

Case Studies:

- **Accident of a Truck Containing Nitric Acid on Bang Na-Trad Road**
- **Illegal Landfill of Hazardous Waste at Pak Chong District, Nakhon Ratchasima Province**

Introduction

General Situation

During the past years of country development, Thailand has accelerated her economic development by maximizing the use of human and natural resources, employing modern technologies, and increasingly importing hazardous chemicals and substances in order to increase the productivity. As a result, the industry has grown very rapid, so has the economic growth and changes. Although such economic changes have positive impacts on the general population including better education, life conditions and well-beings, several changes have caused negative impacts on human health sanity and safety due to higher exposures to environmental emergencies.

The use of hazardous chemicals in agricultural, industrial, and public health sectors has increased rapidly. It was found that the domestic production of hazardous chemicals has increased from 2.74 million tons in 1993 to 23.0 million tons in 2004; where as, the import of hazardous chemicals has increased from 2.79 million tons in 1993 to 5.0 million tons in 2004 (Office of Natural Resources and Environmental Policy and Planning, 2004; Pollution Control Department, 2004). These domestically produced and imported hazardous chemicals are in the form of ready-chemical products and basic active ingredients that are used as raw materials in manufacturing and agricultural sectors. Most of them are classified as inflammable, explosive, poisonous and corrosive substances, and currently they are being improperly employed. It was found that people are lacking of responsibility, awareness, and carefulness in using these hazardous chemicals and there was no effective system for managing hazardous substances' life cycle covering importation, production, distribution, transportation, usage, storage and waste disposal.

As a result, serious accidents and disasters have occurred with an increasing in numbers, variety, and complexity such as chemical leaks from factories, gas explosions, fires in high-rise buildings, traffic accidents and dangers from radioactive materials. These chemical related accidents generated direct and indirect harmful poisoning to human and the environment. Such harmful poisoning can cause acute and chronic illnesses as well as trauma deaths and property losses. Moreover, the environment including soils, waterways, and sediments, have been contaminated with toxic chemicals. The chemical residues have been accumulated and persistent, which would finally damage the ecosystem.

According to official records on emergencies resulting from chemicals and hazardous substances in 2000-2004 collected by the Emergency Response and Remediation Division, Waste and Hazardous Substance Management Bureau, Pollution Control Department, it was found that the frequency of environmental emergencies

including chemical leakages, chemical inflammation, chemical explosion, had increased years by years. Numbers of environmental emergencies increased from 20 cases in 2000 to 29 cases in 2004. In the latest year of record, these chemical related accidents caused 140 injuries and 27 deaths.

Findings of a study conducted by the Knowledge Management Unit for Road Safety under the support of Thai Health Promotion Foundation revealed that densely populated capital such as Bangkok was vulnerable to chemical accidents. The risk is particularly high for the people living in areas adjacent to 5 main transport routes of hazardous substances: Highway 35 (Samut Sakhon-Thonburi-Pak Tho), Highway 34 (Bang Na-Trad), Highway 7 (Bang Pakong), Highway 36 (Chonburi-Rayong bypass), and Highway 3 (Map Ta Phut area). This study also projected that about 13,866 tons of hazardous substances were transported a month, of which 47 percent was inflammable liquid. Moreover, the study found that 26 percent of the vehicles transporting hazardous substances had warning labels affixed on one side only (theoretically, labels must be affixed at sides and back of the vehicle), while 12 percent had no hazardous substance indicator signs at all (Bangkok Post, March 20, 2004, p.4).

Besides hazardous and chemical substance related accidents generated from transportation process and in the factory mentioned above, the long-term impact on human health and the environment resulting from hazardous substance uses is another major concern, especially for those in agricultural sector. The statistics report of sickness and death from toxin, collected by the Epidemiology Division, Ministry of Public Health, in 2002, indicated 751 sickness cases and 11 deaths due to pesticide poisoning. 202 persons were sick due to exposure to toxic chemicals, and another 107 were affected by heavy metal contamination, of which 56 were lead poisoning cases. Although the total numbers of patients and deaths caused by hazardous chemical exposures decreased when compared to those in 1998, the number of patients suffered from chemicals and heavy metals remains high.

Regarding the government's efforts in solving and preventing accidents caused by hazardous substances, the past efforts were proved to be inefficient due to the variety and complexity of responsible agencies (source: interview statement of Mr. Pramoun Ruchanaseri, Deputy Minister of the Ministry of Interior (at that time), Matichon Newspaper, February 27, 2004, page 15). Experienced with an increasing number of hazardous substance related accidents, the government agencies recognized the need of coordination and integrated measures. As a result, Hazardous Substance Committee has been established. The Committee has an important role in regulating and managing 10 types of hazardous substances such as toxic substances, radioactive substances, flammable substances, explosive substances, etc. The regulatory committee is deemed to take a systematic management of chemicals' life cycle including importation, storage, transferring, packaging and directing transport routes to prevent serious impacts on people in case there are emergency situations and chemical accidents (Matichon Newspaper, February 27, 2004, page 15).

Furthermore, the National Coordinating Committee on Chemical Safety had made an effort to set up a system of chemicals and chemical wastes transportation. It was announced that from now on, the Pollution Control Department is to be notified when chemicals are transferred and transported. The rule also requires traffic police to be informed the transport route; deviating from the informed route is prohibited. Also, the officials of the Bangkok Metropolitan Authority are to be informed when transporting chemicals and chemical wastes across the city. In this regard, the Department of Disaster Prevention and Mitigation will be the core agency to develop such transportation system (Dailynews Newspaper, February 27, 2004 page 3).

