

## Measures and Implementation to the Basel Convention in Thailand

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***Abstract:** Overview of Basel Convention background, purposes, and core elements are summarized with specific data and information from practices under responsibilities of the Competent Authority for Convention in Thailand. As a regulator and an authority for Convention, Department of Industrial Works (DIW) control and oversee industrial waste management at national and international levels by law enforcement and provide technical cooperation and support to industries. Relevant legislations for industrial waste management which contain 21 Notifications of Ministry of Industry are referred with actual data of numbers of stakeholders and facilities including waste generators, waste transporters, waste disposers, and waste traders. Lesson learnt and experiences from controlling all those parties are highlighted especially importers and exporters of hazardous wastes. Prior inform consent process and movement tracking system are described in brief especially for those Thai and Asian traders who communicate with European business in this area of which implementation processes according to Convention between these two regions are still in opposite directions. Priority waste streams under Convention are entailed and actual data of those wastes in Thailand are presented. Updated situations for each waste stream are provided with on-going projects and studies to be followed in the coming year (2008). Basel Protocol is also on brief discussion. The study of liability law for industrial waste management under DIW is completed with a draft act to be published and enforced. Although Thai laws for this regard cover all relevant parties in waste management, there are some loopholes for law enforcement and illegal traffic is still occurring; therefore, cooperation among custom officers, regulators, and environmental officers is encouraged. More information sharing among Competent Authorities are also suggested.*

### **1. Introduction**

#### **1.1 History of Convention**

In the late 1980s, a tightening of environmental regulations in industrialized countries led to a dramatic rise in the cost of hazardous waste disposal. Searching for cheapest ways to get rid of the wastes, “toxic traders” began shipping hazardous waste to developing countries and to Eastern Europe. When this activity was revealed, international outrage led to the drafting and adoption of the Basel Convention on the Control of Transboundary movements of Hazardous Wastes and their Disposal on 22 March 1989 by the 116 States participating in the Conference of Plenipotentiaries on the Global Convention on the Control of Transboundary Movements of Hazardous Wastes, which was convened by the Executive Director of the United Nations Environment Programme (UNEP) and held in Basel at the invitation of the Government of Switzerland. The Basel Convention entered into force on 5 May 1992. Presently, the Parties to the Convention are counted to 170 countries. Thailand ratified on 24 November 1997 and has enforced since 22 February 1998.

The Basel Convention is the most comprehensive global environmental agreement on hazardous and other wastes. Its aim is to protect human health and the environment against the adverse effects resulting from the generation, management, transboundary movements and disposal of hazardous and other wastes.

## **1.2 Objectives of Convention**

The main objectives of the Convention are:

- 1.2.1 to reduce transboundary movements of hazardous and other wastes to a minimum consistent with their environmentally sound management;
- 1.2.2 to treat and dispose of hazardous and other wastes as close as possible to their sources of generation in an environmentally sound manner; and
- 1.2.3 to minimize the generation of hazardous and other wastes (in terms both of quantity and potential hazard).

## **2. Waste types under Convention**

a. Under the Basel Convention, the following wastes, subject to a transboundary movement, are defined as hazardous wastes if:

- the wastes belong to any category (Y1-Y45) contained in Annex I of the Convention;
- and exhibit one or more of the characteristics (H1-H13) contained in Annex III of the Convention.

b. Wastes that are not covered under subparagraph a. above but are defined as or are considered to be hazardous wastes by the domestic legislation of the Party of export, import or transit shall be controlled under the terms of the Convention;

c. For the purpose of the Convention, wastes that belong to any of the two categories Y46 and Y47 of Annex II to the Convention, subject to a transboundary movement, are defined as “other wastes” and will be controlled by the Convention.

d. Radioactive wastes which are subject to other international control systems are excluded from the scope of this Convention.

e. Wastes from the normal operations of a ship covered by another international instrument are excluded from the scope of this Convention.

