



BASEL CONVENTION REGIONAL CENTRE  
for SOUTH-EAST ASIA

**FINAL REPORT**  
**THE ENVIRONMENTALLY SOUND MANAGEMENT (ESM) OF ASBESTOS**  
**WASTES IN TSUNAMI-AFFECTED COUNTRIES IN SOUTH AND SOUTHEAST**  
**ASIA**

**Jakarta, Indonesia**

**May 2011**

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## **1. INTRODUCTION**

### **1.1 Background Information**

The devastating tsunami in 2004 caused a lot of damage in several countries in South and Southeast Asia region, namely Indonesia, Malaysia, Myanmar, Thailand, India, Sri Lanka and Maldives. In 2006, another earthquake and tsunami hit Indonesia, among others, in Pangandaran, West Java Province area, causing a lot of destruction. On 19 December 2006, BCRC-SEA organized a Regional Workshop for the environmentally sound management (ESM) of asbestos-containing materials. Country representatives attended from Indonesia, Sri Lanka and Maldives. The objective of the workshop was to raising awareness for countries that were in the process of reconstruction from the tsunamis and earthquakes. Several issues regarding post-disaster asbestos waste management emerged such as little or no asbestos waste clean-up programmes, general lack of proper asbestos waste handling, etc. The use of materials containing asbestos in reconstruction was also widespread.

In this regards, BCRC-SEA undertook a project entitled “The Environmentally Sound Management of Asbestos Wastes (ESM) in Tsunami-Affected Countries in South and Southeast Asia”, according to the Memorandum of Understanding (MOU) established between BCRC-SEA and the Secretariat of the Basel Convention No. 2010-RVL-8250-3537-2644-3303.

The Project was valued at USD 87,000 with the duration of 15 (fifteen) months (December 2009 – February 2011). This project consisted of 3 (three) main activities:

1. Collection of existing information and guidelines for the ESM of asbestos wastes, especially on the handling, transportation and disposal of asbestos waste, and publication of the information on the BCRC-SEA’s website
2. Demonstration project in the ESM of asbestos waste in Pangandaran, West Java, Indonesia;
3. Regional technical training workshop on ESM of asbestos wastes (collection, transportation, disposal, health and safety aspects)

The detailed budget will be reported in the financial report.

## **1.2 Objectives**

The general objective of the project was to promote the ESM of asbestos wastes in countries in South and Southeast Asia which have been affected by tsunami disaster.

The specific objectives of the project were as follows :

- a. To collect information and guidelines for ESM of asbestos waste and publication of the information for public reference on the BCRC-SEA's website;
- b. To conduct a demonstration project on ESM of asbestos waste disposal in 1 (one) country affected by disasters (tsunami and earthquakes), particularly that most affected by Tsunami; this exercise could be used as a model by other countries.
- c. To conduct regional technical training on ESM of asbestos wastes (collection, transportation, disposal, health and safety aspects) and to gather information on the current situation of asbestos waste management as well as the most feasible practices in ESM of asbestos waste in the region, based on the results the demonstration project, countries' presentations and discussions among participants.

## **2. PROJECT WORK PLAN ACTIVITIES**

According to the Project Document as attached to the Memorandum of Understanding, the work plan activities are as in the table in Annex I.

## **3. PROJECT ACTIVITIES**

The activities of the project are described in the following sections:

### **3.1. Activity 1: Collection of existing information and guidelines for the ESM of asbestos wastes, especially on the handling, transportation and disposal of asbestos waste, and publication of the information on the BCRC-SEA's website**

- Recruitment of Consultant
- Data collection and verification
- Posting of collected data on BCRC-SEA's website

The data on asbestos waste management was collected online from internet sources. An e-mail request was also sent to the focal points to the Basel Convention in Southeast Asia to get

information on the available national technical guidelines on asbestos waste management. In order to ensure the current and updated information on the asbestos wastes management, an e-mail request to each source was also sent to validate the information released on their websites.

The main sources for the desk study were from BCRC-SEA's ESM of asbestos waste database website and literature from PT.Prasadha Pamunah Limbah Industri (PPLI) or Waste Management Indonesia (WMI) as one of the few authorized hazardous waste management and handling companies in Indonesia. They were involved in survey, sampling activity, and the implementation of the demonstration project itself.

The following blog was created: <http://brcsea.blogspot.com> to collect all existing information and guideline for the ESM of asbestos waste on which the information was organized in two parts: 1) Information on Asbestos, 2) Asbestos Waste Management Guidelines. In the second part, the technical guidelines were classified into 3 sections: Countries, Organizations/Agencies and United Nations Organizations.

The link has been published on BCRC-SEA's website at the following link:

<http://www.bcrc-sea.org/?content=publication&cat=6>.

It is also published on SBC's website at the following link :

<http://www.basel.int/pub/pub.html>

The blog is currently being integrated into the BCRC-SEA website.

The first progress report (Activity 1) was delivered to the SBC on February 2010.

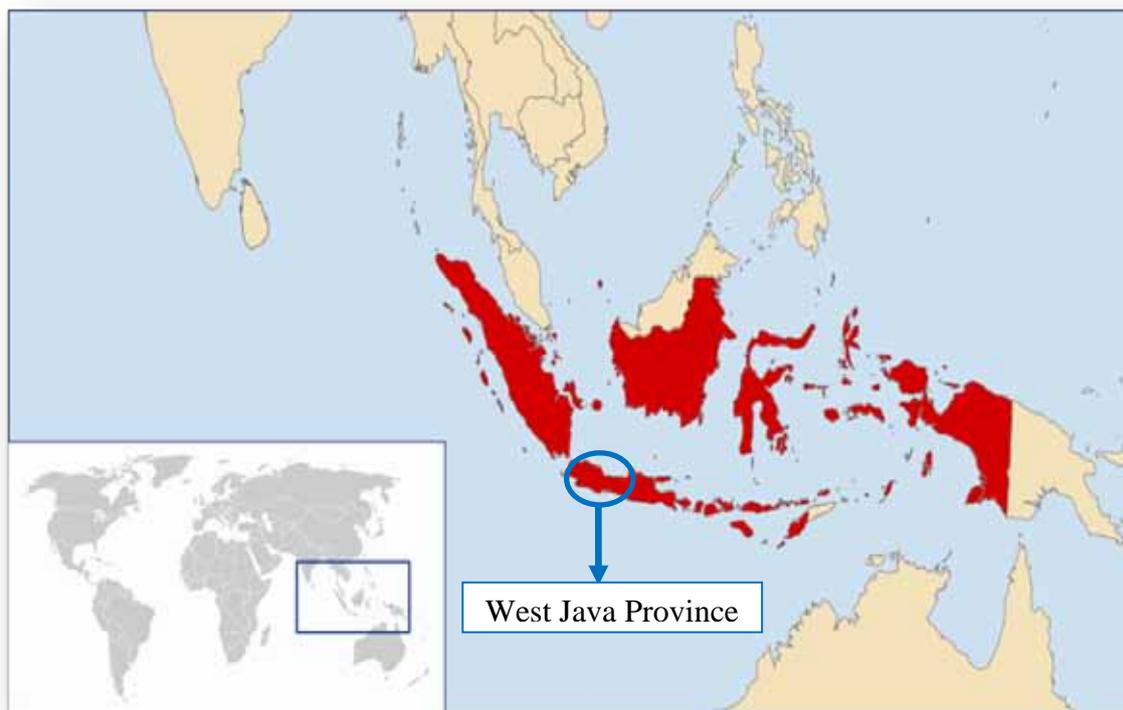
### **3.2. Activity 2: Demonstration project in the ESM of asbestos waste in Pangandaran, West Java, Indonesia**

- Plan the demonstration project with West Java Provincial Government (selecting location/s, recruitment of consultant, best methodology, etc) and finalization of MOU with West Java Provincial Government
- Undertake the demonstration project
- Monitoring of the demonstration project
- Regular evaluation of the demonstration project (every 2 weeks)

Detailed Work Plan and Timeline of activity 2 are provided in Annex II.

The demonstration project was carried out in Pangandaran, Ciamis District, West Java Province, Indonesia, which experienced earthquake and tsunami in 2006 that caused destruction of buildings where asbestos-containing materials were used.

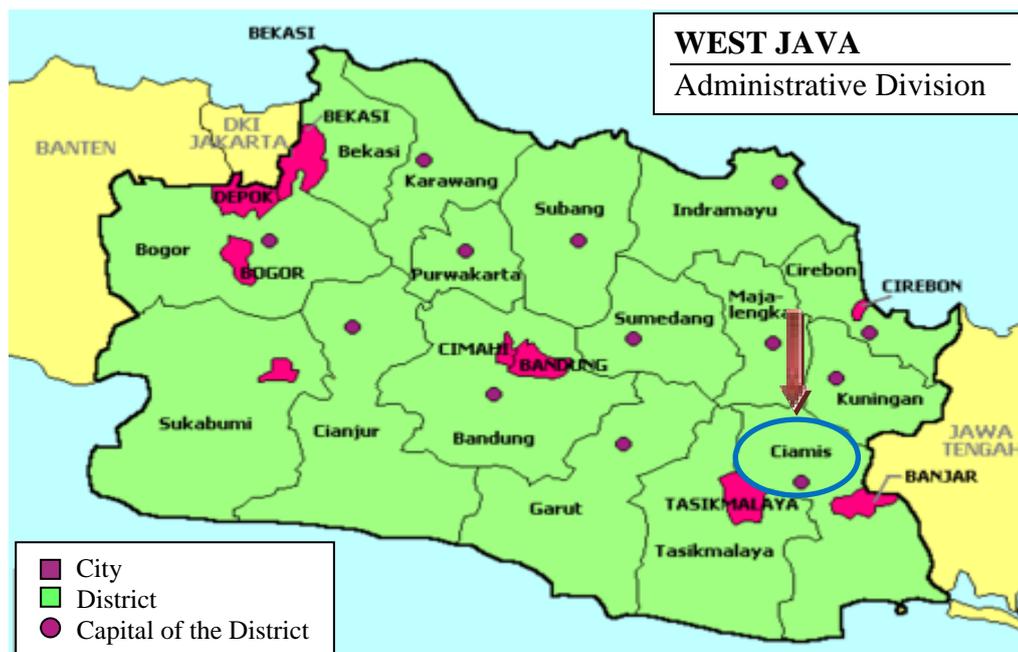
The district is located in the southern part of West Java Province with geographic region at 108 ° 20 ' to 108 ° 40' East Longitude and 7 ° 40'20 "up to 7 ° 41'20" South Latitude, bordered by Tasikmalaya, Majalengka, Kuningan District, Central Java Province and the Indonesian Ocean. The map of Indonesia showing the location of West Java Province can be seen in Figure 1.



**Figure 1. Map of Indonesia Showing the Location of West Java Province**

Ciamis District consists of 36 sub-districts and 350 villages with total area of 244,479 ha (wetland area 51,517 ha (21.07%), swamp area 4127.29 ha (1.69%), dry / mixed garden area of 100,341. 40 ha (41.04%), residential area 29138.40 ha (9.06%), state forest area 34475.69 ha (8.87%), forest area 21678.4 ha (14.10%), and other area 10200.62 ha (4.17%)).

The map of Banten and West Java showing Ciamis District can be seen in Figure 2.



**Figure 2. Map of West Java Province Showing the Location of Ciamis District**

West Java-EMA develops contact with the two local partners (Ciamis-EMA and Ciamis-HA) and then the local partners will facilitate in coordinating with the other key local stakeholders.

The above local partners will then be responsible in the following activities:

1. Facilitating West Java EMA and the project coordinator to develop contacts and coordination with the other local stakeholders
2. Facilitating West Java EMA and the project coordinator to gather relevant secondary data and primary data (surveys, interviews, etc) during site assessment phase
3. Facilitating the implementation of local workshop on Asbestos Waste management in Ciamis District
4. Facilitating the preparation of demonstration project in the selected location, which includes assisting in gaining operational permit for demonstration project, facilitating project coordinators to be engaged with local decision makers (Head of district/Regent and Head of village)

During the site assessment phase, contacts and coordination with local stakeholders have been conducted as follows:

- Initial communication with the local government of Ciamis District - 1<sup>st</sup> week of July 2010
- First Survey to Pangandaran Village - 8<sup>th</sup> July 2010
- Second Survey to Subdistrict of Kalipucang, Cijulang, Parigi, and Cimerak - 18<sup>th</sup> July 2010
- Third Survey to Pangandaran Village - 19<sup>th</sup> July 2010

Surveys were carried out in those locations that were most affected by the tsunami, namely:

1. Kalipucang Sub-District, specifically in Bagolo village and Putrapinggan Village
2. Pangandaran Sub-District, specifically in Pangandaran village and Pananjung Village
3. Parigi Sub-District, specifically in Batu Hiu Tourism Area and Bojongsalawe Village
4. Cijulang Sub-District, specifically in Batu Karas Area.