Case Selection

This section describes the assessment of access to information about environmental emergencies that have local or small scale impacts. Two incidents were selected as cases studies:

- 1) Accident of a truck containing Nitric Acid on Bang Na-Trad Road, February 24, 2004.
- 2) Illegal landfill of hazardous waste at Pak Chong district, Nakhon Ratchasima province, September 8-9, 2004.

The first case is an example of road traffic accident, the leading cause of death in the country. The impact of hazardous chemicals-carrying truck accidents is generally more severe than that of passenger car accidents as seen in the case of a massive explosion caused by the LPG-containing truck accident on New Petchaburi Road inside Bangkok in 1991. Many people were injured by this accident and 91 of them were dead. Statistics reports indicated that traffic accidents from trucks carrying chemical still occur frequently each year, though the degree of severity varies across cases. Many factors influencing the degree of severity include the distance between the accident site and the residential area, the level of traffic density, the type and quantity of chemical leaks, the timeliness and accuracy of rescuing method and the effectiveness and timeliness of informing the people living near by and the commuters of the roads around that area on the situation.

In addition, in term of assessment aspect, the selected case study can be used to compare with the case of a Acrylonitrile-carrying truck accident, the studied case in the pilot test of TAI indicators. The comparison allows the researchers to track the progress of public access to information concerning environmental emergencies (Details of this case study is given in Appendix 2).

The Illegal Hazardous Waste Landfill in Pak Chong case is an example of the chemical related emergencies which ranks the second top of man-made disasters. In this case, the health and environmental hazards are from hazardous wastes that were illegally dumped. Even though this incident did not cause fatal effects to the local people, it had left hazardous chemical residues to the environment in that area, especially contamination to the soils. There was also a concern over the underground water and nearby plants being contaminated with toxic chemicals. The problem of hazardous chemicals and wastes has been aggravated as the demand of hazardous chemicals has rapidly increased in industrial and agricultural sectors. If there is no a systematic and technically sound management of these hazardous substance and wastes, the impact of the environmental hazards from toxic substance and wastes will be more severe. The selected case will be a good indicator on effectiveness of the national monitoring system of hazardous wastes transportation and management. (Details of this case study is given in Appendix 3)

Remarks:

- Responsible and concerning individuals and agencies in case of the truck carrying Nitric Acid over turns on Bang Na-Trad Road are as followed:
 1. Individuals or organizations that should be responsible for redress
 - 1) Mr. Sunthorn Panmasri, Truck Driver
 - 2) Thong Transport Co. Ltd. (company owner of the over turned truck)
 2. Responsible or related agencies in mitigating the emergency
- 2.1 Local agencies in the area

- 1) Bang Na Fire Station
- 2) Bang Na Metropolitan Police Station
- 3) Bangkok Metropolitan Authority (BMA) Emergency Response Center

2.2 Central Agencies

- 1) Emergency Response and Remediation Division, Waste and Hazardous Substance Management Bureau, Pollution Control Department
- 2) Secretariat office for National Commission on Civil Defense
- 3) Department of Disaster Prevention and Mitigation, Ministry of Interior

2.3 Others

- 1) The Rescue Unit, a volunteer rescue team from Bang Khen Fire Station
- 2) The media: Traffic Radio (FM 100 MHz) under Pacific News and Police Traffic Radio (FM 91 MHz) under Communications Police Division, Royal Thai Police

- Responsible and concerning individuals and agencies in the illegal landfill of hazardous waste in Pak Chong district, Nakhon Ratchasima Province are as followed:

1. Individuals or organizations that should be responsible for redress

- 1) A group of 13 persons that dumped the hazardous waste
- 2) The person(s) who hired this group of 13 persons (under investigation)
- 3) Asok Chemical Co.Ltd. (under investigation)
- 4) General Environmental Conservation Public Company Limited (GENCO) (under investigation)

2. Responsible or related agencies in mitigating the emergency

- 1) Klang Dong Tambon (Sub-district) Police Station and Nakhon Ratchasima Provincial Police Office
- 2) Tambon (Sub-district) Administration Organization of Klang Dong Sub-district
- 3) Mayor of Klang Dong Municipality
- 4) Governor of Nakhon Ratchasima Province
- 5) Director of Office of Disaster Prevention and Mitigation of Nakhon Ratchasima
- 6) Ministry of Natural Resources and Environment, main organizations are:
 - Regional Environmental Office 11;
 - Office of Natural Resources and Environment of Nakhon Ratchasima;
 - Geotechnic Division, Department of Mineral Resources;
 - Ground Water Conservation and Rehabilitation Office, Department of Groundwater Resources;
 - Hazardous Waste and Substances Management Bureau, Pollution Control Department;
 - Legal Division, Pollution Control Department;
 - Inspection and Enforcement Division, Pollution Control Department

7) Department of Industrial Works, main organizations are:

- Nakhon Ratchasima Provincial Industry Office;
- Factory Inspection and Regulation Office 3, Department of Industrial Works;
- Office of Factory Environmental Technology, Department of Industrial Works;
- Legal Division, Department of Industrial Works;
- Office of Administration and Management of Unused Materials, Department of Industrial Works

Assessment Methods

In the evaluation of the effort on dissemination of accidents information, the study team emphasizes on agencies responsible for mitigating and rehabilitation of the accident. In the case of the Overturns truck carrying Nitric Acid, the study team interviewed the director and officers of Emergency Response and Remediation Division, Waste and Hazardous Substance Management Bureau, Pollution Control Department (February 1 and March 14 2005 respectively). This is because the Emergency Response and Remediation Division is responsible for coordinating the operations, regulating, controlling, correcting, extinguishing or rehabilitating the environment of the hazardous substance contaminated or spreading areas. It also coordinates operations or supports the operations of other relating agencies. (<http://www.pcd.go.th/about/DivisionThai.htm#div2>). The study team also observed that during the incident, officers from the Emergency Response and Remediation Division have retrieved chemical substances from the site and coordinated with other relating agencies as well.

