

## Appendixes

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### **Appendix 1: Bird Flu Outbreaks**

#### **1.1 Key Facts about Bird Flu (Avian Influenza)**

The avian influenza, popularly known as bird flu, is an infection caused by avian influenza virus type A in a family of Orthomyxoviridae, which has RNA and has an envelope. This kind of virus can be destroyed by a disinfectant solution e.g. alcohol and chloroform. The bird flu that can transmit to humans is the H5N1 virus. Humans can get infected by consuming food or water that is contaminated with excretion e.g. nasal secretions, saliva, and feces of the sick animals. The bird flu virus has a short incubation period from a few hours to 3 days. The chicken infected by this virus will lose appetite and become emaciated. It has also a flu-like symptom, swollen eyes as well as getting swollen and dark comb. It will also have nervous system symptom and diarrhea. If the chicken has a severe infection, it will die immediately without showing any symptoms. Wild birds worldwide carry the viruses in their intestines, but usually do not get sick from them. However, bird flu is very contagious among birds and can make some domesticated birds, including chickens, ducks, and turkeys, very sick and kill them.

Dr. Jaran Tarinwutthipong, M.D., Director-General of the Department of Disease Control pointed out that bird flu caused by the H5N1 virus can transmit from poultry to humans. It has a 1-2 day incubation period. It has typical flu-like symptoms but more severe (e.g., high fever, severe head ache, weakness, cough, difficulty to breathe) as well as a nerve system symptoms (e.g. vomiting, diarrhea, and pneumonia) in some cases. The people who have a higher risk of being infected are those who work in farms and poultry processing factories.

The disease, which was first identified in Italy more than 100 years ago, occurs worldwide. During the 20th century, the emergence of several new influenza A virus subtypes caused three pandemics, all of which spread around the world within a year of being detected.

- 1918-19, "Spanish flu," [A (H1N1)], caused the highest number of known influenza deaths. (However, the actual influenza virus subtype was not detected in the 1918-19 pandemic). More than 500,000 people died in the United States , and up to 50 million people may have died worldwide. Many people died within the first few days after infection, and others died of secondary complications. Nearly half of those who died were young, healthy adults. Influenza A (H1N1) viruses still circulate today after being introduced again into the human population in 1977.
- 1957-58, "Asian flu," [A (H2N2)], caused about 70,000 deaths in the United States . First identified in China in late February 1957, the Asian flu spread to the United States by June 1957.
- 1968-69, "Hong Kong flu," [A (H3N2)], caused about 34,000 deaths in the United States . This virus was first detected in Hong Kong in early 1968 and spread to the United States later that year. Influenza A (H3N2) viruses still circulate today.

In 2004, there was a spread of bird flu type H5N1 virus, which killed massive

numbers of poultry as well as a number of humans. This deadly virus has raised concerns of the World Health Organization (WHO) for the possibility of pandemic.

Migratory waterfowl, most notably wild ducks, are the natural reservoir of bird flu viruses, and these birds are also the most resistant to infection. The bird flu outbreak started in October 2003 and continued until October 2004. The inability to control the disease was due to the lack of knowledge of the officials and the fact that Thailand never had any experience in this kind epidemic. In this light, the officials have overlooked the danger of the disease and covered up information because of political and business interests. The lack of immediate actions to contain the outbreak during the initial stage caused a wide and rapid spread of the disease, which, later on, was difficult to control. The outbreak now became a regional endemic. However, when comparing with the neighboring countries for instance Hong Kong in 1997, the outbreak did not happen again. Therefore, we all need to collaboratively work towards controlling this disease not to spread in humans.

## **1.2 Related Laws and Legislations: Bird Flu Control Zones**

- The Animal Epidemic Act, B.E. 2499 (1956) and its amendment (no. 2, B.E. 2542)
- The Executive Decree of the Animal Epidemic Act, B.E. 2499 (1956)
- The Ministerial Regulation on Animal Epidemic, B.E. 2545 (2002) (additional)
- The Ministerial Regulation on import, export, or transit of animals or carcasses to the country, B.E. 2544 (2001)
- The Notification of the Department of Livestock Development on Inspector Appointment in accordance with the Animal Epidemic Act, B.E. 2499 (1956)
- The Regulation of the Department of Livestock Development on Approval, Inspection and Elimination of Diseases During the Movement of Animals and Carcasses in the Kingdom of Thailand, B.E. 2544 (2001)
- The Regulation of the Department of Livestock Development on the Depopulation of Infected Animals and Disease Carrying Animals or Carcasses, B.E. 2538 (1995)
- The Regulation of Department of Livestock Development on Request for and Issuance of Certificates for Standard Animal Raising Farms, B.E. 2546 (2003)

The provisions under the Animal Epidemic Act, B.E. 2499 (1956) and the amendment of the act (no. 2, B.E. 2542) require epidemic information to be disseminated as follows.

**Article 15** In any area of a province, which has or is suspected to have an epidemic, the governor of that province has the authority to announce a part or all of the areas as an epidemic control zone. The announcement is to specify the type(s) of the animal(s) and the epidemic(s). The announcement must be posted at the city hall, the administrative subdivision office of the province, the residence of the elected district officials as well as at the headman of the village(s) and the community(s) in the effected province(s).

**Article 16** In the case that the veterinarian considers that the found epidemic in his area or the one(s) connected to his area will spread; the veterinarian has the authority to issue a decree to declare a temporary epidemic control zone within five kilometers radius from the affected area. The decree must specify the type(s) of the affected animal(s) and the disease. The decree must be placed at the city hall, the administrative subdivision office of the province, the residence of the elected district

officials as well as at the headman of the village(s) and the community(s) in the effected province(s) and to be enacted for 30 days starting from the announced day.

### **1.3 Bird Flu Control Measures and Preparedness Activities (related to information dissemination only)**

**The Ministry of Public Health (MOPH)** is taking part in a number of control measures, which can be summarized as follows.