The map of those subdistricts can be seen in Figure 3.

The purpose was to identify the most appropriate location for the demonstration project.

During the phase for the preparation of demonstration project, coordination with key stakeholders was conducted as follows.

- Initial discussions with PT.PPLI on the survey and sampling plan
- Fourth Survey and Asbestos Waste Sampling in Pangandaran Village - 30<sup>th</sup> July 2010



Based on initial observation review, it was identified that the type of asbestos waste in the target area was assumed in the form of chrysotile asbestos and used as roofing sheets and ceiling board. It was already mixed with dust and waste from surrounded area, and mostly found in friable forms.

**The following Option on Asbestos Waste Technical Abatement Scheme was utilized:**

**1. Identification**

Identifying asbestos-containing materials (ACMs) is an important first step in asbestos waste abatement. This is done via the following:

- Visual inspection
- Sampling of ACM
- Laboratory analysis

**2. Removal Method**

Wet Method : Spray Method

**3. Packaging**

2-3 layers of Strong Transparent Plastic

**4. Storage**

The bags used to hold asbestos should be of good quality, dust-tight, adequately sealed and should not arrive at the site in a ruptured/torn state. The bags should be labeled (asbestos) and with the corresponding danger symbol:

Wooden Box; made from local bars and boards.

**5. Labeling**

Proper labeling (based on Indonesian Regulations : Kep-Ka Bapedal No.5/1995 about Symbols and Labels of Hazardous Waste) placed on the containers used for packaging and storing the asbestos waste.

**6. Transportation**

Open lorry with covers and Boxed Asbestos Waste :

**7. Disposal**

The given location was used:

A Central and Licensed Disposal Site for Asbestos Waste (PPLI)

## Site Assessment for Demonstration Technical Operation

### Methodology

Site assessment was conducted via surveys, observations, interviews, meetings and discussions in order to identify and clarify the type of asbestos wastes.

Some samples were taken to PPLI laboratory for analysis. Measurements of each of the buildings and area containing asbestos waste were carried out in the targeted area.

Constraints to guard for were accessibility, open or closed area which determine the risk of asbestos air exposure, occupational health and safety for workers and surrounding community.

Interviews were carried out (provincial government, local government and surrounding community) to get information on the feasibility of getting a permit in using the targeted area as a location for conducting the demonstration project.

Site assessment criteria were also developed considering the existing capacity of PPLI to handle the waste.

### Executive team

A quite complete team was involved in target site assessment. The stakeholders involved can be seen in Table 1:

**Tabel 1. Stakeholders Involved in Site Assessment**

No	Institutions	Roles
1	SBC Team	Site Assessment partner in assessment, evaluation and making decision
2	BCRC Team	Site Assessment partner in assessment, evaluation and making decision
3	BPLHD Team	Site Assessment partner in assessment, evaluation and making decision
4	Project coordinator	Site Assessment coordinator
5	Health Agency Team	Site Assessment partner in providing data

6	PPLI Team	Site Assessment partner in conducting measures needed
7	Pangandaran SubDistrict Team	Site Assessment partner in providing data
8	Pangandaran Village Team	Site Assessment partner in providing data

Site assessments were done in the selected target locations; *Pananjung Sari Hotel, Social Agency Building and Shrimp Ponds Construction.*

The criteria used in assessing the target site were as follows:

- Administration Criteria : permit and further usage
- Technical Criteria
- Financial Criteria

Based on the administration criteria, the three alternative locations were reduced to two:

1. Pananjung Sari Hotel
2. Social Agency Building



**Picture 1. Asbestos Ceiling in Pananjung Sari Hotel**



**Picture 2. Asbestos Ceiling in Social Agency Building**

Other documentation of activity 2 can be seen in Annex III – Visual Documentation of Project Activities.

The other criteria used to assess the two alternatives can be seen in Table 2.

**Table 2. Criteria Used to Assess the Two Alternatives Location for Demonstration Project**

No	Criteria	Pananjung Sari Hotel	Social Agency Building	Notes
1	Asbestos Waste Quantity	± 100 m <sup>2</sup>	± 580 m <sup>2</sup>	It was being measured as an area of total ceiling board in each building
2	Asbestos waste Criteria	Friable, Ceiling Board	Friable, Ceiling Board	The ceiling board found in many kind of conditions, bonded, and broken form.
3	Asbestos waste existence	<ul style="list-style-type: none"> <li>• Scattered, in buildings and floor,</li> <li>• mixed with another waste and dust.</li> <li>• In Buildings : 1 main building (Lobby) contain</li> </ul>	<ul style="list-style-type: none"> <li>• Rather in a unite / gathered location.</li> <li>• Consists of 4 main buildings with a fully structured.</li> </ul>	

		a large quantity and · 16 small building (cottage) contain smaller quantity $\pm 4m^2$ each. · All of the buildings are in an opened structured		
4	Building structure	The buildings are already on a fragile building structure condition	The buildings are still on a quite well structure condition	
5	Area conditions	Opened area	Rather Closed area	
		PKL (surrounded by informal traders)	Concrete wall	
6	Financial Criteria (Budget Availability)	High cost on removal preparation	Budget adequate for only 1 building out of four	

Based on those criteria above, the selected area for demonstration project was the Social Agency Building

### **Demonstration Project**

#### **Methodology**

The most appropriate technical and operational aspects were determined based on the desk study and the site assessment results including the measurement and analysis from PPLI (field workers in handling asbestos waste).

Intensive discussions, with the PPLI were conducted to find the most suitable procedure for managing the waste.

#### **Executive team**

1. West Java-EMA: making an agreement with PPLI about their involvement in the project.
2. Project Coordinator: composing and constructing the asbestos waste management scheme in technical and operational aspect.
3. PPLI: completing the asbestos waste management scheme in technical and operational aspect in accordance to specific “symptom” of each area based on site assessment result, limitation in tools and equipment and compliance to Indonesia regulation.

## **Result of the activity**

### **Regulatory Overview**

There are some basic regulation and standards that PPLI used in all their asbestos management activities, they are:

1. Indonesian Regulations:
  - a. Law No.32/2009 – Environmental Protection and Management
  - b. Government Regulation, Indonesia No. 18/1999 junto PP No.85/1999
  - c. Head of BAPEDAL Decree No.: Kep-01/BAPEDAL/09/1995 - Procedures & Technical Requirements for Hazardous Waste Collection & Storage
  - d. Head of BAPEDAL Decree No.: Kep-02/BAPEDAL/09/1995 - Hazardous Waste Documentation
  - e. Head of BAPEDAL Decree No.: Kep-03/BAPEDAL/09/1995 - Procedures & Technical Requirements for Hazardous Waste Treatment
  - f. Head of BAPEDAL Decree No.: Kep-04/BAPEDAL/09/1995 - Procedures & Technical requirements for disposal of treated hazardous wastes, requirements for treatment & disposal site closure and post-closure
  - g. Head of BAPEDAL Decree No.: Kep-05/BAPEDAL/09/1995 - Hazardous Waste Symbol & Label
  - h. Ministry of Man Power Regulation No. Per-03/MEN/1985 on Occupational Health and Safety on Asbestos Use
2. US Occupational Safety and Health Administration (OSHA) – 29 CFR 1926.1101 (Asbestos Standard for the Construction Industry)
3. US Environmental Protection Agency (EPA)
4. 40 CFR Part 61 Subpart M (National Emission Standard for Hazardous Air Pollutants)
5. 40 CFR Part 763 (Asbestos Hazard Emergency Response Act)

### **PPLI also provided the following services:**

- a. Survey (Pre-Work Activities)
- b. Asbestos Abatement

- c. Air Monitoring
- d. Transportation / Disposal

**A. Surveys, included :**

- a. Field Inspections
- b. Bulk Sampling
- c. Laboratory services
- d. Report of Findings : Laboratory Results, Risk Assessment and Recommendations for Handling

**B. Pre-Asbestos Abatement Activities for the project included :**

- a. Client Representative Disables Electrical and HVAC Systems Within the Work Area
- b. PPLI Installs Electrical System To Power Negative Air Machines, Lights Etc.
- c. PPLI Erects Decontamination Enclosure System
- d. Erects Critical Seals over Penetrations and Openings
- e. Wet Wipe/HEPA Vacuum Moveable/Non-Movable Objects
- f. Remove Movable Objects From the Work Area
- g. Seal Non-Movable Objects Under Plastic Sheeting and Duct Tape
- h. Plasticize Floor, Walls and/or Ceilings As Needed To Protect Surfaces Not Being Abated
- i. Placement of “Danger – Asbestos Abatement Signs“ at Entrances and Openings
- j. Install Negative Air Units
- k. Conducted by PPLi Supervisor and Client Representative
- l. Inspection of all PPLi Installed Systems

**C. PPLI also have a basic guideline to protect all the workers which includes**

- a. Removal of Clothing
- b. Abatement Suits, Gloves and Boots
- c. Respiratory Protection
- d. Personnel Air Monitoring
- e. Air Monitoring of Workers

**D. Some methods and activities in removal process of Asbestos Containing Material areas follows:**

- a. Wet Material to Be Removed
- b. Utilize Hand Tools to Remove Material
- c. Place Asbestos Material into Asbestos Disposal Waste Bags, Gooseneck and Seal Bag with Duct Tape

**E. Some methods and activities for Post Removal of Asbestos Materials are as follows**

- a. Double Bagging of Asbestos Waste Prior To Removal from The Work Area
- b. All Plastic Sheeting Except for Critical Seals Are Removed
- c. All Areas Within The Work Area Are Wet Wiped and/or HEPA Vacuumed
- d. Operation of Negative Air Continues
  1. Conducted by: PPLi Supervisor and Client Representative
  2. Visually Inspect for: Remaining Asbestos, Dust and Debris/Residue

**F. Air Monitoring** is being conducted follow National Institute of Occupational Safety & Health (NIOSH) guidelines and gives copies of Results Submitted to Client.

**G. Transportation / Disposal**

- a. Modern Transport Fleet
- b. Hazardous Waste Transport Permits
- c. Class 1 and Class 2 Landfills – Constructed to Meet Indonesian, US-EPA and EU Standards

The detailed work description of the demonstration project can be seen in Annex IV.

**The assessment methodologies are as follows:**

1) Management review

Asbestos waste management review was conducted in order to gain an understanding of the current waste management practices. The options were arranged based on waste management sequence, namely: identification, removal, packaging, labeling and storage, transportation, and final disposal.

2) Criteria based Analysis

Technical aspects option was assessed in terms of the following criteria:

**Environmental parameters:**

The environmental parameters-posing risks due to the presence of asbestos were:

- a. The condition and location of the buildings
- b. The friability of the asbestos waste
- c. The quantity of the asbestos waste
- d. The accessibility to the target site
- e. The amount and extent of work

**Economic parameters:**

- a. The cost needed for the demonstration project
- b. The affordability of BPLHD and BCRC-SEA to sponsored the demonstration project.

**Practicability /feasibility:**

- a. Legal compliance with existing policy and regulations
- b. Existing capacity of PPLI to conduct the asbestos waste management demonstration project.

**Constraints:**

It was found out that most of the people in the community especially the local government offices, lacked knowledge and awareness on asbestos, its waste and health impacts.

**Financial aspect:**

The cost for the demonstration project was USD 3,850 for 36 m<sup>2</sup> of building or USD 107 US\$ per 1 m<sup>2</sup>

**Audiovisual Recording of the Demonstration project for training purposes**

**Methodology**

Using the professional filming activities. All the film crews were adequately protected with protective equipment as the workers used. There were 3 film crews. While conducting the audiovisual the community in the surrounding area watched all that was happening live via a big screen TV. This was designed to raise awareness of the proper way of handling asbestos in the local community.

Also interviews with local communities were conducted as well as with the technical coordinator from PPLI, and some keynote speakers.

## **Development of Comprehensive Programme on ESM of Asbestos Waste in the Pilot Project Area**

A comprehensive programme on ESM of asbestos waste in the pilot project area was made by West Java-EMA as one of the outputs of the activity 2. The objective of the programme development is to provide a framework for asbestos and asbestos waste management in the pilot project area. It is expected that this programme can also be used as a reference for other areas/countries on ESM of asbestos waste in tsunami-affected areas.

The Comprehensive Programme for ESM of Asbestos Waste in the pilot project area is provided in Annex V.

### **3.3. Activity 3: Regional technical training workshop on ESM of asbestos wastes (collection, transportation, disposal and health and safety aspects)**

- Development of workshop concept & programme; (workshop duration 2-3 days, approximately 37 participants from the South East Asia region).
- Development of questionnaire on asbestos waste and distribution to country participants with invitation letter
- Conduct the Regional Workshop

The workshop was held in Jakarta, Indonesia on 19 – 21 October 2010 and attended by 37 participants from the countries in South and South-East Asia (Indonesia, Malaysia, Maldives, Srilanka and Thailand), Secretariat of the Basel Convention (UNEP/SBC), United Nations Environment Programme-Disaster Management Branch (UNEP-DMB), International Labour Organization (ILO), World Health Organization (WHO), the Basel Convention Regional Centre for South-East Asia (BCRC-SEA), the Basel Convention Regional Centre for Asia and the Pacific in China (BCRC China), - resource persons and observers from several ministries and local environmental management agencies in Indonesia, universities, and private companies.