List of hazardous wastes for transboundary movement control are shown in Annex VIII which contains List A and List B:

**List A:** wastes are characterized as hazardous under Article 1, paragraph 1(a) of the Convention and with the use of hazardous characteristics according to Annex III to classify their hazard classes.

**List B:** wastes are not covered by Article 1, paragraph 1(a) unless they contain Annex I material to an extent causing them to exhibit hazardous characteristics according to Annex III.

List A and List B are important lists for the identification of wastes to be or not to be hazardous wastes so that the implementation processes following the Basel Convention obligations would be carried out including consideration by the domestic legislation of the State of Import, Export, and Transit.

### **Hazard identifications according to Annex III of the Convention**

There are 13 hazard classes, with some of them further subdivided into numbered divisions (e.g. class H4.1, H4.2, H4.3). For example, classification H4.1 means that the waste is in division 1 of class 4; and that the waste exhibits “flammable solids” characteristics.

The hazard classes of the Basel Convention correspond to hazard classification 1 to 9 of the United Nations recommendation on the transport of dangerous goods. Each hazardous waste will have one of these 9 classes as its primary classification. The primary classification describes the main hazardous property of a hazardous waste.

### **3. The Focal Point and the Competent Authority of Convention**

**3.1 The Focal Point (FP)** for the Basel Convention in Thailand is the Pollution Control Department, Ministry of Natural Resources and Environment whose duties are to gather and provide information regarding transboundary movement of hazardous wastes including accidents occurring during the transboundary movement and illegal traffic statistics to Secretariat and to raise awareness among stakeholders on the effects of the generation, transportation, and disposal of hazardous wastes on human health and the environment.

**3.2 The Competent Authority (CA)** for the Basel Convention in Thailand is the Department of Industrial Works (DIW), Ministry of Industry. Generally, main duties of DIW are to grant the factory permit to enterprises which listing 107 industrial types. DIW oversee all the factories (120,000 factories) and business operators as importers and exporters all over the country to comply with Factory Act B.E. 2535 and Hazardous Substance Act B.E. 2535. Law enforcement in the area of environmental and safety management for those enterprises are performed. Additionally, DIW bears responsibilities on Multilateral Environmental Agreements. It is the National Authority for Chemical Weapon Convention, Vienna Convention and Rotterdam Convention (specifically industrial chemicals) including the Focal Point for Globally Harmonized System (mainly on industrial sector). Implementation and compliance to the Climate Change Convention, Stockholm Convention, and EU Directives (WEEE and RoHS) are responded by DIW as well. Duties under the Basel Convention of DIW are to:

- conduct the Basel Convention procedures requesting for consents from destination and transit countries;
- grant import and export permits for hazardous wastes according to Hazardous Substance Act B.E. 2535 and cooperate with custom officers for the custom processes;
- cooperate with custom officers and solve the problems for illegal traffic of hazardous wastes;
- draft, amend, publish, and enforce relevant domestic legislations to manage hazardous waste at national and international levels;
- oversee all waste generators, waste transporters, waste disposers, and waste traders by law enforcement and provide technological support for the reduction and/or elimination of production of hazardous and other wastes; and
- gather domestic legislations and the Basel procedures from CA in some destination and transit countries and coordinate with those in case of problems for hazardous waste movement across the border such as mishandling of documents, penalty for any violations, misidentification of wastes, notification rejection, etc.

### **4. Legislations for industrial waste management at national and international levels**

Implementation and compliance to the obligations of the Basel Convention are performed by FP and CA with legislation drafting and publishing, enforcement, follow-up on new technologies for waste disposal or waste reduction, measures taken to tackle the problems of illegal traffic and accidental spills of hazardous wastes, research and studies on relevant issues such as ban amendment, the Basel Protocol ratification, public awareness for environmental impacts of hazardous wastes among enterprises, communities, academia, and other stakeholders, etc. Because the objectives of the Basel Convention are not exclusively focused on the reduction of hazardous waste movement across the boundary, the crucial element of efficient hazardous waste management is resulting from national management systems. Additionally, the minimization of the generation of hazardous and other wastes is one of the objectives of the Convention which would be accomplished by employing technical tools for industrial sectors such as clean technology, life cycle assessment, eco-design, etc.