- 1) Introducing the Ministerial Ordinance under the Contracted Disease Act B.E. 2523 that the occurrence of contagious influenza including those in livestock must be notified to an authority.
- 2) Establishing the bird flu outbreak operation center in the Ministry of Public Health to observe, prevent, and control the infection in humans along with the operation in animals through the network of operational teams including the center expertise group, surveillance and investigation group, disease diagnosis laboratory team, medical team, operational support team and information disseminating team and information technology team.
- 3) Establishing the National Anti-Bird Flu Committee, chaired by Deputy Prime Minister Jaturon Chaisang, in order to work and link all the operational measures in line with each other as well as to promote control measures and cooperation among agencies.
- 4) Informing about the situation and control zones along with giving precautions to the risk group nationwide including chicken raisers and transporters, chicken processors, food providers and consumers of chicken products. This includes educational campaigns through mass media in order to inform the public that the bird flu does not transmit from human to human and that it is safe to consume chickens and eggs, which are sold in the market if it is well cooked.
- 5) Carrying out active public relation campaigns on hygiene in the area, through broadcasting and coordinating with public health volunteers for promulgating accurate knowledge by visiting the people at their houses throughout the country. The measure is undertaken on the belief that by receiving accurate information and knowledge, people can protect themselves and their family members from the disease. The Ministry is deemed to work with other agencies to control the disease.
- 6) Providing the hotline service (Operational Center of the Department of Disease Control, tel. 02-590-3333) in order to respond questions from the public and provide information through the ministry website (<http://www.moph.go.th>).
- 7) Building up public confidence in consuming chickens and eggs through public relations and campaigns in order to reduce the economic impacts on farmers and small businesses.
- 8) Undertaking market clean-up campaigns nationwide aimed at eradicating the spreading sources and promoting hygienic consuming behaviors in order to prevent the spread of the disease. The hygienic behavior includes consuming well-cooked food, washing hands, wearing appropriate personal protective

clothing (for at risk groups) and avoiding direct contact with, slaughter of, or consuming unusual sick or dead animals.

- 9) Coordinating with the Department of Livestock Development for producing educational Video CDs (VCDs) and handbooks on how to eradicate the sick animals in an appropriate way in order to contain the disease and how to undertake surveillance of bird flu in humans.

**The Department of Livestock Department (DLD)** has established a number of standard control measures and surveillance following the principle of the OIE including close consultation with the United Nations Food and Agriculture Organization (FAO) and the World Health Organization (WHO). The measures undertaken by the DLD include cleaning poultry raising farms nationwide to disinfecting the embedded disease and other measures as follows.

- 1) Educational training given to farmers in order for them to understand preventive measures and open poultry raising systems. Such preventive measures include hygienic farm management, spraying poultry feeding containers with disinfectant solutions, maintaining internal use of poultry raising equipments, and having workers wearing with protective clothing every time they enter the farm. Any farm that meets the required standard will receive a certificate from the Department of Livestock Department.
- 2) During normal situation, the concerning agencies will carry out sero-surveillance (serological surveillance) to track the situation of the disease nationwide.
- 3) Drafting a notification of the Ministry of Agriculture and Cooperatives on zoning poultry raising areas. The poultry raising areas will be divided into five zones and in each zone private sector will be allowed to divide up the areas into compartments in order to increase efficiency of disease controls.
- 4) Providing compensation to farmers who lost their chickens either being infected with the bird flu or being killed as a result of culling measures. The compensation received from the government was in the form of funding for purchasing new chickens, approximately 140 Baht per chicken.
- 5) Providing loans to farmers for changing their poultry farming systems to open systems aimed at protecting their poultry stocks from being contracted with the disease outside their farms. Approximately 10,000 billion baht will be allocated to slaughterhouse owners to upgrade their places to meet hygienic standards.

**The Prime Minister Office** has issued the most urgent letter to all governors (at NR 0411/LR 2/P 20 on 26 January 2005) about strict measures in preventing and controlling the bird flu outbreak. The document requires governors to strictly undertake the preventive and control measures and to prepare for emergency response plans, as follows.

- 1) Maintaining provincial- and district-level operational centers for containing the disease, and regularly arranging meetings with all stakeholders within the province, to follow, investigate, and solve the problems so as to track the situation closely. In addition, representatives from the Ministry of Defense are appointed to sit in provincial committees.
- 2) Immediate and continuous reporting of the sick or dead poultry on a daily

basis in order to control the disease in a timely and efficient manner.

- 3) Preparing preparedness plans to control the bird flu outbreak including personnel and equipments in dealing with the poultry and patients at all levels (provincial, district, sub-district, and village levels). This includes practices by duplicating the real situation to enable appropriate and timely operation when the outbreak emerges. The practices follow the guideline issued by the Ministry of Interior (at SPN MT/W199 LW on 1 November 2004) on the prevention and control of the spread of the bird flu.

#### The bird flu prevention and control measures in poultry

- 1) A timely reporting system must be established. Each province must set up a fast and prompt system to report suspected spread of the disease. This includes surveillance information generated by local volunteers who will be rewarded for their reporting. After receiving the reports, officials are deemed to immediately respond to the emergencies.
- 2) Public relations campaigns must be launched continuously to reduce villagers' panic and provide them with proper knowledge about the bird flu virus. It is also aimed to promote community participation by asking for cooperation from local media, community radios and central media for documentation and liaisons that can be broadcasted simultaneously. It is also important that local communities can participate in the government operations in their areas.

#### The bird flu prevention and control measures in humans

Provincial public health physicians are responsible for managing, following up and handling with the public health problems. The Ministry of Public Health has issued the most urgent letter (ST 0419/W774 LW) dated December 13, 2004, asking the provincial physicians to accelerate the bird flu surveillance in humans, as follows.

