional establishment and provide the basis for hazardous waste management

The management of hazardous waste is one important part of the solid waste management. According to “Solid Waste Law” and “Solid Waste Implementing Methods In Shandong” and considering the actual conditions of Qingdao, we set up the regulations of operation permits and transportation manifest for hazardous waste, issued “the Notice on Strengthening the Work of Hazardous Waste Management”, perfected the control measures of the hazardous waste correctly progressively, and

created the advantage for implementing the pollution prevention and control of the hazardous waste in an all-round way.

The established “Hazardous Waste Operating Permits Management Method in Qingdao” regulated the operating activities of hazardous waste in Qingdao. It is regulated that all the facilities who are engaged in the hazardous waste operating business in the scope of Qingdao city must get operation permits and practice their business strictly in the range of the permits. At present, more than 10 facilities got the permits by the experts’ assessments and verification from Environmental Departments.

“Hazardous Waste Transportation Manifest Management Method” regulated that the units that produce hazardous waste can transport them to the qualified disposal facilities only when they hold the hazardous waste transportation manifest, and tell clearly the regular process of getting and using the manifest at the same time. Since then, approximately 15000 pieces of manifests have been used by the units all over the city and the hazardous waste from all professions has been safely transported and disposed.

According to the stipulation of "Solid Waste Law", aiming at the phenomenon of environmental consciousness weakness and hazardous waste uncompleted disposal from some companies, we strengthened the implement of administrative substitute handling. To those production units not handling safely the hazardous waste according to the regulation, we appointed the units having the ability to carry on the disposal. By combining together the mandatory administration and propagation and education , the work of hazardous waste safely disposal has been effectively promoted to implement smoothly.

In order to provide management evidence further and improve the law system, “Hazardous Waste Environmental Pollution Control Methods in Qingdao” had been listed in the Qingdao legislative plan. The Methods will be set up consistent with the new “Solid Waste Law” to be issued soon. It will provide the regulation basis that is more fit to the local area for the hazardous waste management in Qingdao and improve the hazardous waste management further.

4. To perfect infrastructure construction to guarantee the normal operation of hazardous waste disposal

So far the construction of hazardous waste disposal facilities in Qingdao has almost be finished, which mainly includes one incineration facility for hazardous waste and medical waste respectively, two treatment and processing facilities for waste mineral oil, one storage and processing facility for zinckiferous residue, phosphorous residue and waste isopropyl alcohol respectively. All the hazardous waste operating enterprises carried out operation of marketization. Thereinto, the incineration facilities

for hazardous waste are built by the city government, Qingdao Kailian Group and Swiss Qiba Corporation together. The advanced Swiss high-temperature rotary kiln safely incinerating technology and incineration off-gas treating system of Japan TKK Corporation were introduced and by being incinerated at 1100-1200°C in rotary kiln waste can be reduced in capacity and disinfected. And, after recycling the heat from the smoke, the harmful gas can be absorbed by lime powder and active charcoal and after getting washed through alkali the off-gas can be discharged in accordance with standard. With the investment of 35,000,000 Chinese Yuan, the facility has a disposal capacity of 4,000 tons per year which is the important building project of hazardous waste polluting control in Qingdao. Through hazardous waste manage qualification verifying and strict inspection by law, we regulated the disposal behavior of the hazardous waste operating companies and guaranteed the realization of harmless disposal of hazardous waste. So far each hazardous waste disposal facility is well operating and the treatment and disposal market of hazardous waste is under a ruly run.

According to “Hazardous and Medical Waste Disposal Construction Planning in the Whole Country” and the requisition of the economic and social development in the city, the regional hazardous waste disposal center is prepared to construct actively and undertakes the disposal work of the hazardous waste from Qingdao, Yantan, Weihai and Rizhao etc. The center locates in Jiangshan Town, Laixi City and building area is 200 are. With a gross investment of 150,000,000 Chinese Yuan, the first stage project can deal with 80,000 tons hazardous waste per year. Such auxiliary facility construction as the road, water and electricity, communication, etc. has been finished in the centre at present and they has also laid the pipeline to divide the rain and sewage in the landfill area and built up hazardous waste store facilities with an area of 20 thousand square meter.

In Qingdao city medical waste incineration facilities have been built up. According to the actual conditions in Qingdao, we have also established professional companies to collect and transport medical waste and equipped special airtight type medical waste transportation vehicles and professional collecting group. Otherwise we have carried on the standard to set up to clothing , indicating ,etc., collected and transported the behavior after standardizing the medical wastes.

5. To punish the illegal activities of the hazardous waste sternly and guarantee environmental security

We keep strengthening the law enforcement and supervision of hazardous waste and strictly develop the inspection constantly so as to guarantee the smooth implement of the safe disposal of hazardous waste. Through carrying on supervision to the producing unit, transportation unit, handling unit separately, implementing strictly the regulation of administrative substitute disposal, managing the pollution sources of the hazardous waste effectively, careful verification to the information of hazardous

waste transportation and disposal, investigating and prosecuting the environmental illegal activities sternly, we prevented effectively the hazardous waste from emission arbitrarily and avoid the environmental pollution resulted in by unstandardized disposal, and stopped the illegal phenomenon in the course of transportation and disposal.

The work of medical waste centralized disposal is one of the important objectives of the city. So, we pay a close attention to that and regard it a major work that should be cared for a long time. We concentrated on the supervision to the medical waste centralized disposal and developed special inspection on medical waste among the medical units. Regular check and irregular spot check are adopted and we devoted more efforts to enforcing the law, enforced the law strictly, carried on punishment sternly to those behaviors of violating “Medical Waste Management Rule” and then investigate and prosecute the illegal activities effectively. In 2003, the medical waste centralized disposal rate reach 80%.

According to the requirement of “Urgent Notice on Strengthening the Work of Hazardous Chemicals Security Management” issued by the office of provincial government and the overall arrangement of “Peaceful Qingdao” project of the city, we developed the special law-enforcing activity about the waste hazardous chemicals. We combined the normal inspection in weekday with checking by surprise in holidays and went to the producing units to inspect on the spot. We ordered those units of the potential safety hazard to rectify and improve immediately and told the producing facilities to transport the hazardous chemicals safely according to the regulation of “Hazardous Waste Transportation Manifest Management Methods in Qingdao” and to carry on centralized disposal, which prevent effectively the waste hazardous chemicals polluting accidents. At the same time, According to the requisition of “Notice on Launching the Project Management Work of Tetramethylene Disulfotetramine Thoroughly” issued by Office of State Council, in order to do well conscientiously the work of etramethylene disulfotetramine safely disposal, we expanded special law-enforcing inspection to etramethylene disulfotetramine constantly, investigated and prosecuted each link of the production, sale and use of tetramethylene disulfotetramine sternly, appointed special safely disposal units, take over strictly, handle in time and ensure environmental security and people’s health.

6. To study and research pollution prevention technology for hazardous waste and promote the reasonable application of the treatment and disposal methods

In general, the treatment and disposal methods mainly include incineration, landfill, integrative utilization and some other solutions. At present the level of integrative utilization of hazardous waste in Qingdao is still low relatively and cannot realize the scale and marketization. The main categories that can be utilized integratively are metal refining waste, waste halogenated organic solvent, phosphorous residue and smelting slag. We are actively discussing the integrative utilization solution to those

categories of industrial hazardous waste with a high yield so as to make the hazardous waste management in Qingdao to develop towards the direction of “Reduce, Reuse and Recycle” steadily.

We are also devoted to the research of integrated utilization and disposal solution of those categories of normal solid waste with a high yield and have launched some fruitful work. We made the successful experiments of utilizing the sludge produced from the top 3 domestic sewage treatment plants in Qingdao in the production of organic fertilizer; The experiment of utilizing the alkali residue produced from Qingdao Alkali Factory (with a yield of 200 thousand tons in 2004) in enclosing the sea and blocking the dam and in making fodder for fishes and shrimps has also come through and the project has come into operating stage; We have been operating the project that slag and fly ash with the highest yield in the city are used to make building materials and steel residue from Qingdao Steel Plant is used to make concrete for a long time. The projects that waste oil generated from catering trade or vegetable oil plants are utilized in the fatty acid producing and soap processing has been put in operating. Through positive research and operation, we have generally realized the integrative utilization of those waste categories with high yield in Qingdao at present, which both avoided the environmental pollution and realized waste recycling.

7. To positively develop international communication and cooperation and promote the hazardous waste management work to a higher level

Based on doing well in each job, we organize international communication and cooperation actively, expand the information channel and promote the hazardous waste management to a high level. At present, we are cooperating with Rhine Company of German. Our main object is to get more detailed information of the waste status in Qingdao on the basis of declaration and registration of hazardous waste and to launch thoroughly the work of declaration and registration and develop a complete and precise pilot project with the whole work process and method. At the same time, we communicate actively with Pacific-Asia Regional Center of Hazardous Waste Management Training and Technique Transferring and held “National Forum of Establishing Hazardous Waste Environmentally Sound Management New Partnership in the City Level” in Qingdao, which promote the work of hazardous waste utilization and disposal in Qingdao effectively. To sum up the experiences of hazardous waste management in these years, we’d like to list several proposals like below:

One is to strengthen management strictly to actualize reducing, recycling and environmental sound treatment of waste. We should establish comprehensive hazardous waste management system and technical standard system and technical assessment system, enhance the scientific research for the hazardous waste pollution rules and control, boost the development and research for the integrated utilization

and safely disposal technology of hazardous waste, develop international cooperation and build up the industry of integrated utilization of waste according to the requirement of diversified investment, operation marketization, service socialization, and group specialization, set up regular and reasonable operating system and policy supporting system, and strengthen strictly management in every stage of generation, utilization and disposal and realize reducing, recycling and environmental sound of waste. We encourage companies to adopt those processes without or with little produced waste to clearly produce considering local economic and technical development situation through the measures of economic policy. And then hazardous waste can be reduced as much as possible and resource recycling can be realized to bring us economic and environmental profits to the maximum extent. We should further strengthen the city infrastructure construction for hazardous waste disposal, establish the regional centralized facilities for hazardous waste utilization and disposal in various approach, make full use of hazardous waste as second resource and realize waste recycle, regulate the treatment and disposal network for hazardous waste and perfect the method, improve the safe level of disposal, and realize waste environmental sound disposal.

Second is to improve relevant rules and provide basis for strict management of hazardous waste. In order to solve the problems in the aspects of collection, transportation, storage, treatment, disposal, etc, what we should do firstly is to set up regulations of comprehensive hazardous waste management and technical criterion of relevant facility and to carry out responsibility mechanism of environmental management. Otherwise we should formulate concerned technical and economic policy and correctly lead pollution control technology and developing direction of equipment and industry market for hazardous waste so that the pollution control technical policy perform a key role in the direction of the sound management of “from cradle to grave” for hazardous waste. The environmental protection sections should control the environmental examination and approval for the fresh hazardous waste generating projects strictly and implement the hazardous waste declaration and report regulation, operating permits and transportation manifest rules rigidly. At the same time environmental law enhancement should be strengthened and environmental illegal behaviors will be punished severely and the hazardous waste producing sources should be managed effectively.

The third is to strengthen capacity building of staff and serve the hazardous waste generation and disposal units well. Companies are the objects whom we will manage and also we should serve. So, while we implement strict management, on the other hand, we should build up the consciousness of serving and serve the companies as well as we can. Though enhancing the staff construction, improving matched facilities and tools, forming a nice study atmosphere and increasing the personal quality, we will devote ourselves to building a team of hazardous waste management with advanced thought, specialized management and strict enforcement. We should provide initiatively the information of hazardous waste management and of those

qualified disposal facilities to the companies and help them to do the work well. And to the disposal facilities, we will also provide the technical guidance and other supports actively to ensure them voluntarily obey the laws and rules and engage in the business of hazardous waste regularly. Contemporarily we have encourage to be creative in practice, discuss actively the waste treatment and disposal solutions, take research on disposal method and extend creative study in the special disposal technical measure bravely during international communication and cooperation and the quality of the staff has been improved in practice.

The fourth is to strengthen propaganda of environmental protection to enhance environmental awareness for hazardous waste in society. It is very important for the control of hazardous waste pollution to strengthen propaganda for environmental protection and to enhance the consciousness of environmental protection. It is necessary for us to give great publicity to the harm of hazardous waste and the basic principle of Basel Convention via varieties of propaganda channels and to expose this problem to the leaders of all levels and relevant departments. It is obvious that the improvement of environmental protection consciousness of the whole society will promote the improvement of environmental management mechanism and the development of pollution control technology. At the same time it also helps to extend new producing processes and to reduce the yield of hazardous waste, which makes hazardous waste not the potential risk for the economic society development any more.

Nowadays we are engaged in strengthening the soft and hard construction for the hazardous waste management and pollution control and in implementing all courses tracking management to hazardous waste. The management work of hazardous waste in Qingdao has started to be carried out, so we should improve further the understanding to the pressure, hardness, lasting, complexity and systemization of hazardous waste pollution control, use for reference the foreign advanced managing experience, take effective measures actively, do well in the work of hazardous waste environmental sound disposal and integrated utilization, and form steadily the structure combining centralization with decentralization, government with society and restriction with leading for the hazardous waste management in the whole city. The situation requires us to do the solid work, learn widely from others strong points, innovate bravely in practice, promote development in communication, take efficient measures, enhancing supervision and management to establish a senior-junior-combination and perfectly-equipped management system for hazardous waste and to extend a Qingdao City characterized way of hazardous waste management and then to realize the “reduced, recycled and harmless” of the waste, which advances the hazardous waste management in the whole city and even the full-scale environmental work to go up to the next step and makes the sustainable development with the harmonization of economy and environmental protection. Through constant practical work and research, we have strong confidence to do well in the managing and disposing work for solid waste especially for hazardous waste. In

2008, when you come to Qingdao and watch the sailing match of Olympic Games, you are sure to see a new Qingdao with a more graceful environment.

Thank you!

August 11th, 2004

Hazardous Waste Management in China

(Edit according to PPT)

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Aug. 10, 2004, Qingdao

1. Content

- (1). Basic concept of solid waste and hazardous waste
- (2). Endangerment and characteristics of hazardous waste
- (3). Problems and situation
- (4). Frameworks of relevant laws of management in our country
- (5). Fundamental of hazardous waste management
- (6). Approach of our work
 - Improve the sensation of the situation
 - Make sure the target
 - Perfect the system
 - Enhance the basic construction
 - Improve the supervise and improvement

2. Basic concept of solid waste and hazardous waste

- The concept of solid waste (or waste) confines the bound of the solid waste management, which is the base of solid waste management
- The concept in different countries is a concept in law , which is different with the concept in daily life

For example:

- “Law of Solid Waste Disposal” of USA regulated that “solid waste” includes solid, liquid half solid, even gaseous waste substances, the broad bound of this concept includes all the waste except these kinds that are excluded by the law of solid waste disposal and general environment protection bureau items.
- In “Wastes Avoidance, Comprehensive Utilization, and Disposal”,of Germany, waste means all the motive things that the owners dispose or want to dispose. Includes unqualified products and outdated products and unusable parts (such as used batteries and used catalysts) unable to work to satisfy people. Residuals produced between industry (residuals and so on); residuals produced in pollutants control progress (sludge come from washer and ash from bag dust collector). Adulterated materials (oil polluted by PCBs) and any materials and products forbidden by law; things (such as things discarded by household, office and business and stores) that the owners won't use any more.

- The laws and regulations of the advanced countries had been developed from simple pollution prevention of waste disposal at the early stage to multiple pollution prevention accompanied by resource save and resource protection and from the traditional urban solid waste and industrial waste to the untraditional product waste such as scrapped cars and electrical equipments and package waste. For instance, “Wastes Avoidance, Comprehensive Utilization, and Disposal”, of Germany specially emphasized that the producers should design products that lead to less wastes, the consumers should buy clean products, and specially drafted a chapter on products responsibilities.

Hazardous waste means wastes that contains one or more following characteristics

- Erosive such as wasted acid and acrid
- Acute toxicity such as wasted tetramine
- Slow toxicity such as some medical wastes
- Soaked toxicity such as some wastes contains heavy metals like Pb and Hg
- Explosive such as wastes contains ammonium nitrate
- Infective such as medical wastes

The physical state of the HW contains:

- Solid waste such as Cd residuals, asbestos waste, medical wastes, ash produced in the incineration of municipal and HW.
- Half solid waste: such as sludge produced in medical waste disposal and so on
- Liquid waste: such as oil contains PCBs
- Gas waste in container: such as chlorine and phosgene in steel container

The state of the HW:

By-products, residual, used materials, polluted equipments and wasted products and so on

Main source of HW

- Industry: chemical industry, oil chemistry, metal industry and medicine industry. The chemical industry includes plastics cosmetics and paints and medicine and explode and pesticide and some other organic and inorganic process
- Society typical pesticides and lead-acid batteries used in the autos

Definition in “Law of Pollution and Prevention of Solid Waste of The People’s Republic of China”

- Listed in the national HW list or distinguished waste according to the national regulation and distinguish criterions

National HW List

- HW01-HW18

Separate hazardous waste by sort including: Clinical wastes, Pharmaceutical wastes, Waste dyes and paints, Organic solvent wastes, New chemical wastes, Photographic chemical wastes, etc.

- HW19-HW47

Separate hazardous waste by components including: Wastes of hexa valent chromium compounds, Wastes of copper compounds, mining and smelting of nonferrous metal, Wastes of lead and its compounds, etc.

“Classified Catalogue of Medical Waste”

- Infective waste: medical waste carries microbes that are infective. The bodies of animals in the lab and discarded parts of human body in the treatment
- Injury waste: the instruments that can hurt human
- Medicine waste outdated discarded and polluted medicine
- Chemical waste: toxic, erosive, and explosive waste

The distinguish criterions of HW

- Erosive distinguish GB5085.1-1996
- Acute toxicity first step distinguish GB5085.2-1996
- Soaked toxicity distinguish GB5085.3-1996
- Erosive distinguish GB5085.1-1996

The waste is confirmed to be HW when the PH is higher than 12.5 or lower than 2.0

- Acute toxicity first step distinguish GB5085.2-1996

According to the “Method of Experiment in Distinguishing HW”, if the amount of mice died exceeds the half of total that are washed stomach, then the waste is acute toxic

Soaked toxicity distinguish GB5085.3-1996

The waste is HW if any component of the waste exceeds the bound of the following table 1

Table 1 Identification standard for extraction toxicity

No.	Item	The maximum concentration in lixivium (mg/L)
1.	Organic Hg	ND
2.	Hg and its compounds (as totalHg)	0.05
3.	Lead (as total lead)	3
4.	Cadmium (as total cadmium)	0.3
5.	Total Chromium	10
6.	Hexa valent chromium	1.5
7.	Copper and its compounds (calculated by total copper)	50
8.	Zn and its compounds (calculated by total Zn)	50
9.	Be and its compounds (calculated by total Be)	0.1
10.	Ba and its compounds (calculated by	100

	total Ba)	
11.	Ni and its compounds (calculated by total Ni)	10
12.	As and its compounds (calculated by total As)	1.5
13.	Inorganic fluoride (not including CaF ₂)	50
14.	Cyanide (calculated by CN ⁻)	1.0

3. Endangerment and characteristics of HW

The harm to human health

- Acute harm in short time: acute poisoning by or explodes and incineration and so on
- Slow harm: such as contact recently, lead to slow poisoning, cancer, disorder and mutation
- Chronic harm: include repetitive contact, cause the chronic poisoning, cancer, aberrance, and mutation of human body.

The harm to environment

Pollute the air, water and soil through the wind blow and weathering and filtration

Such as in Hengyang Hunan province, a factory piled the As residuals at will , lead to the under ground water was polluted.

Characteristics of harm

- Instantly, permanently and fallow ,and lead to dangerous harm
- Pollute not only the surface water and the air ,but also the underground water and the soil. And the pollution is nearly not reversible, so it is hard to deal with
- The cost on disposing HW is high and the site is difficult to find; highly elastic in production and transport and disposal, hard to manage ,so it is a important part in the environment protection in the world.

4. Problems and situation

Firstly, HW has thousands of different kinds with high amounts, the total amount reach up to 10millions tons and still increasing.

- The number in China in 1999 is 10.15 million and produces 102kg HW when produce 10thousand s of GDP while the counterparts in advanced countries is 50kg.
- In 2002, it is 10.01million and 83.4 kg per 10thousand GDP, decreases about 18% than 1999.

Secondly, we owed a lot in the history. Such as a bankrupt factory in the Xinchengzi in Shenyang, there are 200 thousands of C_d slag residuals are not able to dispose, and the number in the nation of this kind up to million tons

Thirdly, the construction of HW environmentally-safely disposal facilities are not in the need of time. The disposal level is low and the ability is not enough with high secondly pollution

- There are 3 million tons of HW are in the state of temporary storage, from 1996, the stored HW reach up to 20million, this is a great fallow danger
- Only ten or more cities with HW disposal facilities that are not well working for several reasons
- A large amount of HW in the state of temporary storage, pollute the water and the soil heavily

Fourthly, the power of supervision and management for hazardous waste in China is very unsubstantial. In this year, several illegal transfer of hazardous waste happened in China and illegal emission of hazardous waste resulted in the environmental pollution. It shows that supervision and management for hazardous waste in China still exits lots of problems and weak sections. At present, institutions of hazardous waste management are not pretty sound. For example, although special institutions of solid waste management had been established by administrative department of environmental protection in developed provinces and cities compared with others in China such as Beijing, Shanghai, Tianjin and Jiangsu, etc., most of provinces and cities didn't set up the institutions and relative staff.