To fulfill all the above objectives of the Convention, DIW as the CA for the Convention perform duties and responsibilities mainly on two main acts which are the Factory Act B.E. 2535 and the Hazardous Substance Act B.E. 2535 governing all the parties involved with the industrial waste management in Thailand. 60,000 hazardous waste generators out of the whole number of 120,000 factories all over the country, 300 waste transporters, 1,400 waste disposers, and hundreds of chemical and waste traders (importers and exporters) are controlled by law enforcement published from those two acts. Totally 21 Notifications of Ministry of Industry relevant to industrial waste management are enforced. Brief details of those regulations are described as follows:

1. Waste generators are governed by the Notifications of Ministry of Industry (6-8). They need to ask for permits from DIW in case of waste removal out from factories. This is to declare what types of waste and quantities and how to treat or dispose. DIW assign the identification system for industrial waste by using the EU Waste Code system. Hazardous waste identification is clearly defined with hazard characteristics and test methods.
2. Waste transporters are governed by the Notifications of Ministry of Industry (9-11). They need to comply with the standards for chemical and hazardous waste transportation in terms of fixed tanks, packaging, labeling and marking, etc. designated in those legislations. International standards for chemical and hazardous waste transportation: United Nations Recommendations on the Transport of Dangerous Goods and European Agreement Concerning the International Carriage of Dangerous Goods by Road (ADR), are adapted and included in the Thai law. In additions, manifest system is used for hazardous waste transportation. The documents under this system are used by three parties; waste generators, waste transporters, and waste disposers to track the routing of hazardous waste movements.
3. Waste disposers are governed by the Notifications of Ministry of Industry (12-15). Three types of waste disposers are identified; incinerator and waste water treatment plants, sorting and landfill facilities, and recycling plants. Statistically speaking, the quantities of hazardous and non-hazardous wastes in 2007 are 2.32 and 12.9 million tons, respectively. A study of national master plan for industrial waste management (40) entails the maximum capacity for landfill and recycling facilities which could serve those industrial wastes in the future. DIW employ the concept of environmentally sound management of hazardous wastes which addressing this issue through an integrated life-cycle approach involving strong controls from the generation of hazardous waste to its storage, transport, treatment, reuse, recycling, recovery and final disposal. Other than law enforcement on such activities, DIW has partnership with industries and research institutions to use technological approaches such as cleaner production, life cycle inventory and assessment (9 clusters of industries), etc. to reduce hazardous waste at generation sites.
4. Waste traders import or export hazardous wastes across the borders by complying with the Notification of Ministry of Industry (16). The list from that Notification contain 62 items of chemical wastes which are all in accordance with List A in the Convention. Additionally, used electrical and electronic equipment are controlled by the Notification (17). The problems of differentiation between used and waste are still prevalent with misidentification of custom codes. More details are explained in ref. 41. Lastly, importation of plastic scraps and used tyres are strictly controlled by the specific law (19-20) and technical guidelines for those wastes are developed.

## **5. Implementation processes for the Basel Convention in Thailand**

### **5.1 Prior inform consent process**

As the Competent Authority for the Basel Convention; in case of hazardous waste export, DIW processes all the documents from exporters and send to the State of Import asking for a consent letter to permit hazardous waste imported at the destination. In case of hazardous

waste import, DIW consider the documents from the State of Export and grant a consent letter to permit hazardous waste imported into Thailand. The detailed documents include the followings:

1. a business contract between exporter-(importer)-disposer/recycler
2. a letter of guarantee for compensation for environmental damage and returned shipment
3. a notification form
4. a waste analysis report

Exportation or importation of hazardous wastes without the implementation according to the obligations under the Convention and the permit according to domestic legislations (Hazardous Substance Act B.E. 2535) is against the law and the penalty under the law is applied. Generally, the parties to the Convention are able to deny import or export of hazardous wastes according to domestic law enforcement. Transit countries along the route are also requested for transit consents. Tacit consent is admitted if no responses are received within 60 days (26).