- 1) Closely watch the bird flu in humans and observe and prevent the disease strictly through the following mandate and supports:
  - Public health volunteers carry out daily home-visits. If they found any dead poultry, they must immediately report to veterinarians and public health officials in order to appropriately analyze the disease, collect samples, and destroy the disease in a timely manner.
  - Cooperate with private hospitals in disease surveillance and inform patients who might have the bird flu infection.
  - When suspected cases are found, provincial public health officials must inform the provincial livestock development office, the Office of Disease Control and Prevention, and the Epidemiology Division under the Department of Disease Control. An investigation team must be sent to the area immediately.
- 2) Providing advice to people about health and hygiene and allowing them to fully participate in disease preventive measures through educational campaigns and public relations, e.g., radio and information center. The campaigns focus on consumers' behavior, e.g., washing hands when preparing food and promoting cooked food consumption.

**1.4 Order of events: bird flu outbreaks** (source: Prachachart Turakij Newspaper, January 26, 2004)

Mr. Newin Chidchob, Deputy Minister of the Ministry of Agriculture and Cooperatives reassured that Thailand was not affected by the bird flu outbreak; however, he admitted that there was a spread of acute Cholera during November 21, 2003 to January 16, 2004. His statement was not able to restore confidence of poultry farmers and consumers, as it was contrast with the actual evidence reported by reporters of Prachachart Turakij Newspaper, who have been closely followed the incidents.

**1-3 December 2003**

There was a severe spread of bird flu in Nongbua district and Bungboraphet (a big lake) areas in Nakhon Sawan province. The dead waterfowl had bird flu-like symptoms, but the test results from the laboratory of the Livestock Health Institute stated that the chicken died of an acute cholera. Hence, the Department of Livestock Department did not announce an outbreak zone and subsequently poultry were still moved freely in the affected areas.

**18-21 December 2003**

There was a news coverage titled "massive dead chicken found, a cover-up of the outbreak to protect the 40,000 billion baht export" appeared on the newspaper. There were also reports on large numbers of chicken being died with unidentified causes in the areas of Nakhon Sawan, Lop Buri, Sing Buri, Ang Thong, Nakhon Pathom, Chachoengsao, and Nakhon Ratchasima provinces leading to public rumors that the bird flu outbreak was the cause of the deaths. The provincial livestock offices in the affected areas did not have any distinct measure to control the disease and still allow poultry being moved freely.

**22 December 2003**

A poultry export company that also runs domestic poultry businesses across the country, asked the Prachachart Turakij Newspaper to stop reporting the negative news as they affected the chicken export of the country.

**22-24 December 2003**

An article titled "Chickens Sick and Died Due to Weather Change" was on the newspaper. The paper reported that the weather changes were the main cause of the sickness and deaths of chickens as they made chickens become stressful and easily fell ill when the epidemic emerged.

**25-28 December 2003**

An important event was that poultry farmers from the affected provinces rallied to Bangkok to meet Mr. Somsak Thepsuthin, Minister of the Ministry of Agriculture and Cooperatives and call for countermeasures against the wide spread of the bird flu outbreak especially in the areas of Chachoengsao province.

### **29-31 December 2003**

During the year end, there was news reporting the massive deaths of chickens for egg and for meat, and the spread of the disease to Sukhothai province.

### **1-4 January 2004**

An article titled "Covering up Dead Chickens, Foreign Countries Skeptical" was appeared on the newspaper. It was argued that even close-poultry raising system (so-called EVAP-Evaporative Cooling System) was adopted, it could not prevent chickens from being infected and dying.

### **12-14 January 2004**

The Poultry Trade Association of Penang-Terengganu of Malaysia sent a letter to the Malaysian government calling for import ban of Thai broiler as there was a spread of bird flu outbreak in Thailand. Meanwhile, during the first meeting (1/2004) of regulatory committee on animal products, chaired by Ms. Chaweewan Leuwwichak, Deputy Director-General of the DLD, the participants confirmed that the figure of dead chickens was estimated at 40 billion, of which 10 billion were chickens for egg, while, the rest, approximately 160-200 billion, were chickens for meat (broiler).

### **5-18 January 2004**

The main content of the reports during this period was the increase in egg prices to almost 3 baht per egg. It was noticeable that the egg price was adjusted upward around 10-20 satang (1 bath = 100 satangs) within a month. Such rapid increase in egg price never happened before.

### **19-21 January 2004**

The main content of the reports during this period was that the Department of Livestock Department admitted for the first time that not only chickens for egg but also chickens for meat (broiler) had died of the outbreak.

### **1.5 Situation of Information Dissemination about the Bird Flu During the Initial Outbreak** (source: Matichon newspaper, January 30, 2004)

This section presented a meeting report summary of the senate's 7 committees about the bird flu outbreak in Thailand. The committees participating in the meeting include the Committee on Foreign Affairs, the Committee on Public Health, the Committee on Tourism, and the Committee on Environment.

#### Measures in disease control and restriction in animals

The government's analysis of the bird flu situation was misleading causing widespread of the bird flu virus in chickens and making the control of the outbreak becomes more difficult. The misled information generated by scientists and experts of the governmental agencies was a result of political interference. Before December 10, 2003, the Department of Livestock Department had suspected that chickens in Thailand had had the bird flu infection. However, it did not impose any controls or surveillance measures. From the epidemiological perspective, this was an

irresponsible action as it left people in high risk of being infected by the virus without precautions. The untransparent way in handling the bird flu undermined public confidence in the government and the governmental agencies.

#### Measures in surveillance, controls and treatments of the disease in humans

As the outbreak occurred during the winter, which was colder than previous years, many patients who had pneumonia or common flu were suspected of having the bird flu infection. However, only a few of them actually had the bird flu. In this regard, questions were raised on the capacity of the existing surveillance system that could observe and diagnose infected cases and on the sufficiency of budgets allocated for medical treatment, as the bird flu infected patients needed more medical care and medicine.

