



**REPORT INTO THE PAST, PRESENT AND
FUTURE SOCIAL IMPACTS OF
LUMPUR SIDOARJO
(Humanitus Sidoarjo Fund)**



**J R Richards
MARCH 2011**

CONTENTS

1.0 INTRODUCTION

2.0 SOCIAL IMPACT STUDY METHODOLOGY

3.0 BACKGROUND TO LUMPUR SIDOARJO

- 3.1.0 What Is A Mud Volcano**
- 3.2.0 When Did Lumpur Sidoarjo First Erupt**
- 3.3.0 Chronology**
- 3.4.0 Initial Impacts**
- 3.5.0 Mudflow Management Efforts**
- 3.6.0 Presidential Regulations Relating To LUSI**
 - 3.6.1 Presidential Regulation 13 / 2006**
 - 3.6.2 Presidential Regulation 14 / 2007**
 - 3.6.3 Presidential Regulation 48 / 2008**
 - 3.6.4 Presidential Regulation 40 / 2009**
- 3.7.0 Agreements To Date On Social Funding Contributions**

4.0 CURRENT STATE OF LUMPUR SIDOARJO AND POSSIBLE FUTURE SCENARIOS

- 4.1.0 Current Geological And Environmental Conditions**
- 4.2.0 Scientific Evidence For Future Geological Activity**

5.0 SOCIAL ASSISTANCE TO DATE

- 5.1.0 Social Responsibility - Lapindo**
- 5.2.0 Social Responsibility – Government/BPLS**
 - 5.2.1 BPLS**
 - 5.2.1.1 Social Assistance
 - 5.2.1.2 Social Protection
 - 5.2.1.3 Social Recovery
 - 5.2.2 Local Government**
- 5.3.0 Social Funding Expenditure Lapindo**
 - 5.3.1 Land And Buildings Compensation Schemes
 - 5.3.2 General Social Assistance Payments
 - 5.3.3 Total Compensation To January 2011
- 5.4.0 Social Funding Expenditure Government/BPLS**
 - 5.4.1 Social Assistance Payments - Besuki, Kedungcangkring And Pejarakan
 - 5.4.2 Social Assistance Payments - Siring Barat, Jatirejo, & Mindi
 - 5.4.3 General Social Assistance Payments
 - 5.4.4 Land And Building Compensation
 - 5.4.5 Materials Buyback Scheme
 - 5.4.6 Total Expenditure For 2009, 2010, 2011 (Budget) – BPLS
 - 5.4.6.1 BPLS 2009 Expenditure
 - 5.4.6.2 BPLS 2010 Expenditure
 - 5.4.6.3 BPLS 2011 Budget
- 5.5.0 Maps Showing Social Expenditure To Date**

6.0 SOCIAL PROGRAMMES AND IMPACTS

- 6.1.0 Housing & Land**
- 6.2.0 Health**
- 6.3.0 Education**
- 6.4.0 Employment and Skills Training**
- 6.5.0 Environment**
- 6.6.0 Government Infrastructure**

7.0 ECONOMIC IMPACTS

- 7.1.0 Business & Government**
- 7.2.0 Tourism**
- 7.3.0 Future Threats**
- 7.4.0 Opportunities**

8.0 CULTURAL IMPACTS

- 8.1.0 Community Ties**
- 8.2.0 Ceremonies**

9.0 CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS

10.0 REFERENCES

1.0 INTRODUCTION

The parent organisation to the Humanitus Sidoarjo Fund is the Humanitus Foundation. This foundation is a non-political, non-religious, Australian NGO registered as a charitable institution and working within communities in SE Asia at all levels to achieve shared goals.

Humanitus has a long history of achievements working on social development programs in East Africa and SE Asia in the areas of health, education, rural diversification, tourism, community welfare and sustainability.

Humanitus works alongside many agencies, NGO's, CBO's, Government ministries, education providers and industry experts. Our current focus is in the SE Asia region. Humanitus has key team and board members in New Zealand, Germany, SE Asia and Australia. Humanitus is a fully transparent foundation and undertakes only those projects which have solid support at all levels.

The Humanitus Sidoarjo Fund was established in April 2010 to investigate long term solutions to the environmental effects and social impact of Lumpur Sidoarjo.

The Humanitus Sidoarjo Fund, through a co-operative working agreement with the Government of the Republic of Indonesia, aims to assist both the Government and the people of the affected area by raising awareness of the on-going effects of LUSI whilst assisting, in consultation, with many aspects of this disaster including future scientific research and related environmental and social issues.