- The statistics are not very accurate: some enterprises with HW are not registered while some without HW are registered.
- It is common to operate without qualification. In Guangdong, some private operators discard the sludge after extracting some valuable metals without careful treatment
- It is still weak in the technique area, including distinguish analysis and assessment

Fifthly, the laws and the regulations are not perfect

- Such as in “HW Distinguish Criterion-Soaked Toxicity” only inorganic included, the organic part is not included
- “National HW List” is still rough, it needs distinguish and to be more detailed. In America, the list contains 650 kinds, thousands of hazardous waste

5. Frameworks of relevant laws of management in our country

(1). National laws and regulations

“Criminal Law” (revised in 1997)

“Pollution and Prevention of Solid Waste” (published in 1995)

“Hazardous Chemicals Safety Management Rules” (published in 2002)

“Medical Waste Management Rules” (published in 2003)

“Criminal Law” the sixth part the crime of destroying environmental resources

Against national regulations, dumping waste or infectious waste, toxic materials or other HW, which induces immense loss on personal or public properties or loss on human health?

(2). Regulations in the department

“HW Transporting Management Rules” national environment protection bureau fifth order, operated from 10.1,1999

(3). National list

“National HW List” national environment protection bureau national economy and trade committee foreign economy and trade department

“Medical Waste Affiliate” health department national environment protection bureau

(4). National criterion

- HW incineration criterion GB5085.1-3-1996
- HW incineration pollution control criterion GB18484-2002
- HW storage pollution control criterion GB18957-2001
- HW landfill pollution control criterion GB18958-2001
- Medical waste transporting truck technique rules GB19127-2003
- Medical waste incinerator technique rules GB19128-2003

(5). National policy

“HW Pollution Control Technique Policy” national environment protection bureau national economy and trade committee foreign economy and trade department 12.17,2001

“Medical Waste Concentration and Disposal Technique Rules” national environment protection bureau 12.26, 2003

“Notice on Implying HW Disposal Charging to Improve The Industrialization of HW Disposal” national development and revise committee and national environment protection bureau and health department and commercial department and construction department (2003) NO. 1874 11.18,2003

(6). National plan

“National Plan of the Construction of HW and Medical Waste Disposal Facilities” national environment protection bureau national development and revise committee (2004) NO.16 1.19,2004

(7). Local laws and regulations

Ten more provinces and cities publishes the local regulation such as shanghai and so on

6. Fundamental and system of HW management

The whole progress management “from cradle to grave” principle

Control and manage the HW's whole progress including production, collection, transporting, storage and disposal and prevent the pollution

(1). The identification rule of HW

The identification of HW is the start point of HW management.

- "Solid Waste Disposal Law" asks federal environment protection bureau to enact HW list. Wastes in the list are HW, those waste that are not in the list, if easy to combust, erode, and react or fail to pass the toxicity test, are HW
- "Wastes Avoidance, Comprehensive Utilization, and Disposal" of Germany authorize the federal government to set up laws and regulations to decide which kinds of waste should be specially supervised during disposal and comprehensive utilization; which kinds of waste should be supervised. As a result, "Decree on the code of Specially Supervised Waste" are published to list the wastes that need special supervise

(2). Certificate management rules

- The participating countries should set up certificate management rules in the companies that operating the storage, disposal, utilization of HW
- In US, "Law Of Solid Waste Disposal": the treatment and storage, disposal of HW are forbidden by law, unless a certificate is given as well as the construction of new facilities.
- In Germany, "Wastes Avoidance, Comprehensive Utilization, and Disposal" and "Transporting Certificate Items" commercially transporting HW for disposal need should be certificated. Germany "Wastes Avoidance, Comprehensive Utilization, and Disposal": the construction and operation of storage and treatment facilities should be certificated according to the "Federal Pollution Control Law". The federal government can enact items to ask those who utilizing waste that need special supervise and supervise to get certificates

(3). Manifest system of waste transfer

To implement the manifest system of hazardous waste transfer and track:

"Law of Solid Waste Disposal" of USA, "Standard of Hazardous Waste for Producer" drafted by federal bureau of environmental protection, "Standard of Hazardous Waste for Transporter" and "Standard of Hazardous Waste for Treatment, Storage and disposal" regulated that if enterprises of generating hazardous waste treated, stored and disposed hazardous waste out of generating place, they should fill in "the uniform bill of hazardous waste transportation" and enterprises or individual who engaged in transportation, storage, treatment and disposal of hazardous waste must obey the regulations on "the uniform bill of hazardous waste transportation".

(4). Responsibilities insurance rules

The US federal environment protection bureau "HW Management Items-HW Treatment, Storage, and Disposal Operators' Criterion":

- To insure enough money for the close down of the facilities, the operators or the

owners must have financial assurance on the closure of the facilities in the mode of fund or insurance.

- To insure the care of post closure, the operators or the owners must have financial assurance on the care of post closure of the facilities in the mode of fund.
- The operators or the owners must have the responsibilities insurance for accidents to compensate the victims.

Germany “Transporting Certificate Items” asks to apply insurance rules in the transport of HW to cover the responsibility of protecting the environment. The insurance company should afford the costs on emergency treatment and other costs on environment protection.

(5). HW report rules

- In US “Solid Waste Disposal Law” requires that the producers, transporters, and the operators and the owners of the facilities that treat storage and treat HW should report the situation and the activities of them
- In China, “Law Of Solid Waste”: those who produce HW should report the quantities and the flow, storage and the disposal of HW to local government.

(6). The materials preservation rules

- “Transporting Certificate Items” of Germany: the producers and owners and operators of HW disposal facilities should preserve the materials of the kinds and quantity of HW for a certain period (such as 5 years)
- “HW Management Items-HW Treatment ,Storage, and Disposal Operators’ Criteria” of US federal government : -HW treatment ,storage ,and disposal operators should keep the relevant files and report for a certain period (such as 3 years); including the quantity and the methods to treat ,store and dispose HW, time and the location of the facility and so on.

(7). Post closure management rules

“HW Management Items-HW Treatment, Storage, and Disposal Operators’ Criteria” of US federal government: -HW treatment, storage, and disposal operators must set up closure plan which is the necessary file to apply for the certificate to operate the HW facility. All the equipments would be disposed or washed properly after closure... the operators and the owners have the responsibility to look after the site after the closure for 30 years. So, they must give the plan to give the site care such as monitoring and preservation.

In Germany “Wastes Avoidance, Comprehensive Utilization, and Disposal”: the owners of the landfill sites and other HW disposal facilities should report to the municipal department before the sites be closed. The municipal department should apply protection manners to protect the public.

(8). The HW import and export control rules

- “The Law of Disposal of Solid Waste” of US: it is forbidden to export HW without the agreement of import countries. The HW export pre-notice procedure, which means that the US environment protection bureau should announce the import countries beforehand and according to the answer, US environment protection bureau would decide whether to agree the export
- In Germany (EEC) “The Measures on the Supervise and Control of HW Transport in EU countries and Import and Export of EU” (No 259/93)
- “The Measures on the Supervise and Control of HW Transport in EU countries and Import and Export of EU” strictly control the import and export of HW. It regulates that the export and disposal of HW to developing countries is forbidden.
- The import and export of HW to developed countries should all enforce the program of informed consent in advance. The administrative department of export country could agree to export unless import country issued the written agreement of approving import of hazardous waste.

7. Approach of our work

Awareness enhancement

(1). Improve the understanding of the hazard and the dangerous result of HW
Some kind of HW have potential hazard. So, some places have little understanding of HW.

As well as the HW pollute the soil and the underground water; it needs not only long time but also huge amount of money to remediate the environment and ecological balance. It is unable to remediate sometimes

the US set up 1.6 billion dollars super fund to clean the polluted sites in 1980. Between 1986 and 1991, the fund add up to 8.5 billion

(2). Improve the understanding of the urgency, difficulty, long-term, complex and systematic of HW management.

The production, transport disposal and dumping of HW are plastic in time, difficult to supervise and manage.

HW diverse and complex, need advanced technology and huge amount of money to dispose safely. And the sites of HW disposal are hard to decide.

Clarification of objectives

General objectives:

- Reduction: reduce the amount and hazard of HW
- Reclamation: improve the utilization of resources or energy in the HW
- Harmlessness: treat in environment-safely manner, control the import and export of HW

Specific objectives:

- To Set up HW “whole process” management systems and procedures
- To Set up and improve the management department: including the supervising

and the HW production and operating panel Covenas

- To Set up and improve the technical panel including the distinguish and the monitor, analysis and assessment organization
- To Set up and improve the management information system of HW production, transporting, treatment and disposal
- To Set up and perfect the HW management plan including the disposal plan, total quantity control plan and the pollution reduction plan in the polluted sites

System improvement

(1). Perfect certificate management rules

1) HW production certificate rule

- Certificate management rules are universally applied in Europe on the activities influencing the environment.
- The ninth chapter of the Swedish Environmental Code, “environmentally hazardous activities and health”, specially defines that the activities influencing the environment must be approved by the government. Such as in the sixth part “some kinds of plants are not allowed to built or operate without permission or notice beforehand, solid wastes that would possibly lead to soil ,water and underground water pollution are not allowed to dump and store ”
- Federal immission control act (bundes-immissions schutzgesetz.blmschg)
- Article 4 licensing
- The establishment and operation of installations which, on account of their nature or their operation, are particularly liable to cause harmful effects on the environment or otherwise endanger or cause considerable disadvantages or considerable nuisance to the general public or the neighborhood, as well as the establishment and operation of stationary waste disposal plants designed to store or treat wastes, shall be subject to licensing.

2) HW utilization certificate management rules

- There are two outlets after the production of HW, one is comprehensive utilization ,the other is disposal. According to the “from cradle to grave”management rules , not only the disposal need certificate rules, but also the utilization. So, the whole process management rules can be truly realized.
- The local regulations on HW pollution prevention in shanghai, tianjin, Guangdong, jiangsu, shenyang, haerbin, and nanjing require that the enterprises operating HW utilization should get HW operation certificate. About 1/3-1/2 of the certificate authorized in local government are concerned about the utilization of HW.

3) Advanced countries, such as US and Germany ,requires the certificate of the HW utilization too.

- The fiftieth items, article 2, No. 2 of “waste law” of Germany defines that the federal government can enact items to ask the operators of HW utilization to get certificate.

- The definition of HW treatment in US laws includes the concept of utilization.
- Code of federal regulation, subchapter I, part 270-EPA administrated permit programs: the hazardous waste permit program: any measures, techniques and crafts to reach the following aims including neutralization; change the physical and chemical or biological characteristics of HW, in order to neutralize the waste or extract energy or resources from the wastes, or turn the HW to be not hazardous wastes or reduce the toxicity; the transport storage , disposal would be safer; or fit for utilization, storage or reduce the cubic content.

4) Current problems in HW management mainly are: Economical useless HW makes the enterprises not active in paying the treatment cost, and avoids the supervising under the cover of comprehensive utilization, which leads to the low efficiency of treatment. Valuable HW, mostly in the mode of disorder circulation, a huge part of HW utilization enterprises extract the valuable part and dump other parts which lead to secondly pollution.

(2). Set up responsibility insurance rules

- How to apply responsibility insurance rules in the transportation of HW
- The transportation of HW has the risk of accident, the emergency treatment need huge amount of money. For instance, in shenyang city of liaoning province , only in 2003, four batches, about 1160 tons of HW were treated which cost about 2300 thousand yuan mostly afford by the local environment protection department. In the advanced countries, the HW transportation has responsibility insurance which covers the responsibility of environment protection. The insurance company would pay for the cost for the emergency treatment of the accident and other environment protection costs.
- The EKOKEM Company is the largest company in Finland which deals with 10 more thousand tons of HW a year.
- The EKOKEM introduces that responsibility insurance is popular in Finland companies, for instance, the EKOKEM Company has insurance on the personnel health and pollution accident. If the company is in good condition and has few accidents, the insurance cost is low; otherwise, the cost will be raised. The insurance not only exist in the accidents, but also works in the company's revise and environment protection.

(3). Set up HW export control rules

(4). Apply the extended responsibility of the producers

Such as ask the pesticide producers, lead-acid battery producers to be responsible for the recover of the wasted products.

(5). The period of HW storage must have time limit and permanent storage must be forbidden, Generally time limit of HW storage is not more than one year.



Enhance the basic work

(1). Enhance the construction of management institutes and panel

The lack of management ability is one of the important factors that hold the neck of HW management. The country and the province should set up solid waste

management center and the local bureau should set up special panel to manage the solid waste like what are doing with waste water and air pollution- apply to every company

National environment protection bureau plans to hold 2 or 3 times of HW management classes each year to teach the local management personnel

Enhance the basic work

(2). Construct and manage the HW disposal facilities scientifically

1) The construction of the facilities must base on the HW production investigation, and decide which facility and equipment according to the HW's characteristics and the quantities

2) Pollution control facilities must be constructed at the same time to prevent the secondly pollution.

3) HW analysis and monitoring is needed in the HW disposal facilities. Otherwise, the facility should ask those who are authorized to do so

4) To perfect the "national HW List" "HW distinguishes criteria" and set up HW distinguish systems that fit for the country.

Reinforcement of the supervision and management

(1). To improve the supervise of the HW producers

- The enterprises must have special HW workers, and the environment protection department has the responsibility to teach them
- The enterprises must set up HW management plans including HW reduction plans and treatment plans
- The waste sample must be analyzed before the HW are sent to dispose; the analysis report should give the environment protection department to preserve

(2). To set up and perfect the HW application and registering rules. Control the production, dumping and the flow of HW

(3). To set up standard system of HW collection, transportation, storage, utilization and disposal under the certificate rules and transportation exchange set rules

(4). To carry out the law strictly and enhance checking and punishment for those acts against the laws and dumping HW randomly

Reference:

<http://www.sepa.gov.cn>

<http://www.basel.int>

Investigation of the Sources of Hazardous Waste

(Edit according to PPT)

Qi, Wang

Chinese Research Academy of Environmental Science

1. Hazardous Waste

(1) Definition of Hazardous Waste

- The waste which is included in the national hazardous waste name list or identified be of hazardous characteristics according to the national identification criteria and methods. (*Solid Waste Pollution Prevention and Control Law of People's Republic of China*)
- A solid waste, or combination of solid waste, which because of its quantity, concentration, or physical, chemical, or infectious characteristics may (a) cause, or significantly contribute to, an increase in mortality or an increase in serious irreversible, or incapacitating reversible, illness; or (b) pose a substantial present or potential hazard to human health or the environment when improperly treated, stored, transported, or disposed of, or otherwise managed. (*Resource Conservation and Recovery Act issued by EPA*)
- Specially Controlled Waste:(Specially Controlled Industrial Waste and Specially Controlled General Waste) “specially controlled waste” refers to those industrial wastes specified by a Cabinet Order as wastes which are explosive, toxic, infectious or of a nature otherwise harmful to human health and the living environment. (*Waste Management and Public Cleansing Law of Japan*)

(2) Hazardous waste characteristics

EPA:

- Ignitability
- Corrosivity
- Reactivity
- Leaching Toxicity (toxicity characteristics)
- Acute Toxicity (acute hazardous characteristics)
- Toxicity

EU:

- H1 Explosive;
- H2 Oxidizing;
- H3A Highly Flammable ; H3B Flammable;
- H4 Irritant;
- H5 Harmful;

- H6 Toxic;
- H7 Carcinogenic;
- H8 Corrosive;
- H9 Infectious;
- H10 Teratogenic;
- H11 Mutagenic;
- H12 Substances and preparations which release toxic or very toxic gases in contact with water, air or an acid;
- H13 Substances and preparations capable by any means, after disposal, of yielding another substance, e.g. a leachate, which possesses any of the characteristics listed above ;
- H14 Ecotoxic;

Basel Convention:

- H1 Explosive;
- H3 Flammable Liquids;
- H4.1 Flammable Solids; H4.2 Substances or wastes liable to spontaneous combustion; H4.3 Substances or wastes which, in contact with water emit flammable gases
- H5.1 Oxidizing; H5.2 Organic Peroxide;
- H6.1 Poisonous (Acute); H6.2 Infectious Substances;
- H8 Corrosives;
- H10 Liberation of toxic gases in contact with air or water;
- H11 Toxic (Delayed or Chronic);
- H12 Ecotoxic;
- H13 Capable, by any means, after disposal, of yielding another material, e.g., leachate, which possesses any of the characteristics listed above

(3) Form of Hazardous Waste

- Solid waste;
- Liquid waste not allowed to discharge into water;
- Gas waste not allowed to emit to air and stored in containers.

2. Sources of Hazardous Waste

(1) Types of Hazardous waste

- Goods which have lost their original use value and been discarded by last user;
- Byproducts which were produced in course of production or living and cannot be utilized directly as materials to make other goods.

(2) Hazardous waste deriving from industry

- Materials or products out of use value (original form remains unchanged), such as waste acid, waste solvent, waste packing stuff, etc;
- Byproducts produced in course of production, which cannot be used as

products.

(3) Hazardous waste deriving from society: majority of which are waste products out of use value

- Groups sources: such as schools, government organs, office buildings, hospitals, service-providing companies, etc;
- House sources.

3. Preparations for the investigation of generation of hazardous waste

(1) Confirm the purpose to investigate

- Planning
- Facilities construction
- Process and scale of facilities
- Environmental management and environmental quality control

(2) Confirm the range of the investigation

- Investigating region: key industrial area and city;
- Investigating categories: key waste (quantity, harmfulness, extent to which the public pay attention);
- Sources: key sources are industrial and social group ones;

(3) Identification process of hazardous waste

- Solid waste identification
- Hazardous waste name list
- Identification criteria of hazardous waste
- Experts demonstration (according to the hazardous characteristics)

(4) Hazardous waste stream

- Integrated utilization: recycle as substitute material; material utilization with the aim of disposal. Note: the incineration of waste (generating energy by combustion) and land utilization of waste cannot be regarded as integrated utilization
- Storage: short-time behavior in special facilities. Note: different from landfill and dumping
- Disposal: Solidification of harmful components in some products, such as cement kiln disposal; Chemical transformation disposal, such as incineration; Final landfill disposal (safe landfill)
- Discharge (dumping): dumped into rivers, lakes or sea; stored on the lands without protection; mixed with municipal waste for disposal; disposed in unqualified landfill facilities; incinerated in non-appropriative facilities.
- Data preparation beforehand: Industrial construction of the investigation region; Economic developing level in the region; Industrial policy; Generating sources

4. Investigating methods of the generation of hazardous waste

(1) Declaration and statistic

- Definite identification and classification system
- Comprehensive technical training plan for the declaration staff
- Sound credit (rewards and penalties) system
- Checking mechanism of the third party

(2) Material stream investigation (process identical equation, material conservation)

- Basic knowledge of producing process (social economic)
- Basic close assumption for the investigation objects (waste deriving from society)
- Sound data statistical system

(3) Calculation of product/waste coefficient for unit product (value)

- Average estimation of one whole industry and region
- Commonly used to make planning and investigation
- If used to implement facilities construction and environmental management, it's necessary to make thorough investigation and research

(4) Auditing especially

- Investigation in factory (in family)
- Investigation and analysis combined with material stream (process auditing, logistics tracking, etc.)
- Adopting the participation of professional personage
- Appropriate sample analysis

5. Hazardous waste generation investigation data processing

(1) Initial data screening

- Verification of initial data
- Deletion or correction of unreasonable data
- Rationality judgment of repeating data
- Rational supplement of lost data

(2) Auditing of one industry

- Data verification according to the average technical and managing level of one industry
- Judgment of data dependability according to the advance of production process and management
- Rationality judgment of the data according to industrial structure and changing trends.

(3) Literature (historical data) auditing

- Historical data of the region investigated
- Average data of the whole country
- Data of other countries with different developing level
- Recommended data from international organizations or research institute

6. Estimation of the generation of hazardous waste

(1) Time sequence analysis methods

$$N_t = f(t)$$

(2) Multianalysis methods

$$N = a_0 + a_1X_1 + a_2X_2 + a_3X_3 + \dots + a_kX_k$$

N: the amount of waste generation

X_i ($i=1,2,\dots,k$): each social economic index influencing the generation of waste, such as population of a city;

A_i ($i=1,2,\dots,k$): each returning coefficient

(3) Analysis method of Gray System Model

Gray system model (GM) including the variables' dimension (m) and power (n), marked as GM (n, m); GM (1, 1) is often used, and at most occasions it is used to analyze the changing trends of the solid waste generation with the variable of time. So it is actually one of time sequence analysis methods.