### **5.2 Movement tracking system**

A movement document is applied to follow the hazardous waste movement across the border. There are government officers from two agencies involved; one from the Custom Department and another from DIW. DIW collects the copies of the movement document along the way from the origin to the destination. After waste loading, exporters send one copy of the movement document to DIW with signatures of exporters, carriers, and custom officers. Waste disposers in destination countries after receiving waste send back one copy of the movement document to DIW. The last copy is sent back to DIW by again waste disposers after treatment/disposal completed.

### **5.3 Determination of hazardous wastes**

All chemical wastes according to Notification of Ministry of Industry “List of Hazardous substance and chemical waste.” B.E. 2546 are all hazardous wastes which needed to have export or import permits from DIW and they are also in accordance with those in List A, Annex VIII under the Basel Convention. The gist of the problem between the State of Export and the State of Import is due to different determinations of hazardous wastes under the Convention which leads to the conflict of paper processing, waste in cargo left at the port without import permit, and illegal traffic by misidentification of custom codes, finally. The solution to the problem is to have information exchange among countries regarding legislations, procedures, treatment/disposal facilities available in the country of interest, etc. More importantly, no transactions on hazardous waste trading between parties and non-parties to the Convention which needed to be practically restricted.

## **6. Data reporting**

Export statistics of hazardous waste in 2006 is totally 20,420 tons which is a little bit increased from 17,340 tons exported in 2005. Import statistics of hazardous waste in both years are not significantly different which totally 5,379 tons in 2006 and 5,925 tons in 2005. The largest quantities of exported wastes are electronic scraps; the second is solder dross/tin alloy and ashes and residues are the third. Destination countries vary depending on the contacts of Thai enterprises. Most of the countries are in Asia; mostly Japan, Republic of Korea, Singapore, China, and Philippines. The rest of them are European countries; mostly Belgium, Netherlands, Sweden, and Germany. Imported hazardous wastes are mainly electrical equipment and parts by one enterprise who owns a recycling facility in Thailand and it is known as a recycling center for the Asia Pacific region.

## **7. Priority Waste Streams**

Priority waste streams are some categories of wastes which are central to achieving the principle of environmentally sound management of hazardous wastes due to the danger they represent to the human health and the environment. They have been identified as priorities on account of their volume of generation, volume of traffic, hazardous nature or disposal characteristics. The Basel Convention has identified the following priority waste streams:

- Electrical and electronic wastes;
- Used lead-acid batteries;
- Used oils;
- Persistent organic pollutant wastes including obsolete stocks of pesticides, PCBs, and dioxins and furans;
- Mercury wastes;
- Biomedical and health-care wastes;
- Household wastes mixed with hazardous wastes; and
- By-products from the dismantling of ships.

Brief conclusions for priority waste stream management in Thailand are listed below:

1. Used batteries are classified as hazardous wastes according to Notification of Ministry of Industry "Industrial Waste Management." B.E. 2548 which contain 6 categories: lead batteries, Ni-Cd batteries, mercury-containing batteries, alkaline batteries, other batteries and accumulators, and separately collected electrolyte from batteries and accumulators. The quantities of battery wastes granted to be removed from waste generation sites to waste disposal plants are about 30 tons for the past year. Additionally, DIW has published 3 specific Notifications of Ministry of Industry (21-23) which have been used to manage lead in battery wastes from lead smelting plants. These legislations explain all procedures for lead analysis and disposal methods, data reporting, monitoring for environmental impacts and human health and safety measures for lead smelting plants.