An integral role of Humanitus is the forming of an international scientific research group to study the subsurface of LUSI. Through this coordinated, structured collaboration of scientists and experts the research group will endeavour to gain a better understanding of the subsurface of the area, the water source, longevity of the eruption and ultimately the future impact on the area and its people. It is our belief that until this geological phenomenon is better understood only then can long term infrastructure and social planning programs be effectively implemented.

In addition to forming this research group Humanitus has been tasked with conducting this independent social impact study into the current and ongoing effects of Lumpur Sidoarjo on the affected communities.

2.0 SOCIAL IMPACT STUDY METHODOLOGY

Social analysis work will use two main methods:

1. Compilation, comment and analysis of documents and data gathered to date by Humanitus, Government and Non Government authorities
2. Records of interviews with those affected

This report has focussed primarily on the macro social and accompanying economic factors. With a disaster of this scale and considering that it has been almost five years since the first eruption, an effective and relevant interview process with a viable cross section of the affected community is problematic. Those who have been effectively compensated and indeed many who have not, have moved from the area to live either with relatives or in new housing funded by compensation monies. These people, unless living within relocation centres, are difficult to contact and renders a comprehensive individual interview process beyond the scope of this report. Nevertheless, with all interviews that were conducted emphasis was put on maintaining ethical standards of respondent and interviewee anonymity, where appropriate, and voluntary participation.

The interviews will encompass a number of areas;

- I. Interviews with a number of householders affected in Sidoarjo.
- II. Interviews with government authorities, including the Sidoarjo Mudflow Mitigation Agency or Badan Penanggulangan Lumpur Sidoarjo (**BPLS**) and private stakeholders, including PT Lapindo Brantas (**Lapindo**).
- III. We have also recorded and commented on interviews conducted in the past by other organisations and agencies with respect to the relevance to social impacts caused by the mud volcano at Sidoarjo.

This report does not attempt to draw any conclusions relating to the controversy surrounding the triggering of the LUSI mud volcano (drilling Vs earthquake) other than to comment on the effects of the controversy on the social wellbeing of the people of Sidoarjo.

Past funding expenditure (including the names of donors) will be examined in detail. This will include graphs, maps and charts of where funding has been spent to date.

As part of this examination a study will also be conducted on past and existing agreements between the Government and other parties, including compensation plans.

3.0 BACKGROUND TO LUMPUR SIDOARJO

3.1.0 WHAT IS A MUD VOLCANO?



Figure 1 LUSI courtesy BPLS

Mud Volcanoes are also known as sedimentary volcanoes and are close cousins to Magmatic volcanoes. They are geological phenomena caused by subsurface over-pressurised mud layers. These types of volcanoes are also commonly related to fracture lines, faulting, or sharp folding and are often associated with tectonic subduction. Mud Volcanoes are generally eruptions of watery mud or clay (accompanied by methane gas), which commonly tend to build up a solid mud or clay deposit with a conical or volcano-like shape.

The sources of mud volcanoes are commonly traced to a substantial subsurface layer and under compacted, mud or shale. They are frequently associated with earthquake zones and are common in areas rich in hydrocarbons.

The cause for a mud volcano is, in part, simply the weight of rock overburden borne by the fluid content of under-compacted shale. However, mud volcanoes all over the world are associated with methane gas, and the presence of methane gas in the subsurface is also an essential feature of the phenomenon combined with, at times additional triggers such as tectonic activity.

The mud is a mixture of clay and salt water, which is kept in the state of slurry by the boiling or churning activity of escaping methane gas. The methane gas is derived either directly from organic matter or from secondary accumulations in sand stringers within the source-rock shale or from larger reservoirs. Some liquid oil often, but not always, is associated with the hydrocarbon gases of mud volcanoes, commonly the activity of a mud volcano is simply a mild surface upwelling of muddy and usually saline water accompanied by gas bubbles.

Many instances are known of highly explosive eruptions where large masses of rock have been violently blown out hundreds of feet into the air and scattered widely over the countryside. These intermittent violent eruptions strongly suggest that motive force is not merely weight of gradually increasing overburden but is due to periodic build up and release of internal pressure from the generation of methane gas within the shale body or diapir.

Approximately 1,100 mud volcanoes have been identified worldwide on land and in shallow water. It has been estimated that well over 10,000 may exist on continental slopes and abyssal plains. The largest structures are 10 km in diameter and reach 700 meters in height. Azerbaijan has the most mud volcanoes with 300 recorded.

Many mud volcanoes exist on the shores of the Black Sea and Caspian Sea. Indonesia is home to a number of mud volcanoes with the largest in West Timor that equals the size of the Indonesian capital, Jakarta. The fastest growing mud volcano is also in Indonesia, located on the Island of Java. Tectonic forces and large sedimentary deposits around the latter have created several fields of mud volcanoes, many of them emitting methane and other hydrocarbons.