(4) Production value/waste coefficient model

$$DW_t = W_t \cdot S_t$$

$$W_t = W_{t_0} \cdot \exp [\lambda (t - t_0)]$$

DW_t : estimating amount of annual hazardous waste generation (10,000t/a);

W_t : estimation annual production value of total industry (10,000 Chinese Yuan (abbr. CY)/a);

S_t : estimating generation amount of hazardous waste per 10,000 CY production value (t/10,000 CY);

Change of production value/waste coefficient of Beijing from 1999 to 2003

Year	1999	2000	2001	2003
H-waste generation (ton)	108350	118026	131393	131182
Industrial total production value (10000 CY)	21697000	24605000	28176000	36119000

Coefficient (t/10000 CY)	0.005054	0.004708	0.004726	0.003632
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Estimation results of the total generation amount of hazardous waste of Beijing

Year	Normal total industrial value per year (10000 CY/a)	Estimating total industrial value per year (10000 CY/a)	Estimating generation amount of h-waste per 10000 industrial value per CY	Generation amount (10000t)
2003	36119000	39917668	0.003450	13.77
2004		44115846	0.003278	14.46
2005		48755550	0.003114	15.18
2006		53883216	0.002958	15.94
2007		59550164	0.002810	16.74
2008		72734734	0.002536	18.45
2010		197713506	0.001519	30.03

Present Status of Centralized Disposal Facility in Qingdao

(Edit according to PPT)

Dr Yingjie Sun

Qingdao New World Solid Waste Treatment Co.,Ltd

August 10th, 2004

1. Introduction of course of preparation for establishment of the project

To the present situation that international manufacturing industry shifts, Qingdao became the first-selected place to the regional petrochemical industry, steel make , shipbuilding , electrical home appliances electron , in Korea, Japan, etc.

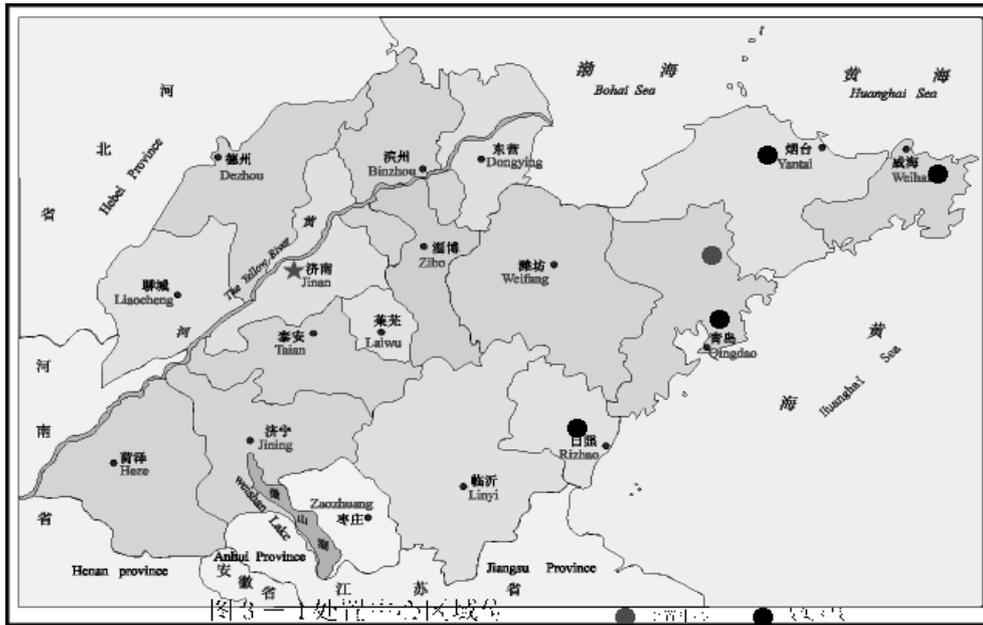
According to the strategic development plan of Qingdao, proceed from trade and investment promotion, meeting the overall situation that the Olympic Games improves the infrastructure of Qingdao, as the beginning of 2002, the municipal government of Qingdao demanded to set up the dangerous waste disposal site of a multiple functional , ecology.

- Purchase of Land: be finished in December, 2002, Permitted Number 290 (2002);
- EPB of Qingdao gives a written reply to this project in January of 2004
- Qingdao Municipal Planning Commission sets up and gives a written reply in February of 2004;
- The course of preparation for establishment of the project gets the energetical support of the related departments of Qingdao, Laixi government.

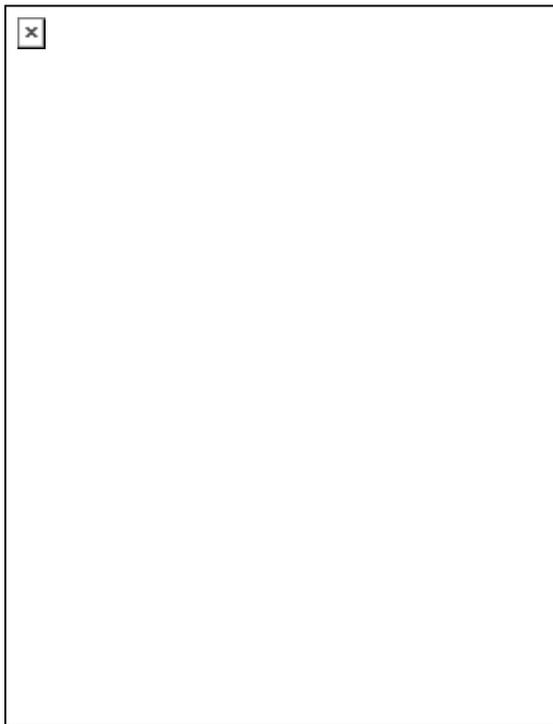
2. Origin of the project

- Facility building plan of hazardous waste and medical waste on state level
- The Operational Suggestion of ShanDong Province about the above plan
- Regional medical and hazardous waste treatment center be built in Qingdao
- Service area: Qingdao, Yantai, Weihai, Rizhao,—— the developed region in Shandong.

3. Regional position



4. Geography site



5. Design scale

- Design scale: $8 \times 10^4 \text{t/a}$
- Floor area : 13.3 hectare
- Gross investment: 150 million Chinese Yuan
- Way of treatment: Pretreatment, Storage, Integrated Reuse, Combustion, Safety landfill

6. Treated and disposed HW

All the hazardous waste in the list except polychlorinated biphenyl
Except radioactive waste

7. System integration

- Caption and transport Sector
- Pretreatment sector
- Integrated Reuse system
- Combustion
- Stabilization/Solidification
- Safety Landfill
- Testing Laboratory
- Automatic control System
- Waste water treatment system

8. Integrated reuse

- Area: 1200m² (Floor area: 1200m²)
- Solid Waste Exchange Centre
- Reclamation Workshop
- Heavy Metal Reclamation
- Rare Metal Reclamation
- Organic Solvent Reclamation
- Research and Development Centre

9. Storage

- Floor Area: 3000m²
- Standard of Design: “Pollution Control Standard of Hazardous Waste Storage”
(GB18597-2001)
- Operating Now

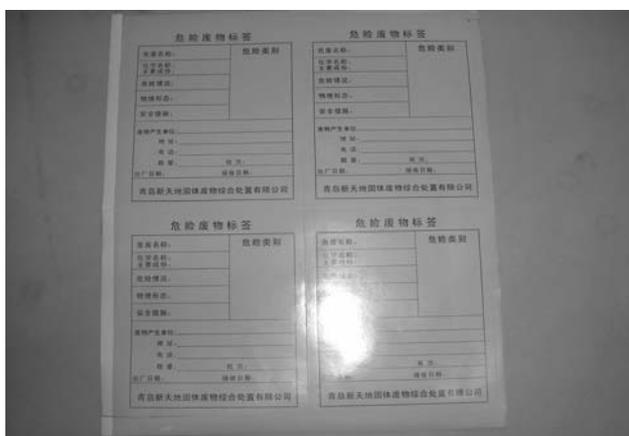
10. Distant view of storage



11. Interior view of storage



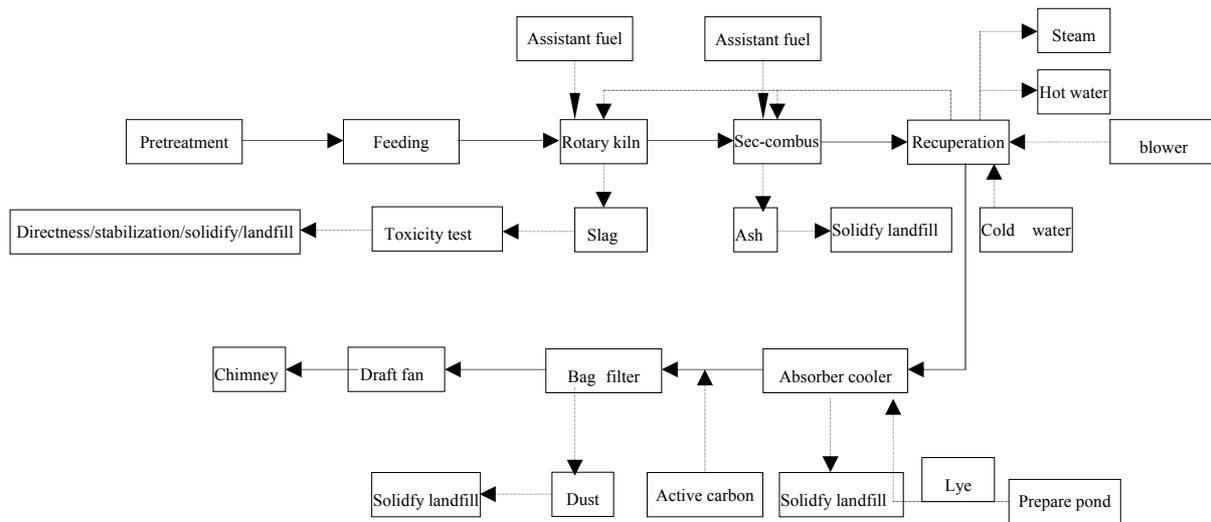
12. Label of hazardous waste



13. Incinerator

- Design Treatment Scale : 30t/d;
- Floor area: 3500m²;
- Rotary Kiln and Secondary combustor
- Semi-Stem Absorber and Cooler Bag filter
- Recuperation: Waste-heat Boiler, Steam and hot water, Air Heating, Sludge Dewatering.
- Present Status of Hazardous Combustion in Qingdao: Qingdao Kailian.

14. Combustion process flow



15. Safety landfill

- Floor Area: 40000m²;
- Height: 8m;
- Design age limit: 20a;
- Storage Capacity: 20×104m³;
- Type of Landfill: Rigid Safety Landfill;
- Nine Braid, 12 cell in one Braid
- Dimension of Cell: 15×15×8m
- Present Status of Safety Landfill in Qingdao: No Safety Landfill. Our treatment center is the only safety landfill in China.

16. Progress of disposal centre

- Finished Work: Land expropriation, Environmental Assessment, Building of Storage

17. Present status of operation

- Collection, Transportation and Storage has processed.
- Oil paint Residue, Organic Liquid(compose Cadmium and Plumbum) , Printing and Dying Sludge, Phenolic Aldehyde Organic Solvent, Discarded Hazardous Chemicals(Ligroin, Carbon Tetrachloride)

18. Oil paint residue



19. Labeled hazardous waste



20. Organic solvent container



21. Discarded chlorine and sulfide pot



22. Handling



23. Fixation



24. Leakage indicator ammonia



25. Building owner

- Building Owner: Qingdao New World Solid Waste treatment Co.,Ltd
- Special solid waste resource reuse and treatment/Disposal Corporation
- Enrolled Capital: 30 million Chinese Yuan
- More than 30 million Chinese Yuan has been invested in the project of non-hazardous industrial solid waste

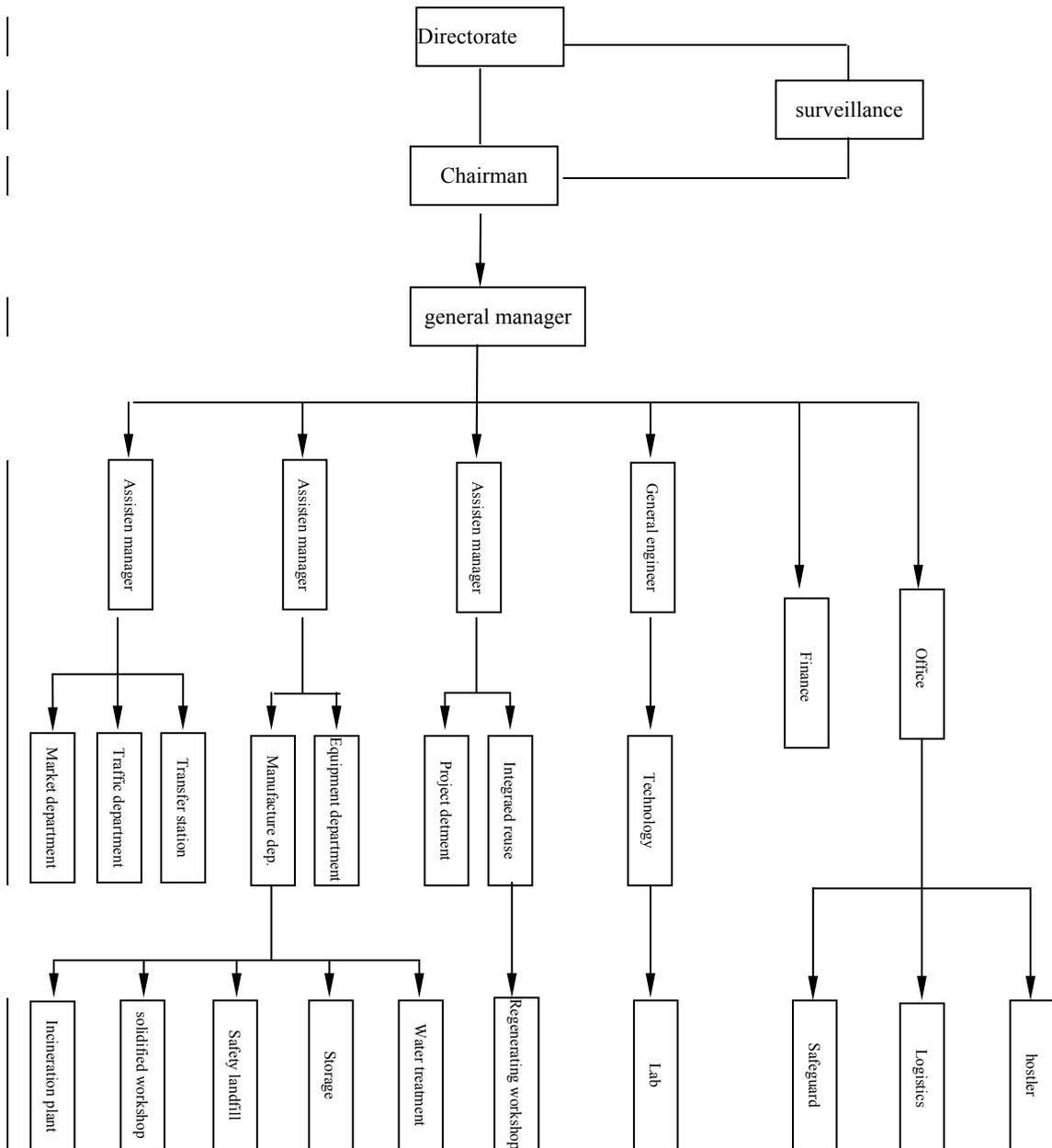
26. Non-hazardous industrial solid waste Landfill





27. Personnel

- Technical personnel: 25, Senior Engineer 5, Engineer 10, two have doctor degree, three have master degree.
- Special: Environmental Engineering/Chemical Engineering/Mechanical Engineering
- Experience: Personnel from government/chemical plant/Enterprise
- Focus: on academic degree/professional rank, more on experience and disposition.



28. Sound management system

- Integrated Management Conception: From cradle to grave

Field Processing personnel, Driver, Escort

- directive rules

The receiving working scheme for checking import hazardous waste

The operation rules of storage in the process of transport

The operation rules of different character of hazardous waste

The landfill operation rules of II Kind landfill

- Precautious Programme under Emergent Condition

- Store storehouse fire-proof and explosion-proof emergency preplan

- Transport emergency preplan of leaking by hazardous waste

- Sewage disposal workshop stoppage in transit emergency preplan/ect.

29. Difficulties

- The problem of Identification of Hazardous Waste

—the persons, including producer, the dispose man, manager, are unable to define to the hazardous waste, the basic reason is the blurring of the list.

—the result problems are about the fee and illegal transfer of hazardous wastes.

- Understanding of Hazardous Waste

Especially the persons who produce have insufficient understanding of harmfulness of the hazardous waste with the public

- Management of Hazardous Waste

The existing problem of declaration and registration, law enforcement dynamics are not enough

- The problem of nonstandard market:

A part of enterprises is managed and illegitimate competition, causing the handling unreasonably of hazardous waste, there is great dangerous hidden danger to the environment.

- Lacking of Industrialized Technology

There are much study, but little ones that realized industrialization; So handle the function that the centre strengthens the centre laboratory , the laboratory is not merely environmental monitoring and production testing service, can grind and develop serving for what has been handled the centre too;

- Lacking of Professional personnel

Experienced technical staff, management is undermanned in hazardous waste; Personnel's technical training is an important problem with training safely.

30. Progress goals

- State HW Centralized Disposal Demonstrative Base

- Regional Modern Hazardous Waste Disposal Centre

- Research & Development Centre of HW Treatment and Disposal

- Environmental Protection Education and Practice Base

- Ecological Demonstrative Park of Solid Waste pollution Control and Resource Reuse

- International Communication Base of HW Treatment and Disposal

31. Proposal developed together

Aim at the developing station of the Qingdao hazardous waste center, faced the difficulty, the fund is not the problem, still need to improve and strengthen in technology, management, so we propose:

- ◆ Strengthen international exchange and cooperation, promote the progress of the pollution control work of the hazardous waste, protect the global environment;

- ◆ Strengthen domestic hazardous waste disposal and handle the exchange and cooperation among enterprises, accelerate the pollution control and progress of the recycle treatment work of hazardous waste of our country, control cause and environmental protection cause and make due contribution for the hazardous waste of our country commonly.

The Construction Plan of Treatment Facilities of Hazardous Waste in Beijing

——Exploring and Practice

(Edit according to PPT)

Qi, Wang

Chinese Research Academy of Environmental Sciences

1. Target of the plan

Basic time of the plan: 2003 (some hazardous waste from social resource: 2002)

Plan time forecast: 2015

Plan scope:

Areas of the plan: Administrative division of Beijing

Waste of the plan:

- Industry hazardous waste (including the mud of waste water treatment with harmful substance).
- Hazardous waste from social source: medical waste; the discarded lead-acid battery; waste with Hg such as waste lamp; waste sensitive material; waste mineral oil; waste household appliances; etc.

Industry hazardous waste (including the mud of waste water treatment with harmful substance)

In Beijing industry hazardous waste will be basically treated with no harm, and facilities that can satisfy and handle the industrial waste of the whole city will be set up in 2006.

Hazardous waste from social source:

- Medical waste: facilities that can basically centralize and treat the medical waste of the whole city with no harm will be set up in 2005;
- The discarded lead-acid battery: collecting and storing facilities that can centralize and treat the the discarded lead-acid battery of the whole city in 2005;
- Waste with Hg such as waste lamps: facilities that can basically centralize and treat the waste lamps of the whole city with no harm will be set up in 2005.
- Waste sensitive material: treatment facilities that centralize and collect, treat, recover the waste sensitive material of the whole city will be set up in 2005;
- Waste mineral oil: treatment facilities that centralize and collect, treat, recover the waste mineral oil of the whole city will be set up in 2005;

- Electronic waste and waste household appliances: comprehensive treatment facilities that can centralize and collect, transport, store, dismantle; recover, treat the electronic waste and waste household appliances will be basically build up in 2006.

2. Principle of the plan

- Central treatment, reasonable distribution;
- Prevent holding the market, promote to socialize, professionalize the treatment of waste;
- More intent on innocuously treatment, encourage resource of the hazardous waste, set up the treatment facilities of hazardous waste, encourage comprehensive treatment and efficiency of scale;
- Suitable to the current development status of Beijing and China, and fully consider developing trend of social society;
- Choose advanced and practical treatment technology;
- In accordance with state principle, law and standard.

3. Current status of the generation of industrial hazardous waste in Beijing

Data investigated analysis:

- Investigate into the 12 important enterprises generating hazardous waste factories;
- In 2003 Beijing environmental protection and monitoring center and Beijing environmental protection and science Academy had the detailed investigation to the current status of generation and treatment of hazardous waste in Beijing steer parent company and the 25 petroleum and chemical industry companies.
- Data applied and recorded of the whole city in 2001, part of the data applied and recorded in 2003.

Result of investigation:

The amount of industrial hazardous waste generated in Beijing in 2003: 131.5

- 41.47% comprehensive application;
- 56.78% treatment
- 0.19% stored
- 1.56% released

In addition, the amount of six kinds of general industrial solid waste, such as waste with autunite, red mud, salt mud, metal oxide waste, inorganic waste water sludge and organic waste water sludge, etc, is 260 thousand tin, including a lot of material with hazardous specialty which need to be treated according to the regulations of hazardous waste.

Waste of the most amount of generation:

- Waste alkaline liquor and solid alkali (37.3%);
- Distilled leavings (19.5%);

- Waste acid or solid acid (8.8%);
- Waste crude oil (8.7%);
- Waste with organic solvent (8.0%).