The summary report of the workshop was delivered to all workshop participants on February 2011.

The proceedings of the workshop and the summary report have been published on BCRC-SEA's website at the following link: <http://bcrc-sea.org/index.php?content=publication&cat=4>

#### **4. CONCLUDING REMARKS**

##### **4.1. Activity 1:**

BCRC-SEA shall continue in updating the information contained in the database as necessary. The information on technical guidelines on ESM of asbestos wastes was used as references in carrying out the demonstration project, , and was also disseminated to participants in the regional workshop for ESM of asbestos wastes with tsunami-affected countries as target participants. The results have also been published in BCRC-SEA website and BCRC-SEA's Newsletter 2009 and disseminated to BCRC-SEA's stakeholders, which are the national focal points and competent authorities in the region, other BCRCs, UN bodies, private sectors and other relevant stakeholders. This publication through direct sending of Newsletter through e-mail is also considered effective as a number of receivers have acknowledged receipt and expressed positive response. The newsletter can be seen in the following link: <http://www.bcrc-sea.org/?content=publication&cat=3>.

One of the activities in BCRC-SEA's business plan for 2011-2014 is development of regional database on asbestos waste. The results could be used as a reference in the regional database and serve as one of the nodes to the concept of Clearing House Mechanism (CHM).

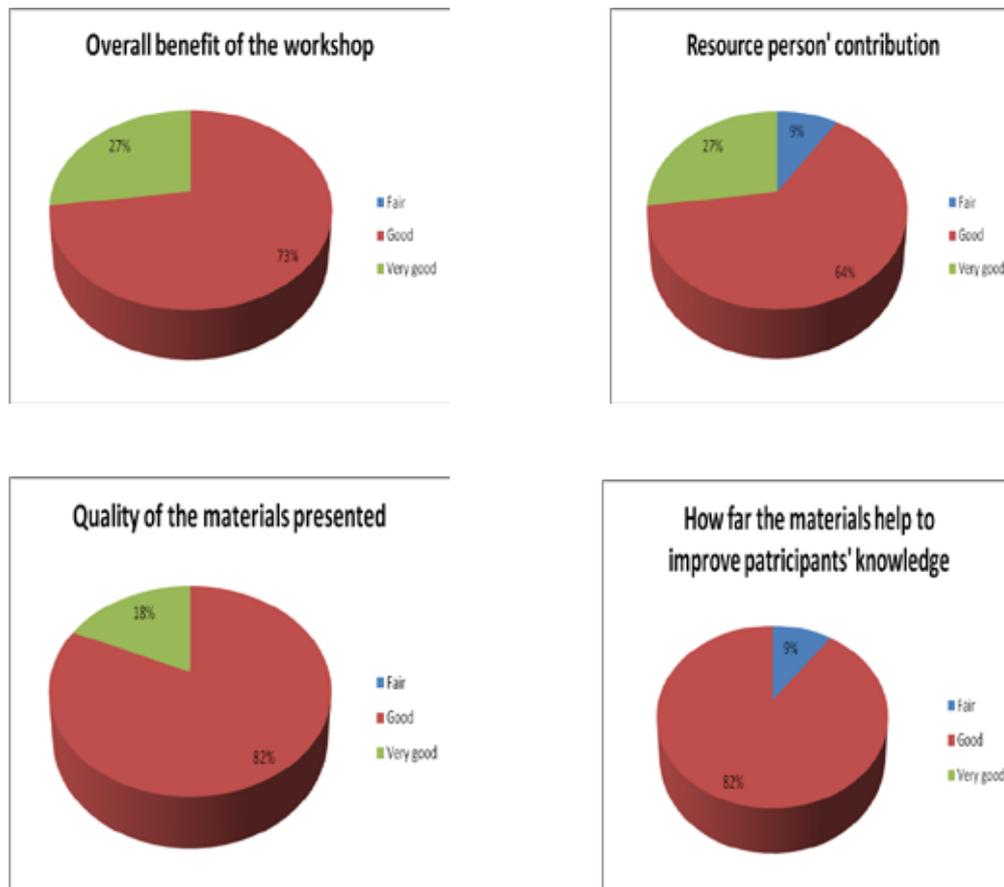
##### **4.2. Activity 2:**

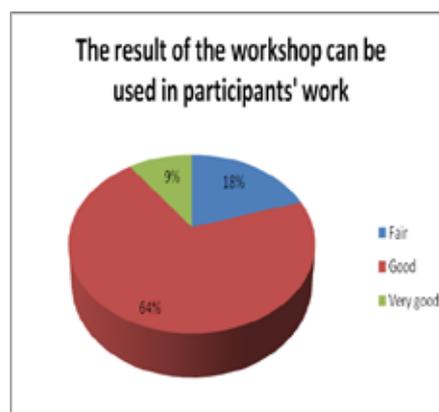
The direct impact of Activity 2 implementation was that there has been increased awareness of the West Java provincial government (West Java Environmental Management Agency/West Java EMA) in handling the asbestos containing materials and asbestos wastes. This can be seen from the willingness of West Java EMA to provide financial contribution in developing a documentary for general public awareness raising. West Java EMA also conducted two (2) workshops, on ESM of asbestos waste, and they were attended by various sectors. The workshops were used to disseminate the impacts of asbestos waste on human health and how to properly manage asbestos waste in an environmentally sound manner. A comprehensive Program for ESM of asbestos waste management in the pilot project area was also developed by West Java EMA. Public campaign (by developing several slogans, stickers, banners and posters) and media exposure, development of local regulation, phasing

out the use of asbestos were also included within the program. Those above activities show the seriousness and awareness of the West Java government in handling asbestos containing materials and asbestos waste management.

### 4.3. Activity 3:

The result of activity 2 was disseminated to participants in the regional workshop. At the end of the workshop, an evaluation questionnaire was distributed to the countries participants. Following are the conclusions from the questionnaire:





From the charts above it can be concluded that the workshop was considered good overall and the goal was achieved. Other suggestions from the questionnaire were the requests for more workshops related to asbestos waste since it is quite a new issue and should be emphasized.

Audiovisual record of the demonstration project was also presented in the workshop and was viewed as a useful and interesting presentation.

Project activities and cost can be seen in Table 3.

**Table 3. Project activities and Cost**

No	Activity	Duration	Outputs	Cost (USD)
1	Activity 1: Collection of existing information and guidelines for the ESM of asbestos wastes, especially on the handling, transportation and disposal of asbestos waste, and publication of the information on the BCRC-SEA's website	3 months	Asbestos waste database website (can be seen on <a href="http://brcrsea.blogspot.com">http://brcrsea.blogspot.com</a> )	10000
2	Activity 2: Demonstration project in the ESM of asbestos waste in Pangandaran, West Java, Indonesia	12 months	a. Demonstrated technical operation of ESM of Asbestos Waste at a selected site b. Audiovisual record of	30000

			the demonstration of the technical operation of ESM of Asbestos Waste for technical training purpose. An extra documentary for general public awareness raising c. Comprehensive programme on ESM of asbestos waste in the pilot project area	
3	Activity 3: Regional technical training workshop on ESM of asbestos wastes (collection, transportation, disposal and health and safety aspects)	6 months	Regional workshop	37000

**ANNEX I**  
**Work Plan and Timetable**

ACTIVITY & REPORTING/ YEAR	2009	2010												2011	
	12	01	02	03	04	05	06	07	08	09	10	11	12	01	02
1. Collection of information and publication on website															
1.1 Recruitment of Consultant															
1.2 Data collection and verification															
1.3 Publication on BCRC-SEA's website															
Deliver 1st Progress Report															
2. Demonstration project on ESM of asbestos waste															

project planning and finalization of MOU with Indonesia															
project implementation															
Project Monitoring															
Regular evaluation of the pilot project															
Deliver 2nd Progress Report															
3. Regional technical training on ESM of asbestos wastes															
Workshop programme planning															
MOUs between BCRC-SEA & Indonesia															
Development of questionnaire and distribution to participating countries with invitation letter															
Logistic preparation of the Workshop															
Conduct the Regional Workshop															
Deliver Proceeding of the Workshop															
Finalization															
Deliver Final Report and Financial Report															

# INPUT

Desk Study & Initial Field Observation

Field Study (Site Assessment)

# ACTIVITIES

- Literature Study
- Determine the Key Stakeholders Involved
- Develop contacts and Coordination Between Stakeholders
- Initial Field Observation on the Target Site Area

- Site Assessment for Demonstration Technical Operation
- Gathering Information on Study Area (Past AWM Activities and Condition after Tsunami)

- Determine the Appropriate AWMS
- Development of Detailed Demonstration Technical Operation Plan
- Development of a Comprehensive Programme for ESM of Asbestos Wastes in the Pilot Project Area

Demonstration Technical Operation of ESM of Asbestos Waste in the Target Site (Pilot Project Area)

Evaluation of Demonstration Technical Operation

Finalising a Comprehensive Programme for ESM of Asbestos Wastes in the Pilot Project Area

# OUTPUT

- Annotation of selected content of BCRC-SEA's database on ESM of Asbestos wastes
- Brief info on the Target Site Area
  - Selected Ideal AWMS
- Commitment and Role Justification of Stakeholders

Field Study (Site Assessment) Report

- Document of Detailed Technical Operation Plan with Financial Aspect
- First Draft Comprehensive Programme for ESM of Asbestos Wastes in the Pilot Project Area

- Audiovisual records of key operations for training purpose
- Demonstration Technical Operation Report

Final Report of Demonstration Technical Operation

A Comprehensive Programme for ESM of Asbestos Waste with Financial Mechanism in the Pilot Project Area as a Model for other Natural Disaster Areas

Ref

Ref

Ref

Ref

# INPUT

Desk Study & Initial Field Observation

Field Study (Site Assessment)

# ACTIVITIES

- Literature Study
- Determine the Key Stakeholders Involved
- Develop contacts and Coordination Between Stakeholders
- Initial Field Observation on the Target Site Area

- Site Assessment for Demonstration Technical Operation
- Gathering Information on Study Area (Past AWM Activities and Condition after Tsunami)

- Determine the Appropriate AWMS
- Development of Detailed Demonstration Technical Operation Plan
- Development of a Comprehensive Programme for ESM of Asbestos Wastes in the Pilot Project Area

Demonstration Technical Operation of ESM of Asbestos Waste in the Target Site (Pilot Project Area)

Evaluation of Demonstration Technical Operation

Finalising a Comprehensive Programme for ESM of Asbestos Wastes in the Pilot Project Area

# OUTPUT

- Annotation of selected content of BCRC-SEA's database on ESM of Asbestos wastes
- Brief info on the Target Site Area
  - Selected Ideal AWMS
- Commitment and Role Justification of Stakeholders

Field Study (Site Assessment) Report

- Document of Detailed Technical Operation Plan with Financial Aspect
- First Draft Comprehensive Programme for ESM of Asbestos Wastes in the Pilot Project Area

- Audiovisual records of key operations for training purpose
- Demonstration Technical Operation Report

Final Report of Demonstration Technical Operation

A Comprehensive Programme for ESM of Asbestos Waste with Financial Mechanism in the Pilot Project Area as a Model for other Natural Disaster Areas