#### The effects of bird flu on the public and at risk groups

The bird flu can transmit from animals to humans and kill humans. Moreover, the bird flu in poultry may be able to spread to other kinds of animals, e.g. fish, pigs that live near poultry farms, or possibly it can transmit from humans to humans.

#### The country's image and the impact on international relations

The government was afraid that the bird flu outbreak would affect the country's economy and tourism. For this reason, it covered up the information. But, when the truth was revealed, this led to negative impacts on the government's creditability at national and international levels, chicken import bans by the EU and Japan as well as criticisms from media worldwide on the bird flu cover-up of the Thai government.

### **1.6 Find Faults on Taksin Government to Seek "Scapegoat" Covering up "Bird Flu Outbreak"** (source: Matichon Newspaper, January 26, 2004)

Mr. Newin Chidchob, Minister of the Ministry of Agriculture and Cooperatives (MoAC), stated in a press conference on January 24, 2004, that the MoAC would investigate the officials of Department of Livestock Development (DLD), who involved in bird flu covering up process and failed to warn people about the disease. It is obvious that only department-level officials, not ministerial-level politicians were blamed. The statement of Mr. Newin raised a question on the governance of the government since November 2003, seen from the following incidents:

- 1) The spread of the disease, which claimed a large number of chickens in Nakhon Sawan province; however, Mr. Yukol Limlamthong, Director-General of the DLD, stated that the results from the laboratory of the Animal Health Institute and the Laboratory of Kasetsart University at Kamphaengsaen were the same and had proved that it was just an acute cholera caused by bacteria not by the bird flu, and he said that the source of the disease was under control in the province. Nevertheless, a group of farmers believed it was the bird flu because the chickens died rapidly in 1-2 days unlike the chicken with cholera.
- 2) After a confirmation from Mr. Yukol, there was another spread in Lop Buri, Nakhon Pathom (Banglane district), Ang Thong, Chachoengsao (Bangnampreal district), Sing Buri and the areas between the Central and the Northeast regions of Thailand, especially in the area of Pak Chong district (Nakhon Ratchasima



province) and Saraburi province. Moreover, the governor of Suphan Buri had reported to the Prime Minister Taksin Chinnawatra that there was a large number of chickens died since December 9, 2003. Thus, the incident proved that what Mr. Yukol Limlamthong had said was not true.

- 3) After a great number of chickens had died, the DLD reported on December 17, 2003 that the chickens died because of the weather change, which caused stress and difficulty in adapting themselves. Furthermore, mismanagement of farming system was claimed to be another reason for rapid spread of the sickness. The department said that it could control the disease. There was no report of dead chickens later on. Additionally, Mr. Amnaj Thienpramuk and Mr. Jumjane Jitrathorn, senators from Surin and Sukhothai provinces respectively had led poultry farmers from many affected provinces to meet with Mr. Somsak, Minister of the MoAC (during that time) and ask him for help regarding the epidemic. Mr. Somsak said that he would manage the compensation and assured that there was no epidemic, but there was still a spread of the disease to 24 provinces (according to MoAC announcement) covering one third of the country. This demonstrates how ineffective bird flu control measures were.
- 4) In January 2004, when the disease had widely spread, Prime Minister Taksin Chinnawatra directed Mr. Navin Chidchob to help Mr. Somsak who was having full hands. Nevertheless, on the day that the disease spread heavily, Mr. Somsak had celebrated his birthday and arranged a football match between ministries showing no serious concern to tackle the bird flu problem.
- 5) The Animal Epidemic Act B.E. 2499 (1956) clearly states that a control zone must be declared by a governor if there is any suspicion of any endemic in a province. The high ranking officials of the MoAC claimed that the control zone was announced. However, poultry farmers did not know at all what catastrophe they were facing as the DLD was unable to answer their questions. The governor of Suphan Buri province had reported to the Prime Minister Taksin that there were a large number of chickens in the province died since December 9, 2003, but the ministry just announced the province as a control zone during January 21-22, 2004, one and a half month later.
- 6) Mr. Somsak Thepsuthin and Mr. Yukol Limlamthong's statement on January 23, 2004, was that 16,164 of 100,000 samples collected from poultry farms nationwide had been tested. Only one sample taken from a farm in Suphan Buri province, was found positive. Nevertheless, when reporters asked the DLD about the sample collection during January 16-23, 2004, they were left with unanswered questions regarding where, when, how many samples collected and the results.
- 7) On January 23, 2004, the MoAC officially informed the public about the bird flu situation and claimed that it had provided measures to control the spread in 24 affected provinces classified to two levels, which are:

**The first level:** the provinces that had not yet had the outbreak after being under surveillance for 21 days were Kamphaengphet, Sukhothai, Phetchabun, Nakhon Sawan, Sing Buri, Phichit, Nakhon Nayok, and Saraburi (green area). However, on January 5<sup>th</sup>, there were a number of chickens that died from the disease in Sukhothai province. There was also a report from Ministry of Public Health that there was a bird flu infected patient.

**The second level:** The provinces that had already depopulated chickens and were under surveillance for 21 days, namely; Bangkok, Uttaradit, Phitsanulok,

Lop Buri, Chai Nat, Ang Thong, Uthai Thani, Kanchanaburi, Nakhon Pathom, Nonthaburi, Pathum Thani, Ratchaburi, Samut Prakan, Chachoengsao, and Ayutthaya (yellow area). However, when the Ministry of Public health found a six year-old boy who infected by the bird flu virus in Panomthoan district, Kanchanaburi province, the ministry did not announce the district as a control zone, but only put it under surveillance on January 25.