The amount of the generation of above 5 kinds of waste is 108066 tin, accounting for 82.4% of the whole generation of industrial hazardous waste.

- Chemical material and chemical goods manufacturing industry (51.5%);
- Processing and coking of petroleum industry (18.8%);
- Oppressing and smelting of black metal processing industry (7.6%);

The amount of the generation of above three industries is 77.9% of the whole amount

- Fangshan district (46.25%);
- Chaoyang district (20%);
- Tongzhou district (17.5%);
- Shijingshan district (4.94%);
- Fengtai district (4.35%);
- Haidian district (3.23%)

The amount of the generation of above districts is 96.3% of the whole amount.

4. Trend forecast of the generation of industrial hazardous waste in Beijing

Year	General production at the basic year ((Million Yuan/a)	The production in the forecastyear (Million Yuan)	Hazardous waste production in the forecasted (t/Yuan)	Production (Million ton)
2003	361190			
2004		399176.68	34.5	0.01377
2005		441158.46	32.78	0.01446
2006		487555.50	31.14	0.01518
2007		538832.16	29.58	0.01594
2008		595501.64	28.1	0.01674
2010		727347.34	25.36	0.01845
2016		1199193.03	19.63	0.02354

Hazardous waste specially explained:

- Hazardous waste generated by electronic industry;
- Ash from incineration of garbage: 50 kt/per year

5. Current status of the generation of hazardous waste from social source in Beijing

- Medical waste: there are 74298 beds in hospitals of Beijing in 2003. according to parameter 0.6kg/day.bed; medical waste generated is 44.6 t/day, 16271 t /year;
- The discarded lead-acid battery: the amount of discarded lead-acid battery in Beijing in 2003 is 18.4 thousand tin;
- Waste mineral oil: the amount of waste mineral oil from social source is 24 thousand tin;
- Waste fluorescent bulb: the amount of waste fluorescent bulb in 2003 is 6570.55 thousand pieces, almost 1300 tin;
- Waste sensitive material: the amount of waste sensitive material in 2003 is 523 tin;
- Waste household appliances: the amount of waste consumer household appliances in 2003 is 1721 thousand pieces, almost 16898 tin.

6. Situation of hazardous waste treatment and disposal and facilities in Beijing

- Treatment facilities of industrial hazardous waste: small scope, low level
- Treatment facilities of hazardous waste from social source:
 - medical waste: 3 factories which are building;
 - the discarded lead-acid battery: dismantling on low level, no recovering companies;
 - waste mineral oil: some are recovered by qualified companies; some are applied as primary material;
- Treatment and disposal of hazardous waste from social source:
 - waste fluorescent bulb: Beijing Panasonic electrical technology company limited has its own treatment facilities of waste fluorescent bulb, others are almost treated with life garbage;
 - Waste sensitive material: waste films and sensitive material go into landfill field of life garbage with garbage; fixation medical liquor are sole to individual operators for recovering Ag, which brings heavy environmental pollution;
 - Waste household appliances: state to construct facilities and ability of collecting, treatment, recovering.

7. The plan of construction of treatment facilities of medical waste

Three facilities of central incineration of medical waste were set up in Beijing:

- Incineration facilities of medical waste in south city: serving scope involves Fengtai district, Xicheng district, Xuanwu district, Chongwen district, Shijingshan district, Daxing district, treatment ability achieves almost 25 ton /day, 10 thousand ton every year;
- Incineration facilities of medical waste in the west of north city: serving scope involves Haidian district, Changping district, treatment ability achieves 5 ton/day, 1800 ton/year;

- Incineration facilities of medical waste in the east of north city; serving scope involves Chaoyang district, Shunyi district, Dongcheng district; treatment ability achieves 20 ton/day, almost 7300 ton/year.
- Non-incineration facilities of medical waste have been set up in exurb.

8. The plan of recycling and treatment of the discarded lead-acid battery

Set up suitable and effective collecting system of the discarded lead-acid battery

- Will not set up treatment facilities of the discarded lead-acid battery in Beijing area;
- Set up 4 storing facilities of discarded lead-acid battery, which should have their own collecting and transport system, and storing ability of every storing facility should achieve 4000-5000 ton/year.

9. The plan of recycling and treatment facilities of waste mineral oil

- Some waste mineral oil can be treated by the producers which generated it;
- Some waste mineral oil which is suitable for incineration will go into the incineration facilities of hazardous waste;
- A treatment factory of waste mineral oil ,which has the treatment ability of more than 10000 tin per year, will be built up within the treatment facilities of hazardous waste before 2005;
- Before 2008, another treatment factory of waste mineral oil will be built up in the north area of the city on the basis of evaluating newly on current technology and requirement.

10. The plan of treatment facilities of waste fluorescent bulb

Within the comprehensive treatment facilities of hazardous waste, a facility of waste fluorescent bulb, which has the treatment ability of about 1500 tin per year, will be set up.

11. The plan of treatment facilities of sensitive material and fixation liquor

Set up facilities of recovering Ag from sensitive material and fixation liquor at the hazardous waste integrated treatment facilities.

- Collecting percent of sensitive material is about 30%, and the collecting amount is 60-70 thousand square meters (about 30 tin/year);
- Collecting percent of fixation liquor is about 90%, and the ability of treatment is about 300 ton/year.

12. The plan of recycling and treatment facilities of waste household appliances

- Set up a treatment facility of waste household appliances before 2005, which has the treatment ability of 500000 units /year;
- Set up the second treatment facility before 2008, and the whole treatment ability adds up to 800000 units /year;
- Set up the third treatment facility before 2010, the whole treatment ability adds up to 1000000 units/year;

- Set up the fourth treatment facility before 2015, the whole treatment ability adds up to 3000000 units/year.

13. The plan of constructing hazardous waste centralized treatment facilities in Beijing.

Scheme 1:

- Rebuild and enlarge the current facilities within the Yanshan petroleum and chemical industry parent company, fully enhance technology and management levels, and set up treatment center of hazardous waste petroleum and chemical industry.
- Set up centralized a treatment facility of hazardous waste in some place of the south area in Beijing.

	Planning fixed year	Building scale	Incineration	Physico-chemical	Capacity of landfill hazardous waste to the Beijing treatment center
		ton			
First-stage	2006	28000	10000	20000	8000
Second-stage	2010	55000	14000	47000	15000
Third-stage	2015	10000	25000	84000	27000

	Planning fixed year	Industry hazardous waste				
		Building scale	Incineration	Physico-chemical	Landfill	Disposal by the cement kiln
		Ton				
First-stage	2006	43000	20000	5000	30000	15000
Second-stage	2010	86000	35000	10000	55000	20000
Third-stage	2015	120000	42000	16000	80000	30000

	Planning fixed year	Society-source hazardous waste				
		Waste lead acid batteries (t)	Waste lamp (t)	Photographic material and fixative (t)	E-waste (set)	
First-stage	2006	20000	1500	500	500000	
Second-stage	2010				1000000	
Third-stage	2015				3000000	

Scheme 2:

- The treatment facility of hazardous waste in the east-south area: mainly receive the hazardous waste from Tongzhou district, Daxing district, Fengtai district, Shunyi district, Chaoyang district, etc.
- The centralized treatment facility of hazardous waste in the west-south area: mainly receive the hazardous waste from Fangshan district, Shijingshan district, Mentougou district, Haidian district, Changping district, etc.

	Planning fixed year	The building planning of hazardous waste treatment facility in the southwest			
		Building scale	Incineration	Physico-chemical	Landfill the southeast center of disposal hazardous waste
		Ton			
First-stage	2006	30000	15000	20000	8500
Second-stage	2010	58000	28000	35000	17000
Third-stage	2015	90000	40000	63000	26000

	Planning fixed year	Industry hazardous waste				
		Building scale	Incineration	Physico-chemical	Landfill	Disposal by the cement kiln
		Ton				
First-stage	2006	44000	15000	10000	30000	15000
Second-stage	2010	87000	26000	21000	60000	20000
Third-stage	2015	124000	35000	38000	80000	30000

	Planning fixed year	Society-source hazardous waste				
		Waste lead acid batteries (t)	Waste lamp (t)	Photographic material and fixative (t)	E-waste (set)	
First-stage	2006	20000	1500	500	500000	
Second-stage	2010				1000000	
Third-stage	2015				3000000	

14. Assessment of fund about treatment facilities of hazardous waste

Scheme 1:

	The main craft	Amount of investment(million RMB)
Hazardous waste treatment center of Yanhua	Incineration	70
	Physico-chemical	20
	others	20
	Comprehensive utilization	50
	Total	160
Hazardous waste treatment center in Beijing	Incineration	150
	Landfill	70
	Disposal by the cement kiln (alteration)	15
	Physico-chemical	5
	Comprehensive utilization	70
	Others	20
	Hazardous waste from society source	260
	Total	590
Summation		750

Scheme 2:

	The main craft	Amount of investment(million RMB)
Hazardous waste treatment plant in the southwest	Incineration	100
	Physico-chemical	20
	others	20
	Comprehensive utilization	50
	Total	190
Hazardous waste treatment plant in the southeast	Incineration	100
	Landfill	70
	Disposal by the cement kiln (alteration)	15
	Physico-chemical	10
	Comprehensive utilization	70
	Others	20
	Hazardous waste from society source	260
	Total	545
Summation		735

Thoughts of Technology Policy of Pollution Control in Slag Incineration

(Edit according to PPT)

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1. Generation and pollution characteristic of incineration slag

- To control the air pollutant emission produced in incineration, exhaust gas is strict purified by high-efficiency dust catching and gas washing. Main pollution produced in incineration usually enrichment in slag
- Slag is a double Hazardous Waste because it contain heavy metals and dioxin of high density
- The dominate pollutant produced in incineration:
 - heavy metals
 - dioxin
 - acid gas
- diversified pollutant enrich in slag

The content of heavy metals in slag compare to other environmental sample (unit: mg/kg)

Element	Slag	Ash in flue	Flying ash	Waste	Initial value in soil	Flying ash of Japan	Ash of coal powder
As	148	Nd	82		8.7	62	
Cd	3	29	72	10-40	0.15	290	0.24
Cr	179	306	318	100-450	59.2	360	65.53
Cu	365	638	977	450-2500	27.2	1300	47.45
Mg	2885	6882	3854			20000	
Mn	1194	2011	2035			930	167.0
Ni	140	203	186	50-200		100	
Pb	439	2267	4770	750-2500	18.78	6500	34.14
Sn	1112	3125	5880				
Zn	2035	5352	6090	900-3500	58.9	18000	54.92
Total	8500	20813	24264		172.93	47542	369.28

The content of dioxin in incineration fly ash (unit: mg/kg)

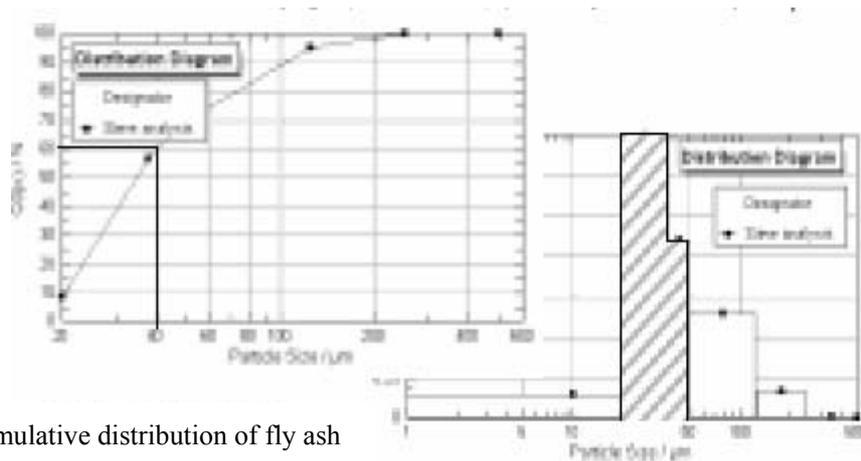
sample	Concentration[ng-TEQ/g-dry]
Garbage fly ash 1	3.9
Garbage fly ash 2	3.0
Garbage fly ash 3	2.3
Garbage fly ash 4	0.35
fly ash of Medical waste	94

- In the annex of Basel Convention, incineration fly ash was placed in the forbidden transboundary list required special consideration because its contaminative characteristic
- China's HW listing does not include the fly ash directly, but according to the Identification standard for extraction procedure toxicity, it is unassailable a HW
- The incineration capability is about 10,000t/d in China, which account for 2.5% of the total garbage treatment. There is about 100,000t fly ash produced every year and mostly concentrate in big cities if the produce rate of ash is 3%
- In Shenzhen, the incineration capability will achieve to 5000t/d next year, output of fly ash will be about 45,000t/a; In Shanghai, the one and only HW landfill will be filled in if all the incineration ash was filled directly

The treatment and disposal of fly ash has become the urgent matter of the moment!

2. The physical and chemical characteristic of incineration fly ash of China

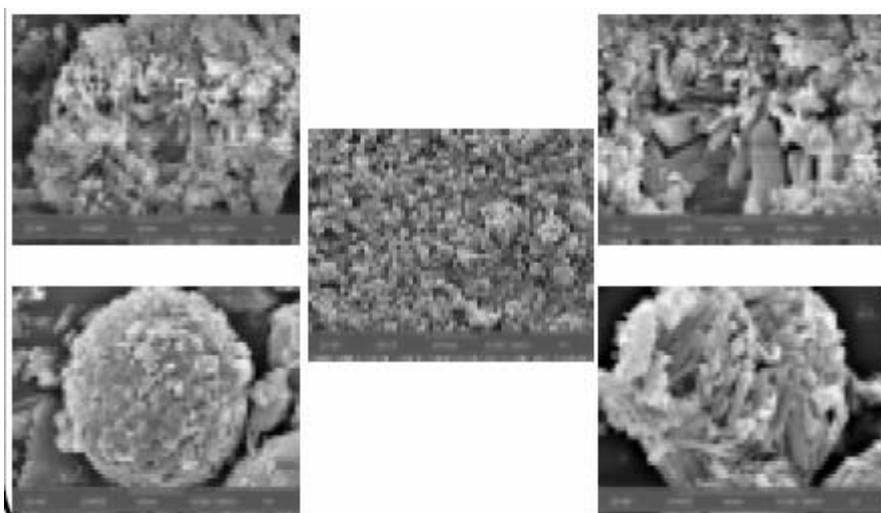
Study on physical and chemical characteristic of incineration fly ash—granularity distribution



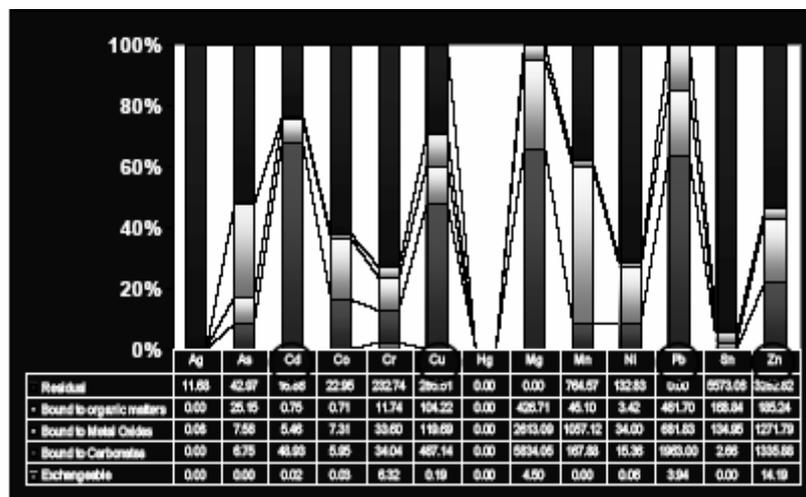
Cumulative distribution of fly ash

Granularity and frequency distribution of fly ash

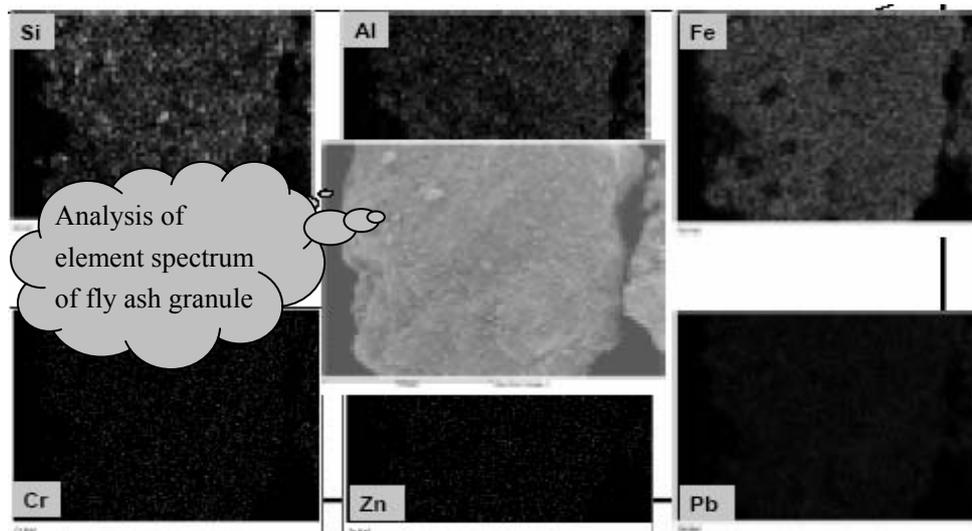
Study on physical and chemical characteristic of incineration fly ash—microstructure

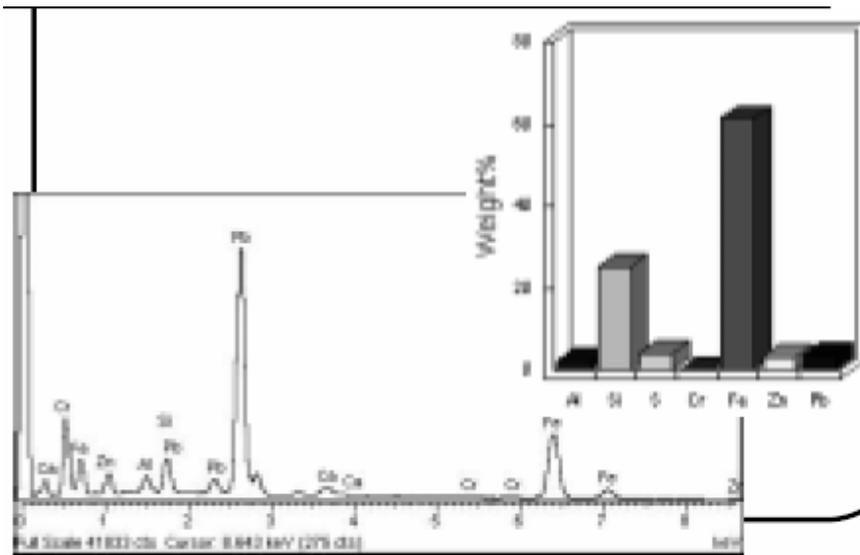


Study on physical and chemical characteristic of incineration fly ash—the existent form of heavy metals



Study on physical and chemical characteristic of incineration fly ash—the analysis of element spectrum of fly ash granule:





3. Estimation and prediction method of HW

- toxicity characteristic leaching procedure (TCLP)
- extract process toxicity experiment (EP TOX)
- California waste extract experiment (Cal WET)
- Multi-extract procedure (MEP)
- Sole landfill waste extract procedure (MWEP)
- Equilibrium leach testing (ELT)
- Acid neutralization content (ANC)
- Sequential extract testing (SET)
- String chemical extract (SCE)
- Material characteristic centre captive extract test (MCC-IP)
- America nucleus association extract testing (ANS-16.1)
- Dynamic leach testing (DLT)

3.1 TCLP toxicity characteristic leaching procedure:

- Making sample by shivering and screening
- Vacuum filter and separate the liquid
- Select the lixivium according to buffer capacity of waste to acid
- **L/S=20, 30 rpm** rotative stir for 18hours
- Vacuum filter and testing
- **GB/5086.1** benefit from TCLP procedure to a great extent