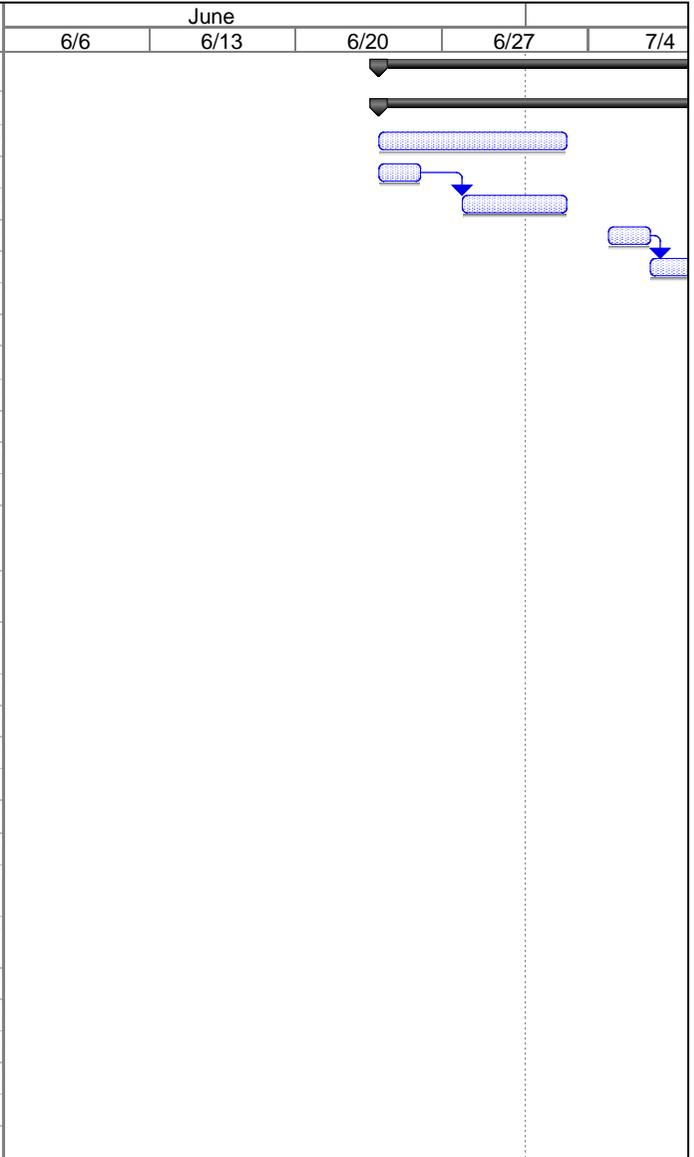
Ref

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ID	Task Name	Duration	Start	Finish	June				
					6/6	6/13	6/20	6/27	7/4
1	<b>SCHEDULE</b>	<b>72 days</b>	<b>Thu 6/24/10</b>	<b>Fri 10/1/10</b>					
2	<b>Desk Study and Initial Field Observation</b>	<b>12 days</b>	<b>Thu 6/24/10</b>	<b>Fri 7/9/10</b>					
3	Desk study	7 days	Thu 6/24/10	Fri 7/2/10					
4	Determine the key stakeholders involved	2 days	Thu 6/24/10	Fri 6/25/10					
5	Develop contacts and coordination with key stakeholders	5 days	Mon 6/28/10	Fri 7/2/10					
6	Initial field observation in the target area	2 days	Mon 7/5/10	Tue 7/6/10					
7	Identify the suitable AWMS options	3 days	Wed 7/7/10	Fri 7/9/10					
8	Desk Study Report and Site Assessment Plan submission	0 days	Fri 7/9/10	Fri 7/9/10					
9									
10	<b>Target Site Assessment</b>	<b>7 days</b>	<b>Wed 7/14/10</b>	<b>Thu 7/22/10</b>					
11	Site Assessment for Demonstration Technical Operation	5 days	Wed 7/14/10	Tue 7/20/10					
12	Site Assessment Report Development	7 days	Wed 7/14/10	Thu 7/22/10					
13	Site Assessment Report submission	0 days	Thu 7/22/10	Thu 7/22/10					
14									
15	<b>Development of ESM of Asbestos wastes scheme with a financial aspect</b>	<b>30 days</b>	<b>Mon 7/12/10</b>	<b>Fri 8/20/10</b>					
16	Determine the most appropriate AWMS, technical & operational aspects	3 days	Mon 7/26/10	Wed 7/28/10					
17	Development of a draft Comprehensive Programme for ESM of Asbestos Waste in the Pilot Project Area	30 days	Mon 7/12/10	Fri 8/20/10					
18	Development of Detailed Demo Technical Operation Plan	6 days	Thu 7/29/10	Thu 8/5/10					
19	Detailed Demo Technical Operation Plan submission	0 days	Fri 8/6/10	Fri 8/6/10					
20	First draft of a Comprehensive Programme document submission	0 days	Fri 8/20/10	Fri 8/20/10					
21									
22	<b>Demonstration Project</b>	<b>32 days</b>	<b>Tue 8/10/10</b>	<b>Wed 9/22/10</b>					
23	Preparation for Demo Technical Operation Plan implementation	5 days	Tue 8/10/10	Mon 8/16/10					
24	Demo Technical Operation of ESM of Asbestos Waste on the target site	7 days	Thu 8/19/10	Fri 8/27/10					
25	Audiovisual Recording of Demo Technical Operation for training purpose	7 days	Thu 8/19/10	Fri 8/27/10					
26	Demo Technical Operation Draft Report and AuVi Record submission	1 day	Wed 9/1/10	Wed 9/1/10					
27	Evaluation of Demo Technical Operation Report and AuVi Record	3 days	Thu 9/2/10	Mon 9/6/10					
28	Demo Technical Operation Report and AuVi Record finalisation	3 days	Mon 9/20/10	Wed 9/22/10					
29	Demo Technical Operation Final Report submission	0 days	Wed 9/22/10	Wed 9/22/10					
30									
31	<b>Development of Comprehensive Programme</b>	<b>5 days</b>	<b>Mon 9/27/10</b>	<b>Fri 10/1/10</b>					



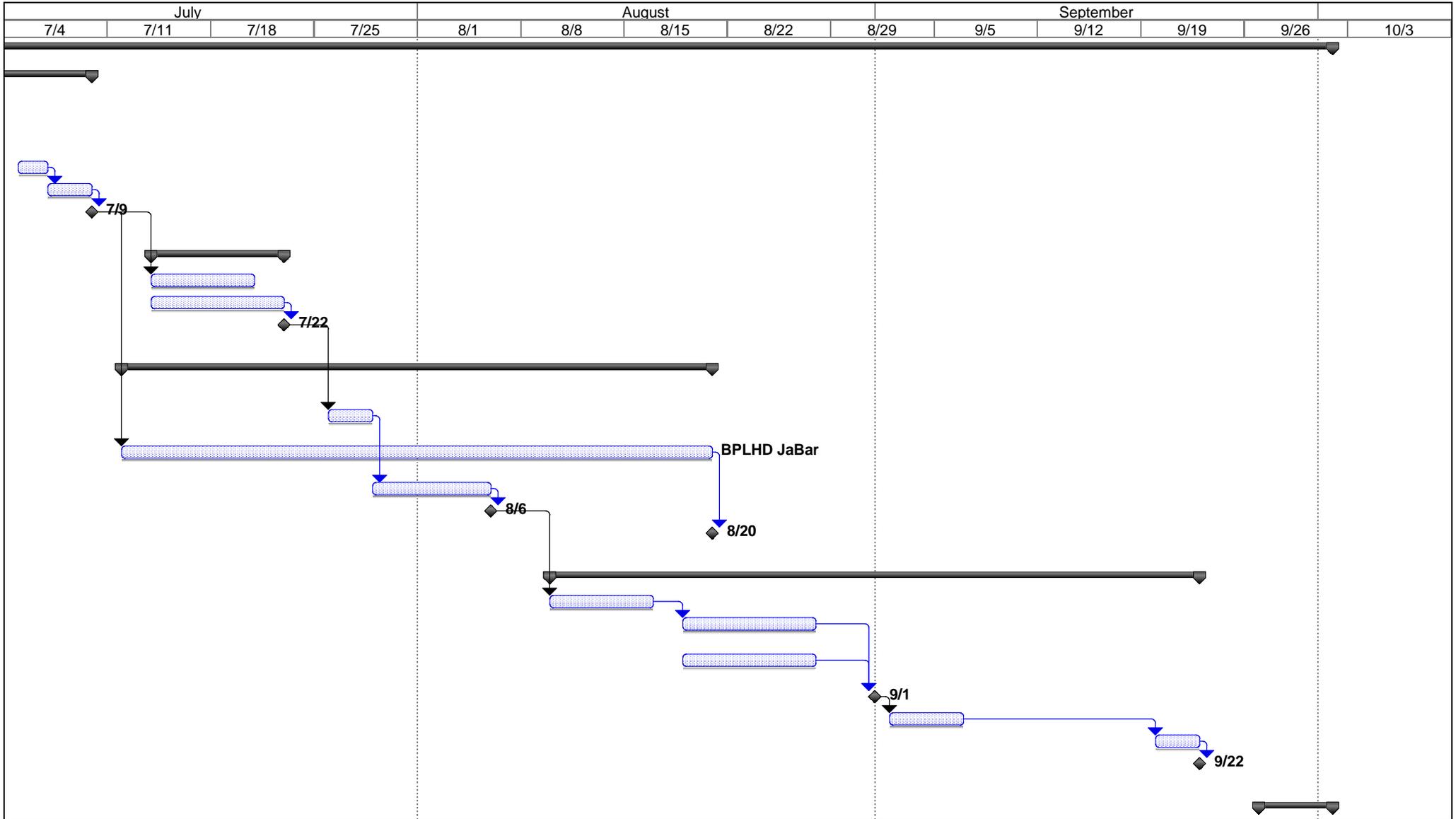
Project: Skedul  
Date: Tue 2/15/11

Task		Project Summary		Progress	
Split		External Tasks		Deadline	
Milestone		External Milestone			
Summary		Inactive Task			

ID	Task Name	Duration	Start	Finish	June				
					6/6	6/13	6/20	6/27	7/4
32	Assissting BPLHD Jabar in finalising the Comprehensive Programme of ESM Asbestos Waste in the Pilot Project Area	5 days	Mon 9/27/10	Fri 10/1/10					
33	Comprehensive Programme document submission	0 days	Fri 10/1/10	Fri 10/1/10					

Project: Skedul  
Date: Tue 2/15/11

Task		Project Summary		Progress	
Split		External Tasks		Deadline	
Milestone		External Milestone			
Summary		Inactive Task			



Project: Skedul  
Date: Tue 2/15/11

Task		Project Summary		Progress	
Split		External Tasks		Deadline	
Milestone		External Milestone			
Summary		Inactive Task			

July				August					September					
7/4	7/11	7/18	7/25	8/1	8/8	8/15	8/22	8/29	9/5	9/12	9/19	9/26	10/3	
														◆ 10/1

Project: Skedul  
Date: Tue 2/15/11

Task		Project Summary		Progress	
Split		External Tasks		Deadline	
Milestone	◆	External Milestone	◆		
Summary		Inactive Task			

# ***ANNEX III VISUAL DOCUMENTATION OF PROJECT ACTIVITIES***

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1. Initial Dissemination and Discussion on Asbestos Waste Management in Ciamis District  
(19<sup>th</sup> July 2010)



2. Target area for demonstration project:

2.1. Pananjung Sari hotel



## 2.2. Social Agency Building



3. Selected site for demonstration project

LOCATION: Buildings owned by Social Agency



Building 1



Building 2



Building 3



Building 4

**The selected building :**  
**35,75 m<sup>2</sup>**

# ANNEX IV

## DETAILED WORK DESCRIPTION

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### Detailed Work of Selected Asbestos Waste Technical Abatement

#### 1. Identification Process

Prior to conducting the project, waste characterization shall be performed to ensure the safety during handling, transport and disposal. Waste characterization includes asbestos identification, which is intended to determine the type of asbestos being handled.

Identification of asbestos waste can be seen in Figure 1.

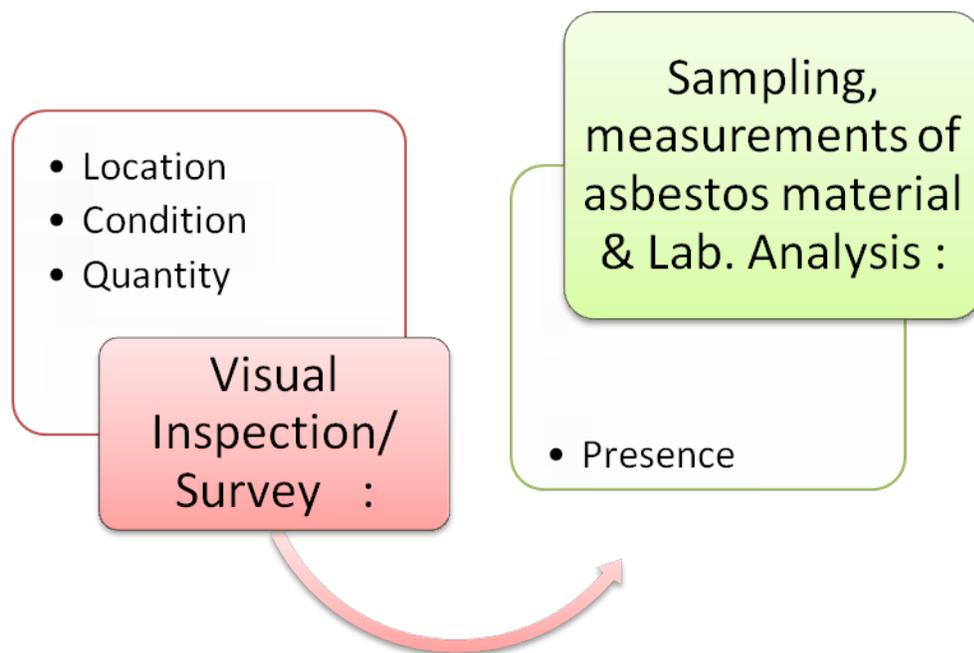


Figure 1. Identification of Asbestos Waste

Identification of asbestos fibers (laboratory analysis) commonly uses a polarized light microscope (PLM). In Indonesia, only one laboratory was available to perform the asbestos analysis, i.e. "Laboratorium Pengujian Balai Hiperkes dan Keselamatan Kerja-

Jakarta". Unfortunately, this Laboratory is capable of conducting a screen test only, not the PLM analysis.