- 8) The government claimed that it could put the bird flu outbreak under control and the disease would not spread beyond those provinces in the Central and Northern regions of Thailand. Nevertheless, in Prachuap Khiri Khan province, the deaths of quails revealed a continuing spread of the outbreak. By letting the outbreak in animals continue more than three months without control, Thai public health officials, who were at a conference in Geneva, Switzerland during that time, had been reprimanded by the WHO.
- 9) There was a news report in the end of last year (2003) stating that the officials from the DLD proposed the government to order bird flu vaccines and medicine from the United States but "somebody" in a high position held back the proposal. The given reason was that ordering the vaccines and medicines would lead other countries to know that the bird flu outbreak occurred in the country which could affect the poultry export of the country. These events have led to questions whether there was a cover-up of information, and whether ministries could make their own decisions or if there was someone behind the scene.

## **Appendix 2: Accident of a Truck Containing Nitric Acid on Bang Na-Trad Road**

### **Order of Events:**

#### **24 February 2004**

03.00 AM The Emergency Response and Remediation Division of the Pollution Control Department was alerted by the community radio channel Unity by Helping and JS100 MHz that a truck belonging to Thong Transport Company had overturned causing the Nitric Acid that it was transporting in drums to fume vigorously. This was a serious concern because it was hazardous to the community and those traveling through the same road. The Emergency Response and Remediation Division of the Pollution Control Department responded immediately and while they were traveling to inspect the site, they contacted the local fire department and also provided safety and primary precautionary information to the public, airing through community radio channel Unity by Helping, JS 100 MH and Police Radio Station 91 MHz. From the inspection, the following has been determined:

- 1) The respective truck was carrying 360 plastic tanks of 78% concentrated Nitric Acid, each with a 33 kilograms capacity. The truck was transporting the Nitric Acid belonging to Thai Nitrate Company from Rayong to one of their customers (name unknown) at Sukhumvit 63. When the truck arrived at the accident site where there was a fork in the road with a ramp leading to the Expressway, the 40 year old driver Mr. Sunthorn Panmasri was not familiar with the roads and was confused with the changes of the lanes. His confusion caused him to drive the truck onto the concrete lane divider before the truck overturned on its side and caused the Nitric Acid to leak and fume vigorously. The detailed inspection determined that actually only three drums (approximately 100 kilograms) leaked onto the road. The other remaining drums remained in their normal condition. The accident site was on the parallel road to the Bangna-Trad Road in front of the BITEC, Bang Na.
- 2) The Rescue Unit of the Bangkok Fire Department, the Bangna Fire Department and other departments involved cooperated to contain the leaking chemicals by using sand and cement to cover the road in order to neutralize the chemicals and prevent the acid from vaporizing further. Thereafter, they cleaned the road by spraying water until the situation was in control at 07:30 AM of the same day. There were no people harmed by this accident.
- 3) Nitric Acid which is used in many industries such as the fertilizer, explosives, metal and chemical science industries has the quality of being a highly corrosive compound. If exposed to the skin, a scar would be left and the skin would be damaged. The vapor of this acid can cause damage to the respiratory system and lungs as well. If the vapors are inhaled at high levels, the victim will experience nausea, fatigue, infection of the lungs, and eventually possible death. Thus, there was tremendous planning between the rescue teams and they proceeded with caution at all levels which included working with the local police department to redirect traffic and constantly informing the commuters of the roads around that area on the situation.

### **Appendix 3: Illegal Landfill of Hazardous Waste at Pak Chong District, Nakhon Ratchasima Province**

#### **Order of Events:**

##### **7-8 September 2004**

A group entered a site adjacent to Asok Chemical Company situated around Moo 1 Klang Dong, Pak Chong, Nakhon Ratchasima. This site was a toxic waste dump site used by the General Environment Conservation Public Company Limited or GENCO as a "transition" ground for the wastes from industrial factories, which had outsourced this task to them, before transporting the waste to be incinerated in a cement oven of Asok Chemical Company. In contrary, the toxic wastes were transported and released by backhoes which grinded and compressed 200 liter drums containing chemicals and chemical wastes, which were usually in the liquid form, into man-made pits in the premises. There were no precautionary measures to prevent soil contamination and there were also some chemical substances spilled on the ground which caused a strong chemical stench to spread across the area. The hazardous wastes which were found were such as used lubricant oil, paint residue, used organic solvents, waste water sludge, tarmac, chemical-contaminated scraps and so on. The personnel operating the disposal activities also sold the empty drums of the industrial waste to the villagers. Officers from the Tambon Administration Organization of Klangdong interrogated the villages of how they came to possess these drums and were asked to also show where the transactions took place. These findings were announced to the other organizations in the areas and to the province as a whole as well.

##### **9 September 2004**

Police officers of Klangdong together with other government agencies in Nakhonratchasima which are Environmental Bureau Division 11, Office of Natural Resources and Environment of Nakhon Ratchasima, Industrial Works Department of Nakhon Ratchasima, and the Tambon Administration Organization of Nakhon Ratchasima visited the site and caught thirteen personnel destroying and burying the industrial wastes.

##### **11 September 2004**

The Minister of Natural Resources and Environment (Mr. Suwit Khunkitti) visited the site and coordinated with the Minister of Industry (Mr. Pinij Jarusombat) to ask General Environment Conservation Public Company Limited to relocate the 4,000 drums of hazardous wastes from the area and rehabilitate the areas which were contaminated. In addition, the Minister of Natural Resources and Environment ordered the police officers of Klangdong to further investigate case so the responsible parties can be penalized as per se the law.

##### **13 September 2004**

The Ministry of Natural Resources and Environment presented the case of the illegal hazardous waste dumping around Moo 1, Klang Dong, Pak Chong, Nakhon Ratchasima to the Cabinet Ministers.