In addition to direct interviewed mentioned above, the study team reviewed documents and relevant legislations from printed documents, memorandum (copied), information in the websites of Pollution Control Department and the Department of Disaster Prevention and Mitigation, and newspaper articles covering the incident in Matichon and Dailynews Newspapers.

In the case study of Illegal Hazardous Waste Landfill at Pak Chong, Nakhon Ratchasima Province; the study team has interviewed environmental experts from Inspection and Enforcement Division, Pollution Control Department (February 14, 2005) who are responsible persons monitoring this case. Moreover, the study team reviewed relating governmental documents including the Report of the Ministry of Natural Resources and Environment proposed to the Cabinet, Orders of Nakhon Ratchasima Province, Orders of Ministry of Industry and the Cabinet's Resolution, as well as newspaper articles covering such incident.

Case Study: Truck Carrying Chemicals (Nitric Acid) **Overturms on Bang Na-Trad Road**

Table of Indicators

Indicators	
II.A.1 Mandate to disseminate information about environmental and health impacts to the public during an emergency*	
Values	Explanation and Justification
(0) Not applicable/not assessed	<u>Related Laws and Regulation</u>
(i) <u>There is no mandate that a government agency or responsible party disseminate information about environmental emergencies and accidents</u>	<ul style="list-style-type: none"> ▪ The Enhancement and Conservation of National Environmental Quality Act, B.E. 2535 (1992) Section 9 ▪ Official Information Act, B.E. 2535 (1997) Section 7 and 9 ▪ The Civilian Protection Act B.E. 2522 (1979) Section 8
(ii) There is a mandate that a government agency or responsible party disseminate information about environmental emergencies and accidents, but mandate has vague or broad exceptions or restrictions (please specify)	<ul style="list-style-type: none"> ▪ Regulations of the Pollution Control Department on the Official Information B.E. 2542 (1999) ▪ Notification of the Pollution Control Department, Subject, "Structure and Organizational Administration, Authority and Responsibilities, Work Procedures and Contact Points to access information of the Pollution Control Department" (August 11, 2004)
(iii) There is a clear mandate (incl. means of dissemination) that a government agency or responsible party disseminate information about environmental emergencies and accidents, and mandate has clearly defined exceptions or restrictions	<ul style="list-style-type: none"> ▪ Notification of the Ministry of Industry, subject, "Ground Transportation of Hazardous Substances" B.E. 2546 (November 7, 2004) <u>Relating Plans and Policies</u> <ul style="list-style-type: none"> ▪ Pollution Prevention and Reduction under the Policy and Perspective Plan on Enhancement and Conservation of National Environmental Quality, 1997-2016 ▪ Civilian Protection Plan 2005 <p>The review of the above legislations and regulations has not found any provision that enforced organizations to specifically disseminate or publicize information concerning the health and environmental impacts from chemical hazard.</p> <p>However if the information is in the possession of governmental organization, the general public may exercise his/hers rights pertaining to Section 58 of the Constitution of the Kingdom of Thailand 1997 and to Section 11 of the Official Information Act, 1997.</p>

	<p>In the case when responsible party or offender are not government agencies, there is no provision enforcing such party to publicize information on impacts occurred.</p> <p>Even though there is no provision that clearly mandates the dissemination or publication of accident information, the information dissemination and notification in terms of warning and problems watching have been set as one of the strategies of Pollution Control Department and Department of Disaster Prevention and Mitigation.</p> <p>Source: -Pollution Control Department Website (www.pcd.go.th) -Department of Disaster Prevention and Mitigation Website (www.disaster.go.th)</p>
II.A.2 Quality of information provided in ex post investigation report*	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) No report from ex post investigation was produced</p> <p>(ii) <u>Ex post investigation did not collect and report does not contain relevant information on or analysis of long-term environmental and health impacts</u></p> <p>(iii) Ex post investigation report contains limited information on and analysis of long-term environmental and health impacts</p> <p>(iv) Ex post investigation report contains relevant information on and analysis of long-term environmental and health impacts</p>	<p>From the interview with the officers from the Emergency Response and Remediation Division, it was found that the Division is not responsible to produce a post-investigation report after an accident and it is the responsibility of the police department. Instead, the Emergency Response and Remediation Division officer will prepare a memorandum informing the supervisor.</p> <p>In the case where there is impact on the environment and requires remediation or rehabilitation, the Division will prepare a remediation report, proposing various measures to local authorities. In this case study, the accident did not create long term affects on health and the environment; therefore, such report was not prepared, rather the internal memorandum was generated.</p> <p>Source: - Interview of the Director of the Emergency Response and Remediation Division, Office of Hazardous Waste and Substances Management, Pollution Control Department, February 1, 2005. - Interview of officers of Emergency Response and Remediation Division, Office of Hazardous Waste and Substances Management, Pollution Control Department March 14, 2005.</p>