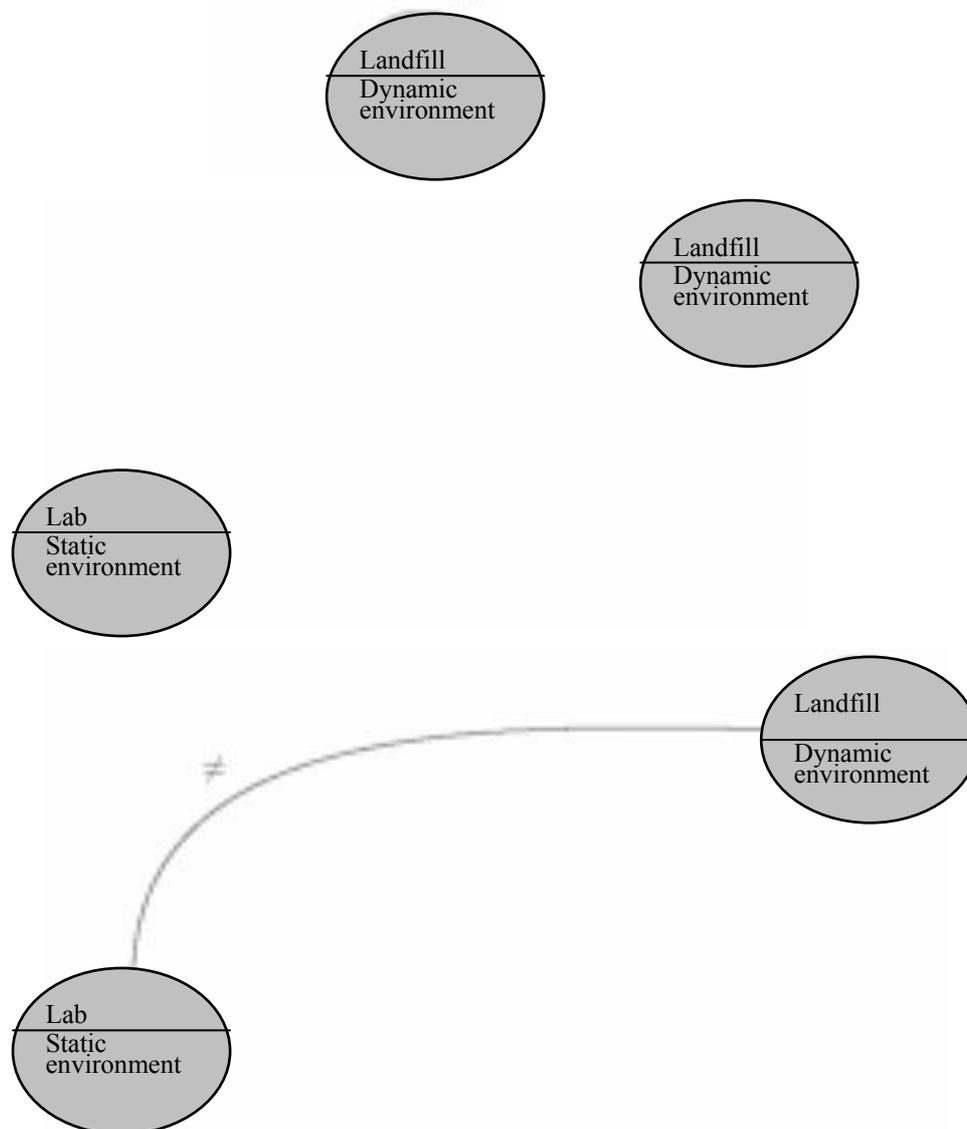
Method	lixivia	solid: liquid
TCLP	pH=2.88±0.05 HAc alleviant	20:1
	pH=2.88±0.05 HAc alleviant	
GB	water without ion	10:1

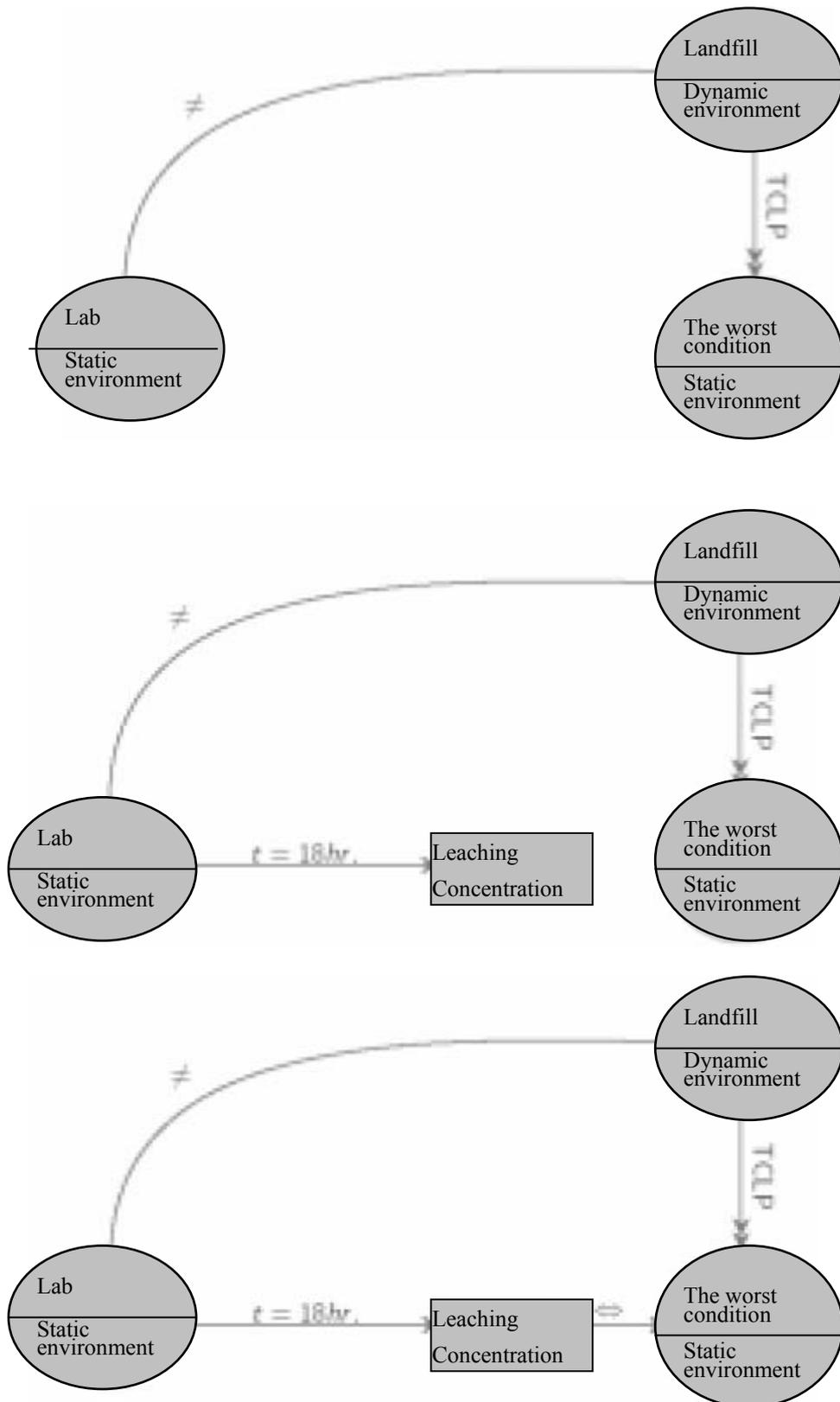
- Use captive test to accelerate model dynamic procedure
- Starting point—EPA want to use TCLP procedure assess the concentration of lixivium in worst situation when TCLP was suggested

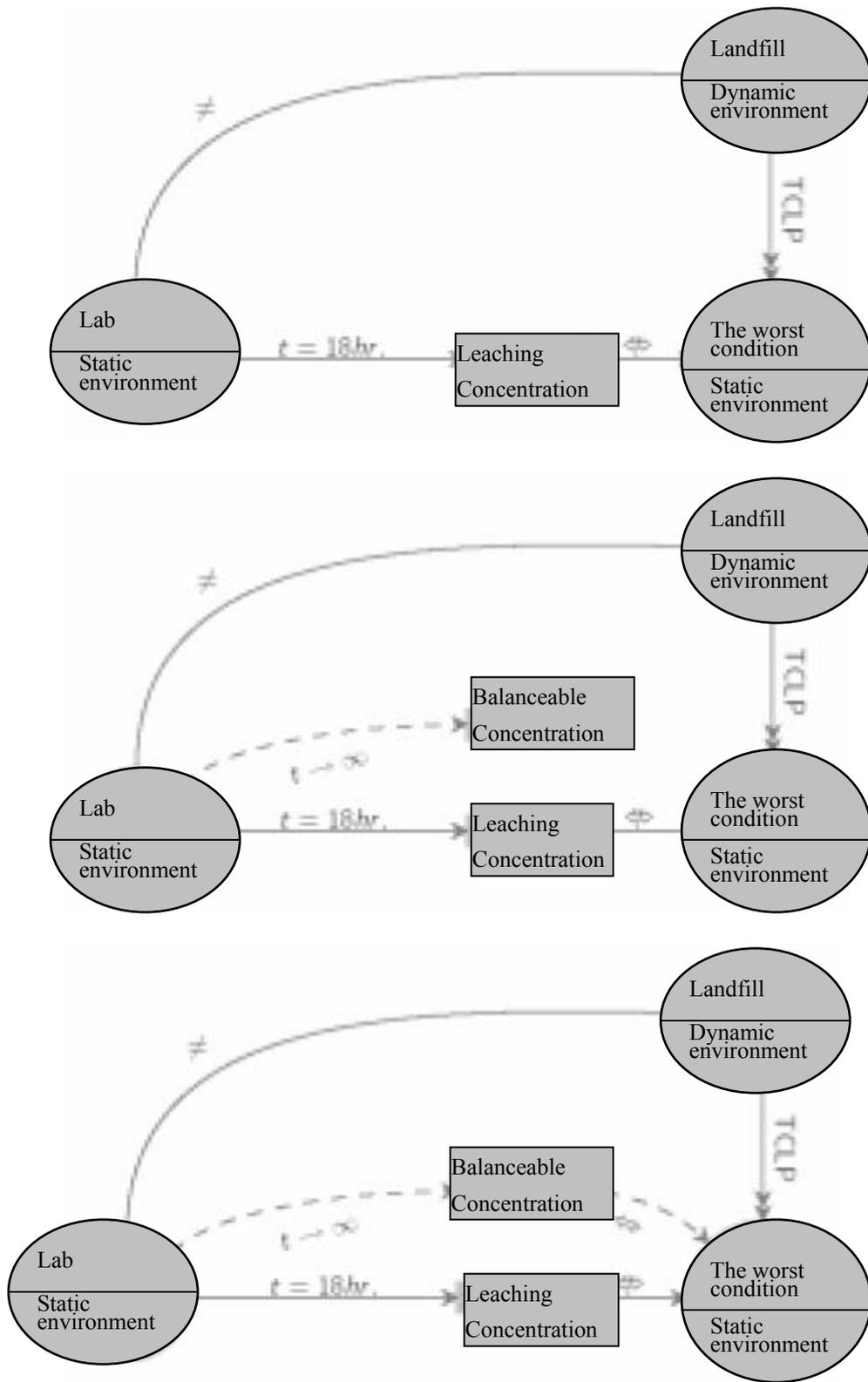
- In practice, TCLP procedure combine with diversified standard threshold to judge:
 - Whether the experimental waste is HW
 - Whether the waste achieve the desire of landfill by solidification/stabilization

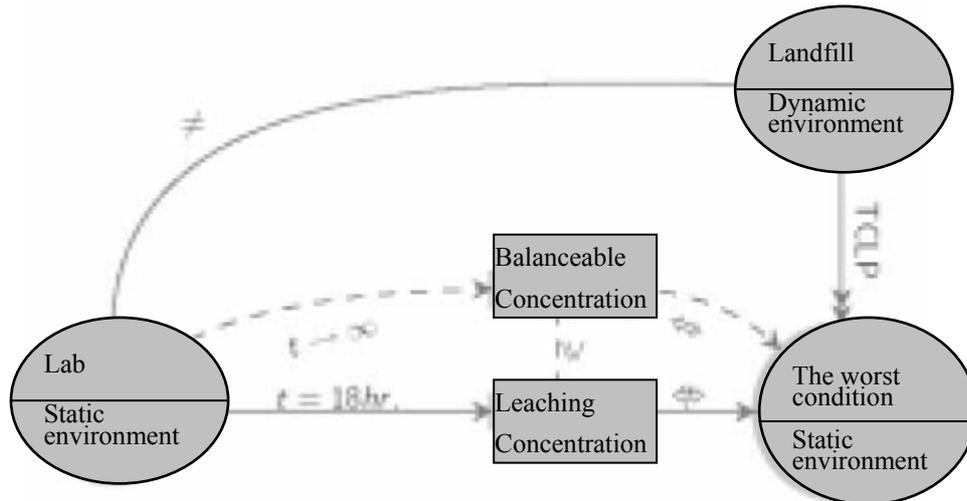
	As	Cd	Cr	Cu	Mn	Ni	Pb	Zn
EPA: Limited Value of TCLP	5.0	5.0	1.0	-	-	-	5.0	-
GB: TCLP	1.5	10	0.3	50	-	10	3	50
GB: Standard of admissive control	2.5	12	0.5	75	-	15	5	75

3.2 The correlative logic relationship of TCLP









3.3 The expression of TCLP and GB in fly ash

The content of heavy metal in some kind of fly ashes (unit: mg/g)

	As	Cd	Cr	Cu	Mn	Ni	Pb	Zn
M1	0.283	ND	0.555	4.368	0.560	ND	1.612	4.012
M2	0.180	0.085	0.191	1.254	---	0.101	5.126	23.504
M3	0.093	0.114	0.882	6.707	---	0.529	1.408	41.608
M4	0.096	ND	0.871	0.639	---	0.181	0.827	14.521
C1	0.109	0.166	0.155	0.765	0.176	---	2.581	36.376
C2	0.148	0.009	0.020	0.063	0.166	0.005	0.239	3.565

The incineration fly ash in municipal waste: the content of Cr, Cu, Pb and Zn is high

The incineration fly ash in municipal waste: the content of Cu, Pb and Zn is high

The total heavy metal in fly ash is about 3~5% of the gross fly ash

TCLP leaching concentration (mg/L)

	As	Cd	Cr	Cu	Mn	Ni	Pb	Zn
M1	ND	0.115	2.755	0.190	ND	ND	1.765	3.275
M2	0.134	ND	0.042	ND	-	ND	0.674	1.115
M3	0.104	2.107	0.342	88.5	-	1.49	9.800	513.5
M4	0.127	ND	0.727	0.045	-	ND	0.042	1.290
C1	0.905	6.570	2.005	27.700	9.950	1.645	6.825	1663.0
C2	0.018	0.279	0.311	0.201	4.225	0.199	3.115	147.5

The leaching concentration of GB reversal method (mg/L)

	As	Cd	Cr	Cu	Mn	Ni	Pb	Zn
M1	0.178	ND	0.056	1.476	-	ND	143.36	8.006
M2	0.155	ND	ND	ND	-	ND	0.953	0.268
M3	0.085	0.002	0.380	0.047	-	ND	ND	0.134
M4	0.207	ND	0.444	ND	-	ND	6.680	2.080
C1	1.444	-	3.572	56.67	10.414	-	6.494	3343.8

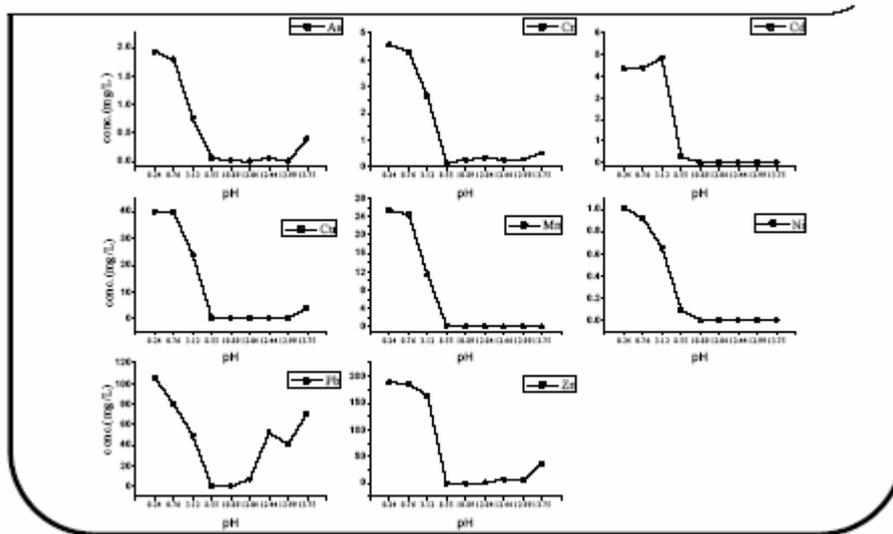
- The measure results of lead and zinc are very discrepant using TCLP and GB method, because:
 - the discrepancy of ultimate pH value result from different lixivium
 - lead and zinc are typical amphoteric elements and very apt to lixiviate under partial acid or alkali, but hard to lixiviate under neutral condition
- Testing:
 - Experiment of relationship between leaching characteristic of heavy metal and ultimate lixivium pH value

3.4 pH correlative experiment

The heavy metal leaching concentration of M1 under different initial pH value (mg/L)

Initial pH Value	As	Cd	Cr	Cu	Mn	Ni	Pb	Zn	Final pH Value
1	ND	0.012	0.182	0.041	0.019	0.003	0.952	0.508	11.33
2	ND	0.016	0.192	0.971	0.007	ND	126.4	7.14	12.46
3	ND	0.011	0.166	0.853	0.02	0.006	111.1	8.96	12.42
4	ND	0.019	0.154	0.929	0.017	0.015	113.5	13.88	12.42
5	ND	0.010	0.202	1.007	0.009	0.014	126.5	7.61	12.45
7	ND	0.013	0.176	0.869	0.012	0.003	116.6	8.53	12.47
10	ND	0.104	0.206	1.009	0.033	ND	124.4	8.85	12.45
13	0.217	0.032	0.652	0.549	0.08	0.012	96.5	12.30	12.71

The relationship between leaching concentration and ultimate pH value of solution



4. Is fly ash HW to the end?

- Contradiction:
 - The detection value of toxicity characteristic leaching using TCLP/GB method is low
 - But the total content of heavy metal in fly ash is very high
- Cause:
 - Biggish acid neutral content (ANC) in alkalinescent system
- Thought:
 - How long can ANC sustain in the worst condition?
 - Which one is longer between the life-span of landfill sites and the time ANC destroyed?

5. The treatment and utilization of fly ash

- Stabilization and landfill
- Fusion, calcinations
- ...
- Can it be utilized?
 - Construction material
 - Recycling metals
 - ...

6. The difficulties confronted in landfill

- The landfill amount are increasing steadily
If the amount of incineration can account for 10% of the total amount of garbage treatment and the proportion of fly ash is 3%, the amount of fly ash can reach to 400,000t per year, and mostly produced in big city
- If the construction cost of HW landfill is 300/m³, treatment cost of HW is 700/m³, it can cost 400,000,000 per year
- The life-span of landfill site is restricted, according to the current assessment of impermeable material, the safety period which can be ensured of the landfill site is 50years, but the heavy metal would persist in the landfill site

7. Cement and concrete material

- American Stony Brook university ocean research centre assess the feasibility of incineration slag utilised in sea and land after stabilizing from 1985
- In Long Island Sound seabed, concrete brisk made up of incineration slag have been built two man-made submerged rock
- After 6 years series testing, it turned out that no organic or inorganic toxic and poisonous component exuded into environment

8. Use in bitumen road surface

- American federal road authority had finished omnibus demonstration project of utilizing slag as bitumen pavior in Houston, Washington and Philadelphia from 70~80years
- Slag can be used in road binding course, antiwear coating or surface layer and base course
- The testing results indicated that if slag was treated properly, it can be used in bitumen without hazardous to environment

9. Ground treatment

- Compared with traditional padding, fly ash has lower density and can be used to road and soft ground treatment padding
- Mixed with soft clay and maintain,
 - the shearing strength, solidify factor and penetrative factor of soft clay increased
 - plasticity and condensability of soft clay decreased
- It can partial substitute lime and cement used in curing agent of reformative ground soil

10. Application to make cement

- Japan Pacific cement research centre
- Remove the metal and other noncombustibility of incineration ash in advance
- Removal Cl through water washing (water washing ash system)
- Cement dosing

11. Recovery of heavy metal

- thermometallurgy: volatile again at high temperature
 - the problem of energy consumption
 - the problem of recycling technology
 - the problem of dioxin
- Hydrometallurgy: mainly use acid soluble and electrochemistry method
 - the problem of secondary pollution
 - recovery efficiency

The proportion of heavy metal of “easy transfer” state in fly ash

		M1	M2	M3	M4	C1
Pb	Exchangeable species	74.80	2.80	29.95	0.55	42.35
	Carbinate species	26.35	205.0	68.75	9.85	155.8
<i>Ratio (%)</i>		<i>53.85</i>	<i>51.01</i>	<i>40.95</i>	<i>21.06</i>	<i>67.75</i>
Zn	Exchangeable species	17.15	2.65	95.65	3.40	741.4
	Carbinate species	97.25	225.5	358.8	80.3	88.55
<i>Ratio (%)</i>		<i>20.35</i>	<i>22.03</i>	<i>21.95</i>	<i>11.19</i>	<i>59.60</i>

Situation of Hazardous Waste Management in Beijing

It is requested for Beijing to improve environmental quality to a higher level for the coming of the Olympic Games in 2008, and then, we are confronted with an unprecedented challenge in the work of environmental management. Not only should we strengthen the administration to air and water, but waste management is to be one of the key things we should do in the environmental management of Beijing. In order to perfect the environment quality of our capital, reduce the generation of waste, regulate the management of the process of transportation, storage, treatment and disposal, some things has been done in the aspects of regulation construction, framework adjustment, facility planning and so on. As follows, relevant work and confronted problems are summed up:

1. Status of institution construction

(1) Perfect the implementation of the transfer manifest institution of hazardous waste

We have been implementing the transfer manifest institution rigidly. According to the statistics of the recent years, the transfer amount of hazardous waste in Beijing increased by the speed of 40%-50% annually. For the purpose of seizing the circumstances of hazardous waste transfer in the whole city, combining with the implement of Administrative Permit Law, SEPA adjusted the working process of carrying out transfer manifest institution of hazardous waste: next year, the environmental management work of hazardous waste transfer will be shifted down to the environmental protection bureaus of district or county; the mode will be adopted that the bureaus of district or county are responsible for the management of the transfer manifest of hazardous waste of the city and the city agency is in charge of the regular statistic work which needs to be put on records; the regional advantages of district or county bureaus will be given full play and the management will also be strengthened. Those transprovincial shift activities of hazardous waste will be managed all by city bureaus.