## **14 September 2004**

The Cabinet Ministers reached a consensus on the case of the illegal hazardous waste dumping as presented by the Ministry of Natural Resources and Environment as follows:

- 1) To appoint the Ministry of Industry to carry out the following
  - 1.1 Urgently dispose or destroy all the hazardous waste including the contaminated soil through proper disposal methods.
  - 1.2 Investigate, identify the responsible party/parties, and follow through with the regulations and laws that apply to the violations.
  - 1.3 To not permit any trial incineration disposals or any other trial methods of disposal of hazardous industrial waste water sewage. However, trial disposing methods can be allowed only after the identifications of clear timelines and proper amounts of hazardous waste which can undergo the trials.
  - 1.4 Establish an Inventory System and a Manifest and Tracking System of hazardous industrial wastes which will track the originations, the storing, the transporting, and the disposing activities of hazardous wastes. This system will prevent illegal disposals and destructions through unsound and unlawful practices and be a modern and convenient way to manage and monitor hazardous wastes.
  - 1.5 Establish stricter regulations on paperwork procedures required for the transportation of hazardous industrial wastes.
- 2) To appoint the province of Nakhon Ratchasima to carry out further investigations to identify the violators who illegally disposed the hazardous wastes and penalize them as per se the law.
- 3) To appoint the Ministry of Natural Resources and Environment to monitor the contamination of the soil, underground water, and surface water in the area in order to take precautionary measures on the impacts it had on the environment and the community.

After this consensus by the Cabinet Ministers, the Ministry of Industry established the Working Committee on the Monitoring of Illegal Dumping of Hazardous Waste from Industrial Factories. The committee was empowered to decide and establish measures to prevent illegal dumping of hazardous waste from industrial factories, to rehabilitate the environment which was harmed, and to issue regulations dealing with the illegal dumping of hazardous waste from industrial factories so that all efforts would be in sync with the measures and directions decided upon by the committee.

## **15 September 2004**

The province of Nakhon Ratchasima established a subcommittee overlooking, monitoring and directing the implementations of the orders of the Minister of Natural Resources and Environment. The committee consisted of the Deputy Governor of Nakhon Ratchasima (Mr. Somsakti Suwansujarit) who was the president of the subcommittee, Deputy Director General of the Provincial Police Department, Director of the Environment Bureau Division 11, Head of the Office of Natural Resources and Environment of Nakhon Ratchasima, Head of the Disaster Prevention and Mitigation Bureau of Pak Chong, Nakhon Ratchasima, Director General of the Klang Dong Police

Department, Municipal Councilor of the Klang Dong Municipality, President of the Tambon Administration Organization, and the Industrial Works Department of Nakhon Ratchasima. The subcommittee had a consensus as follows:

- 1) Follow and speed up the investigation, arrest, and proceed with the trial of the guilty party/parties urgently.
- 2) Contain the areas which were contaminated with the chemicals so that it will not spread to other areas.
- 3) Control and direct the transportation of hazardous industrial chemical wastes in the area through having a clear and knowledgeable transportation policy on industrial wastes.
- 4) Overlook, control and direct the rehabilitation of natural resources and the environment which have been contaminated by the hazardous industrial chemical waste.
- 5) Inspect the illegal disposal and destruction of industrial wastes and other hazardous chemicals in other areas of Nakhon Ratchasima.

## **21 September 2004**

Mr. Wanchai Phalothaithakerng, Managing Director of General Environmental Conservation Public Company Limited or Genco denied that the company did not illegally dump the wastes because the company sent wastes containing synthetic oil to Asok Chemical Company to be burned and used as inexpensive fuel. Genco also stated that they properly sealed the chemicals in good conditioned containers before sending them to Asok.

The management of Genco called for internal meetings on the allegation with their company and determined that the majority of the problematic wastes resulted from other companies which probably used these chemicals without permission. Therefore, the transportation and storage procedures were not done properly and thus resulted in leakages which caused the stench which disturbed the community in the area. Respectively, the management of the company explained to the Minister of Industry and the Minister of Natural Resources and Environment their side of the story, promised cooperation with the Industrial Works Department on inspections to search for the truth and also agreed to transport and properly dispose the waste by goodwill. Genco also pledged to help find the responsible parties of the damages caused.

## **25 September 2004**

Mr. Supat Wangwongwatana, Deputy Director General of the Pollution Control Department, updated the advancements of the investigations to identifying the culprits of the dumping of the 4,000 drums of hazardous wastes in Klang Dong, Pak Chong, Nakhon Ratchasima after the Cabinet Ministers asked for the identification of the violators and owners of this massive amount of hazardous waste at Klangdong. Through investigations, the police department found that the land which was used as a toxic waste dump site was leased land. The police officers also got hold of documental evidence of photocopies of checks issued to the owner of the land by the leaser. Evidently, one of the checks was issued by Genco to Mr. Nopporn Suebsiri, the owner of the land, for the amount of Bt. 95,000 on November 2003 which was for the lease for the last three years, starting from 2001. There was also another check by the amount of Bt. 28,500 issued in the month of August 2005 to Mr. Pisit Suebsiri whom Mr. Napaporn transferred the land to. The police then issued an invitation letter to the management of Genco to be interrogated on 27 September 2005.

The Pollution Control Department transported 70% of the chemical substances from the site for proper disposal. Altogether, 2,666 empty drums, 3,096 chemical filled drums, 236.5 cubic meters of contaminated water, 261 cubic meters of contaminated soil and 5 containers of contaminated mud were disposed.

## **27 September 2004**

General Environmental Conservation Public Company Limited or Genco transported all the remaining hazardous waste from the site and stored the waste in the Genco factory in Rayong in order to test the waste composition before disposal.

The Ministry of Natural Resources and Environment monitored and took precautionary measures on the contamination of the waste dump by collecting samples of water from wells in the community surrounding the site. The results of the sampling which continued until 11 October 2004 showed that the water was in normal condition and there were no underground water contaminations.