II.A.3 Information about the emergency available on the Internet*	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) No information on the environmental emergency could be obtained on government agency website or other websites</p> <p>(ii) <u>Information on the environmental emergency could be obtained after in-depth search or multiple links on government agency website or other websites</u></p> <p>(iii) Information on the environmental emergency could be obtained immediately in search or on home page of government agency website or other websites</p>	<p>From reviewing of the Websites of related agencies such as the Pollution Control Department and the Department of Disaster Prevention and Mitigation, it was found that specific detailed information pertaining to this incident was not publicized. However, the Department of Disaster Prevention and Mitigation has published the Annual Report on Accidents and Disaster Statistics collecting information on accidents and public hazard incidents from internal and relating agencies. (Presently, Report Issue 3 of 2004 is being prepared.) However, publications of the report is limited due to budget constraints (only 400 copies and 400 CD Rom are available); therefore, this report will be distributed to only related organizations and educational institutions, the general public may read this report from the website of the Department of Disaster Prevention and Mitigation.</p> <p>From the review of information in the report, the study team found that the information exhibited is short summaries of incidents presented in the format of tables showing the date, time, characteristic of the accident, the damage/impact, the cause/detail and solution of the problems.</p> <p>Source: -Pollution Control Department Website (www.pcd.go.th) -Department of Disaster Prevention and Mitigation Website (www.disaster.go.th) -Interview of the Research and Development Officer, Disaster Prevention Measures Bureau, Department of Disaster Prevention and Mitigation, March 21, 2005.</p>
II.A.4 Information about an ex post investigation available on the Internet *	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) <u>No information about an ex post investigation could be obtained on government agency website or other websites</u></p> <p>(ii) Information on the ex post</p>	<p>From Indicator II.A.4, the publicized information of the report was only the summary of incidents and impacts which are very limited information, therefore, it was not information on ex post investigation.</p> <p>Source: -Department of Disaster Prevention and</p>

<p>investigation could be obtained after in-depth search or multiple links on government agency website or other websites</p> <p>(iii) Information on the ex post investigation could be obtained immediately in search or on the home page of government agency website or other websites</p>	<p>Mitigation, (www.disaster.go.th)</p>
<p>II.A.5 Efforts to reach mass media during the emergency*</p>	
<p>Values</p>	<p>Explanation and Justification</p>
<p>(0) <u>Not applicable/not assessed</u></p> <p>(i) The responsible agency/party did not issue statements and information to the media during the selected emergency</p> <p>(ii) The responsible agency/party gave insufficient information to the media (produced only one statement, gave conflicting information, etc.)</p> <p>(iii) The responsible agency/party carried out a comprehensive outreach effort, including press releases, interviews, and press conferences reaching various media outlets (e.g., TV, radio, press, etc.)</p>	<p>The term "responsible organizations or divisions" for indicators II.A.5 and II.A.6 stands for agencies and divisions that are responsible for mitigate the incident, and not being a party who causes the accident.</p> <p>From the interview with the director of the Emergency Response and Remediation Division, which is responsible for mitigation and prevention of hazardous substance dispersal, it was found that the agency did not inform the incident to the mass media. Nevertheless, the local news reporter was able to arrive at the scene to cover the story only 30 minutes after the accident. Later Traffic Radio FM 100 MHz and Police Traffic Radio FM 91 MHz requested an interview on such incident and advices on primary damage preventive measures to inform the public. Hence, this can be regarded as an attempt by the media to access responsible agency. Nevertheless, after being contacted from the mass media, Emergency Response and Remediation Division and local rescue unit eagerly provided information on the accident.</p> <p>On the other hands, the study team received additional information from The Department of Environmental Quality Promotion which is responsible for disseminating and publicizing environmental information that it has received an order from the Ministry of Natural Resources and Environment to inform the media and have the accident reported by the media. The Pollution Control Department may not have been informed about this matter. (Interviewed of the Director of the Office of Public Participation Promotion, April 28, 2005)</p> <p><u>Comments</u></p>

	The fact that Department of Environmental Quality Promotion has contacted the media could be considered as an effort by governmental organization to reach mass media during the emergency. However, the agency being accessed who is responsible for mitigation (Pollution Control Department) showed passive effort to publicize information relating to emergency or public hazard; therefore, the value (0) is selected.
II.A.6 Efforts to reach mass media after the emergency*	
Values	Explanation and Justification
(0) Not applicable/not assessed	From the interview with the director of the Emergency Response and Remediation Division, it was found that the officers of the emergency response team viewed that the impact was not severe since the accident occurred quite a distant from community area, the amount of hazardous chemical leakage was limited (3 drums spilled, accounting for approximately 100 Kilogram) and the rescue team was able to quickly extinguished the situation within 4 hours; hence, the agency did not arrange a press conference on this matter.
(i) <u>The responsible agency/party did not issue statements and information to the media after the selected emergency</u>	
(ii) The responsible agency/party gave insufficient information to the media (produced only one statement, gave conflicting information, etc.)	
(iii) The responsible agency/party carried out a comprehensive outreach effort, including press releases, interviews, and press conferences reaching various media outlets (e.g., TV, radio, press, etc.)	Source: -Interview of the Director of the Emergency Response and Remediation Division, Waste and Hazardous Substance Management Bureau, Pollution Control Department, February 1, 2005.
II.A.7 Quality of information accessible to the public during an emergency*	
Values	Explanation and Justification
(0) Not applicable/not assessed	Officers of the Chemical Emergency Response Division of the Pollution Control Department provided safety information and primary damage preventive measures information for the general public through Traffic Radio FM 100 MHz and Police Traffic Radio FM 91 MHz, and for commuters passing along the accident area through loud speakers during the incident.
(i) Information about immediate health and environmental impacts of selected emergency was not accessible to the public	
(ii) Incomplete or contradictory information about immediate health and environmental impacts of selected emergency was accessible to the public	
(iii) <u>Complete and consistent information about immediate health and environmental impacts of selected emergency</u>	Source: -Interview of the Director of the Emergency Response and Remediation Division, Pollution Control Department, February 1, 2005 -The Emergency Response and Remediation Division, Memorandum Number 0302/2547 dated 25 February 2004, subject, "The Over