## **2. Preparation Process**

The method for asbestos removal followed US Occupational Safety and Health Administration (OSHA)-29 CFR 1926.1101 and Asbestos Hazard Emergency Respond Act (AHERA)-40 CFR part 763 procedures/standards. Prior to executing the project, work preparations were performed as the following.

### **2.1 Personnel Qualification**

PT PPLI has a dedicated team for on-site asbestos removal and handling activities. The team personnel have gained intensive trainings for general hazardous waste handling as well as certified training specific for asbestos handling. It is minimum requirement for the personnel involved in asbestos removal and handling to have 5-day EPA/AHERA Asbestos Supervisor/Contractor Program Training on 2008 and 1-day Annual Refresher Training each year (example of training certificate is shown in Figure 2).

#### **Site preparation:**

### **2.2 Safety Toolbox Briefing**

Before start working, all team crew attended safety toolbox briefings. The purpose of toolbox briefing is to remind all crew about hazards and risks that would be exposed during asbestos removal project. For the physical hazards, there are two important hazards of concern, which are: working at high level (removing the ceiling) and working at slippery condition (removing asbestos using wet method).



Picture 1. Safety toolbox briefings

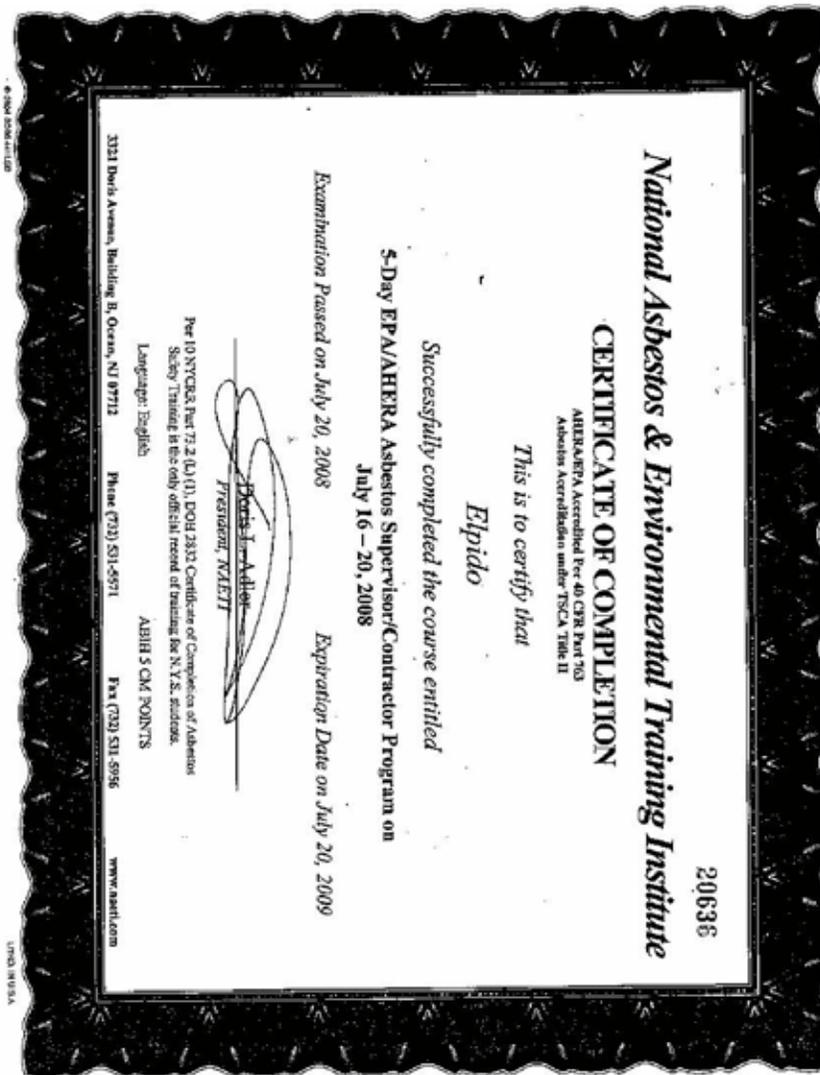


Figure 2. Example of Training Certificate

### 2.3 Barricade Line Installation

The location of asbestos removal project is a limited and restricted area. Only workers for asbestos removal are allowed to enter the project location. The location of the project was demarcated in any manner that minimizes the number of persons within the area. Sign or tag of asbestos removal project was installed to inform other people than workers that asbestos removal project was in progress.



Picture 2. Barricade Line Installation

### 2.4 Equipment Preparation

The main equipment that were used for this asbestos removal project are:

- Air sampling equipment: filter cassette, air pump, tripod
- Personal Protective Equipment (PPE): safety helmet, safety boot, gloves, mask (including asbestos filter), disposable coveralls, body harness.
- Asbestos removal equipment: water spray pump, surfactant, safety line, tags, vacuum cleaner, blower, Polyethylene (PE) plastic liner, electric generator, water pump, etc.



Picture 3. Equipment Used for the Asbestos Removal Project

## 2.5 Air Monitoring

Air sampling prior to commencement of asbestos removal was conducted to determine the existing airborne fiber concentration inside the working area. This type of sampling is also referred to as background. The results of this monitoring can be used as reference, and compared to the asbestos fiber concentration detected upon the completion of the asbestos removal work.

Air monitoring sampling was performed using small air pump (battery powered pump) and connected to filtered cassette using flexible plastic pipe. Air monitoring sampling was conducted for about 3 hours with the filtered air volume around 900 liters. The result of the air monitoring samples is presented in Figure 3.

Air monitoring at outside of the building was not performed due to windy condition. Note that the building location is close to the East Pangandaran beach, where it is windy almost all the time.



## 2.6 Cleaning/Removing Non-Stationary Items

The building already had not been occupied since 2006, therefore there were no items in working area to be removed and/or protected from the building from being contaminated during removal activity. To clean-up the possible asbestos sticking into the surface inside the building, the area was cleaned using vacuum cleaner. This vacuum cleaner is equipped with HEPA (High Efficiency Particulate Air) filter, which has an efficiency of 99.97% at filtering particles of 0.3 micrometers in diameter.



Picture 5. Cleaning/Removing Non-Stationary Item

## 2.7 Plastic Barrier Installation

Once all the surface areas were cleaned, before asbestos removal began, the area was covered with plastic liners. 2-3 plastic liners were used for the wall surface, while one layer was used for the floor surface. The liners were securely sealed with duck tape to achieve an air tight around work area, and to ensure that they would not be contaminated during asbestos removal project.



Picture 6. Plastic Barrier Installation

## 2.8 Installation of Decontamination Unit

Decontamination Unit provides workers who are involved in asbestos removal hygiene facilities to be used to decontaminate asbestos-exposed prior to leaving the working area. The Decontamination Unit is designed to allow passage to and from the working area during asbestos removal operation with minimal leakage of asbestos-containing dust to outside. A typical decontamination room unit consists of a clean change room, a shower, and an equipment/dirty room separated by airlocks.



The Decontamination Unit is attached to the building door, where the personnel get in and out. All personnel involved in the project should walk through this unit.

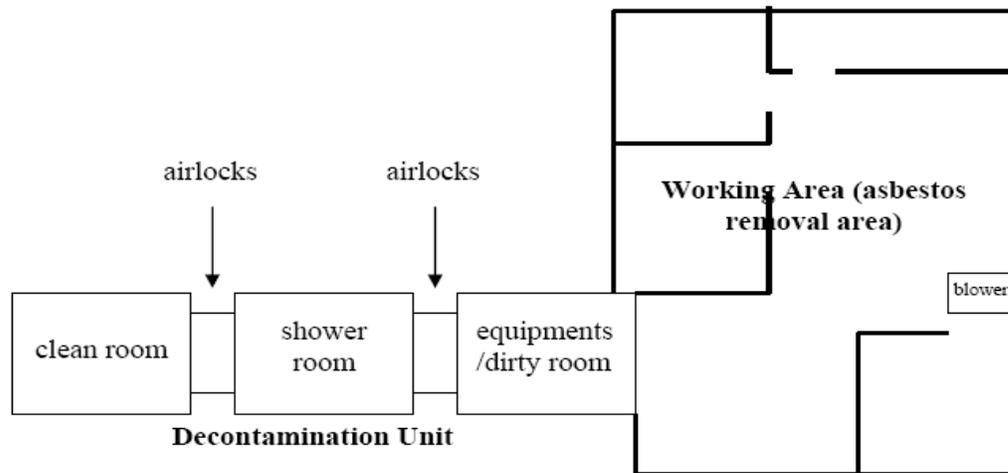


Figure 4. Decontamination Unit

- ü Clean room is an uncontaminated room having facilities for storage worker clothing and uncontaminated materials and equipment. This room is where workers change into coverall and PPE and also room where workers dress in clean clothes after showering.
- ü Shower room is room where workers clean their body with water (shower) after leaving their contaminated clothes in equipment/dirty room, prior to moving to clean room.
- ü Equipment/dirty room is contaminated area where workers remove their protective coveralls and where equipment, shoes, hard hats, goggles and any contaminated work clothes are stored. Worker places disposable clothes in bins before leaving this area for shower room. Respirators are worn into the shower room and thoroughly soaked with water before they are taken off.
- ü Airlocks is formed by overlapping three sheet plastic (polyethylene) at exit of one room and three layer sheet at entrance to the next room.



Picture 7. Installation of Decontamination Unit



Picture 8. Decontamination Unit

## 2.9 Exhaust Blower Installation

To prevent/minimize asbestos dust from being released to the outside of the building, the working area of asbestos removal should be in negative pressure. Negative pressure system was made by installing exhaust blower equipped by HEPA filter. Location exhaust blower should be located so that makeup air enters the work area primarily through the decontamination facility and traverses the working area as much as possible.



Picture 9. Exhaust Blower Installation

## 2.10 Personal Protective Equipments (PPE)

Workers who are involved in dismantling of asbestos containing material should use PPE (figure 4). The PPE will minimize workers from being in contact with asbestos containing material.

### 1) Protective Clothing (PC)

The protective clothing was made from tyvex that resisted the asbestos fiber penetration. The PC was disposable coveralls and covers the body, head and fits tightly at the neck, wrist and ankles

### 2) Respirators

The respirator was a full face piece respirator equipped with particulate filter P-100 cartridge to protect the workers from the fiber during the project.

### 3) Rubber boots

The safety boot was a lace less rubber boots

### 4) Rubber gloves

### 5) Eye Protection



Picture 10. Personal Protective Equipments

### 3 Removal Process

Asbestos removal in this project implemented a wet method.

#### 3.1 Entering the Working Area

The removal process was started since the workers entered the Decontamination Unit. Below is the procedure for entering the working area, through decontamination unit:

- Entry to clean room. In this room workers:
  - ü Remove clothes, places in locker
  - ü Put on clean coverall and other PPE. Due to small size of clean room, workers can use coveralls and PPE since they are outside decontamination unit.
- Proceed to equipment/dirty room (via shower room)
  - ü In the equipment/dirty room workers collect necessary tools and enter to the workingarea

#### 3.2 Wetting the Asbestos Ceiling

Due to the high ceiling position, installing scaffolding should be done carefully, as not to scratch the plastic barrier. The first step in the asbestos removal process was thoroughly

wetting the ceiling with a low pressure mist with amended water (water is mixed with surfactant to improve penetration in asbestos containing materials that are being removed).

### 3.3 Removing The Asbestos Ceiling

After the wetting process, one or two workers removed the ceiling cautiously, to prevent dust release. In some cases, the upper side of the ceiling also needs to be wetted. After it was removed, the asbestos ceiling materials were wrapped in plastic liners. During the removal activity, the ceiling was always kept wetted. When required, the ceiling was re-sprayed with amended water. After all ceiling inside the building was removed, all plastic barrier in the walls and floor were removed after spraying with water. This plastic barrier and other disposable equipment were handled as asbestos containing materials, i.e. wrapping them with at least two layer plastic liners.



Picture 11. Removing the Asbestos Ceiling

## 4 Packaging, Storage and Labelling

The asbestos containing waste was packed in double liner plastic. Other wastes such as

plastic barrier, disposable coverall, and gloves were also wrapped in double plastic liners. Due to long distance to the disposal location, the plastic wrapped asbestos materials were further contained in wooden boxes.