2. Used oils are classified as hazardous wastes according to Notification of Ministry of Industry "Industrial Waste Management" B.E. 2548 which contain 8 categories: waste hydraulic oils, waste engine, gear and lubricating oils, waste insulating and heat transmission oils, bilge oils, oil/water separator contents, wastes of liquid fuels, and oil wastes not otherwise specified. They are also classified as chemical wastes according to Notification of Ministry of Industry "List of Hazardous Substance and Chemical Waste" B.E. 2546. The quantities of used oil wastes are about 50,000 tons which removed from generation sites to disposal sites, but there are about 618,265 tons under having in possession permits. Used oil recycling business is very popular which counted to approximately 35% of total numbers of recycling businesses in Thailand.

3. Mercury compounds and wastes are classified as hazardous substances and chemical wastes according to Notification of Ministry of Industry "List of Hazardous Substance and Chemical Waste" B.E. 2546. There are 9 types of mercury compounds and wastes; mercuric chloride, mercuric oxide, mercuric sulfide, mercury chromate, mercury (quick silver; hydrargyrum), mercury compounds both chemicals for use and wastes, mercury (II) thiocyanate, and mercury bearing wastes. In Thailand, large sources for mercury compounds and wastes are from natural gas and petroleum drilling and production sources especially in the Gulf of Thailand. In 2007, there is only one upstream business operator for petroleum exporting waste containing mercury for the total amount of 300 tons to European countries for recovery & recycling. Examples of mercury wastes are spent catalyst, absorbent, used activated carbon filters and PPE contaminated with mercury sulfide. The details of recovery & recycling methods are explained in ref. 37.

4. Persistent organic pollutant wastes including obsolete stocks of pesticides, Polychlorinated Biphenyl (PCBs), and dioxins and furans are priority waste streams under the Basel Convention. Government of Thailand has prepared National Implementation Plan

under the Stockholm Convention which approved by the cabinet on May 15, 2007. Major work on PCBs inventory, POPs destruction and applications of BAT and BEP for dioxins and furans management in the industrial sector lie under the responsibility of DIW. PCBs are classified as hazardous substances and chemical wastes according to Notification of Ministry of Industry “List of Hazardous Substance and Chemical Waste” B.E. 2546. In case of identification as hazardous substances, PCBs and Polychlorinated Terphenyl (PCT) are ban for production, import, export, and having in possession, but if identified as chemical wastes, those can be imported and exported with permits. At present, most of PCBs in transformers are shipped to France for disposal. Regarding POPs destruction, the project of “Environmentally Sound Destruction of POPs – A Study of Co-processing in Cement Kiln” was developed with PCBs analysis and blending design as on-going activities. A handbook for PCBs management in Thailand was developed and approved by relevant government agencies (38).

5. Biomedical and health-care wastes are under control by Ministry of Public Health according to the Public Health Act B.E. 2535 (31). The quantities were 25,000 tons in 2005. The management system for these wastes are still developed with techniques of storage, transportation and treatment.

6. Household wastes mixed with hazardous wastes are under control by Pollution Control Department with quantities of 0.4 million tons in 2005. A handbook for separation, collection, transportation, handling activities, and disposal methods was published with implementation by local authorities all over the country. Efficient tools and activities are developed for sustainable development. Those are 3 Rs activities, clean production, waste exchange system, life cycle assessment, eco-design, capacity building, green labeling, and green procurement.

7. By-products from the dismantling of ships are under control by the Port Authority of Thailand and the Office of the Maritime Promotion Commission, Ministry of Transportation.

## **8. E-wastes: one of priority waste streams; what’s going on in Thailand?**

E-wastes are identified as chemical wastes according to the Notification of Ministry of Industry (16) which need import or export permits. DIW also control used electrical and electronic equipment and parts under the Notification of Ministry of Industry (17) which import permits are granted according to the specific objectives as stated in the law. Although wastes and used equipment and parts are under control differently, import figures are still alternated in certain circumstances (37, 41). National strategy for waste electrical and electronic equipment was developed and implemented by FP, CA and other relevant agencies (32-33) as well as Thai RoHS. These two standards and regulations respond to EU Directives which influence international trade among regions. Take back systems of mobile phones and fluorescent lamps are operated by FP with increasing numbers of recycling and treatment facility establishments for fluorescent lamps and numbers of mobile phone batteries exported to European countries for recovery and recycle. Lastly, one project is carried out by DIW to establish a tracking system of electrical wastes. Data access and tracking models will be developed and completed in 2008 (41).