China has a number of mud volcanoes in Xinjiang province. There are also mud volcanoes at the Arakan Coast in Myanmar and two active mud volcanoes in South Taiwan, and several inactive ones.

The island of Baratang, part of the Andaman archipelago in the Indian Ocean has several sites of mud volcanic activity. There was a significant eruption event in 2005 that was believed to be associated to the 2004 Indian Ocean earthquake. (LUSI Research Summary Report)

3.2.0 When did Lumpur Sidoarjo first erupt?

On 29 May 2006 in the Porong area, Sidoarjo Regency, East Java, Indonesia the mud volcano know now as LUSI (a contraction of Lumpur, the Indonesian word for mud and Sidoarjo, the Regency within which the eruption occurred) erupted spewing hot gases, mud and water into the surrounding communities.

The mudflow not only damaged peoples properties, Government infrastructure and the physical environment it has caused and continues to cause damage to lives, livelihoods, and the sense of community.



Figure 2 LUSI 2006 courtesy BPLS



Figure 3 LUSI 2009/10 courtesy BPLS

TODAY – 2011



Figure 4 LUSI 2011 courtesy BPLS

3.3.0 LUSI Chronology

Date	Event	Comment
9 th July 2005	A magnitude 4.4 earthquake struck right below the LUSI mud eruption zone.	See 27 May 2006 below
March 2006	PT Lapindo Brantas (Lapindo) a majority Indonesian owned gas drilling company began drilling of the Banjar Panji 1 exploration well. This well was commissioned to determine the feasibility of exploiting an underlying rich natural gas formation (named the Kunjung formation).	The first LUSI eruption in May 2006 occurred some 200 metres from this exploratory well. Some scientists and commentators contend that this well was the trigger for the LUSI mud volcano.
27 th May 2006	Devastating 6.3 magnitude earthquake struck near the heavily populated city of Yogyakarta (around 200km from the LUSI mud eruption zone) killing almost 6,000 people.	Some scientists and commentators contend that this earthquake in combination with the July 2005 earthquake and the continuous Watukosek fault movement was the trigger for the eruption of the LUSI mud volcano
29 th May 2006	At 5.00am an eruption of steam, water, and gas was observed 200 meters southwest of the Banjar Panji 1 well.	The LUSI mud volcano is born.
30 th May 2006	An unusual smell appears around the hot mudflow area. Rapid response measures were enacted as follows: <ul style="list-style-type: none"> • The distribution of masks to the public near the eruption site. • Clean water supplied by Lapindo to residents in the vicinity of the eruption and residents asked to temporarily not use well water. • Siring village residents asked not to light fires. • Essential food supplies distributed. 	Students are evacuated from two primary schools in the village of Renokenongo and the school is closed. Factories around the eruption were closed, including the PT Catur Putra Surya and PT Primapindo.

1 st June 2006	Second eruption occurs	An initial emergency response team is established. The team is headed by Commander Kodim Sidoarjo with members of relevant agencies involved such as environmental, Police, BP Migas, Lapindo, as well as community leaders.
2 nd June 2006	Third eruption occurs. Evacuation of 735 residents begins from Renokenongo Village to village halls and houses of relatives. Lapindo agreed on granting aid amounting to Rp 200,000 per family in the village of Siring and Renokenongo. Furthermore, assistance provided in the form of a rental assistance package and home and life insurance.	The second and third eruptions are short lived and apparently stop on 5 June 2006. They are situated between 500 and 800 metres North East from the gas drilling well.
3 rd June 2006	Affected villagers continue evacuating in greater numbers to more secure areas.	Some of these areas include Pasar Baru (New Market) Porong (PBP) and Mapolsek Village Hall.
9 th June 2006	Residents rejected the idea of dumping sludge into Kalimati	This was because they made the assumption that the sludge contained hazardous materials.
10 th June 2006	Lapindo asked to bear all the costs of mitigation by the Regent of Sidoarjo	
11 th June 2006	Mudflow estimated to be 5,000 cubic meters per day. Toll road is inundated despite a coordinated response	Porong toll road is periodically opened and closed several times up until 22 nd November 2006 despite repeated efforts to protect it.
12 th June 2006	Independent Team Formed by the Minister of Energy and Mineral Resources. Under decree No. K/73/MEM/2006 2231.	The task of this team was to: <ul style="list-style-type: none"> • Examine the geological conditions around the Banjarpanji-1 well and the source of the eruption. • Research and evaluate the drilling program and its implementation in the field. • Formulate a technical solution to stopping the mudflow. • Develop alternative solutions