<u>was accessible, along with instructions and suggestions on how members of the public can protect themselves</u>	Turned Truck Carrying Nitric Acid on Bang Na-Trad Road (copied).
II.A.8 Quality of information accessible to the public about ex post investigation*	
Values	Explanation and Justification
<p>(0) <u>Not applicable/not assessed</u></p> <p>(i) Information about long-term health and environmental impacts of selected emergency was not accessible to the public</p> <p>(ii) Incomplete or contradictory information about long-term health and environmental impacts of selected emergency was accessible to the public</p> <p>(iii) Complete and consistent information about long-term health and environmental impacts of selected emergency was accessible, along with instructions and suggestions on how members of the public can protect themselves</p>	<p>Value (0) is selected since the post accident-investigation report was not formulated.</p>
II.A.9 Timeliness of information disseminated to the public during an emergency	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) No information was disseminated to the public</p> <p>(ii) Information was disseminated with significant delay that caused avoidable harm</p> <p>(iii) Information was disseminated with a reasonable delay that caused no perceived additional harm</p> <p>(iv) <u>Information was disseminated immediately after the emergency occurred or was discovered</u></p>	<p>Chemical Emergency Response Division of the Pollution Control Department provides safety information and primary damage preventive measures information for the public through Traffic Radio FM 100 MHz and Police Traffic Radio FM 91 MHz during the chemical substance retrieval process.</p> <p>Source: Interview of the Director of the Emergency Response and Remediation Division, Waste and Hazardous Substance Management Bureau, Pollution Control Department, February 1, 2005.</p>

Analysis

When comparing the Over turns truck, carrying Nitric Acid on Bang Na-Trad Road case study with another similar case: the over turned truck carrying Acrylonitrile Chemical along the motorway in 2001 which was a case study in the first evaluation (Thailand Environmental Institute, B.E. 2545 (1992)); it was found that this time, the operation of the emergency rescue team is more effective comparing to the previous case study in that it was able to manage the situation within 4 hours (comparing to the 10 hours used in the case of the over turns truck carrying Acrylonitrile Chemical). The rescue team has more knowledge on spilled chemical retrieval and it carried out the operation in compliance to safety regulations. Furthermore, it coordinated with the local police in redirecting traffic and informing the commuters along the road throughout the incident.

The improvement of such operation is due to an existence of a specialized agency directly responsible for this type of situation, namely, Emergency Response and Remediation Division, Pollution Control Department, consisting of chemical experts; and also owing to an establishment of Chemical Emergency Response Supporting Center, responsible for facilitate coordination among relating agencies as well as provide information on chemical substances and on remedies of chemical accidents. The Hotline No. 1650 was installed under the authority of this center to receive emergency calls on chemical issues, pollution complaints, and primary measures for chemical substance accidents.

In addition, The Emergency Response and Remediation Division, Pollution Control Department has published Hazardous Substances Accidents Immobilize Manual and Hazardous Substances Transportation Manual and distributed to the operational staff relating with Safety issues, drivers of vehicles transporting hazardous substances, related officers and the general public. Furthermore, the division has published the Provincial Chemical Emergency Response Planning Manual for the relevant government and private agencies to use as a framework in preparing the measures on prevention and mitigation of chemical accidents of the province. Interested person may contact the Department to receive a free copy of the manuals or download such manuals from the Pollution Control Department Website (www.pcd.go.th).

However, in term of the an effort to disseminate information to the public, the evaluation of the effort to reach the media during the incident shows that it was the mass media's efforts to access related agencies. This can be witnessed from the fact that Traffic Radio FM 100 MHz tried to request for an interview with the Director of Emergency Response and Remediation Division, asking for information relating with the accident, chemical substance retrieval, and primary damage preventive measures. Therefore, information provided by the agency was in a passive manner. Furthermore, there is no provision prescribed that responsible agencies shall disseminate accidental information to the public; information disclosure is not mandated in work procedures, rather it depends on policies of the executives whether or not such information shall made available and to what extent.

In the past, there were only Annual Report on Accidents and Disaster Statistics prepared by the Department of Disaster Prevention and Mitigation which has been carried out for two consecutive years. However, due to budget constraints, the department only distributed the report to relating agencies and educational institutions. The general public can search for such information in the department's Website. Nevertheless, comparing with total population, the number of internet users is still minimal; hence, information dissemination to the general public is still limited.

Case Study: Illegal Landfill of Hazardous Waste at Pak Chong District, Nakhon Ratchasima Province

Table of Indicators

Indicators	
II.A.1 Mandate to disseminate information about environmental and health impacts to the public during an emergency*	
Values	Explanation and Justification
(0) Not applicable/not assessed	<p>From reviewing of various legislations from Pollution Control Department, Department of Industrial Works and Department of Disaster Prevention and Mitigation, it was found that there is no legal provision mandating government agencies to disseminate specifically information concerning health and environmental impact from accidents. In cases when responsible party or the offender is not government agency, there is no mandate that responsible party disseminate information on impacts of the accidents.</p> <p>However, the dissemination and publication of accident information in terms of warning and problem watching is one of the strategies of Pollution Control Department and Department of Disaster Prevention and Mitigation.</p> <p>Source: -The Pollution Control Department Website (www.pcd.go.th) -The Department of Industrial Works Website (www.diw.go.th) -Department of Disaster Prevention and Mitigation, (www.disaster.go.th)</p>
(i) <u>There is no mandate that a government agency or responsible party disseminate information about environmental emergencies and accidents</u>	
(ii) There is a mandate that a government agency or responsible party disseminate information about environmental emergencies and accidents, but mandate has vague or broad exceptions or restrictions (please specify)	
(iii) There is a clear mandate (incl. means of dissemination) that a government agency or responsible party disseminate information about environmental emergencies and accidents, and mandate has clearly defined exceptions or restrictions	
II.A.2 Quality of information provided in ex post investigation report*	
Values	Explanation and Justification
(0) Not applicable/not assessed	<p>The Ministry of Natural Resources and Environment has brought the case into the consideration of the Cabinet on 13 September 2004. Then the cabinet arrived the resolution on 14 February 2004, appointing the Ministry of Natural Resources and Environment to monitor the contamination of the soils, underground water, and surface water in the surrounding areas, in order to take precautionary measures</p>
(i) No report from ex post investigation was produced	
(ii) Ex post investigation did not collect and report does not contain relevant information on or analysis of long-term	