## **9. Relevant issues**

### **9.1 Ban Amendment**

At the Conference of the Party (COP) 2 and COP 3, the Parties have agreed to ban hazardous wastes exports for final disposal and recycling from what are known as Annex VII countries (Basel Convention Parties that are members of the EC (the European Community), OECD (The Organization of Economic Cooperation Development), and Liechtenstein) to non-Annex VII countries (all other Parties to the Convention). At COP 3,

it was proposed that the ban be formally incorporated in the Basel Convention as an amendment. The Ban Amendment has to be ratified by at least three-fourths of the Parties who accepted it in order to enter into force. At present, 63 countries ratified this Amendment except Thailand.

### **9.2 The Basel Protocol on Liability and Compensation**

This Protocol was adopted at COP 5 in response to the concerns of developing countries about their lack of funds and technologies for coping with illegal dumping or accidental spills. The objective of the Protocol is to provide for a comprehensive regime for liability as well as adequate and prompt compensation for damage resulting from the transboundary movement of hazardous and other wastes, including incidents occurring because of illegal traffic. The Protocol addresses who is financially responsible in the event of an incident in each phase of a transboundary movement from the point at which the wastes are loaded, the means of transport, the unloading of wastes at destination, etc. At present, total numbers of Parties to the Protocol are 8 Parties. Thailand has not yet ratified the Basel Protocol. There is only one Notification (11) regarding liability and compensation for damage resulting from hazardous substance and waste transport. Compensation covers damages for lives, properties, remediation and clean up. The coverage is defined at minimum of 1 million dollars per one incident. Additionally, DIW has completed a study for liability and compensation for damage system resulting from pollution sources which have high risk for pollutant leakages into soil and underground water (39). Liability and Compensation for Environmental Damage Act was drafted from this study. It entailed the financial guarantee system in the form of clean up fund with effective mechanism for financial management. It was referring to liability and compensation for environmental damage systems from the United States of America, Japan, European countries and Germany. Suggestions have been provided to DIW assigning the priority industrial types in Thailand which should have the liability system. However, there is no environmental liability insurance presently in Thailand. Main problems come from lacking of information necessary to define insurance premium such as numbers and amount of leakages, activities of insured, all damage fees resulting from hazardous wastes, risk assessment, etc. (39).

### **9.3 Illegal traffic**

Preventing, detecting and acting against illegal transboundary movements of hazardous and other wastes is a crucial element in the global waste challenge. Illegal traffic of hazardous waste is unfortunately still very common in all corners of the world. Statistics in Thailand show the figures of illegal import of used tyres, used electrical parts and used lead acid batteries for total quantities of 150 tons and also illegal export of E-wastes from Thailand to China and Hong Kong totally 80 tons (37). The Government of Thailand try to solve the problems of illegal traffic of hazardous wastes with the cooperation between environmental officers and custom officers by at least forming an emergency inspection team for suspicious characteristics of hazardous wastes. Quick inspections of hazard characteristics from container types, odor, and labeling give the introductory notices. However, technical sampling, analysis (HazCat Kit, XRF analyzers, and Raman Spectrometer), and proofs of hazard characteristics with indication of hazardous wastes would be very critical coupled with efficient handling with consideration of environmental impacts and human health.

To tackle the environmental crime resulting from hazardous waste movement across the border, the Custom Department develops the procedures for investigation and cooperation with FP and CA. Brief procedures are explained in steps as follows:

1. False declaration or unclaimed goods or transboundary movement without consent and permits are found and inspected by custom officers.
2. Custom officers inform carriers/consignee within 15 days.
3. If no one claimed the goods, custom officers with the inspection team including environmental officers will investigate the goods.