15 th June 2006	<p>SATLAK (An integrated Team from the Sidoarjo Local Government) was established and led by Sidoarjo Regency.</p> <p>The team consists of 3 coordinators:</p> <ul style="list-style-type: none"> • Control Coordinator – Sidoarjo. • Technical Coordinator chaired by Lapindo and a representative of BP Migas. • Coordinator of Social Rehabilitation and PR chaired by Vice Regent of Sidoarjo. 	<p>SATLAK was organized to investigate a number of aspects of the mudflow such as:</p> <ul style="list-style-type: none"> • Evacuation of those affected by the mud flow • Provide an evacuation centre • Disseminate information and ensure good communication with local communities about the disaster and its impacts. • Build an emergency hospital, health posts, security post, public kitchen and refugee area at New Market Porong. • Combat the spread of the mudflow. • design an alternative mud disposal plan. • Conduct ongoing monitoring of the mudflow.
17 th June 2006	Approximately 100 employees cracker factory PT Inti Pratama Sari demonstrate at the Lapindo offices.	Employees sue for lost wages
	Levee at the Siring village is broken.	Mud starting to inundate homes in Siring
20 th June 2006	The Indonesian Ministry of Environment (KLH) made a request for technical assistance with the identification of environmental impacts of the ‘mud flow’ to the United Nations Office of Humanitarian Affairs (OCHA).	OCHA Environmental Emergencies Section in collaboration with the OCHA Field Coordination Support Section deployed a United Nations Disaster Assessment and Coordination (UNDAC) team with five environmental experts from 25 June to 6 July 2006.
	Vice President Jusuf Kalla gave a statement to the refugee area at New Market in Porong.	In essence he asks Lapindo to bear the entire responsibility for the social impact caused by the hot mudflow disaster in Sidoarjo.
	Lapindo deliver social assistance of 5 billion Rupiah	Money given symbolically by Nirwan D. Bakrie to the Vice Regent Saiful Ilah.

21 st June 2006	Lapindo calculated the volume of mud emitted since 29 May 2006, based on surface and depth measurements using GPS.	The volume was estimated to be 1.1 million m ³ of mud. The depth of the mud was ranging from 3.5 to 6.4 metres around the source of the mudflow, to 0.1 to 0.6 metres at the edges of the flood zones. Although the flow is not continuous and the mud volcano is intermittently active, the estimated average volume of emitted mud over that period would have been over 40,000 m ³ /day.
	Lapindo met with representatives of 15 small to medium scale companies affected by mudflow	Lapindo agreed to replace workers' wages amounting to Rp 700,000 per month per person for 1879 workers. On June 29, Lapindo paid 1787 workers wage relief from 13 companies affected.
	Two reported dead from inhaling H ₂ S - hydrogen sulphide gas	During this time 12,000 receive medical treatment for respiratory problems, the mud flow reaches 40,000 cubic metres per day and 7,000 people are displaced
27 th June 2006	The Toll road closed for a time due to mud flow.	
5 th July 2006	Affected residents started demanding compensation. Collective agreements started for house rental assistance	Agreement reached between Lapindo, and representatives of people from Kedungbendo Perumtas 1 (Housing Estate) and mediated by the Vice Regent Saiful Ilah. These agreements consisted of home rental assistance amounting to Rp 2 million per year to the residents directly affected. On 10 July, house rental assistance is then raised to Rp 2.5 million per year in response to requests from those affected
7 th July 2006	Several trials were conducted relating to the utilization of the mud.	Among other things, the mud was tested for the raw material for making mud bricks. Craftsmen from Mojokerto started making 5000 bricks with mud from LUSI.

9 th July 2006	Residents who owned their homes rather than rented began asking for compensation.	
12 th July 2006	Hundreds of residents of the village of Siring stop sand trucks in protest.	Siring residents who could not be categorized as directly affected demanded that they also be given compensation. Demands were met on 15 July: Lapindo to provide compensation of Rp 300,000 per family.
13 th July 2006	Extensive efforts are undertaken to try and stop the mud flow.	This includes; drilling of relief wells and the dropping of over 500 concrete balls of various types into the eruption zone. None of these attempts were successful and deemed by many scientists to be somewhat futile from the beginning.
16 th July 2006	Lapindo start paying rent for the land needed for ponds.	A total of 42 residents from Besuki receive 2 years rent worth a total of Rp 259.2 million. Up until August 6, 2007, Lapindo had paid rent for pond areas and failed horticultural crops worth Rp 13,244,588,635 to 1720 residents and landowners affected.
3 rd August 2006	Environment Minister gives sludge removal permit. However prohibits removal to the sea.	
4 th August 2006	Residents of Besuki reject the use of land there as ponds.	
5 th August 2006	3 factories in Jatirejo affected by mud.	
7 th August 2006	Meeting with people of Jatirejo.	Agreed to the evacuation of 871 Jatirejo families.
	Toll road closed again in one direction.	
8 th August 2006	Forum for Environment Foundation (WALHI) refuse to allow the disposal of mud to the sea.	
	Both sides of toll road closed.	
9 th August 2006	Villagers in Siring request land purchase.	