Picture 12. Packaging



Picture 13. Storage



Picture 14. Labelling

As required by the Indonesian regulation Head of BAPEDAL's decree No.Kep-05/BAPEDAL/9/1995, the packaging of asbestos waste were completed with hazardous waste labels and symbols. The shape and colour of the label can be seen in Figure 5.

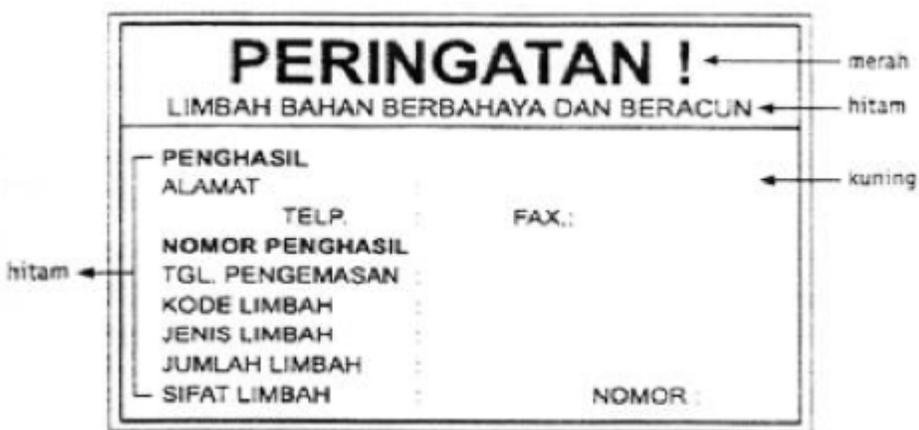


Figure 5. Shape and Colour of the Label

Prior to transportation, a hazardous waste manifest was also prepared for tracking

purpose, complying with the Head of BAPEDAL's decree No.Kep-02/BAPEDAL/9/1995. The copy of manifest is attached in Figure 6.

After the abatement work was completed, final air sampling was performed to check asbestos fiber in the air



Picture 15. Final Air Sampling

## 5 Exiting the Working Area

Below the procedure for exiting from the work area:

- Entry equipment/dirty room. In this room worker:
  - ü Removing all clothing except respirator
  - ü Places disposable protective clothing in a bag
  - ü Stores any other contaminated articles/equipments
- Proceed to shower. In the shower room:
  - ü Washes respirator and soaks filters (without removing)
  - ü Removes respirator, wash with soap and water, disposes of contaminated filters in receptacles and put in disposal bag at equipment/dirty room
  - ü Thoroughly washes body and hair
- Proceed to clean room. In clean room worker:

ü Dries off, dresses in clean clothes

ü Cleans and dries respirator

 <b>DOKUMEN LIMBAH B3</b> <b>(HAZARDOUS WASTE MANIFEST)</b>		Surat Keputusan Kepala Badan Pengendalian Dampak Lingkungan No. Kep. 02/Deptal/08/1995 Tanggal 5 September 1995 NO: 200 - TD - F115
DAFTAR DENGAN BUNUT DAN/ATAU JILAT BAGIAN YANG HARUS DILENGKAPI OLEH PENGUMPUL LIMBAH B3 (THIS SECTION MUST BE COMPLETED BY THE GENERATOR/COLLECTOR)		
1. Nama dan alamat perusahaan penghasil/pengumpul limbah B3 (Generator/Collector name and mailing address) PT. PPLI - Desa Nambu - Cilenggang - Bogor (IL. NMBANBU,20 TELP. 0251 8573303, FAKS 0251 8574343)		2. Lokasi Perusahaan bila berbeda dari alamat perusahaan (Department/location if different from mailing address) Tidak Ada 3. Nomor pengenal (Generator registration No.): XXX
4. Data pengiriman limbah B3 (Shipping Description) A. Jenis Limbah B3 (Physical state): B3 B. Nama Limbah B3 (Chemical name if applicable): ASBESTOS C. Kuantitas limbah B3 (Volume/Weight): 1 BOK D. Kode limbah B3 (Hazardous waste code): 070040 E. Kode UN39 (UN39 code): UN3902		5. Klasifikasi kemasan (Packaging group): OT 6. Sifat-sifat khusus (HMT 05) (Special characteristics): Beracun (Toxic) 7. Jumlah kemasan (Quantity of packages): 1 BOK 8. Nomor (Nomor) (No.): 805 9. Nama (Nama) (Name): DUMP TANK
5. Kelengkapan tambahan untuk limbah B3 yang tercantum diatas (Additional description for material listed above): XXXX No. Pict Wpt: 10220 6. Instruksi penanganan khusus dan keterangan tambahan (Special handling instruction and additional information): Where appropriate using plastic bag prior put in good closed wooden box or other close box.		7. Nomor telepon yang dapat dihubungi dalam keadaan darurat (Emergency response contact phone No.): 8. Tujuan pengangkutan ke (Shipping purpose to): PT. PPLI Pengumpul/Collector/Pengolah (Processor/Powerplant/Generator)
Catatan/Note: Jika pengisian formulir ini adalah pengumpul limbah B3 maka sebutkan nama penghasil limbah yang limbahnya akan diangkut disertai dengan salinan dokumen limbah yang dikirim pengumpul ke pengumpul. If the party filling this form is the collector for the waste of the generator whose waste will be transported, furnished with the appendix to copy of the document sent by the generator to the collector.		
Penyataan perusahaan pengumpul/pengangkut limbah B3: Dengan ini saya menyatakan bahwa limbah B3 yang diinformasikan sesuai dengan peraturan pada daftar item diatas yang tercantum diatas, telah diinformasikan dan diklasifikasikan baik untuk angkutan di jalan raya, sesuai dengan peraturan Perundang-undangan atau secara internasional. I hereby declare that contents of this consignment are accurately described above by the proper shipping description and have been used labels and are in proper condition for transport by highway according to GDF or international regulation.		
9. Nama (Name): H. Samsudin	10. Tanda Tangan (Signature):	11. Jabatan (Title): Sup
12. Tanggal (Date): 20/8/10		
BAGIAN YANG HARUS DILENGKAPI OLEH PENGANGKUT LIMBAH B3 (THIS SECTION MUST BE COMPLETED BY THE TRANSPORTER)		
13. Nama dan alamat perusahaan pengangkutan limbah B3 (Transporter name and address): PT. PPLI - Desa Nambu - Cilenggang - Bogor 14. Nomor telepon (Phone No.): (021) 8573303 15. Nomor Faks (Fax No.): (021) 8574343		16. Nomor pendaftaran Bepedal (Special registration No.): KKP 180000741/0802002 17. Identitas kendaraan (Vehicle Identity): F 8099 FV Nomor BUK (Book No.): Nama Kapal (Ship Name): Lem Pengangkutan (Shipping Permit):
18. Nama (Name): H. HANIK ISKANDAR	19. Tanda Tangan (Signature):	20. Jabatan (Title): DEWASA 21. Tanggal Pengangkutan (Shipping date): 22. Tanggal berakhir (Sign date):
13. Nama dan alamat perusahaan pengangkutan limbah B3 (Transporter name and address): 14. Nomor telepon (Phone No.): 15. Nomor Faks (Fax No.):		16. Nomor pendaftaran Bepedal (Special registration No.): KKP 180000741/0802002 17. Identitas kendaraan (Vehicle Identity): Nomor BUK (Book No.): Nama Kapal (Ship Name): Lem Pengangkutan (Shipping Permit):
18. Nama (Name): 19. Tanda Tangan (Signature):	20. Jabatan (Title): 21. Tanggal Pengangkutan (Shipping date): 22. Tanggal berakhir (Sign date):	
13. Nama dan alamat perusahaan pengangkutan limbah B3 (Transporter name and address): 14. Nomor telepon (Phone No.): 15. Nomor Faks (Fax No.):		16. Nomor pendaftaran Bepedal (Special registration No.): KKP 180000741/0802002 17. Identitas kendaraan (Vehicle Identity): Nomor BUK (Book No.): Nama Kapal (Ship Name): Lem Pengangkutan (Shipping Permit):
18. Nama (Name): 19. Tanda Tangan (Signature):	20. Jabatan (Title): 21. Tanggal Pengangkutan (Shipping date): 22. Tanggal berakhir (Sign date):	
BAGIAN YANG HARUS DILENGKAPI OLEH PERUSAHAAN PENGOLAH/UMPUL/PEMANFAAT LIMBAH B3 (THIS SECTION MUST BE COMPLETED BY THE PROCESSOR/COLLECTOR/RECIPIENT)		
23. Nama dan alamat perusahaan Pengolah/Pengumpul/Pemanfaat Limbah B3 (Processor/Collector/Recipient name and address): PT. PPLI - Desa Nambu - Cilenggang - Bogor		24. Nomor telepon (Phone No.): (021) 8573303 25. Nomor Faks (Fax No.): (021) 8574343 26. Nomor Pendaftaran Bepedal (Special registration No.): KKP 180000741/0802002
Penyataan perusahaan Pengolah/Pengumpul/Pemanfaat Limbah B3: Dengan ini saya menyatakan bahwa saya telah menerima limbah B3 dengan jenis dan jumlah seperti tercantum diatas dan bahwa limbah tersebut akan diproses sesuai dengan peraturan Perundang-undangan atau secara internasional. I hereby declare that I have received the type and quantity of waste as described above by the Generator/Collector/Supplier and that it will be processed according to GDF or international regulation.		
27. Nama (Name): SUPRIATNI ARIENDI	28. Tanda Tangan (Signature):	29. Jabatan (Title): Petugas Center I 30. Tanggal (Date): 20/8/10
Penyataan/Statement of waste: limbah yang disebutkan tidak memenuhi syarat sehingga selanjutnya akan dikembalikan kepada perusahaan penghasil limbah. (Company declaration: The following waste is not being accepted and will be returned to the generator)		
31. Jenis limbah (Type of waste): 32. Jumlah (Quantity): 33. Nomor Pendaftaran Bepedal (Special Reg. No.):	34. Alasan penolakan (Reason for rejection): 35. Tanggal pengembalian (Date returned): 36. Tanda Tangan (Processor/collector signature):	
*Garis pengisian telah diisi (Cross out where not applicable)		
SALINAN 1: Berlingguk Untuk Pengumpul (COPY 1: Transporter's Copy)		GA/DC 08/05/02

Figure 6. Hazardous Waste Manifest of Asbestos Waste

## **6 Dismantling the Decontamination Unit**

The Decontamination Unit was dismantled and, together with other disposable equipments, such as plastic liners, it was handled and packaged as asbestos container materials for further transport and disposal at PT PPLI's.

## **7 Transportation and Final Disposal**

Once the asbestos waste was properly packed and boxed, then the waste was placed in the transportation vehicle (open lorry truck with cover) and transported to the disposal location.

Following the End-Acceptance standard procedures, the load was weighed and documentations were checked. The actual weight of the asbestos containing waste was 680 kegs. After a physical inspection, the waste load was then delivered to the Secure Landfill.

To prevent the packaging from being damaged during landfilling, the waste was carefully placed in excavator's bucket, and slowly dumped into the Landfill Category 2, Module 1, in Grid F2 and Layer 2. All waste and activities implemented to the wastes were documented and recorded in Operation computerized database, Laboratory Information Management System (OLIMS).

The secure landfill owned and operated by PT PPLI complies with the standard requirements for final disposal of hazardous waste, as stipulated in Head of BAPEDAL's decree No. Kep-04/BAPEDAL/9/1995, as well as US-EPA standard.