<p>environmental and health impacts</p> <p>(iii) Ex post investigation report contains limited information on and analysis of long-term environmental and health impacts</p> <p>(iv) <u>Ex post investigation report contains relevant information on and analysis of long-term environmental and health impacts</u></p>	<p>on the impacts it had on the environment and the community. The Ministry by the Pollution Control Department has written a progress report on the environmental impacts monitoring for the cabinet reviews. It is speculated that the incident will create a greater impact on the environment than on the public's health since the illegal landfill site is about 2-3 kilometer from the community. Hence, the investigation report focuses on monitoring and observance of the environment quality within the contaminated area.</p> <p>Source: -Interview of Environmental Expert, Inspection and Enforcement Division, the Pollution Control Department, February 14, 2005. -Progress Report of the case of the Illegal Hazardous Waste Landfill in Pak Chong, Nakhon Ratchasima Province proposed by the Pollution Control Department to the Cabinet, September 20, 2004, October 4, 2004 and November 1, 2004 (Copied).</p>
<p>II.A.3 Information about the emergency available on the Internet*</p>	
<p>Values</p>	<p>Explanation and Justification</p>
<p>(0) Not applicable/not assessed</p> <p>(i) <u>No information on the environmental emergency could be obtained on government agency website or other websites</u></p> <p>(ii) Information on the environmental emergency could be obtained after in-depth search or multiple links on government agency website or other websites</p> <p>(iii) Information on the environmental emergency could be obtained immediately in search or on home page of government agency website or other websites</p>	<p>From reviewing of the related government agencies' websites, including Pollution Control Department, Department of Industrial Works and the Department of Disaster Prevention and Mitigation, no specific information relating to this accident is available.</p>

II.A.4 Information about an ex post investigation available on the Internet *	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) <u>No information about an ex post investigation could be obtained on government agency website or other websites</u></p> <p>(ii) Information on the ex post investigation could be obtained after in-depth search or multiple links on government agency website or other websites</p> <p>(iii) Information on the ex post investigation could be obtained immediately in search or on the home page of government agency website or other websites</p>	<p>Pertaining to the Cabinet's Resolution of September 14 2004, two investigation committees were established: the Investigation Committee under the Notification of Ministry of Industry, and the Investigation Committee under the Order of Nakhon Ratchasima Province. Furthermore, another Working Group was established under the Order of Ministry of Natural Resources and Environment to follow up investigations, to rehabilitate the environment and to ascertain of truth.</p> <p>However, from reviewing of the related agencies' websites, including Department of Industrial Works, Pollution Control Department and Nakhon Ratchasima Province, the investigation report of this incident could not be found.</p>
II.A.5 Efforts to reach mass media during the emergency*	
Values	Explanation and Justification
<p>(0) <u>Not applicable/not assessed</u></p> <p>(i) The responsible agency/party did not issue statements and information to the media during the selected emergency</p> <p>(ii) The responsible agency/party gave insufficient information to the media (produced only one statement, gave conflicting information, etc.)</p> <p>(iii) <u>The responsible agency/party carried out a comprehensive outreach effort, including press releases, interviews, and press conferences reaching various media outlets (e.g., TV, radio, press, etc.)</u></p>	<p>After the officers of the Natural Resources and Environment of Nakhon Ratchasima Province, Regional Environmental Office 11, Pollution Control Department and other relating governmental agencies in Nakhon Ratchasima, including Nakhon Ratchasima Provincial Industry Office, Klang Dong Tambon (Sub-District) Administration Organization and Klang Dong Police Department had investigated the sites on the 9 of September 2004, Chief of Klang Dong Tambon (Sub-district) Administration Organization has informed the incident to Thairath Newspaper at once. Furthermore, the press conference to inform the public on the incident was held after the visit of the Minister of Natural Resources and Environment (Mr. Suwit Khunkitti) on the 11 September 2004. Almost every newspaper published this story on the 14 February 2004 (Thairath Newspaper, page 15; Matichon Newspaper, page 10; The Nation, page 6A; Bangkok Post, page 1) The continued news was reported on the following day.</p>

II.A.6 Efforts to reach mass media after the emergency*	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) The responsible agency/party did not issue statements and information to the media after the selected emergency</p> <p>(ii) <u>The responsible agency/party gave insufficient information to the media (produced only one statement, gave conflicting information, etc.)</u></p> <p>(iii) The responsible agency/party carried out a comprehensive outreach effort, including press releases, interviews, and press conferences reaching various media outlets (e.g., TV, radio, press, etc.)</p>	<p>The study team has evaluated this indicator starting from the time that the General Environmental Conservation Public Company Limited (GENCO) began to remove the waste from the site on the 13 September 2004.</p> <p>Follow up reports on investigation and rehabilitation of the affected area by related agencies were consecutively submitted to the Cabinet during September and October.</p> <p>However, from middle of November until the day of this study report is prepared (March 2005), there has been no report on the progress of the investigation of the case and on monitoring the environmental impact from the incident, even though the three working committees continue to investigate the case and to monitor impacts on the environment.</p>
II.A.7 Quality of information accessible to the public during an emergency*	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) Information about immediate health and environmental impacts of selected emergency was not accessible to the public</p> <p>(ii) Incomplete or contradictory information about immediate health and environmental impacts of selected emergency was accessible to the public</p> <p>(iii) <u>Complete and consistent information about immediate health and environmental impacts of selected emergency was accessible, along with instructions and suggestions on how members of the public can protect themselves</u></p>	<p>During the incident of the 9-12 September 2004, the Department of Pollution Control, has the Klang Dong Tambon (Sub-District) Administration Organization Dong informed the public within the vicinity of the incident not to enter near the site since there were strong chemical odors dispersed throughout the area.</p> <p>Source: -Interviewed with Environmental Engineering Expert, The Inspection and Enforcement Division, Pollution Control Department, February 14, 2005.</p>