11 th August 2006	President of Indonesia visits refugee area in Porong.	During his visit, President Susilo Bambang Yudhoyono stressed the importance of increasing the area set aside for mud ponds.
	Governor allows sludge to be pumped to the Porong river and eventually to the sea.	However he says that it must be treated first and the more heavy mud is not allowed to be pumped.
12 th August 2006	The region of Renomencil in the village of Renokenongo is submerged by mudflow.	
13 th August 2006	Number of refugees rises sharply.	It is estimated that there is now a total of 10,000 displaced persons.
14 th August 2006	Further discussions with affected communities' takes place in relation to the proposed house lease agreement.	An agreement is finally reached.
16 th August 2006	Lapindo advised that they are willing to purchase affected land and buildings.	This was announced at a meeting at the Sidoarjo Regency Hall.
18 th August 2006	Mud flow estimated to be 50,000 cubic metres per day. As a result of this the levee that was established to control the mud flow breaks.	11,000 people are now displaced.
	Lapindo agreed to temporarily relocate 11 factories.	The cost of this is Rp 6.832 billion.
22 nd August 2006	People of Besuki village protest about the breaking of the dike.	The protest takes the form of a blockade of the toll road as they will do a number of times.
25 th August 2006	An explosive eruption occurs at the main eruption site.	This results in minor and serious injuries to workers. One person, Yuli Eko, eventually dies of his injuries on 1 st September.
29 th August 2006	Levee breaks once again.	Toll road affected again.
30 th August 2006	President calls a meeting with the Regent of Sidoarjo, Governor of East Java and the Cabinet.	The discussion focuses on 4 things: <ul style="list-style-type: none"> • Strengthening the storage pond's dikes. • What to do with the mud. • Disposal of sludge into river or sea after treatment. • Environmental factors.

1 st September 2006	Politician, Amien Rais, said LUSI is a national disaster.	This follows similar calls months earlier by Abdurrahman Wahid. Amien Rais urges government to take over the disaster management.
	The village of Jatirejo is increasingly inundated by mud.	This increases throughout September.
3 rd September 2006	Residents of the villages of Siring, Renokenongo, Kedungbendo, Keboguyang and Besuki protest at the toll road.	Residents concerned about the strength of the dike and the constant spillage into villages.
4 th September 2006	Bulldozer driver killed in accident at relief well site.	
	Residents of the 5 villages of Sentul, Glagaharum, Plumbon, Permisan and Keboguyang urge Lapindo and government to channel mud to the Porong river.	Hundreds of residents from these villages are concerned that if this is not done the mud will soon overflow the dikes and inundate their villages.
7 th September 2006	About 170 families from Siring asked Lapindo to purchase their properties.	Families refused the rent assistance package in favour of purchase.
8 th September 2006	With a further escalation in the disaster, the national team for management, Sidoarjo Mudflow Team (TimNas), was organized by the President, four months after the eruption happened. All costs to be borne by Lapindo. This was termed as Presidential decree 13/2006	<p>Main tasks of this team are:</p> <ul style="list-style-type: none"> • Rescue residents affected. • Maintain basic infrastructure. • Closure of mud eruption. <p>After seven months of operation and completion of a report on the number of victims and losses, TimNas was dissolved.</p>
15 th September 2006	More protests by affected residents at the toll road demanding action to channel mud to the Porong River after mud overflows the dike in Besuki, Pejarakan and Mindi.	Sidoarjo Regent orders the channelling mud to the river.
18 th September 2006	High level meeting of government officials.	Decision made to replace strained emergency embankments with a permanent dike.
19 th September 2006	Residents of Siring request rent assistance package.	54 families given assistance similar to that given to Perumtas 1.
	Sludge pumped to the Porong river.	7 pumping stations used. Each pump had a capacity of up to 300 litres per second.