Picture 16. Transportation



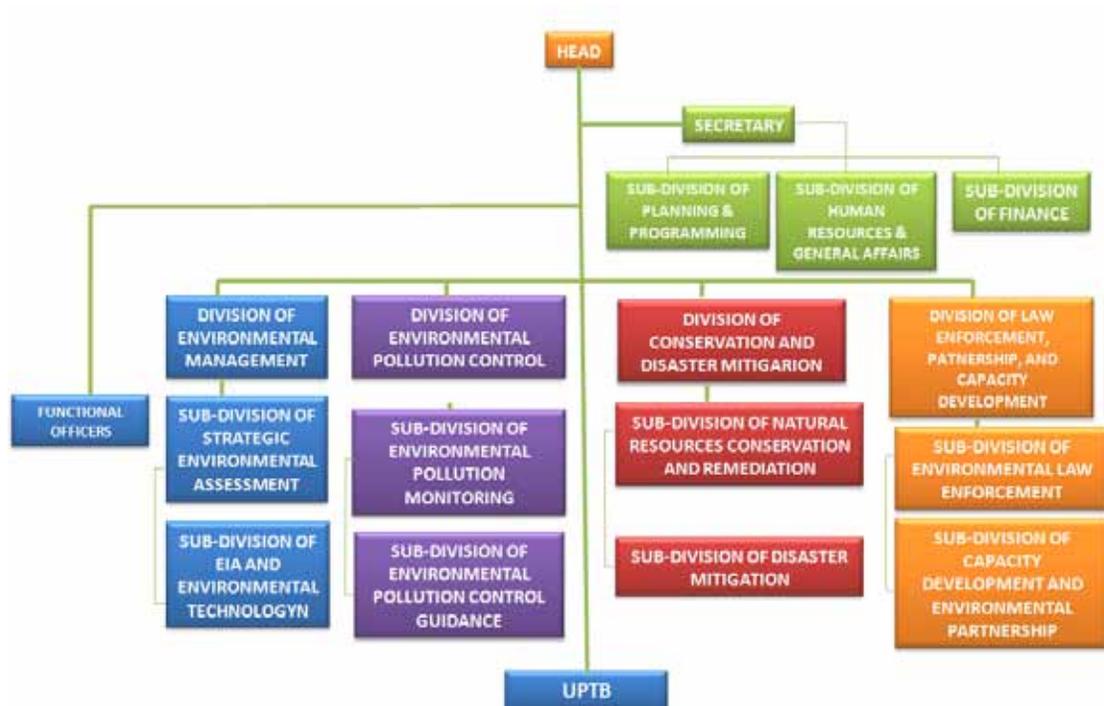
Picture 17. Final Disposal

## ENVIRONMENTALY SOUND MANAGEMENT FOR ASBESTOS WASTE MANAGEMENT IN WEST JAVA PROVINCE INDONESIA

### I. Overview of BPLHD Jawa Barat

Badan Pengelolaan Lingkungan Hidup Daerah (BPLHD) Jawa Barat or Environmental Management Agency (EMA) of West Java Province has a vision to be an agent of change in attitudes and behavior in order to achieve environmentally sustainable development in 2013.

The organization structure of West Java EMA is presented in Figure 1.



**Figure 1. The Organization Structure of West Java EMA**

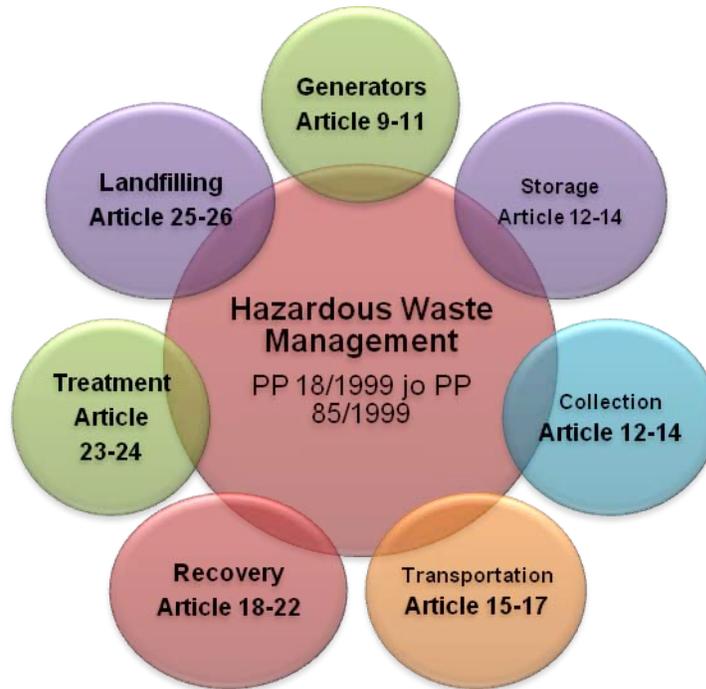
There are some divisions in the organization structure to achieve the vision as can be seen in the above chart. The division responsible in the management of hazardous waste is the Division of Environmental Pollution Control, which has primary goals as follows:

- To improve the quality status of 7 (seven) main watersheds in West Java

- To improve environmental management in businesses and industries, through the following programs: EPCM (Environmental Pollution Control Manager), Proper, Prokasih & Superkasih
- To improve urban air quality

## II. Overview of Hazardous Waste Management in West Java Province

The Hazardous Waste Management in West Java Province is conducted according to the Government Regulation (PP) No. 18/1999 jo Government Regulation (PP) No.85/1999. This regulation relates to the arrangement and organization of hazardous waste generators, storage, collection, transportation, treatment and landfill. The elements of Hazardous Waste Management in general can be seen in the Figure 2.



**Figure 2. The Elements of Hazardous Waste Management**

The overview of current and future projection of hazardous waste generation in West Java Province is presented in the Table 1.

**Tabel 1. Overview of Current and Future Projection of Hazardous Waste Generation in West Java Province**

No	Year	Waste Generation (Ton/Year)			
		Bandung	Bandung	Sumedang	Garut

		Regency	City	Regency	Regency	
1	2000	81,314.5	21,087.5	14,161.8	618.2	<b>117,182.0</b>
2	2005	94,221.3	24,434.7	16,409.7	716.3	<b>135,782.0</b>
3	2010	123,762.0	32,086.2	21,548.2	940.6	<b>178,337.0</b>
4	2015	165,573.3	42,938.6	28,836.4	1,258.8	<b>238,607.1</b>
5	2020	221,574.4	57,461.5	38,589.6	1,648.6	<b>319,274.1</b>

Source : BPLH Kota Bandung, 2007

Based on the above Table, it is clear that hazardous waste generation is gradually increasing over time, posing serious environmental problems in West Java Province. There are some problems in managing hazardous waste that government and society facing in the present time, they are for example concerning:

- Hazardous waste temporary storage
- Packaging : Improper packaging, no symbols & labels
- Improper transportation system : Inadequate transportation vehicles, No symbols & labels
- Illegal disposal of B3 Hazardous Industrial Waste

The government has made an effort to manage the hazardous waste generation through the stipulation of Government Regulation No. 38 / 2007 which concerns about the distribution of authority in the issuance of permit and inspection based on Table 2.

**Table 2. Distribution of Authority in the Issuance of Permit and Inspection**

Hazardous Waste Management Function	Permitting			Inspection		
	Central Gov't	Provincial Gov't	Local Gov't	Central Gov't	Provincial Gov't	Local Gov't
Storage			v	v	v	v
Collection	v	v	v	v	v	v

<b>Transportation</b>	v			v	v	v
<b>Recovery</b>	v			v	v	v
<b>Treatment</b>	v			v	v	v
<b>Landfilling</b>	v			v	v	v

Presently, there is no official record of asbestos waste generation in West Java in particular or Indonesia in general. However, the overview of asbestos consumption can be seen in the list of Top 10 Asbestos Consuming Countries in 2009 , which is presented in Table 3.

**Table 3. List of Top 10 Asbestos Consuming Countries in 2009**

<b>No</b>	<b>Country</b>	<b>Asbestos consumption (tonnes)</b>	<b>Percentage</b>
1	China	565,313	28.6%
2	India	340,544	17.2%
3	Russia	276,821	14.0%
4	Brazil	140,272	7.1%
5	Thailand	102,739	5.2%
6	Uzbekistan	98,635	5.0%
7	<b>Indonesia</b>	<b>82,302</b>	<b>4.2%</b>
8	Vietnam	80,875	4.1%
9	Ukraine	63,600	3.2%

10	Kazakhstan	40,217	2.0%
	World Total	1,977,069	100%

Source : USGS, 2009

As presented in the Table above, Indonesia is the 7<sup>th</sup> highest asbestos-consuming country in the world, which counts for 4,2% of the world's asbestos use.

The main asbestos factories located in West Java are located in Cibinong (Kab. Bogor) & Kab. Bekasi, and it is being banded that around 25-30% of asbestosmaterial consumption in Indonesia is within West Java Province.

Several programs have been launched by West Java Environmental Management Agency concerning the hazardous waste in general, which are :

- Development of local regulation (*Perda*) on the Management of Solid & Hazardous Waste. Current progress : development of academic draft
- Development of Hazardous Waste database in West Java Province
- Prioritization of main hazardous waste types, such as domestic (house hold) hazardous waste, asbestos waste, e-waste, and Persistent Organic Pollutants (POPs)
- Improvement in the delivery of permit issue and field inspection of hazardous waste collection

### **III.Lesson Learned from Pilot Project For Environmentally Sound Management For Asbestos Waste Management in Tsunami Area**

Some lessons that can be learned from the pilot project and can be taken into consideration in formulating the comprehensive program are as follows:

1. Technical aspect in asbestos waste abatement in environmentally sound management is quite complex and requires a lot of specific equipment, skills and requirement.
2. Asbestos waste abatement efforts requires sufficient financial support, as it is a complex, and thus expensive activity.

3. It was found that there were lack of local people's awareness on the danger of asbestos health effect which in turn created a lack of know-how in asbestos waste abatement and asbestos handling in daily activities. This situation was found within the community, local workers and even in the local authority.
4. Due to the lack of local people's awareness on the danger of asbestos health effect, it is found in the location that asbestos materials is still massively used after the tsunami for housing, schools, public building and even government / local authorities building
5. The fact that asbestos materials were still massively used, it arose questions as to where the source of asbestos materials are coming from and subsequently the lack of regulation / policy in this matter.
6. In the other point of view, the lack of law and regulation comes also in order to look at asbestos when it becomes a waste. It is regarded as a hazardous waste, which needs to be handled and managed only by the authorized waste management institution. This could become a barrier for household community to execute the asbestos waste abatement by themselves.
7. The demonstration project has invited quite a response from the community living in the surrounding location, as they need more information on the requirement of practical guidelines in handling asbestos for daily activities in a proper and safety way, especially for household community used or for informal worker used.
8. In conclusion, to start dealing with asbestos waste management there are some aspects that need to be taken into consideration
  - Asbestos material. The source of asbestos materials must be managed and regulated, and then socialized to local people.
  - Asbestos waste. The waste must be managed according the regulation on hazardous waste management and conducted by authorized party.
  - Law and Regulation and practical guidelines (such as the “Dos and Don'ts in handling asbestos waste”).
  - Financial Aspects. Substantial and sufficient funding must be made available to conduct an environmentally sound management of asbestos waste.
  - Social Aspects. Community awareness must be improved through extensive dissemination program

#### **IV. Comprehensive Program**

Considering the lesson learned from the pilot project, integrated with the program of EMA in West Java province in handling the hazardous waste, the comprehensive program for Environmentally Sound Management of Asbestos Waste Management in West Java is developed based on three pronged approach. Three Pillars and Nine Elements of Comprehensive Program are presented in this Figure 3.

Implementation of full scale projects	Development of Asbestos waste stakeholders network	Mainstreaming of Asbestos Waste Management Policy
<ol style="list-style-type: none"> <li>1. Taskforce establishment</li> <li>2. Financing mechanism</li> <li>3. Local capacity building</li> </ol>	<ol style="list-style-type: none"> <li>4. Stakeholders engagement</li> <li>5. Workshops and dissemination</li> <li>6. Public campaign and media exposure</li> </ol>	<ol style="list-style-type: none"> <li>7. Develop asbestos safe handling guidelines</li> <li>8. Development of local regulation</li> <li>9. Phasing out the use of asbestos</li> </ol>

**Figure 3. Three Pillars and Nine Elements of Comprehensive Program**

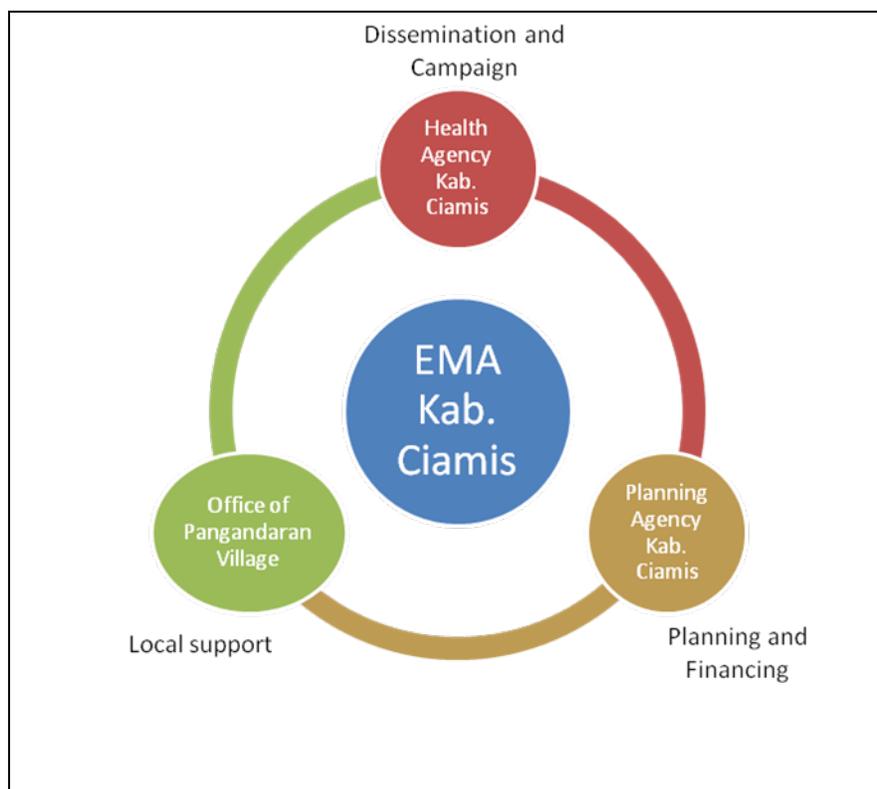
Brief explanation of the above programs is presented in the following sub-chapter.