## **2 October 2004**

General Environmental Conservation Public Company Limited or Genco transported all the drums including both the drums containing the chemicals and the empty drums out of the site. The 8,786 drums were stored in the Genco factory in Rayong. However, none of it was properly disposed yet. As for the site where the two leaking chemical filled drums were kept, rehabilitation of the land was needed because there were traces of contamination which required the excavation of at least three meters deep of soil to be treated.

There were three rehabilitation alternatives for the land contaminated by the chemicals: 1) Transport all the contaminated soil to be disposed at Genco, Rayong. This method however, required massive funds. 2) Eradicating the contamination on site through permanently burying the land and 3) Burning the land so that all the chemicals will be vaporized.

Nevertheless, Mr. Suwit Khunkitti, the Minister of Natural Resources and Environment focused more on the identification of the responsible parties involved in the case of illegal hazardous waste dumping. He also discussed with Mr. Pinij Jarusombat, the Minister of Industry on these issues. On 5 October, Mr. Suwit also reported to the Cabinet Ministers on how problems were solved and the challenges involved in monitoring illegal chemical dumping. At the same time, Mr. Suwit stressed that if there were no incremental advancements in problem solving, cooperation from the Special Investigation Department, Ministry of Justice would be needed. The Special Investigation Department would carry out the investigations because the violators still could not be identified.

## **8 October 2004**

The Ministry of Natural Resources and Environment established a working committee to inspect illegal hazardous waste dumping cases around Klang Dong, Pak Chong, Nakhon Ratchasima. The working committee was empowered and responsible for developing policies to track, monitor, and anticipate problems, inspecting, rehabilitating the quality of the environment, and constantly reporting back from time to time. Also they were responsible for finding the truth and collecting evidence that can be used in trial in accordance to the Enhancement and Conservation of National Environmental Quality Act, B.E. 2535 (1992).

## **Appendix 4: List of Participants in the Public Consultation Seminar on the Draft Water Resources Act**

Date of Seminar: Thursday 23 December 2004

Venue: Golden City Hotel, Ratchaburi

<b>No.</b>	<b>Category</b>	<b>No. Invited</b>	<b>No. of Attendees</b>	<b>% of Attendees/ Invitees</b>
1	P.A.O. Representative of Ratchaburi	2	1	50.0
2	T.A.O. Representative of Miang, Ratchaburi	21	12	57.1
3	T.A.O. Representative of Jombung, Ratchaburi	6	4	66.7
4	T.A.O. Representative of Suanphung, Ratchaburi	4	1	25.0
5	T.A.O. Representative of Damnern, Ratchaburi	14	9	64.3
6	T.A.O. Representative of Barnpong, Ratchaburi	16	5	31.3
7	T.A.O. Representative of Bangpae, Ratchaburi	8	3	37.5
8	T.A.O. Representative of Potharam, Ratchaburi	21	9	42.9
9	T.A.O. Representative of Paktho, Ratchaburi	14	7	50.0
10	T.A.O. Representative of Watplaeng, Ratchaburi	3	1	33.3
11	T.A.O. Representative of Barnkha Sub-amphur, Ratchaburi	3	3	100.0
12	Government Agency of Ratchaburi	26	21	80.8
13	Water Consumers of Ratchaburi	13	7	53.8
14	Experts and Organizations on Commercial Sector Development of Ratchaburi	17	6	35.3
15	Subcommittee of the Meklong River Basin Group of Ratchaburi	9	5	55.6
16	P.A.O. Representative of Kanchanaburi	3	2	66.7
17	T.A.O. Representative of Miang, Kanchanaburi	12	2	16.7
18	T.A.O. Representative of Darnmakhamteer, Kanchanaburi	2	1	50.0
19	T.A.O. Representative of Thongpapoom, Kanchanaburi	5	1	20.0
20	T.A.O. Representative of Thamuang, Kanchanaburi	7	1	14.3
21	T.A.O. Representative of Thamaka, Kanchanaburi	8	1	12.5
22	T.A.O. Representative of Saiyok, Kanchanaburi	5	4	80.0
23	T.A.O. Representative of Boploi, Kanchanaburi	3	1	33.3
24	T.A.O. Representative of Panomthuan, Kanchanaburi	5	3	60.0
25	T.A.O. Representative of Laokwan, Kanchanaburi	4	1	25.0
26	T.A.O. Representative of Srisawat, Kanchanaburi	3	0	0.0
27	T.A.O. Representative of Sangklaburi, Kanchanaburi	2	0	0.0
28	T.A.O. Representative of Nhongprue, Kanchanaburi	2	1	50.0
29	T.A.O. Representative of Huaykrajao, Kanchanaburi	3	5	166.7
30	Government Agency of Kanchanaburi	23	13	56.5
31	Water Consumers of the Agricultural Sector of Kanchanaburi	28	0	0.0
32	Experts and Organizations on Commercial Sector Development of Kanchanaburi	9	3	33.3
33	Subcommittee of the Meklong River Basin Group of Kanchanaburi	8	3	37.5
34	P.A.O. Representative of Phetchaburi	2	1	50.0
35	Government Agency of Phetchaburi	13	9	69.2
36	Water Consumers of the Agricultural Sector of Phetchaburi	13	1	7.7
37	Experts and Organizations on Commercial Sector Development of Phetchaburi	4	2	50.0
38	Subcommittee of the River Basins Group of Phetchaburi	28	12	42.9
39	P.A.O Representative of Samutsakhon	2	0	0.0