II.A.8 Quality of information accessible to the public about ex post investigation*	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) <u>Information about long-term health and environmental impacts of selected emergency was not accessible to the public</u></p> <p>(ii) Incomplete or contradictory information about long-term health and environmental impacts of selected emergency was accessible to the public</p> <p>(iii) Complete and consistent information about long-term health and environmental impacts of selected emergency was accessible, along with instructions and suggestions on how members of the public can protect themselves</p>	<p>There was an establishment of the Working Group of the Ministry of Natural Resources and Environment on the 8 October 2004 to monitor, investigate, problem watching, and rehabilitate the environment. However, from the reviews of various newspapers, the study team found that information dissemination of work progress such as analysis results, and anticipation of hazardous chemical contamination, to the public was continuously conducted only in the early stage after the incident. Examples of such is a report of artesian well water analysis in the surrounding areas found no contamination in the groundwater; while the report of soil analysis found contamination of Volatile Organic Carbon (VOCs) in the soil of more than 1 meter depth. (Kom Chad Luek Newspaper, November 3, 2004, page 2,17)</p> <p>Later on, from November 4, 2004 until today (the day when this study report is prepared: 22 February 2005), it was found that there has no news on the progress report of the incident. For example, the ground water examination results of the 3 new artesian monitoring wells in the area. Furthermore, the community in the surrounding area was not informed of the progress of the investigation and problem watching on the contamination issues in the surrounding areas.</p> <p>Source: -Interviewed with Environmental Engineering Expert, The Inspection and Enforcement Division, Pollution Control Department, February 14, 2005)</p>
II.A.9 Timeliness of information disseminated to the public during an emergency	
Values	Explanation and Justification
<p>(0) Not applicable/not assessed</p> <p>(i) No information was disseminated to the public</p> <p>(ii) Information was disseminated with significant delay that caused avoidable harm</p>	<p>From the interview with the Inspection and Enforcement officer, the Pollution Control Department, it was found that Officers of the Klang Dong Tambon (Sub-District) Administration Organizations informed the provincial authorities and local police of Klang Dong regarding the illegal landfill of hazardous waste on 9 September 2004.</p>

<p>(iii) Information was disseminated with a reasonable delay that caused no perceived additional harm</p> <p>(iv) <u>Information was disseminated immediately after the emergency occurred or was discovered</u></p>	<p>The police officers then brought force to the site and arrested 13 workers illegally land filling industrial hazardous wastes. On the same day, Chief of the Klang Dong Tambon (Sub-district) Administration Organization who is a local news reporter informed the incident to Thairath Newspaper.</p> <p>Source: -Interviewed with Environmental Engineering Expert, The Inspection and Enforcement Division, Pollution Control Department, February 14, 2005.</p>
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Analysis

The case study of the Illegal Landfill of Hazardous Waste at Klang Dong Sub-district, Pak Chong District, Nakhon Ratchasima Province reflects ineffectiveness of the management and tracking systems of the transportation of Hazardous Waste from the Industrial Sector, resulting in many illegal landfill of hazardous waste incidents. In this case, the officers found the illegal dumpers in action, the immediate impact did not cause serious damage or harm to the local people. There were only problem of strong odor from the hazardous chemical in the initial stage. However, since a large amount of chemical waste was piled without proper storage, it resulted in leakage of chemical substance from the container and contaminated the soils, and may further contaminate the groundwater in such premise.

Findings of the assessment on the effort to disseminate the accident information in this case show that government agencies responded promptly to the incident. It can be seen that after the police officers arrested the groups of offenders on 9 September, only two day after that (11 September), the Minister of Natural Resources and Environment traveled to inspect the site and coordinated with the Minister of Industry to hire General Environmental Conservation Public Company Limited (GENCO) to remove the hazardous waste from the area immediately. Moreover, a press conference was held on that day.

Nevertheless, after the incident, the Cabinet arrived a resolution on 14 September 2004 to establish 3 working committees, including 1) The Province of Nakhon Ratchasima: to carry out further investigations; 2) the Ministry of Natural Resources and Environment: to monitor the contamination of the soil, underground water, and surface water in the surrounding area in order to take precautionary measure on the impacts it had on the environment and the community; and 3) the Ministry of Industry: to monitor Illegal landfill of hazardous waste from industrial factories. This is to search for the person who employed the relating government agency. From reviewing information in the newspapers, it was found that there have been reports on the operations of the working committees continuously during September to early October. From then to the present, there has been no further report on the operation of the working committee in the investigation, rehabilitation and environmental impact watching, even though the operations of the working committees have not been completed. This reflects the discontinuity of information dissemination for the public regarding the progress of the investigation and long term environmental impacts.