20 th September 2006	In addition to the channelling of mud to the Porong River dump trucks are also used to transport the mud to Ngoro, Mojokerto.	The trucks travelled up to 250 times a day and were averaging 2500 cubic meters per day.
21 st September 2006	Environment Minister approves disposal of mud to Porong river.	
27 th September 2006	Rail lines at KM32 are twisted due to subsidence or Watukosek Fault movement.	
	Cabinet meeting confirms approval to channel mud to the sea via the Porong river.	The main points of the meeting were: <ul style="list-style-type: none"> • 495 acre area declared disaster prone. • All people in this zone should be relocated. • Continue efforts to stop the mud flow. • Channel mud to Porong River. • Reinforce dikes. • Move the toll road, railway and gas pipelines.
1 st October 2006	Reports of damage to buildings due to cracking.	Thought to be caused by subsidence.
2 nd October 2006	Permanent relocation begins and KASIBA (ready to build a new Sidoarjo) is launched to the public.	However support in some villages for relocation is waning as many prefer 'cash and carry'.
8 th October 2006	President visits site again.	Directs TimNas to: <ul style="list-style-type: none"> • Start dredging the Porong River. • Ensure the safety of those affected. • Secure infrastructure.
9 th October 2006	Lapindo agrees to give assistance to factory workers affected.	1428 workers from 19 businesses get assistance.
19 th October 2006	Dikes initially strengthened with iron waste.	Following protests concerning environmental factors this is changed to a liquid polymer.
29 th October 2006	Lapindo asked to pay Rp 2.5 million per square metre to owners of houses affected by the widening of dikes.	In further discussions, 6 other areas are agreed as important to address: <ul style="list-style-type: none"> • Clean water supply. • Health insurance. • Transport compensation. • Irrigation pumps. • Grave relocation. • Strengthening of dikes.

30 th October 2006	Spillway finally opened to Porong river.	However problems occur with pumping due to silting and other factors. The result is that mud and sludge are not being removed fast enough from the ponds.
1 st November 2006	Protest rallies in the village of Jatirejo.	Residents want clarity over compensation for property. Residents now want Rp 3.5 million per square metre.
4 th November 2006	Toll road reopened.	
6 th November 2006	Pertamina say they will relocate gas pipeline.	
7 th November 2006	Toll road closed.	Reopened 8 th November. Closed 9 th November. Reopened 11 th November.
9 th November 2006	Homes in Pejarakan flooded from the spillway.	As the pumps were unable to cope with the volume of mud and water the spillway overflowed. People affected demand compensation.
18 th November 2006	Toll road closed again as mud spills over the road.	Opened again on the 20 th November but ultimately closed for the last time on the 21 st November as subsidence and landslides prove too dangerous.
22 nd November 2006	Pertamina gas pipeline explodes at KM38.	12 people, mainly soldiers and police, are killed. 2 people are missing. Police declare it was an accident.
25 th November 2006	Mud begins to inundate Perumtas 1.	Evacuation of Perumtas 1 residents begins. Evacuation of Siring, Renokenongo, Kedungbendo and Jatirejo intensifies.
30 th November 2006	Perumtas 1 residents start receiving rent assistance.	
1 st December 2006	In a meeting between Lapindo, government and representatives of those affected, Lapindo offers a compensation package.	This consisted of: <ul style="list-style-type: none"> • Rp 500,000 per square metre for land. • Rp 1.25 million per square metre for buildings. • Rp 90,000 per square metre for rice farmers. However residents rejected this amount.

4 th December 2006	Lapindo, Pemkab Sidoarjo and Timnas agree to a price for land and building under a compensation package and clarify that the compensation package takes the form of a buying and selling contract (PIJB). This agreement encompasses the 4 villages of Siring, Renokenongo, Kedungbendo and Jatirejo. The package is to be paid in initial instalments of 20% of the total and the remaining 80% within 2 years. This is later confirmed by Presidential decree	Protests and meetings lead to agreement on 'cash and carry' compensation for the four affected villages: <ul style="list-style-type: none"> • Rp 1 million per square metre for land. • Rp 1.5 million per square metre for buildings. • Rp 120,000 per square metre for rice farms. There is still some disagreement amongst residents as to whether to accept the package.
7 th December 2006	Mud inundation becoming increasingly widespread.	
8 th December 2006	Wangkal residents, in the village of Renokenongo forced to evacuate.	
15 th December 2006 th	Mud inundates more of Ketapang.	
	Porong inundated with mud.	
24 th December 2006	Fields in Gempasar inundated.	
27 th December 2006	Heavy rain increasing the problems.	Siring, Kedungbendo and Jatirejo now totally inundated.
	PBP refugee camp becoming increasingly crowded.	