4. Further legal action will be proceeded.

Although there are not many cases for illegal traffic of hazardous waste in Thailand, statistics of numbers of movement across the borders might be deviated resulting from misidentified custom codes, concealment, mislabeling of packaging, etc. The intention of dumping hazardous waste is still prevalent and existed beyond expected.

## **10. Encountered problems and suggested solutions**

### **10.1 Different classification of hazardous wastes**

Methods of classifying hazardous wastes vary throughout the world. Many countries have their own national or domestic classification schemes and hazard criteria. So, the problems of different classification of hazardous wastes in different countries lead to the complicated control of transboundary movement of those wastes; for example, one waste was not classified as hazardous wastes in Thailand but it was in Canada so the shipment of waste exported had been deterred at the port of Canada without the Basel consent and permit from the State of Export (37), etc.

Solutions to this problem are to have common understanding of each country's classification methods of hazardous wastes and domestic legislations by sharing the information among countries in the region.

### **10.2 Different procedures of the Basel Convention implementation**

Different procedures delay the process of the Convention implementation and affect the cost of enterprises more or less especially those from Asian countries and European countries. Contrast practices occurred between these two regions without any notices and discussions. A solution to this problem is that each country should have information exchange on its procedures and discuss among the CA to make more clear comprehension. More details of case studies and suggestions are explained in ref. 37.

### **10.3 Illegal traffic of hazardous wastes**

A monitoring system for suspicious hazardous waste shipments among countries in Asia-Pacific region and others should be set up with a real time database linkage system. This monitoring system will be introductory mutual assistance among custom officers, FP and CA from those countries. However, custom officers should have clear understanding on the objectives of the Basel Convention, identification of hazardous wastes and other environmental issues other than the objectives of custom code identifications and a tax system (37).

## **11. Further actions and studies**

Trade and environment issues should be studied and analyzed with recommendations beneficial to future free trade or bilateral agreement launch. Lately, Japan-Thailand Economics Partnership Agreement (JTEPA) was effective since November 1<sup>st</sup>, 2007 and hazardous waste; one of many items on trading, is on the controversy the most. Results from implementation under JTEPA will be clearly seen and followed from now especially recycling/treatment facility establishments in Thailand with more numbers of transboundary movements of hazardous wastes. Additionally, liability law for industrial waste management will be considered to be published and enforced in order to drive all the relevant parties to strictly comply with the law and guarantee the minimization of environmental damage with human health protection.

## **12. Conclusions**

Although DIW perform its dual duties on promotion of factory establishment and law enforcement in the area of environmental and safety management covering all aspects of industrial waste management, there are still some obstacles for the Basel Convention implementation as follows:

1. inefficient cross-function management and cooperation among relevant government agencies;
2. limited knowledge on this Convention among government officers, public, and stakeholders; and
3. although DIW plays major roles with many duties and responsibilities on industrial promotion and regulations, top priority for management in terms of human resources, budget, etc. is not assigned to the Basel Convention implementation. This phenomenon seems to be similar for both at an organization level and a national level.