No.	Category	No. Invited	No. of Attendees	% of Attendees/ Invitees
40	Government Agency of Samutsakhon	8	4	50.0
41	Water Consumers of the Agricultural Sector of Samutsakhon	0	0	0.0
42	Experts and Organizations on Commercial Sector Development of Samutsakhon	3	0	0.0
43	Subcommittee of the River Basins Group of Samutsakhon	9	1	11.1
44	P.A.O. Representative of Samutsongkhram	2	1	50.0
45	Government Agency of Samutsongkhram	9	6	66.7
46	Water Consumers of the Agricultural Sector of Samutsongkhram	20	1	5.0
47	Experts and Organizations on Commercial Sector Development of Samutsongkhram	10	3	30.0
48	Subcommittee of the River Basins Group of Samutsongkhram	9	3	33.3
49	P.A.O. Representative of Nakhonpathom	3	1	33.3
50	Government Agency of Nakhonpathom	8	4	50.0
51	Water Consumers of Nakhonpathom	6	2	33.3
52	Experts and Organizations on Commercial Sector Development of Nakhonpathom	5	3	60.0
53	Subcommittee of the River Basins Group of Nakhonpathom	11	6	54.5
54	Members of Parliament from Kanchanaburi	6	3	50.0
55	Members of Parliament from Samutsongkhram	1	0	0.0
56	Members of Parliament from Ratchaburi	3	0	0.0
57	Members of Parliament from Nakhonpathom	5	0	0.0
58	Members of Parliament from Samutsakhon	4	0	0.0
59	Members of Parliament from Phetchaburi	2	0	0.0
60	Senators from Kanchanaburi	2	0	0.0
61	Senators from Samutsongkhram	1	0	0.0
62	Senators from Ratchaburi	3	0	0.0
63	Senators from Nakhonpathom	3	1	33.3
64	Senators from Samutsakhon	1	0	0.0
65	Senators from Phetchaburi	1	0	0.0
66	Reporters	38	5	13.2
67	Government Agencies of Water Resources	36	13	36.1
68	Top Level Management	7	2	28.6
<b>Total</b>		<b>587</b>	<b>220</b>	<b>37.5</b>

Note: According to the TOR (Term of Reference) in the agreement, the attendance target of each seminar should be approximately 200 people. However, the Department of Water Resources invites about 400-500 people for each event. For this seminar, the invitations resulted in about 200 attendees and thus, the 200 attendee target was met as agreed.

P.A.O. stands for Provincial Administration Organization.

T.A.O. stands for Tambon (Sub-district) Administration Organization.

## **Appendix 5: Educational Education**

### **5.1 Strengthening Environmental Education in Thailand Project: SEET**

Strengthening Environmental Education in Thailand Project (SEET) is a project managed through the Ministry of Education and is funded by the Danish International Development Agency (DANIDA) of about DKK 23,205,582 (approximately THB 120,000,000). The Project aimed at integrating learning processes of environmental education through focusing particularly on the development of preparing its students to be able to solve environmental problems together with the community effectively. SEET also emphasized on capability building of the students in order to strengthen cooperation between local communities. The founding committee of SEET first met in 1999 with members from various sectors: Office of National Primary School Education Commission (ONPEC), Green World Foundation (GWF), Population and Community Development Association, World Wide Fund (WWF), Department of Environmental Quality Promotion (DEQP) and Danish Cooperation for Environment and Development (DANCED). Thereafter, the committee developed and improved the proposal for the project. Finally on May 2001, DANCED approved the project and the duration of the project was pledged to be three years. Soon after, DANCED was dissolved and SEET was assigned to be overlooked by the Danish Ministry of Foreign Affairs under the supervision of DANIDA. SEET was then officially established on 12 November 2001 and continued until 31 December 2004 where the project was ceased as agreed in the pledge.

SEET focused on the development of teachers to acquire the quality to develop and integrate environmental issues into the education curricula and also be able to organize environmental education activities with the community. The project had an aim of training teachers from forty-seven schools and from fifty networks of schools to be able to develop and integrate environmental education into the educational curricula and also contribute to a teaching information database on environmental education for those interested from all over the country. These pilot school tests were executed in five provinces namely Chiang Mai, Khon Kaen, Chachoengsao, Uthaitхани and Krabi.

An assessment done after the project ended showed that SEET was successful in achieving its goals at a satisfactory level. The project was able to develop teachers in the forty-seven schools and also exceeded their target of environmental education training for fifty networks of schools to ninety-two networks. Also, they produced communication materials on environmental education, created a report on the results of the education and a summary of the project, developed a plan and policy for national environmental education policies which were sent to schools and other organizations, and made a website for easy access to environmental education learning and information on the project. (For additional information on the project, please click on the following link

<http://www.seet.or.th/document/CR%2020%20OCT%20%E4%B7%C2%20edit.pdf>)

## **5.2 Environmental Education Division of the Public Education and Extension Division, Department of Environmental Quality Promotion**

The Environmental Education Division of the Public Education and Extension Division, Department of Environmental Quality Promotion, a division under the Ministry of Natural Resources and Environment, had the responsibility of developing environmental education processes to enhance knowledge both within and outside the education system and for lifetime learning as well. The aim is at developing and producing environmental education communication materials which can be passed on through generations and creating conscience on the environment through fifty-nine provincial environmental education centers all over the country.  
([http://www.deqp.go.th/data\\_env/educentre/edumain.htm](http://www.deqp.go.th/data_env/educentre/edumain.htm))

The environmental education centers had the responsibility of being the facilitators and integrators of carrying out environmental education development efforts through interaction with the community, administrations, and organizations in the province. They were to develop policies on the basis of the environment of local communities and encourage the maximization of human resource deployment in the area to help develop environmental education. The centers also played a role in developing personnel who work in fields related to environmental education, promoting and developing teaching techniques, and creating environmental education activities, curricula, manuals and supporting communication materials which related to the local environment. They would also support and develop environmental education interactions with communities and other organization so that efforts were complemented throughout the network.

The centers were also a center facilitating communication materials, equipment and training on environmental education to institutions and the local community. The criteria used in evaluating the success of the provincial environmental education centers was based on evaluating four main groups which are the management of the centers, the personnel and the development of the personnel, the development of the processes and communication materials on teaching according to environmental education curricula, and the services and networks of the center (the Department of Environmental Quality Promotion, Provincial Environmental Education Division: 2546).