28 th December 2006	Major crisis meeting held by the President.	<p>7 key points agreed:</p> <ul style="list-style-type: none"> • Lapindo to provide Rp 1.3 trillion needed for mudflow management. • Lapindo to provide Rp 2.5 trillion in initial 20% compensation costs to start in March 2007. • Speed up management of affected infrastructure. • Allocate gas power plant to produce fertiliser. • Government to provide assistance. • Move mud to Porong river/sea for eventual coastal reclamation. • Help victims to open new businesses and gain new employment.
10 th January 2007	150 families from Perumtas 1 offered living expenses, moving costs and other assistance.	
13 th January 2007	Residents of Jatirejo complain they are not receiving living expenses as promised.	This is found to be due to a technical problem at the Mandiri Bank and is soon corrected.
16 th January 2007	Financial aid package agreed for Perumtas 1.	<ul style="list-style-type: none"> • Payment of Rp 500,000 per family • Rp 5 million per family over 2 years for housing assistance. • Rp 300,000 per person per month in expenses.
17 th January 2007	Problems with corruption in distribution of rice in PBP refugee camp.	Lapindo explain that they are only providing Rp 15,000 per person per day and are not responsible for rice distribution.

18 th January 2007	Residents of Perumtas 1 hold rallies and various meetings are held to demand/discuss further compensation. These protests continued over the next year.	Residents of Perumtas 1 want to be included in affected map area as of 4 th December 2006.
1 st February 2007	Article appears in GSA Today entitled <i>Birth of a mud volcano: East Java, 29 May 2006 (Davies et al)</i>	Article suggests possible trigger for eruption is underground blowout from Banjar Panji-I Well
19 th February 2007	Many meetings held in relation to compensation packages.	One of the serious issues is that of documentation. Many residents do not have land and building certificate of title and Lapindo cannot pay without proof of ownership.
24 th February 2007	Efforts continue in order to stop the mudflow.	This includes high density chain balls inserted into eruption zone. These efforts eventually prove unsuccessful.
March 2007	During the month, residents of Perumtas 1 and other villages continue to protest concerning compensation.	
22 nd March 2007	TimNas and government officials define a new map area of affected property.	The government states that if people or properties are subsequently affected outside the 22 nd March map area, then the government will provide compensation to these people.
	Lapindo makes a concession regarding documentation proving ownership.	The company lowers its requirements but asks for help from the Sidoarjo government to verify ownership of property claimed. There have been some instances of people who never lived in the affected area trying to claim compensation.
23 rd March 2007	A meeting between TimNas, Sidoarjo regency and citizens representatives moves forward the initial 20% compensation package.	

25 th March 2007 th	Further meetings held between parties.	<p>Outcomes include:</p> <ul style="list-style-type: none"> • Approved a 3 month extension of Lapindo agreements for residents affected in the 4th December map area. • Sidoarjo Regent not prepared to verify ownership of land or buildings without permits. Proposed that the Governor and BPN provide legal verification. • Schedule of payment of 80% compensation not yet agreed.
26 th March 2007	Lapindo pay initial 20% compensation to a number of Mindi residents.	The rice field area compensated totalled 115,945 square metres.
5 th April 2007	Up to this time, Lapindo has paid 20% compensation to residents of Mindi, Jatirejo and Siring.	The total area compensated is 215,243 square metres with a total payment of Rp 5.165 billion.
7 th April 2007	Residents of Mindi, Besuki, Kedungcangkring and Pejarakan demand to be included in the 22 nd March map of affected regions.	The reason for that is that if mud extends beyond the 22 nd March map boundary it may be dealt with under the National Disaster plans.
8 th April 2007	Presidential Regulation 14/2007 is declared.	This regulation confirms Lapindo's agreement to compensate victims of four villages included in a March 22, 2007 map of affected areas. Under this scheme, the government would be responsible for covering costs related to the disaster's social impact on people living just outside the designated areas, but Lapindo would pay the costs of containing and stopping the mud flow, as well as compensating the people left homeless ("Indonesian mud-flow victims", 2008). This compensation takes the form of a 20% initial payment and the remaining 80% after 2 years.

13 th April 2007	Government representatives and residents meet.	Residents want Lapindo to accelerate payment of initial 20% compensation to those affected in the December 4 th map area. This is despite many only possessing limited documentation.
	Total land area compensated now 188,099 square meters.	Total cost so far for 20% compensation is Rp 5.74 billion.
18 th April 2007	Individual differences in the type of compensation wanted by residents continue to emerge.	An example of this is 56 Jatirejo village families who prefer the relocation option as opposed to 'cash and carry'.
20 th April 2007	Total land area compensated now 250,168 square metres.	Total payment to date Rp 6.43 billion.
23 rd April 2007	As part of the Presidential Regulation 14/2007 TimNas is replaced by the Sidoarjo Mudflow Mitigation Agency or Badan Penanggulangan Lumpur Sidoarjo (BPLS)	BPLS is the representative of the government tasked to manage the disaster prevention and recovery based on Presidential Regulation 14/2007 and subsequent regulations.
26 th April 2007	Big rallies held in Sidoarjo by affected residents.	Want an acceleration of 20% compensation payments regardless of whether all legal documentation is available.
	Negotiations continue between Lapindo and factory owners concerning compensation for workers.	Factory owners threaten to mobilize workers to protest in Jakarta.
27 th April 2007	The 4 villages within the affected map area organize a meeting in Jakarta to discuss concerns.	2 representatives from each village plus representatives from BPLS and the Sidoarjo government will attend.
7 th May 2007	Protests continue throughout May, including a big demonstration to mark the 1 st anniversary of the eruption.	
28 th May 2007	US representative Christopher Hill visits Sidoarjo.	
15 th June 2007	Mud overflows part of the main dike.	
16 th June 2007	Water and gas eruption (bubble) occurs in a home in Jatirejo village.	
	Mindi residents take their battle over the spillway to the courts.	