#### **4.1. Pillar 1 : Implementation of full scale projects**

The implementation of full scale projects will be accomplished through the following elements: conducting task force establishment, develop the financing mechanism and enhance the local capacity building.

##### Element 1 : Task Force Establishment

The plan of task force establishment can be seen in this Figure 4.



**Figure 4. Plan of Task Force Establishment**

The Environmental Management Agency (EMA) of Ciamis Regency will play an important role as the coordinating agency of full scale implementation of asbestos waste abatement in post-tsunami area, as hazardous waste management authority falls within the jurisdiction of EMA's task and responsibility.

The task for dissemination and campaign will be given to the Health Agency of Ciamis Regency, as the agency possess an extensive network and access towards local community up until village level through the operation of a local community health centers (PUSKESMAS). Thus, it will be more effective and efficient that the dissemination and campaign of the health effect of asbestos waste can be integrated into routine program of PUSKESMAS.

The role for planning and financing of the activity will be given to the planning agency of Ciamis Regency (BAPPEDA), as they have an important role in local development planning and budgeting. The full implementation project can hopefully be allocated within the budget of the local government through the development plan and budget formulation conducted by BAPPEDA.

Last but not least, the office of Pangandaran Village must also be involved to provide local support, as they are government officials who are the closest to the local people. The head of village is a highly respected Figure within the community and thus will play an important role in channeling the information to the local people.

### Element 2 : Financing mechanism

As mentioned previously, asbestos waste abatement project is a very costly endeavour. Thus, a proper financial planning must be conducted.

This can be drawn up from the experience in conducting the pilot (demo) project in cooperation with PT. PPLI as the waste management service provider. The cost for Pilot (demo) Project was USD 3,850 for 36 m<sup>2</sup> of building or around USD 107 US\$ per 1 m<sup>2</sup>.

It was estimated that asbestos waste remaining in Pangandaran is around 753.15 m<sup>2</sup>. Thus the cost required for comprehensive cleaning-up process : 80,545 US\$ or around IDR 721 million (cost for dissemination and campaign is not yet included)

Possible sources of funding are as follows :

- § APBD (local government budget) of Ciamis Regency, especially in providing in-kind and partial funding for the full scale asbestos waste abatement project
- § APBD (provincial government budget) of West Java Province, especially in providing facilitation and socialization through various workshops in asbestos waste management throughout West Java Province, prioritizing the disaster prone area
- § APBN (national budget) : through DAK (Dana Alokasi Khusus or Specific Allocation Fund), that may be available for asbestos waste abatement in Pangandaran.
- § International Donors and Agencies
- § Strategic Cooperation with NGOs, such as WALHI (through INA-BAN network), etc

### Element 3 : Local capacity building

Local capacity building can be conducted through the following activities:

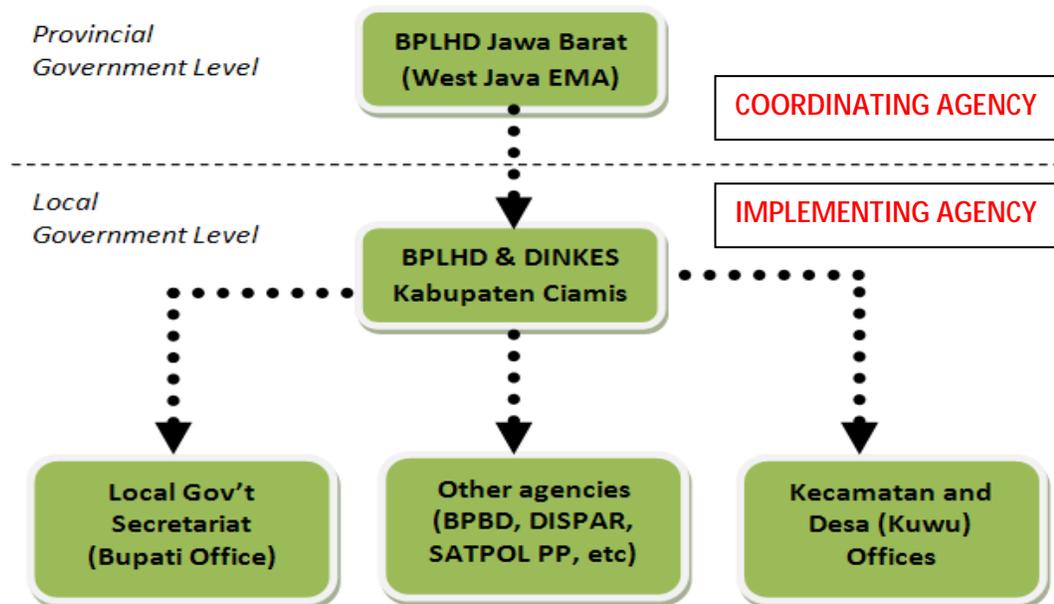
- Training for local people to safely handle asbestos waste (simple methods : DO's and DON'Ts)
- Development of training curricula
- Provision of minimum PPEs (Personal Protective Equipments) for safety handling of asbestos waste

## 4.2. Pillar 2: Development of Asbestos Waste Stakeholders Network

The activities to this approach will consist of:

### Element 4 : Stakeholders engagement

The following stakeholders must be engaged :



**Figure 5. Execution of the Communication Flow within the Project**

It must be emphasized that although West Java EMA was the implementing agency of the pilot (demo) project activity, the future asbestos waste abatement activities must be implemented by the local government (Ciamis Regency), to ensure the sustainability of the activity. The provincial agency will play the role as coordinating agency and networking with central government and various provincial level partners.

Other Possible Partners that can be considered:

- Ø Private sectors / companies (through CSR programs)
- Ø NGOs network (through INA-BAN : Indonesia – Ban Asbestos Network)

### Element 5 : Workshops and dissemination

1. Local Level Workshop  
Conducted on 5 August 2010

The Inputs:

- The government must provide protection to its people from harm, including asbestos waste
- Find alternative to asbestos material, but still affordable and practical for the local people
- The activity must be expanded to cover all asbestos waste in Pangandaran, not only pilot/demo project
- The government must be serious about this and provide appropriate budget to handle asbestos waste problem



**Picture 1. Documentation of the Local Level Workshop**

2. Provincial Level Workshop

Conducted on 7 October 2010

Participants of the workshops:

- Representatives from 26 Districts/City in West Java
- Sectoral agencies (health, social, industry, etc)
- Media/press (local, provincial, and national)
- etc

The Inputs:

- We need to build our people's capacity in facing the asbestos waste problem. Please give us simple guideline for day to day asbestos waste handling
- Our village needs continuous support and campaign to improve people's awareness
- We don't want asbestosis disease "time bomb" to happen in Pangandaran



**Picture 2. Documentation of the Provincial Level Workshop**

### 3. Future Workshop Plan

- Regional / Provincial Level Workshops (3 Workshops)
- Local / District Level Workshops (26 Workshops)
- Sub-Districts / Village Level Workshops / Trainings (6 Workshops/Trainings), in selected area (Pangandaran/Kab. Ciamis, Cibinong/Kab. Bogor, Kab. Bekasi, etc)
- Cross-sector disseminations / workshops
- etc

#### Element 6 : Public campaign & media exposure

The campaign is aimed at relevant representatives of the general population and provide simple and easy to understand information that describes:

- What asbestos is
- Where it might be found
- What the hazards are
- The alternative material for substituting asbestos products
- What “dos” and “don’t” related to asbestos handling
- That only trained personnel with adequate protective equipment should access suspect sites and / or handle asbestos-containing material

Public campaign can be done by these methods:

1. Community Engagement During Demonstration Project

During the demonstration project, local people were invited to come to the project site and watch the documentation of asbestos waste abatement process which was concurrently conducted in the project site. This would provide a “hand-on” experience of the local people, to learn the danger and intricate level of asbestos waste handling. This would also provide an opportunity for the local people to ask questions and learn directly from the qualified personnels working in the area.



**Picture 3. Community Watching Live Demonstration Project in TV**

## 2. Interview with Villagers

In order to understand the current understanding of the local people towards the danger and health effect of asbestos waste, extensive interviews were conducted with villagers living within the surrounding area of the project site.

This process is very important to learn and identify baseline knowledge, understanding, and the concern of the local people. This would subsequently provide an important input for the development of future methods and means for dissemination.



### Picture 4. Interview with Community in Surrounding Demonstration Project Area

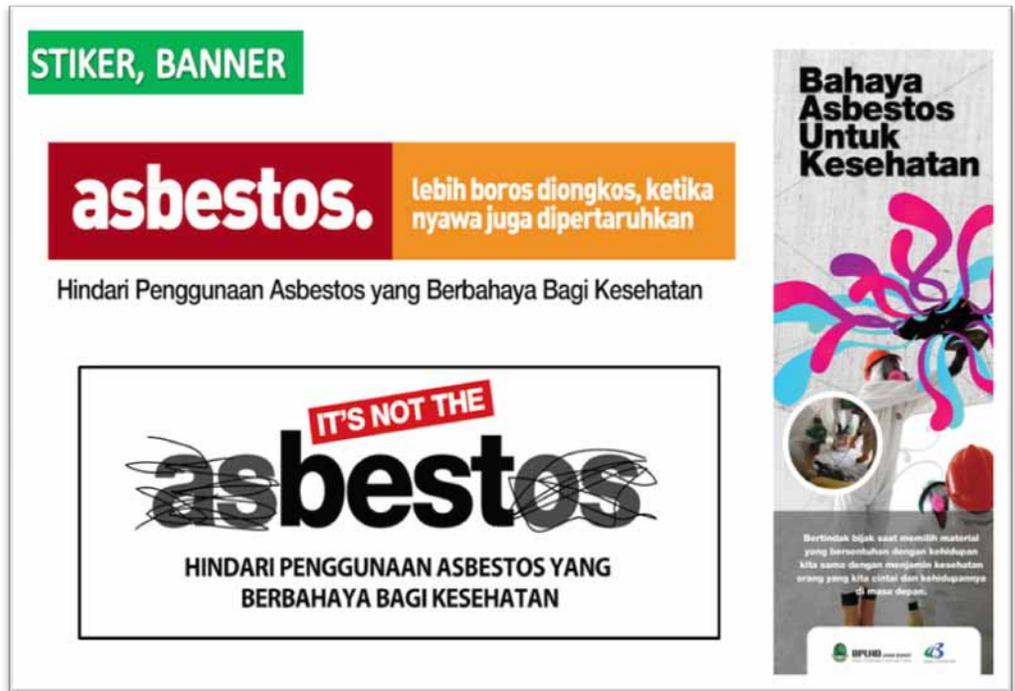
#### 3. Public Campaign Media

##### a. Slogans

Several slogans have been developed, as presented below.



##### b. Stickers and Banners



c. Posters



4. On-Line Dissemination

Through BPLHD Website ([www.bplhdjabar.go.id](http://www.bplhdjabar.go.id))



## 5. Media Exposure

The pilot (demo) project was disseminated through several workshops, inviting local and national media. Thus, the activity was extensively exposed through local and national newspaper and website.

Pikiran Rakyat ON LINE :



Antara NEWS. Com



## 6. Development of Documentary Movie

Two versions of documentary movie was developed.

Version 1 : showing the technical aspect of demonstration project

Version 2 : showing the full extent of various aspect of asbestos waste management, starting from the source of asbestos, health effects, and suggestions for future policy. This longer version of documentary movie will be 25 minutes in length and is intended to air on national and local TV station.

### 4.3. Pillar 3: Mainstreaming of Asbestos Waste Management Policy

The activities to this approach will consist of:

#### Element 7 : Development of asbestos safe handling guidelines

- Guideline on comprehensive technical handling of asbestos materials and waste
- Guideline on practical/minimum handling of asbestos materials and waste (“DOs and DON’Ts”)
- Guideline on safe use of asbestos materials in housing activities
- Guideline on safe use of asbestos materials in industrial activities
- Guideline on the use of alternative materials
- etc

Element 8 : Development of local regulations

- Development of provincial regulation (Perda) on Hazardous Waste
- On-going progress : development of Academic Draft

Element 9 : Phasing out the use of asbestos

- Consider a legislative ban on asbestos (the production, manufacture, distribution, and importation of products)
- Reduce unintended asbestos in products
- Reduce asbestos-containing products in commerce
- Cross-sectors cooperation: agency of industry and trade, education agency, work force agency, etc.
- Local governments have the right to reject asbestos materials provided as development aid.
- Provincial Government will assist in advocating and encouraging the effort