(2) Permit System

“Interim Measures on permit for Operation of Hazardous Waste of Beijing” was issued on 18th September, 2000, which standardized the management of those companies with permit, instituted the qualification and procedure of the application for hazardous waste dealing permit, and established the hazardous waste dealing ability assessment regulations. Besides, standardizations have been imposed on the inner process of examining and approving of hazardous waste dealing permit, and detailed regulations have been made on those matters including approving time limit, approving process, etc.

By means of establishing that regulation, in Beijing, we have set up 10 companies with dealing permit, 7 of which are in charge of hazardous waste disposal, and 3 of which are responsible for medical waste disposal but have only temporary permit for medical waste dealing. In the early 2003, combining “*Pollution Controlling Criteria for Hazardous Waste Storage*” with the characteristics of medical waste, the bureau put out “*Directive Proposal on Medical Waste Storage Pollution Controlling in Beijing*”, the implementation of which performed an important role with the period of “SARS”. In July, 2003, the charging standards of Beijing were issued for the disposal of medical waste, which regulated the charging behaviors of those medical waste operating units.

After the implementation of the national “Hazardous Waste Operating Permit Regulating Methods”, according to it, the bureau reappraised the operating capacity of the current 7 disposing units, 1 of which was shut down due to its disqualification, and, at the same time, instituted and declared the work process of the issuance of hazardous waste operating permit and forwarded some directive proposals on the permit-issuing work of the bureaus of districts or counties.

(3) Declaration and Registration System

So far, there has not been any special regulation for hazardous waste’s declaration and registration in Beijing. The declaration work of hazardous and solid waste is still under the national framework of the declaration and registration of pollutants discharge.

2. Adjustment of Administrative Institutions

In order to enhance the management of solid waste, in May of this year, Beijing environmental protection bureau made adjustment upon the function and personnel of the organization and specially set up a new division of solid waste and noise management in charge of the relevant work, for which the division of pollution control is responsible before, to make out and supervise the implementation of those laws and regulations on solid waste, hazardous chemicals and noise, organize and study out the plans and special projects for the pollution control of solid waste, hazardous chemicals and noise, and to execute the administrative approval for hazardous waste operating permit and meet the emergency of solid waste polluting accidents. At present, in the collocation of the administrative organ, a three-level management mechanism has primarily come into being among Department of Solid Waste, Administrative Centre of Solid Waste and Environmental Protection Bureaus of divisions or counties.

3. Facilities Programming and Execution

In 2003, we have executed “door-to-door investigation” on waste-producing units basically getting insights into the current situation of waste generation of Beijing. Based on this statistics and “*National Programming for Disposal Facilities Construction of Hazardous and Medical Waste*”, early this year, we launched into “*Beijing Programming for Centralized Disposal Facilities Construction of Hazardous Waste*” planning establishing two hazardous waste disposing centers and three medical waste disposing centers. For getting more investment, the mode of inviting public bidding will be adopted for the building of the disposing centers under planning. A large range of public funds will be introduced and concessionary operating style will be offered.

4. Emergency Meeting System

Whereas currently accidents of hazardous waste pollution and medicals happened frequently, it is necessary to establish an emergency system for dealing with the accidents. According to the characteristics of Beijing, we firstly urged each disposal units to institute relevant emergency measures and put them into force. Now, the emergency-meeting system of Beijing for hazardous waste is under building up with the cooperation of Department of Pollution Control and Department of Solid Waste of our bureau. This system includes hazardous emergency-meeting measures for waste medicals, database of hazardous medicals management units, emergency-meeting database of hazardous medicals, experts group of hazardous medicals, etc.

5. Problems

(1) Uncertainty of the true number of hazardous medicals operating units

At present, the most serious problem with which we are confronted in management of hazardous waste in Beijing is that we lack of adequate information about the operating units of the whole city and the truth of number is unclear, which magnified the difficulty in emergency supervision and treatment to those contaminations. In term of *Ordinance of Hazardous Waste Management*, the sections of environmental protection are responsible for the work of disposing hazardous chemicals, while, the uncertainty of the truth brought about many disadvantages to their implementation.

(2) Exclusive regulation of report and registration of hazardous waste is under instituting

So far, there is still not an specific regulation of declaration and registration for hazardous waste in Beijing, and the current declarations of hazardous waste are only large-scale ones which lack of accurate data and cannot reflect the detailed description of the production, treatment and utilization of hazardous waste in Beijing. All of these add to some difficulty to the management of hazardous waste. So, the establishment of the exclusive regulation should be put into the schedule.

(3) There are too many recycling units to manage

There are a number of units for hazardous waste recycling in Beijing with some hidden problems of accidents caused by hazardous waste, which is a great challenge to the management of hazardous waste. The key point we discuss all the time is about the problem of how the units grant permits and execute management.

(4) Management level of bureaus of districts and counties is under improvement

At the beginning of next year, the local transferring of hazardous waste in Beijing will be supervised by bureaus of districts or counties, and this raises new requirements to their quality of hazardous waste management. Because city bureau and city solid waste management center were responsible for all works relating to hazardous waste,, district and county bureaus were involved in such little works as to lack of the experiences of work and management about this aspect. The overall management capacity should be advanced. If being short of the assistances from district or county bureaus, the local administration of hazardous waste would become weakened greatly.

(5) Problem of soil pollution

With the development of construction of Beijing city, it becomes more and more popular to transform the exploitive property of industrial land. On account of some environmental accidents which resulted from residue contaminants or soil pollution, there are extended difficulties not only in technique also in funds. Therefore, it's necessary to take a thorough investigation trying to find the real situation of the utilization and programming of the incity industrial land and to assess those kinds of land the utilizing property of which has changed to avoid that sort of pollution happenings. It is also expected for SEPA to add to the relevant contents of management.

Since some tasks have been fulfilled at the aspect of the environmental management of hazardous waste in Beijing, there is still much insufficiency compared with other provinces or cities. We would like to make a full communication with them and to learn advanced experience from them, and it will be appreciated that all of you would give us excellent proposals.

August 6th, 2004

Hazardous waste environmental management overview of Tianjin

The amount of hazardous and medical waste is very large in Tianjin as a super large city, therefore, increasing the pollution protection management to dangerous and medical discarded production and grasping the construction of treatment to dangerous discarded product are very important in the environmental protection work of Tianjin City. In these years, with the correct instruction of headquarters, with the supporting of local institute and government, we have done some work on the management and construction of treatment of dangerous discarded product .the follow is the main methods and experiences:

1. Accelerating the construction of treatment of dangerous discarded and medical product.

“The Tenth Five-year Plan” of the According to leading idea and target requirement of the National Environmental Protection, a series of high-lever projects of treatment to dangerous product are constructed gradually in Tianjin in recent years. Thereinto, one of the most important projects is “Tianjin dangerous discarded product treatment center”. Tianjin dangerous discarded product treatment center is 1999 national debt-invested and high-tech industry demonstrated subject created by the nation. The total investment the of this the subject is RMB13 billion, including 2 billion in the medical discarded products, which is invested and run by the four sides of the Tianjin management center of the solid waste products and the poisonous medical products, the Onyx company of the French Veolia Environment Group, Jinneng investment company and China energy- economized company. It has land of 130 acre ,and it has the ability of treating 37 thousand hazardous discarded products per year, including burning, filling in safety, physical chemical treatment and so on ,except that it has two series of high-temperature steam disinfection equipment to medical wastes. Main technology and equipments of recycling in the subject are designed by Tianjin environment and science academe itself according to international standard, the percent of to be made in china of which is more than 90%,and the practical investment of construction is only 10% that of foreign congeneric corporations. It is the first national comprehensive and modern corporation of treating poisonous and harmful hazardous wastes with take-back of resource, control of burning, high-temperature steam disinfection and filling in safety. The It has been started up and run formally on Sep 1, 2003 and it has treated about 2400 tons medical wastes, the 4700 tons industrial hazardous wastes, the 30 tons cyanide, the 50 tons arsenic turns the thing, the 1.57 tons “the poisonous rat is strong” from some departments so as to ensure the safety of environment and common sanitation.

The environmental protection bureau of Beijing has set up the training class of treatment facilities construction of hazardous waste organized by State Environmental

Protection Administration of China 3 times one after another, totally 200 persons. For example, on March 18, “the whole national training class of treatment facilities construction of hazardous waste and medical waste ” organized by State Environmental Protection Administration of China (SEPA) and National Development and Reform Committee (NDRC) opened the spot meeting in the hazardous waste treatment and disposal center, the relevant leaders from SEPA and NDRC and other participants from sectional EPA and DRC, who total to 100 participants, visited and investigated Tianjin treating and handling center of hazardous waste. Successively there have been 20 Piece provinces, autonomous region and municipality directly under the Central Government 500 more than person come to investigate and learn, since the treatment and disposal center of hazardous waste was built. The experience and lessons accumulated in the course of building and running will play reference function to other areas of the whole country.

SEPA confirmed the centre as “national model” at the working conference on national environmental protection in November 2003, And has already determined to prepare to establish “the treatment facilities engineering research and development centre of the national hazardous waste” in our city, in order to induct and help the dangerous waste disposal of the provinces and cities in the whole country to handle the design and construction of the project.

Secondly, it is the planning of “garden of environmental protection industry of Ziya of Tianjin” that is set up. The disassembling industry in Ziya town of Jinghai county of Tianjin has developed since reform and opening-up, The huge raw materials demand market of disassembling industry , simple and convenient processing means, in addition the characteristic of low risk , high profit, make this industry develop rapidly, But some problems was exposed that can't be ignored at the same time such as nonstandard market management, backward disassembling technology, pollution resulted from incineration of wires. Since 2001, the Tianjin Environmental Protection Administration conferring with county government of Jinghai, In line with “guide actively, relatively centralized, manage in unison, normal development” principle, has began to build “the Garden of environmental protection industry of Ziya” taking the land of 500 acre. At present, public buildings , highway , water , electricity , enclosure in the garden have already been built up, 27 enterprises (including 2 deep processing enterprises) have already started and built some by oneself in the garden, 7 have already built up. Except that it utilizes synthetically the seventh kind of wastes imported by out city on disassembling and deep processing, the garden still reserves some land., and plans to build up our city to disassembles , processes to the base that abolishes the electromechanical equipment products , abolishes household appliances and electronic product wastes at home.

While above-mentioned projects are completed for use, we were still builds up Comprehensive utilization of a number of hazardous waste and handling enterprises etc, for instance: state recycling of port shipping waste oil in National marine

high-new technological development in Tanggu District, handling and recycling of packaging container place of the hazardous waste in Dagang District and Wuqing district. The construction of the infrastructure for environmental protection in Tianjin helped Tianjin set up, form and improve the pollution prevention and control system for hazardous waste including the laws and regulations, establishment of institution and support of hardware which provides management of environmental pollution prevention for hazardous waste with powerful support.

Our overall thinking in building the treatment facilities of hazardous waste is “The system of facilities is intensified, built Set up the fund is socialized, the technological craft internationalization, equipment production domesticization of facilities, enterprise run the marketization, environment Manage the standardization, design team's specialization ”.

Our experience of the treatment facilities construction aspect of the hazardous waste is as follows:

- (1). The demand of City's infrastructure construction. The construction of high-level treatment facilities of hazardous waste has solved the question of safe home of the hazardous waste, has filled the blank of City's infrastructure construction, and has improved the investment climate. For instance, the centre in dangerous waste disposal of Tianjin has passed the Global environmental auditing of some trans-corporations, Motorola, tongyong, Inter etc, and accorded with standard and demand of handling hazardous waste of above-mentioned companies. Some overseas enterprises making an investment in Tianjin in some plans has also visited the treatment facilities of hazardous waste of Tianjin, so that the worry of making an investment in China has solved for these companies.
- (2). The demand of environmental protection. The construction of the treatment facilities of hazardous waste offer reliable hardware guarantee for carrying out “Law of Prevention and Control of Pollution of Solid Waste in the People's Republic of China” and managing, supervising and controlling the hazardous waste in the whole course.
- (3). It is the demand of the anti-shot SARS. Tianjin City has already completed the demand of “Cities above municipal level with established districts should build up centralized treatment facilities for medical wastes within one year” stipulated in “the Medical Waste Management Regulation” by State Department 9 month in advance, that gain voluntarily for medical centralized wastes Treatment and do the material preparation for preventing form SARS again.
- (4). It is the demand of developing the circulating economy. The construction of the treatment facilities of hazardous waste is one important part in a city circulating economy, and doing well this part work can arouse the whole operation of circulating economy.
- (5). It is the demand of Seizing the commanding point and developing the environmental science and technology industry. In Tianjin the construction of the treatment facilities of hazardous waste is practice of making the scientific

findings turn into productivity, has independent intellectual property rights, can pull the environmental protection industry, and bring about an advance in economy.

- (6). It is the demand of leading the public-spirited business into the market mechanism. In Tianjin the construction of the treatment facilities of hazardous waste broke through the social construction and management mode, in which the public-spirited business is invested, supported and managed by the government, and introduced the public-spirited business into the operating mechanism of the market.
- (7). It is the demand of the development and reform in the scientific research institutions. Scientific research technology is combined with enterprise's market organically, that has tempered the scientific and technological ranks and expanded the development space of the scientific research institutions.

In a word, in Tianjin the construction of the treatment facilities of hazardous waste has reflected the overall thoughts of innovation, improving level in an all-round way, great-leap-forward development put forward by municipal Party committee and government of Tianjin from 99 that are every year, Reflect " 358 ten " strategic spirit , reflect in a situation that there is no condition setting the spirit of terms, and reflect science and technology of relying on , respect spirit and Tianjin of talent create national individual event spirit of fighting with all one's might of champion bravely.

2. Strengthen the work of management for the prevention and control of pollution of the hazardous waste

Having perfect hardware facilities of waste management, we should perfect the construction of the management software of the hazardous waste even more. Without management software, hardware facilities can't fully play an effective role.

(1). Strengthen the construction of the management organization

In order to ensure the smooth implementation of the laws and regulations, we must set up the high-efficient, smooth mechanism of management. The Tianjin Environmental Protection Bureau established solid waste and physics to pollute the management office in 1997, which specialize in the managements of prevention and control of pollution of solid waste, hazardous waste, noise and radiation.

The Tianjin Environmental Protection Administration in 2001 ascertained the structure mode, in which the 4 key offices of water, gas, solid waste (noise) and ecology are always responsible for environmental quality, the management office of solid waste and physical pollution as the key office is responsible for the management of solid waste firmly in an all-round way. In 2001 "Administrative Center of Solid Waste and Poisonous Chemicals" was founded, which Entrusted by Environmental

Protection Administration of the city and carried on the technical management to solid waste, hazardous waste, medical wastes and poisonous chemicals.

(2). Strengthen the construction of management laws and regulations

In order to carry out in an all-round way “Law of Prevention and Control of Pollution of Solid Waste in the People's Republic of China”,

Our city since 1999 Have issued in succession “Regulation on Environmental Pollution Prevention of Poisonous Chemicals in Tianjin” and “ Regulation on Environmental Pollution Prevention of Hazardous Waste in Tianjin”; and EPA of Tianjin in 2001 constituted “Management Regulation on Permitted Licenses of dealing in Hazardous Waste in Tianjin” and “Detailed Rules on Hazardous Waste Manifest in Tianjin”, etc., basic management regulations about hazardous waste, so as to perfect the laws and regulations of hazardous waste and poisonous chemical products management further.

In management of medical waste, “Notice on Comments of Centralized Disposal of Medical Waste Written by the government of Tianjin and Transmitted to the Environmental Protection Bureau of Tianjin” is successively issued this year, “Notice on Related Problems of Centralized Disposal of the Medical Wastes”, “Notice on Checking and Ratifying Regulation of the Amount of Collecting the Medical Wastes”, “Rules on the Supervision of the Environmental Pollution Prevention Medical Wastes in Tianjin” and “Temporary Provisions on Medical Waste Management of health and Sanitation organization of Tianjin”, etc.. The above regulations, for strengthening the management of the medical wastes in Tianjin, get up to the legal guarantee. In order to implement the “Notice on Implementing the System of Paying Hazardous Waste Disposal to Advance the Industry of Hazardous Waste Treatment” (NDRC-Price-No.[2003]1874), Municipal Price Bureau of Tianjin has already issued the document (Tianjin price medicine [2004] No. 311), which regulated that since August 1, 2004, to improve the berth fee in hospital and clinic examine expenses standard in the non-profitable medical organization, that the income lifted will be used for paying for the treatment of medical waste and collection and storing inside the hospital etc. to raise the price; that the hospital will turn in the treatment expenses of medical wastes according to the operating position of the berth. The Policy play an important role in ensuring the dangerous waste disposal of the city to handle the operation of the centre and ensuring the realization of goal to the limit to should collect dangerous waste disposal.

(3). Strengthen integrated control planning o the hazardous waste and pollution

In order to meet the need of the environmental protection changing situation, at the beginning of 2003, we set about the establishment work of “the Plan on Integrated Control of Solid Waste Pollution in Tianjin” promptly. The nation has none unified ,

systematic solid waste pollution integrated control to plan to work out outlines, the local organization set about the establishment work without something consulted. Therefore,

We have worked out outlines of planning at first on the basis of the thing that fully survey and study to the current situation of solid waste management. The Planning has already been finished at the beginning of this year.

(4). Do each management job better

Besides doing above-mentioned several management job better, we have also launched the application and registration of solid waste and hazardous waste, have set up application and registration database, thus grasped the producing and handling situation of the hazardous waste more factually. Apply for the management that management of examination and approval and hazardous waste shift in the business license of the hazardous waste, have make out a set of concrete, normal management modes too, and has set up the database.

We also managed strictly the examination and approval of environmental impact assessment; to the construction project producing the hazardous waste, we require project unit and “Tianjin Solid Waste and Poisonous Chemicals of Managing During the Course of Appraising the Heart” signs “the Dangerous Waste Disposal Agreement”, and regard this agreement as one of the essential conditions that the ring comments examination and approval, therefore has realized that manages from the source.

In order to propagate and implement every rules and regulations, improve employees' professional qualifications, we write and print “the Environmental Management Training Materials of the Hazardous Waste”, “Hazardous Waste Environmental Management Regulation Collect”, study propaganda materials and CD. And have already carry on the professional knowledge training for all the personnel of the whole city who handle enterprises and deal in the hazardous waste.

The implementation of the above control measures has created the advantage in order to realize the goal of 100% of the innocuous struggles that handled of security of hazardous waste.

Tianjin Environmental Protection Administration
August 2, 2004

**The Present Situation of Solid Waste Discharge, Disposal and Industry
Development Prospect in Chongqing**

Solid Waste Management and Service Centre of Chongqing

August 11, 2004

Honorable leaders and friends,

Thanks very much that State Environmental Protection Administration and Asia-Pacific Regional Centre for Hazardous Waste Management Training and Technology Transfer hold this meeting. It has fully explained our country's solicitude and expectation on solid waste disposal industry development. And it has also offered me a chance to report Chongqing city solid waste discharge and disposal present situation and prospect on solid waste disposal industry developing tendency to leaders and friends on environmental protection. Here, I unfeigned express the highest respect and thanks to the leaders and friends who always guides and sustains vigorously developing solid waste disposal industry.

Chongqing locating in southwest of the motherland and having 81 thousand square kilometers, the youngest , have 31.3 million people, municipality directly under the Central Government, has jurisdiction over 40 counties (the autonomous counties and cities), realized 225 billion RMB GDP in 2003, 83.5 billion RMB total retail sales of social consumer goods, 20.6 billion RMB local budgetary fiscal revenues, 8093 RMB disposable annual income per urban residents and 2214 RMB net annual income per peasants; 25% city forest coverage rate, 27% mainly urban green coverage rate. In 2003, "three civilizations" construction has been pushed forward vigorously, in building "the economic center in upper of the Changjiang River" and great project of "fresh , clean" new Chongqing have taken a solid step, overall work will overfulfil established task.

With the rapid development on economy of our city, the solid waste not only grow quickly on quantity , but have more various and complex kinds. Especially hazardous wastes, whose pollution is more harmful, not only pollute the environment, destroy natural landscape and take harm to people's health, but also can leave great difficulty on management after polluting and have long time influence. So solid waste, especially hazardous wastes disposal problems have become Chongqing city's important environmental protection work.

According to recent years' statistical data, the whole city produces 13.48 million tons industrial solid wastes (including hazardous waste). which contain integrated utilization 8.9705 million tons, discharging 1.6094 million tons, handling 687.8

thousand tons, storing 2.2123 million tons, taking producing quantity separately 5%, 11.9%, 5.1%, 16.4%.