Recommendations

▪ For Thailand

- 1) Network for the dissemination of information on accidents, emergencies, and primary damage preventive measures as a warning system for the general public shall be established. Such network should involve a core agency, for example, the Department of Disaster Prevention and Mitigation acting as a host. Furthermore, the "Accident and Disaster Prevention Coordinating Center" that has the same characteristic of Coordinating Center for Road Safety, may be established. This center may compose of representatives of relating agencies and competent experts acting as member committee to identify integrated accidental prevention plan, covering epidemics and chemical substances accidents. This will create a collaborated and systematic problem solving among relating agencies.
- 2) A network between the government and the mass media shall be established with Department of Disaster Prevention and Mitigation is a core agency, collaborating with Government Public Relations Department and Thai Broadcast Journalists Association. There shall be an official agreement that if similar situations occur, the information dissemination to main media shall be carried out promptly and efficiently, and not in the manner of regular news broadcast. The news shall be broadcasted according to the hierarchy system, which is, from the central to regional and local level, respectively; with each level have clear responsibilities. The system shall be constructed with clear hierarchy levels, with each agency aware of their work scopes, and equipped with information accuracy checking system.
- 3) There should be work procedures or manuals for the operational officers in the relating agencies such as Pollution Control Department, Department of Disaster Prevention and Mitigation, Royal Thai Police, Ministry of Public Health, and local administrations (Bangkok Metropolitan Authority, Provincial Authority, Provincial Administration Organization, Tambon (sub-district) Administration Organization and Municipality). The manual shall cover procedures in dissemination of information on details and impacts of the accident to the general public, methods to quickly access mass media, and how to provide comprehensive information on primary damage preventive measures from the accidents to the general public.
- 4) Every government agency shall place an importance on the investment in information dissemination. There should be a system and clear strategic plan with certain budget for information dissemination activities. The budget may be set at 10 percent of total budget of the project for information dissemination activities during the preparation of project proposals.
- 5) Department of Industrial Works shall increase watching measures and prepare for accidents or emergencies which might happen in factories located near the community area, specifically those related with the use or production of hazardous substances. Information and knowledge on self-protection from accidents should be provided twice a year to the general public. Factories located in the area shall support information dissemination on chemical substances used and preventive measures of the factories, as well as self-protection tips in case of emergency.
- 6) Ministry of Education, Ministry of Public Health, Ministry of Natural Resources and Environment and Thai Health Promotion Foundation (ThaiHealth) should place an importance in the dissemination of knowledge relating to the danger of chemicals to human health and the environment in order to prevent accidents as a priority

mission of the organizations. Ministry of Education should pressure to include in school curriculums the subject on Toxin of Chemicals, in order to create student awareness in the primary, secondary, high schools and higher education level that chemical accidents are not far issue and create knowledge and understandings on self-protection from these chemicals substances. Knowledge built in the youth can later transfer to the parents as well. With regard to Ministry of Public Health, Food and Drug Administration and Department of Health should create a campaign for the general public especially for the farmers to be aware of the dangers of chemical used in agricultural activities. Ministry of Natural Resource and Environment (Department of Environmental Quality Promotion) should coordinate with Waste and Hazardous Substance Management Bureau, Pollution Control Department to inform the general public of dangers of the chemical substances on their health and to the environment. With respect to Thai Health Promotion Foundation (ThaiHealth), the agency shall incorporate a safety culture into its plans on campaigning program to reduce the accidents.

- 7) Agencies relating to the protection and alleviation of accidents such as the Department of Disaster Prevention and Mitigation, Pollution Control Department and Department of Industrial Works shall disseminate accidents information and theirs impact analysis on health and environment, both in short term and long term, of incidents happened within the year for the public through websites and other printed media. In case of accidents which have severe effects on the environment and the public health, the Office of the Natural Resources and Environmental Policy and Planning shall provide accident information and its impact analysis on the environment and public health in the State of the Environmental Report of that specific year.
- 8) With respect to chemical substance accidents in the Industrial Sector, the Department of Industrial Works should invest in the development of the Inventory System and the Manifest and Tracking System of hazardous industrial waste by installing the GPS (Global Positioning System) to assist the tracking of hazardous waste truck carriers, and affixing bar-codes on the hazardous waste. The installation of a well designed and meticulous system may involve high expense but it could be worthwhile when considering the benefit of the country in the long term in managing of hazardous waste from the industry, especially the electronic industry. The budget for systems development can be obtained from the taxation on disposal or recycle/reuse services, which are high profiting activities. In addition, it was found that presently the GPS can be produced in Thailand; therefore, it should support the development of this technology in the country, which would reduce the cost of importing this machine from abroad. Once the Manifest and Tracking System is developed, the public participation in the system should also be promoted.

▪ For Development of the Indicators

- 1) The indicators on efforts to establish watching, monitoring and emergency warning systems, as well as to set up the holistic coordination by all related agencies should be developed.
- 2) There should be indicators that evaluate the consistency and result of trainings or emergency procedure practicing in high risk area (such as on the chemical truck routes). Furthermore, it shall evaluate the effort to create public knowledge and understandings on hazardous substances signs, labels and the hotline numbers of relating organizations.

- 3) Indicators to follow up the dissemination of information to the public regarding the accident's long term impact should be developed, especially in the incidents that caused environmental contamination. This is to assess whether related agencies have monitored the environment quality regularly such as annually, or every two years, and whether the public received these finding results.
- 4) Regarding the people who should received information, if the impact has spread further from the incident area (such as the contamination of chemical to water sources), the "stakeholders" definition should be expanded, not only covering the people within the incident area who received reimbursements for the damages, but also covering those who should know about self-protection which may include the general public as well.
- 5) There should be a development of indicators for the information access or information dissemination on health and environmental impact in the long terms from the chemicals usage in the agriculture sector, which does not create acute effect, but accumulate for a time period. Thus, there should be indicators that evaluate the information dissemination and its consistency to create knowledge and awareness of the general public on toxicity of chemical substances.