## References

1. Website: [www.basel.int](http://www.basel.int)
2. Website: [www.interpol.int](http://www.interpol.int)
3. Website: [www.wco.org](http://www.wco.org)
4. Website: [www.diw.go.th](http://www.diw.go.th)
5. Website: [www.pcd.go.th](http://www.pcd.go.th)
6. Notification of Ministry of Industry “Industrial Waste Management.” B.E. 2548.
7. Notification of Ministry of Industry “Types and sizes of factories, pollution control procedures, and qualifications of pollution control operators, supervisors, and managers and environmental personnel registration procedures with Department of Industrial Works.” B.E. 2545.
8. Notification of Ministry of Industry “Notification procedures for industrial waste movement via internet.” B.E. 2547.
9. Notification of Ministry of Industry “Transportation of hazardous substances and wastes by road.” B.E. 2546.
10. Notification of Ministry of Industry “Manifest system for transportation of hazardous waste.” B.E. 2547.
11. Notification of Ministry of Industry “Liability and compensation for damage resulting from transportation of hazardous substances and wastes by road.” B.E. 2549.
12. Notification of Department of Industrial Works “Operation procedures for waste disposal factories.” B.E. 2550.
13. Notification of Ministry of Industry “Characteristics of used oil with quality improvement in process and synthetic fuels used in industrial incinerators as substituents for fuel oil.” B.E. 2547.
14. Notification of Ministry of Industry “Stack emissions from hazardous waste incinerator.” B.E. 2545.
15. Notification of Ministry of Industry “Licensing system for waste disposal factory establishments: factory type 105 (sorting and landfill) and 106 (recovery and recycle) according the Factory Act B.E. 2535.” B.E. 2545.
16. Notification of Ministry of Industry “List of Hazardous substance and chemical waste.” B.E. 2546.
17. Notification of Department of Industrial Works “Regulations and procedures for used electrical and electronics equipment importation.” B.E. 2550.
18. Notification of Ministry of Industry “Regulations for plastic scrap importation.” B.E. 2549.
19. Notification of Ministry of Commerce “Regulations for used tyre importation.” B.E. 2546.
20. National Environmental Board Resolution “Ban on used battery importation” B.E. 2536.
21. Notification of Ministry of Industry “Measures for waste management in lead (from old batteries) smelting plants.” B.E. 2544.
22. Notification of Ministry of Industry “Data reporting from lead (from old batteries) smelting plants.” B.E. 2544.

23. Notification of Ministry of Industry “Safety measures for lead (from old batteries) smelting plants.” B.E. 2544.
24. UNEP, 2005: Training Manual for the Enforcement of Laws Implementing the Basel Convention: Guidance for Safe and Effective Detection, Investigation and Prosecution of Illegal Traffic in Hazardous and other Wastes, UNEP/CHW/OEWG/3/INF/19.
25. Ercan Saka, 2000, “WCO enforcement programme on combating environmental crime” WCO.
26. Manual for Implementation Process according to the Basel Convention, Department of Industrial Works, 2007.
27. Training workshop documents for custom officers on “Hazardous Waste Classification and Transportation” by Pollution Control Department, August, 2007.
28. Training workshop documents on “Operation Procedures for Industrial Waste Management according to Notification of Ministry of Industry and other relevant regulations.” by Department of Industrial Works, September, 2007.
29. Factory Act B.E. 2535.
30. Hazardous Substance Act B.E. 2535.
31. Public Health Act B.E. 2535.
32. Technical Guideline on the Reduce, Reuse, Recycle (3R) of End-of-Life Electronic Products, Basel Convention Regional Centre for South-East Asia, 2007.
33. Technical Guideline for Inventory of Electrical and Electronic Waste, Basel Convention Regional Centre for South-East Asia, 2007.
34. Handbook for inspection standard method of waste disposal factory type 105 (sorting and landfill), Department of Industrial Works, 2006.
35. Handbook for inspection standard method of industrial waste, Department of Industrial Works, 2006.
36. Handbook for the licensing system for industrial waste according to the Factory Act B.E. 2535.
37. Case studies and lesson learnt from implementation and compliance to the Basel Convention, Competent Authority, Department of Industrial Works, Ministry of Industry, June, 2007.
38. A handbook of PCBs management, Pollution Control Department, 2007.
39. A completion report on Liability law for industrial waste management, Department of Industrial Works, February, 2006.
40. A draft paper titled “National master plan for industrial waste management in Thailand 2008.” Submitted to Enviro 08 Secretariat, Waste Management Association of Australia for the 5<sup>th</sup> biennial Enviro Conference and Exhibition; 5-7 May, 2008, Australia.
41. A draft paper titled “E-waste: what’s going on in Thailand?” submitted to City Waste Asia 2008; 17-19 June, 2008, Singapore.

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