In the past, our city's solid waste management, especially hazardous wastes management, was the unsubstantial aspect. We didn't clearly know about the situation of solid wastes in the enterprises, especially stream, quantity and pollution status of hazardous waste, although we have tried several times to find out the some situation through the declaration of pollution emission and investigation of solid wastes. In order to strengthen the grasping and understanding of hazardous waste, solid waste control center have verified whole city's hazardous wastes disposal on March, 2003.

It shows: the amount of the hazardous wastes producing was 0.471 million tons in recent years, among which industrial hazardous waste was 99.5%, hospital rubbish was 0.3% and others was 0.2%. The comprehensive utilization amount of the hazardous waste was 0.181 million tons, 38.4% of the whole and discharge amount was 2.6 ten thousand tons. According to investigation, the producing amount of hazardous waste in Chongqing was 0.318 million tons in 2000, 0.448 million tons in 2001. The amount of the hazardous wastes producing shows an increase tendency year by year.

In the whole city, except few produce units utilize hazardous waste, the majority is utilized by other units. Comprehensive utilizing technological level is relatively low, and some enterprises still do secretly discharge.

For reasons given above, on the basis of do better city industry layout, Chongqing city adjust the industrial structure, optimize resource distribution and develop no pollution, low pollution, low energy consumption products. Do something more to strengthen hazardous wastes pollution prevention technique and open up new way of wastes comprehensive utilization. Improve products recovery rate to make wastes discharge minimum. Achieve the goal of making harm into benefit and turning waste into useful products.

In recent years, especially after SARS epidemic situation took place last year, the country pay more attention for the disposal problem of solid waste especially hazardous waste, enact a series of requirements from regulations preparation, facility construction to charge policy and supervising law execution. Therefore a good opportunity has been offered for the development of solid waste disposal industry.

In regulations preparation, besides a series of laws and regulations made by the country, "Regulation on Pollution Prevention Management of Hazardous Waste in Chongqing", "Working Program of Hazardous Waste Manifest in Chongqing", "Implementing Rules on Permitted License of Dealing in the Hazardous Waste in Chongqing", etc are in course of examining and approving now, these all have offered regulation guarantee for the proper development of solid waste disposal industry.

In facility construction and national financial support, according to “Construction Program of National Hazardous Waste and Medical Waste Disposal Facility”, Chongqing city is going to build 4 hazardous wastes centralized-treatment projects and 4 medical waste centralized-treatment projects. In order to protect reservoir area of Three Gorges water quality from solid waste pollution, our city have concentrated build up, build and to build 3 industrial solid waste landfill, 2 hazardous wastes disposal facilities, 6 hazardous wastes transfer fields, 16 household garbage disposal facilities and 3 medical waste incinerators, for the purpose of centralized-treatment of industrial solid waste, urban household garbage, hazardous waste and medical waste. The majority of construction fund will be support by the national debt fund. Entrusted by environmental protection administration of Chongqing, our solid waste center have workout “Implementing Scheme on ‘Construction Program of National Hazardous Waste and Medical Waste Disposal Facility’ in Chongqing”, which have already solicited every relevant department’s suggestions for many times and is to be reported to municipal government for approval.

In charging policy, according to National Development and Reform Commission, State Environmental protection Administration and other 3 ministries issued together last year, “Notice on Implementing the System of Paying Hazardous Waste Disposal to Advance the Industry of Hazardous Waste Treatment ”, after coordinated with city price department, the expenses standard of our city is hopeful to issue in the short term.

In industry's market demand, except that household garbage built and operated large quantities of disposal field according to “Program on Water Pollution Prevention in the Upper of the Changjiang River”, Chongqing city have 0.47 million tons hazardous waste need safety disposal every year, and need to construct final disposal center which make several concentration disposal fields as core, large quantities of professional disposal fields for integrated utilize of electronic waste , heavy metal , used battery and some other waste, medical waste incinerator field, and disposal fields constructed by corporations themselves which produce waste thousands ton every year. Construction, operation of these treatment facilities, and disposal technology about incinerator and integrated utilize, of which are in dire need to be exploited and introduced electronic waste, have all brought business opportunity for solid waste disposal industry.

We warmly welcome domestic and international friends come to our beautiful mountain city —Chongqing and beautiful Sanxia to take a visit, invest and cooperate to exploit and construct hazardous wastes disposal and treatment environment harmless industry, and have develop simultaneously.

**Set Up and Carry Out the Scientific Development View Firmly Advance the
Overall Development of the Management of Hazardous Waste in Shandong
Looking For the Truth and Be Practical**

Fusheng, Zhong

Hazardous Waste Management Center of Shandong Province

August 3 in 2004

“Putting people first, establishing overall, coordinate, sustainable development view and promoting the economic society and people's overall development” is the concrete embodiment which carries out the important thought of “Three Represents”, it is an inevitable demand for building the ecological province and developing recycle economy in an all-round way. Implement the scientific development view, look for the truth and be practical, pay real attention to doing solid work, it is the only way of advancing the hazardous waste in our province with all-round developing management under the new situation too. In accordance the practice, we have the following ideas on how to do our own job when insisting on the scientific development view:

1. Implement the country to "Plan" conscientiously, define the hazardous waste treatment facilities in our province and build the direction.

● define the main task of our province in the plan

The first is the construction of the treatment facilities. According to “the Plan on Construction of Hazardous Waste and Medical Waste Disposal Facilities” (abbr. Plan), in the whole country 31 multiple functional and comprehensive hazardous waste treatment centers are built. it is planed to build up one in Zibo of our province, and scale of treatment ability is 200 thousand ton per year; it is planed to increase the treatment ability of 50 thousand ton of the hazardous waste treatment facility per year each at Qingdao , Linyi separately. In the whole country the 300 treatment facilities of hazardous waste are built, and it is planed to build up 15 ones in our province. The treatment ability of hazardous waste is increased by 300 thousand ton per year, and the treatment ability of medical waste is increased by 126 ton per day. The second is the increasing of monitoring of the basic ability construction, including Building the 31 provincial register and exchange centers of hazardous waste, increasing the ability construction of monitoring , information , technology research, supervising and management, etc. and setting up national in common use information system and accident network of meeting an urgent need. The third is setting up collecting, transporting and treatment system. Including setting up medical wastes collecting,

transporting, storing and treatment system detailed to hospitals of villages and towns, forming and relatively perfecting special treatment and supervising mechanism, implementing the whole course manage of producing, collecting, transporting, storing and treatment to hazardous waste and medical wastes, guaranteeing the hazardous waste and medical wastes are stored and handled safely. The fourth is to establish and improve the system of supervision and management. It requires us to constitute and perfect the laws and regulations system of hazardous waste management, set up the operation system with the clear responsibility and complete management file.

- **Hold accurately and the construction principles of the plan**

The first is centralized treatment and reasonable distribution. According to security and economy reasonable, easy demand that supervise, build the centralized treatment facilities of hazardous waste by province, and build the medical waste treatment facilities covering the county Districts according to the zoning construction of the region. The second is the comprehensive plan and construction of hazardous waste and medical waste facilities in order to give full play to benefit of the treatment facilities. The third is to enhance the technical start by use of advanced, practical, mature and reliable technology. According to national standard, technical specification construction and management, realize handling safely conscientiously. The fourth is Multiple functional, and to form a complete set synthetically. According to “the Trinity” of the handling centre mode, we should carry on design and construction, and insure the requirement of the recycle treatment, reduction and innocuous disposal. The fifth is to enhance the construction of the ability of supervising and management. We insist that the project construction, operation and management should be considered as a whole, and build and drive software construction with the hardware. The sixth is to improve and equip the manufacture level, and to advance industrialization actively. The seventh is to go ahead of the rest Pilot project, then to push away steadily. On the basis of summarizing experience of popularizing constantly, the treatment facilities of the hazardous waste and medical waste are organized and built.

- **Understand the national policies and measures correctly**

The treatment of hazardous waste and medical wastes has stronger public commonweal and urgency. For it we Should mobilize the citizen's participation and raise fund for organizational building actively; the country encourages absorbing the domestic and international social fund which is used in investing in construction; we also should draw lessons from domestic and international advanced technology actively, promote industrialization for device fabrication and production domesticization level, and guarantee to build the quality and progress; according to “Notice on Implementing the System of Paying Hazardous Waste Disposal to Advance the Industry of Hazardous Waste Treatment” issued jointly by national five ministries and commissions, we make the policy of charging, guarantee the normal

running of facilities; we should set up specialized treatment team, implement commercialized management , and strengthen the supervising of the whole course.

2. Serve the ecology construction of Shandong, guarantee the development of recycle economy, and establishes the management guidelines of hazardous waste accurately.

To build the ecological Shandong city and develop the recycling economy, which means we should organize the whole course of producing, consuming and waste treatment in accordance with ecological rules, improve fully the using efficiency of resource and energy, realize the recycling process of “resource, products, recovering resource and recovering product”, decrease farthest the waste releasing and end-treatment, and realize the common benefit of economy, society and environment, bring forward the higher requirement and more strict standard. So we must work tightly around the ecological construction of Shandong and recycling economic development, and establish the lodestar of hazardous waste management by scientific developmental view.

- **Understand profoundly the abundant meaning of scientific developmental view, and enhance the idea of serving guarantee.**

To establish and fulfill the scientific developmental view requires that we must realize profoundly the importance of the scientific developmental view in our heart, hold correctly the real spirit of the scientific developmental view, understand really the abundant meaning of scientific developmental view, and confirm the basis of thought of scientific developmental view. The connotation of the scientific developmental view is comprehensive, harmonious and sustainable developmental view, is improving the better and faster development of economic society. The essence is that people first, the basic demand is to make overall plans. according to the harmonious and sustainable development and “five plans as a whole”, we should Focus on holding intension, changing the idea and implementing the measures, and establish the solid thought theoretical foundation in order to serve the construction of ecological province , develop recycle economy.

- **Practise the scientific development view consciously, and establish the guidance and ideas of hazardous waste management.**

In order to achieve the whole target of ecological province construction and recycle economy development of our province, on the basis of the current reality of hazardous waste management of our province, and according to the responsibility of hazardous waste management center, we go ahead with current age and create the new thoughts. We have established the guideline and thought of hazardous waste management of our province ,which orders that we should regard the important thought of 'Three Represents' and spirit of the Third Plenary Session of the 16th Party Central

Committee of the party as guidance, and insist on people first , firmly establish and implement scientific development view, round and build “great and strong , rich and beautiful socialistic new Shandong” firmly in order to serve the construction of ecological province and ensure recycle economy development as the basic point, in accordance with the demand of scientific development view. with recycle treatment, reduction, innocuous for criterion, we set up the mechanism of supervising and management in the whole process, carry out practical scientific development with looking for the truth, realize the total goal that hazardous waste are treated finally with recycling and innocuousness, and transformed the linear economic mode of “resources - the products - the wastes” into recycle economy of “resources - the products - the regenerated resources” progressively.

3. Implement the scientific development view, look for the truth, concentrate on the reality, and promote the comprehensive development of hazardous waste management.

“The one that be known is non- difficult, and the ones that be done are only difficult.” “The empty talk misses the country, and to work at practice will make the country prosperous”. Setting up and implementing the scientific development view, building the ecological Shandong, and developing recycle economy have offered the wide space that a secretary started an undertaking for the better hazardous waste management deeply made by us. This year is important year for us to carry out the each work constituted by Government of Shangdong Province. We should develop the spirit of being practical and realistic and faithfully put each work into force,in accordance with the request of scientific development view.

- **Plan as a whole, and carry out “the suggestion of implement” conscientiously.**

according to the national “Plan” and the “Notice on Accelerating Centralized Treatment Facilities Construction of Medical Waste” of provincial government, the Environmental Protection Agency of the province and planning commission of the province have jointly printed and distributed “the Implementation Opinions on ‘the national plan of treatment facilities construction of hazardous waste and medical waste’” (abbr. Implementation Opinions). It has determined “one guideline, two overall goals, four main tasks, five guarantee measures.” of the treatment facilities construction of hazardous waste and medical wastes in our province. Before the end of 2006, our province will finish the treatment facilities construction of hazardous waste and medical waste, which has been involved in the national plan and is in accordance with the national construction standard. We will also have set up the management system of the whole treatment process including collection, transport, storing and treatment of hazardous waste and medical waste; have built up the commercial running mechanism. For implementing “Implementation Opinions” and for accelerating the treatment facilities construction pace of hazardous waste and

medical wastes in our province, we make the focal point of work of the step: the first is making detailed task, and defining responsibility. we should make the plan that the goal is resolved, and then resolve scientifically the task stipulated in “Implementation Opinions” into concrete working projects, define item by item responsibility onto the unit and personnel; we should make and implement the reasonable time table of “Implementation Opinions”, define construction criterion, stipulate the finishing time limit, make project construction with methods, steps and standards orderly. The second is to strengthen the supervising and guiding. According to reality, we should manage the building progress in good time, supervise every city to accelerate working paces, pinpoint the problems in time, correct deviation of building, solve the difficulties actively, and guarantee project quality. The third is implementing the guarantee measures. Under leadership of the leading group in the “three wastes” treatment facilities of province office, we should set up effective management and coordination system; strengthen the Organization leadership of treatment facilities. According to the reasonable distribution, we should selects site with discretion, confirms the scale scientifically, implement the project owner as soon as possible, and do a good job of project earlier stage responsibly and seriously. In line with principle of "who pollute, who pay” and “breakeven or small profits”, we should make and implement the Charge policy of “three wastes treatment” as soon as possible. We should find out the truth of a matter of “three wastes “in our province, set up the database of sharing and realize resource-sharing. We should also strengthen the construction of ability of supervising, improve the competence of supervising, really supervise and manage the projects built well.

- **be as Pioneer, invent and do practical work, and do a good job of four key jobs conscientiously**

The first is to do a good job of the declaration and registration of the hazardous waste conscientiously. In the first half of this year, we organized the declaration and registration of the hazardous waste Exhibition hazardous waste of the whole province, worked out and issued “the Source of Producing the Hazardous Waste and Cue Form of Probably Produced Hazardous Waste”, “Declaration and registration form of Hazardous Waste Pollution Sources in Shandong” , “Declaration and Registration Software of Hazardous Waste Pollution Sources in Shandong”, and have carried on special training about declaration and registration. We will declare according to four big classes of business activities, including industrial enterprise, hygiene medical treatment, waste disposal industry, using and running, and will gather relevant data materials, set up the shared database between hazardous waste and medical wastes in the whole province, and offer the reliable basis to confirm the construction scale of the treatment facilities scientifically. The second is accelerating the construction of treatment facilities center of hazardous waste in our province. We should confirm the subject unit of the project according to relevant laws and regulations, investigate actively that drafts the cooperative partner, and establish the project company as soon as possible, operate the project to prepare to establish and work at the beginning, and

manage and make use of country's assets reasonably and seriously. We should accelerate the establishment work of the feasibility research report of the project and project environmental impact appraisal report, declare relevant formalities to Planning Commission, National Development and Reform Committee, State General Bureau of Environmental Protection of the province according to the capital construction procedure, so as to obtain the national subsidy fund to put in place as soon as possible, and make the project of our province start as soon as possible. We should determine the project site, on the foundation of selecting site and operation in earlier stage, adopt the way in which the land pools, strive for it by fixed position as soon as possible, and enter substantive operation stage. We should find out it on the foundation of the resources in declaration and registration of hazardous waste, and confirm the construction scale rationally.

The third is accelerating the technological reconstruction of treatment facilities of hazardous waste in the whole province. Because the medical waste treatment facilities previously built in our province with low technical level are just used to resist SARS, which was the serious epidemic happened widely in China in 2003, and most facilities within it do not accord with the construction criterion issued newly. In order to improve the engineering level of medical waste treatment facilities in our province in an all-round way, according to the national implementing plan, “the suggestion of implementing”, relevant standards and technical specifications, we should check, in an all-round way, such seven contents as scale of project, project function, engineering level to the medical waste treatment facilities, etc. Thought it we can instruct every city to regroup the application report for developing or environmental report, and to propose the technological transformation scheme, guarantee to all accord with national relevant standards with contrasting the new standard. The fourth is to strengthen to propagate the general knowledge of preventing and curing the hazardous waste. Environmental security question has something close to do with the healthy of the broad masses of the people. With the development of economy, the progress of the society, the people have more and higher expectations for environmental quality of life, and the consciousness of caring about and participating in environmental protection is stronger and stronger. For this reason, we specially publish “Manual of Publicizing the General Knowledge for Hazardous Waste Management” and “Selected Anthology on Case of Hazardous Waste Accident or Incident of Shandong”, which were distributed to the people on the environment day of June 5th. Through propagating and educating, we have made the broad masses of the people know what the hazardous waste is, see clearly the danger of the hazardous waste, find out about general knowledge of prevention and cure of the hazardous waste, and improve the whole people's environmental awareness, resource consciousness and precautions against consciousness to the hazardous waste. We will strengthen general knowledge propaganda strength of prevention and cure of the hazardous waste further, lead the masses to participate in the prevention and control of pollution of the hazardous waste together, and form a group of supervision pattern managed by the mass though depending on the strength of the whole society.

- **Strengthen ideological education, take charge of the institutional improvement severely, and perfect management mechanism of hazardous waste.**

“No square and round without bow compass and ruler”. It is the key point of promoting the implementation of work to implement the system. Equally, to implement the scientific development view, look for the truth and be practical and pay real attention to doing practical work, and implement the system seem particularly important. First of all, we need to strengthen the consciousness of scientific development and looking for the truth and be practical from thought. The thought is the guide of all actions. To establish the scientific development view from the thought and look for the truth and be practical and pay real attention to doing practical work in the action, we must strengthen theory study, understand the deep intension of scientific development, know importance of scientific development of view deeply at thought, and play firm thought foundation that scientific development looks for the truth and be practical. Secondly, the ones that reflect and look for the truth and be practical in scientific development are regulatory from system. We should insist scientific development view by the implementation of the system, carry forward the spirit of looking for the truth and be practical, on the basis of studying and drawing lessons from, set up and amplify and endanger the system in charge of the centre, insist and perfect every system of studying and check and rate the system, establish the idea of “serve ecological Shandong, and ensure recycle economy”, follow “efficiency, fair, open, just”, carry out the environmental protection system of “six prohibitions”, and promote the standardization that bring about an advance in science and look for the truth and be practical with the institutional improvement by institutions. The factor that means Establishing, implementing the scientific development view firmly, building ecological Shandong and developing recycle economy, offer the good opportunity for hazardous waste management of our province, and bring the severe challenge at the same time. We will strengthen opportunity consciousness and suffering consciousness further, will remain the sober head throughout, dare to exert pressure by oneself, meet the difficulty, seize the opportunity, ready for the challenge, make a contribution for building “great and strong, rich and beautiful socialistic new Shandong”.

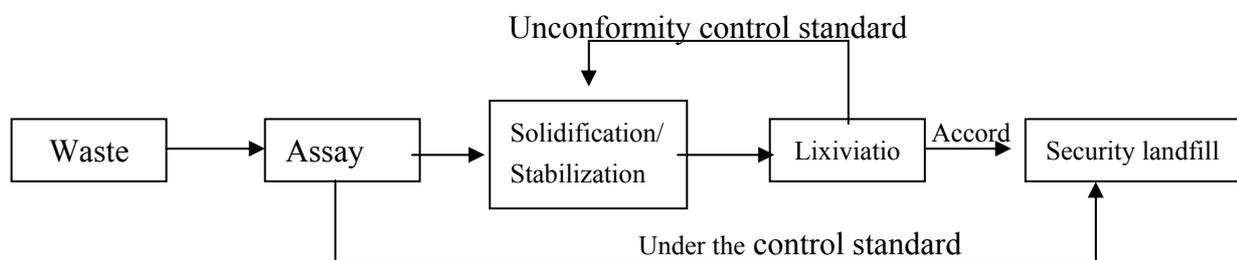
Hazardous Waste Landfill Centre of Liaoning Province industrial Solid Wastes Centre of Shenyang

Shenyang Industrial Solid Waste Disposal Center, which firstly adopted the international advanced technology and equipment, is a specialized company to treat and utilize hazardous waste safely. About 1400 million yuan, 13 hectares, design and deal with all kinds of 20,000 tons of hazardous waste, operation time limit is 12 years every year. At present, the centre has already become the popular science educational base of the environment of Shenyang and hazardous waste disposal center of Liaoning Province.

1. Technological route of landfill

Three kinds of hazardous wastes can enter the safe landfill yard of Shenyang is metal wastes of leaded, mercury, nickel, copper, zinc, chromium, etc.; Solid state and half acid or alkaline of solid state; such other kinds of wastes as the resin, cyanide, small amount of asbestos, patent leather dreg, and abolishing, etc..

After the waste enters into the site of treatment, It will be treated harmlessly in accordance with the following technological route:



Waste water, producing in the process of stabilization/solidification, filtrate in the course of landfill, waste in the course of washing car and the process of test, gather to waste water treatment plant, through the physics chemical disposal: deoxidizing, neutralizing, depositing, filtering, active carbon absorbing reducing, etc., discharge or utilization or washing after being up to standard.

2. Operation permit

Once get “Permitted License of Dealing in Hazardous Waste” of Liaoning Province, the enterprise can have the qualification of collection, transportation, storing, exchanging, handling safely, comprehensive utilization on the industrial solid wastes. October 2000, get the reply file on the expenses standard of industry harmful wastes

([2000]267), and applied the operation permit after Shenyang Price Bureau established the expenses standard on the industry harmful waste clearly.

- Abandonment hazardous chemicals that SEPA announced fixed treatment unit, in 2003.
- Regard as the hazardous waste landfill and treatment center of Liaoning Province by Liaoning EPB, in 2003.
- Pass ISO14001 Environment Management system and OHSAS18001 job healthy and safe management system authentication smoothly in January of 2004.

3. The perfect infrastructure and complete mechanical configuration

The center has workers more than 40, and is building and operating the first standardized safe landfill yard of hazardous waste in national area. There is tested and analyzed system, collection and transportation system, classification storing and stabilization and solidification system, security landfill system and sewage disposal system for hazardous waste. In addition, in order to meet the need of environmental management, built a new standardization storehouse to store hazardous chemical, 4000 square meters, used for collecting, storing all kinds of discarded dangerous chemicals temporarily, in 2002.

The factory has 25 various kinds of vehicles in all, 1 shovel excavator (PC300), 1 bull-dozer, 2 vibration type road rollers (15 tons), 6 hook trolleys by oneself (15 tons) of wushiling, 4 unload and hang transport by oneself, 1 flatbed of east wind, 1 tip truck of east wind, 1 forklift truck, 1 waterwheel, 3 forklifts, 2 small-scale tip trucks, 1 motor bus, 1 limousine.

4. Outstanding achievement

Solid waste treatment center has finished basically transition from construction period to operating. Since putting into operation in 2000, it has obtained certain achievement in different fields.

1) The collection station of hazardous waste

Up till now, collect 16 kinds of hazardous waste in 47 kinds of hazardous waste in the national hazardous waste register and discard about 20,000 tons of chemicals altogether.

2) The work on the waste integrated reuse

Treatment centre is studying and starting the project to of the sensitive material wastes, old and useless tire, etc.

3) Building the network for solid waste

The network has put into operation that set up by the treatment center and the information centre of the city on January 1, 2004. It will widen the channel greatly in the collecting, exchanging, disposal and integrated reuse of waste.

5. Environmental protection industrialized yard of solid waste in the Northeast (Shenyang)

At present, we set about carrying on the planning of “Industrial Park of Solid Waste Environmental Protection in the Northeast of China (Shenyang)”. In solid waste environmental protection industrialized country construction project garden, it can make the waste resource to collect, configure, exchange and utilize circularly among the enterprises. And public auxiliary equipment is shared. The final residue is treated safely. Pollution gets centralized control. The implementation of this project can already create the good investment environment, has promoted the urban overall image, solve the environmental pollution, can drive the development of the environmental protection industry and create enormous economic benefits, environmental benefit and social benefit.

Shenzhen Baoan District Industrial Waste Disposal Center

Shenzhen Baoan district industrial waste disposal center is an institutional unit that under the direct control of Shenzhen Baoan district environmental protection administration. It was built in April of 1996 and covers 25 thousand square meters and has over 40 staffs. It is a environmental protection professional organization for socialization concentrative disposal, treatment industrial waste especially hazardous wastes and takes charge of collect, transport , treatment, comprehensive utilize and safety disposal all enterprises and institutions' industrial waste in Shenzhen Baoan district. And it bears collection and disposal task of small amount of industrial wastewater produced by enterprise without treatment facility.

In recent years, Baoan district industrial waste disposal center has invest more than 20 million yuan successively to build a comprehensive environmental protection industrial park in Shayi village, Shajing town, Baoan district, as the pretreatment and transporting base of industrial waste in Baoan district. Now, this disposal base has built a perfect system of waste collection, a waste acid synthesise using workshop, a set of waste water (liquid) physical and chemical processing system and a waste storehouse. waste acid synthesise using workshop has a productivity of 500 tons per month, and physical and chemical processing system 's maximum treatment ability can be 200 tons per day.

Between 2000 and 2003, waste hydrochloric acid comprehensive utilization amount is up to more than 23000 tons, hazardous industry mud transporting amount is up to more than 10000 tons, the treatment capacity of waste liquid is more than 7500 tons and other hazardous waste are up to more than 300 tons.

Disposal center regards the control of industrial waste (especially hazardous waste) pollution as own duty, and through a few years' effort it has made remarkable social benefit, environment benefit and economic benefit. It has made contribution on improving and safeguarding the environment quality of Baoan district.

Mailing address: Environment protection industrial park in Shayi village, Shajing town, Baoan district of Shenzhen

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Yantai Hazardous and Medical Waste Treatment Facility Construction Report

Under national, province relevant laws and regulations, in order to do well the hazardous and medical waste centralized treatment; there have been making comprehensive investigation and research from 2000, studying successful experience outside, harmonizing working of concerned sector. Relevant situation are as follows:

1 Work situation

(1) Carried medical waste investigation of the whole city and grasped the direct information. Investigating the medical waste discharges and existing disposal ability, and stressing field verification to 58 medical institutions above county level to provide foundation for building medical waste treatment center.

(2) Organized inspections and investigations, studied the management experience outside of our city. From 2001, we organized involved person to investigate and study the construction, management and operation experience from Dalian, Hangzhou, Weihai, Rizhao, Qingdao etc.

(3) Prepared to construct “Yantai Environmental Hazardous Waste Treatment Corporation”. Because of lacking effective and uniform treatment facility, we took Yantai environmental protection consultation design institute as a main body, established “Yantai environment hazardous waste treatment corporation” in 2002, and constructed hazardous waste incineration and discarded organic solvent recycling bases in Yantai development zone, Fushan zone and Laizhou city.

2 Construction situation of medical waste treatment center

The construction of medical waste treatment center has already brought into agenda of municipal government, specially after 2003, according to State Council “Rules of Medical Waste Management”, people government office of Shandong Province “Notice on Accelerating the Construction of Medical Waste Centralized Facility” (Lu government office[2003] No.26), Shandong Province environmental protection bureau “Notice on Implementing the Rule of Medical Waste Management” (Lu environmental office [2003] No.198), as well as Yantai people's government office “Conference Summary of Relevant Problem on Construction of Medical Waste Treatment Facility” (conference summary [2003] No.99), Yantai medical waste centralized treatment center adopted market operation pattern, which was invested and operated by Shengjie environmental protection corporation.

This center was located in Yantai garbage disposal plant (in ancient-present office of development zone, Yantai), occupied 15 Chinese acres, planed 17 million Yuan

investment, designed to treat 10 tons medical waste per year. After inspecting and early arranging, this center officially began to construct from October, 2003, and at the end of March, 2004, the infrastructure and relevant facility were finished, treatment facility was installed, debugged and had been operated for 1 month, each concerned pollutant discharge target had conformed to the state discharge standard through monitoring of Yantai environmental monitor center in May, 2004, the process ability reached 8 tons, special transport vehicles all had already arrived, everything varied from personnel to main facility had been achieved and conformed to check and accept condition. So far, the center has completed investment of 12 million Chinese Yuan and still has one spare product line treated the installment. At the beginning of operation, this center was in charge of primarily centralized treatment of urban district medical service waste, and will serve the whole city in future (5 areas and 7 county level cities).

At present, the municipal government relevant charge policy and “Rules of Medical Waste Management in Yantai” had been made and would be polished and put into force in the near future. At the appointed time, Yantai environmental protection department will associate with plan committee and board of health etc. to check the medical waste treatment center of Yantai, Shengjie environmental protection corporation. After the approval, we will provide the centre with “Permitted License of Dealing in Hazardous Waste” according to “Management Regulations on Permitted License of Dealing in Hazardous Waste”, driving the medical waste treatment centre into operating early.

3 Construction situation of hazardous waste treatment center

To carry out “Implementation Regulation on ‘Solid Waste Pollution Environment Prevention Law of People's Republic of China’ of Shangdong Province” and manage the hazardous waste, we had developed hazardous waste declaration and registration at the beginning of 2003, and published “Notice on Strengthening Hazardous Waste Management”, strictly forbidding hazardous waste to illegal transferring. In this foundation, Yantai environmental hazardous waste Treatment Corporation had to quick the construction of relevant facility according to the species and amount of hazardous waste in our city. At present, waste organic solvent treatment base, incineration base and waste emulsion treatment base have been established, and have received the hazardous waste business license issued by Shandong Province environmental protection bureau.

The present situation of hazardous waste treatment in our city is that waste solvent treatment base can deal with: the refined residue (HW11), the organic resinic waste (HW13), the containing phenolic waste (HW39), the containing aether waste(HW40), the waste chloride(HW41), the waste organic solvent (HW42), the waste oil (HW08), the organic solvent waste (HW06). These things can be dealt with in incineration base: timber preservative waste (HW05), dye, coating waste (HW12), biphenyl

photosensitive material waste (HW16), polychlorinated biphenyls waste (HW44) and some breed of other category waste. These things can be dealt with in waste emulsion treatment base: each kind of emulsion (HW09) and waste water containing oil, waste acid (HW34), waste alkali (HW35) etc. agglomeration base can be dealt with each kind of water sludge etc. In other words, in 47 kinds of hazardous wastes, the common category can be dealt with.

Next step, we will strictly fulfill municipal government requirement and will coordinate with other related section according to national, province laws and regulations. After official operation of the medical waste treatment center, we will do our devoir to fulfill the centralized treatments and monitors of the hazardous waste and medical waste produced in our city.

August 7, 2004

Conclusions and Suggestions of the National Forum on New Partnership for the Environmentally Sound Management of Urban Hazardous Wastes

The National Forum on New Partnership for the Environmentally Sound Management of Urban Hazardous Wastes was holding on 10-11 of August, 2004, Taipingwan Hotel, Qingdao city. There are 51 representatives participated the meeting, which came from State Environmental Protection Administration, Qingdao environmental protection administration, Shandong Province solid waste management center, Basel Convention regional center and hazardous wastes administrative responsible institution and hazardous wastes treatment and disposal corporation of Beijing, Tianjin, Chongqing, Dalian, Shenzhen, Shenyang, Shanghai, Hangzhou and other places. The meeting was sponsored by Basel Convention Regional Centre of the Asian-Pacific area and Qingdao environmental protection administration (the Solid Waste Administrative Center of Qingdao).

1. Conclusions from the seminar

All participating cities in the conference have established hazardous waste report registration, transfer list associated and license systems already, basically set up hazardous waste management system, and have constructed or are constructing hazardous wastes treatment and disposal facilities. Through the experts and representatives' reports, and discussion of the meeting participators, we thought that it was necessary to establish hazardous wastes environmental harmless management fellowship in city level. This meeting was a beneficial attempt of developing fellowship in the field of hazardous waste. The kinds of fellowship could include the partnership between government and corporation (including enterprises of producing hazardous waste and engaging in the treatment and disposal of hazardous waste), city and city, government or NGO and international organization.

2. The problems that exist in management and practice

- ✧ The method of license needs coordination of all levels government departments. To hazardous waste which needs special treatment, the yardstick grasped is different;
- ✧ The scale of facilities is being developed progressively, but to ensure the quantity of the waste that can be collected needs to enforce the next step work;
- ✧ The producing source list of the hazardous waste is the base of hazardous wastes management and disposal facilities' construction. Finish the list needs to carry on methodology exploration and do plenty of investigation works;
- ✧ It is difficulty to grant the license and manage the units that use of hazardous waste;

- ✧ Incineration flying ash is hazardous wastes which is gradually being paid more attention to, for its producing amount is large, it's disposal plan need to be discussed.

3. Suggestions from the seminar

- ✧ Set up one mechanism, which encourages bringing disposal corporation service objects into cooperative partner relationship. If necessary, we can consider setting up treatment facilities corporately with the producer, founding multi-kinds of cooperative partner relationship between producer and disposal aspect, in order to reduce the cost of hazardous wastes treatment and disposal;
- ✧ The environmental protection departments of the county play very important role in the city hazardous wastes management. The hazardous waste management capacity of the environmental protection department in the county level still urgently needs to be enhanced and related staff trained;
- ✧ To solve the problems of soil pollution produced by the hazardous chemicals, we have some difficulties on technology and fund. The assessment of the pollution location needs embodying in the laws and regulations of solid waste management;
- ✧ License management system needs to detailed further. The grant of license needs to consider not only annual treatment ability, but also the characteristic of waste;
- ✧ Presently the hazardous waste disposal enterprise will be increasingly. It is suggested to set up a professional organization, join resource together, establish a channel to share experience, criterion industry development and found fellowship;
- ✧ Managers need to examine the disposal ability and object of facility, then to limit its scope of operation, establish system to disposal aspect, carry out regular inspection of its facility regularly, and accept the supervise and management of the environmental protection department;
- ✧ Encourage waste disposal unit to bear community responsibility, propagandize and popularize hazardous wastes safety disposal knowledge, and accept public's intendance;
- ✧ It is necessary for hazardous wastes environmental harmless management to set up special institution for solid waste management, solid waste management agency or center;
- ✧ It is also necessary to use media to do proper propaganda and supervision, because it is helpful for producers and facilities running normative and useful for the distribution of hazardous waste management information and enhance of the public's environmental awareness;

- ✧ It can reduce management cost to use report system in transfer list associate, and can help waste environmental harmless management;
- ✧ The construction and operation of the hazardous waste treatment and disposal facilities in Qingdao need domestic and international technology and financial support to improve its disposal level and operation ability;
- ✧ Strengthen the discussion and exchange of hazardous waste management and technology further;
- ✧ Propose the person who handles hazardous wastes and the city environmental protection administrative department establishing extensive and closely connection with administrative responsible institutions in the city such as urban economy, finance, tax, etc. Strive for the government making the supporting policy which is favorable to hazardous wastes environmental hammerless management aspect;
- ✧ It is necessary to develop further project about partnership, to strive for fund and technology's support as much as possible under Basel Convention frame.

**Speech in Closure of the National Forum on New Partnership for the
Environmentally Sound Management of Urban Hazardous Wastes**

(Arrangement according to recording)

Ruisheng, Yue

Deputy Director of the Department of International Cooperation, SEPA

First, I thank environmental protection department of Qingdao city, Basel Convention Asia-Pacific Regional Centre/Tsinghua university for organizing this meeting; appreciate every representative coming from every region to attend this meeting; appreciate the meeting organizer, and appreciate the work which Qingdao city solid waste administration center and New world solid waste joint treatment limited company have done.

This meeting is going on well, “advance with times”, we can hold on the similar meeting in this way, and can be a bit more active, more effective, there might not be lecture notes, as some foreigners make a speech, without interrupt they will not stop, but we are be invited to speak. For example, a Chinese worker who is working in the World Bank spoke only for five minutes at a meeting, communicated for two and a half minutes, only slowly talked three suggestions, but the his translated lecture was very clear, and give the substantiality conclusion. Therefore, we suggest that we may be more actively in a meeting, to increase communion opportunity.

There are a lot of global environmental problems, and the hazardous wastes transfer is an important problem. There are three covenants related with hazardous wastes State General Bureau of Environmental Protection take lead of. In 1989 our country participated as covenant side in Basel Convention, which is an international convention for preventing hazardous wastes shift cross the boundary illegally. Rotterdam convention which is about adopting knowing and agreeing beforehand procedure in some hazardous chemicals and pesticide, hasn't come into effect, its major function is if other country think export chemical is dangerous, must inform other country in advance, comparative some time before we only need the enterprise's agreement, now we must have government agreement. It is in fact protecting the benefit of import country, and level is favorable for developing country in certain kind. Stockholm pact is aim at decreasing or eliminating the emission of endurance organic contaminant, and protecting human health and ecological environment from its harm. Each of the three pacts has there own characteristic and close connects with each other. This meeting we will chiefly discuss Basel Convention.

According to present international situation, globalization process accelerates constantly, and with our country have joined in the WTO, the global environmental problem also influences our country.

China is a big country, and also a country with serious environmental problems. Its total economic amount in the world is No.6 and is one Permanent Member of the United Nations. It has great environmental capacity, but is relatively fragile. As for global environmental problem it is a victim, but also a producer. Considering the national rights and interests, we couldn't be charged with the responsibility beyond the Chinese economic ability, which is one of the major liabilities of the Department of International Cooperation of State General Bureau of Environmental Protection. When we go on a negotiation about convention, some responsibility and obligation are impossible to bear, because they can not be completed even if promised. Such as the dioxin, the convention demands to offer the source of all dioxins and total amount. Though such developed countries as Germany etc can tell you the total amount of this hazardous waste, and there are a lot of countries which can a hundred per cent handling it too, but our country can't accomplish.

What is the relationship between Basel Convention negotiate and the economic development of our country? In fact they have very intimate relationship, for example, the question about PVC, in some people's opinion, it doesn't produce dioxin in normal situation, but other country think it can produce dioxin to incinerate PVC in open country optionally, and think this kind of incineration can be seen in developing countries everywhere, so require to treat it as hazardous wastes, this means that PVC is unable to be traded and electric wire cable, which use PVC as the foreskin, also can't be imported. Obviously, the convention and our economy are closely linked. Another example is about dismantle ships, in which Indian be the most, China is the second and then Bangladesh, Vietnam, but the disassembling amount of China reduces gradually now. The amount of disassembled hulk accounts for the fifth of steel output in India, and this can produce a series of questions and cause very great pollution. After the disassembling of hulk, the steel can be reused, but asbestos, compressing water, domestic rubbish, used heavy oil, etc. will be abandoned randomly. For example, the original treatment method was to push beaches, it means after the ship was used for the last time, the empty ship put into high gear and dashed to the beach, then laid aside and be disassembled. At present, hulks are disassembled at the quay of our country. In the past, our country had two picture shoot by the green peace organization, one of which was the rubbish pollution situation of the disassembling of hulk, another was that some children in Fanyu district of Guangdong province sit on the old and useless electric apparatus after disassembling and eat something, exert negative influence on environmental image of our country, but now the environmental improvement of our country has already taken a favorable turn to some extent.

Import wastes and foreign rubbish are known to everyone. Export wastes, the letter, which environmental minister of Australia has written to me, mentioned that the chromium dreg in Hunan province exceeded limited content in the standard and should be regarded as hazardous waste to dispose the same as in Philippine and other countries. We export waste through formal channel too, for example the offal some proprietorships of development zone in Beijing produced, can't be dealt with in our country and need to export; China Taiwan Province produces a large amount of hazardous waste, which need the general bureau of environmental protection stamp to release and then can be received by the receiving country, otherwise can't be received. There are a lot of other examples, I do not enumerate one by one.

So Basel Convention and our work are related closely. Now, with the economic development of our country and the improvement of people's lives, it is an inevitable demand for economic development to treat the hazardous waste well and the assurance of people's life quality. Fresh air can not be bought by money, including hazardous waste problem.

Partnership relation was advanced in the United Nations environment development conference in 1992, in which Premier Li Peng spoke and Song Jian participated and made a speech. But it developed slowly from 1992 to 2001 on account of a lot of political factors. For example, developing countries think developed countries differ from developing countries on the global environmental problems, every country has responsibility, but by the look of responsibility, article 7 of Rio Declaration mentions, the developed country should be charged with more responsibilities, because quite a lot of present pollutions were produced by developed country's industrial revolution course, which have caused more pollution compared to developing countries. They have already polluted water, atmosphere, soil, so developed country should offer more fund and technical assistance. Global environmental fund, can subsidize 30 hundred million dollars in four years, China took the most, have taken several hundred million. The multilateral agreement under Kyoto Protocol, has fund of more than ten hundred million dollars altogether, our country has taken 7 hundred million dollars. Under this principle, we do not think that the developed countries should waver and reduce the aid to developing countries, but they should provide more fund and technology aid.

World Summit on Sustainable Development in 2002, the partnership was proposed again, adopted more extensive meaning, made the developing countries can accept it too. The partnership may be set up between the developed country and developing country, the government and the NGO, enterprise in and out our country, it is very empty, but it encourages the whole society to participate in environmental protection actively actually, mobilizes the strength of the whole society, has very positive meanings. So, developing countries do the work of launching the partnership actively, we do not have any question international aspect at home, can develop it as a very good form. This meeting hold By Asian-Pacific centre, is we make great efforts to try to receive at the Basel Convention meeting last time too, it is all to take me as the core

that we launch seminar purposes and the national interests as the main fact, this is a very good meeting, hope this meeting can play its function, information can be exchanged through the meeting.

In the meeting on population, resource and environmental in 2003, the General Secretary Hu Jintao said that environmental protection should focus on making people drink clean water, breath fresh air, eat reassurance food and work in graceful environment, this is also the goal of our work for ever, the work launched today is according with the demand of the Central Party Committee too, it is hoped to exchange message through this meeting. Our way is still very long and our work is still very serious, holding a meeting can't solve a lot of problems, but the meeting can let us understand about the national situation and the relevant methods of each province and city. This also can promote our work and communicate any suggestion and idea at any time. The Department of International Cooperation of State Environmental Protection Administration will try its best to safeguard everybody's interests in the front, make chance for everybody to fulfill convention and obtain fund, solve the hazardous waste problem of our country, and benefit the environmental cooperation.

Finally, thank the deputy director general Song of Qingdao city environmental protection administration for attending our work from beginning to end of meeting, and thank you.

**National Forum on New Partnership with Local Authorities for the Environmentally
Sound Management of Hazardous Wastes in Urban Areas**

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