19 th June 2007	Perumtas 1 residents increasingly angry over compensation process.	
	Bubble at Jatirejo home cannot be stopped.	
	Rain inundates the area.	This puts significant stress on the existing dikes.
22 nd June 2007	In an encouraging sign some Perumtas 1 residents engage in the buying and selling process through PT. Minarak Lapindo Jaya (MLJ).	
25 th June 2007	Institute of Technology 10 November Surabaya (ITS) team manage to cap the bubble at the Jatirejo home.	Residents in the area still concerned about more eruptions.
	150 more families now want relocation.	Following some 500 families from block AA in Perumtas 1, another 150 families want to take advantage of the relocation program.
26 th June 2007	President sets deadline for payment of the 20% initial compensation for 10,000 cases to be made by 14 th September 2007.	The President also handed over Rp 10 billion worth of donations from various parties. The President also stated that Lapindo must place Rp 100 billion into an escrow account which will be kept at that amount.
27 th June 2007	Lapindo complete advance payments as verified by BPLS verification team.	
	Residents of Besuki, Pejarakan and Kedungcangkring protest regarding sludge disposal.	The efforts of BPLS to dispose of mud/sludge to the Porong river are disrupted by protestors.
28 th June 2007	BPLS added an extra verification team.	This follows the President's instructions that the advance payments be accelerated and brings the total number of teams to 15 with 10 people in each team.
29 th June 2007	Regent asks that the PBP refugee camp be disbanded.	Deadline July 2007.
	Jatirejo canal levee bursts.	The cause is not certain but could be from an increased volume of mud or a blockage in the channel to the Porong river.

30 th June 2007	Heavy rain falling.	Dikes at critical levels.
1 st July 2007	Raya Porong Road is flooded with mud and water.	
3 rd July 2007	Article published in Science Direct entitled <i>Triggering and dynamic evolution of the LUSI mud volcano, Indonesia</i> (Mazzini et al)	Article suggests possible trigger for LUSI was earthquake
4 th July 2007	Pipe on Raya Porong Road bursts.	
	Lapindo pay compensation to residents for areas needed for storage ponds.	205 landowners are paid a total of Rp 1.4 billion.
5 th July 2007	Residents of Perumtas 1 protest outside Lapindo offices and fight amongst themselves.	Residents fought over disagreements regarding whether to demand 100% upfront payment or accept the staged payment offer.
6 th July 2007	Dike overflows.	Overflows at the border of Pejarakan and Kedungcangkring villages.
10 th July 2007	Refugees in PBP camp protest over right to remain.	Prepare defences of sharpened bamboo poles.
11 th July 2007	MLJ begin payments for compensation based on only Letter C proof of ownership.	
	Perumtas 1 residents confront verification teams.	Residents demanding an acceleration of the verification process.
13 th July 2007	3 employers affected by the mud agree to offer made by Lapindo.	
14 th July 2007	Residents begin to question ITS data.	
	Lapindo pay more of the rental assistance for the pond areas.	
22 nd July 2007	Pipe on Raya Porong Road bursts again.	
23 rd July 2007	Residents protest at Bank Mandiri.	They are questioning the slow transfer of initial 20% compensation.
25 th July 2007	The process of verification of ownership through the taking of oaths by residents who have not been able to produce ownership papers begins.	500 residents make these oaths with another 236 on the 26 th July.
27 th July 2007	Condition of Porong river sediment begins to be examined.	

30 th July 2007	New bubble occurs.	This is the biggest to date and forms in the Eastern Pacific premises.
	Pipe on Raya Porong Road leaking again.	Again on 1 st August.
31 st July 2007	Compensation for initial payment made for 34 properties in Kalitengah.	
2 nd August 2007	Parliament examines alternative ways to dispose of the mud.	
5 th August 2007	BPLS discovers possible crude oil coming from a bubble.	
11 th August 2007	Canal embankment collapsed.	Possibly due to subsidence in the area.
12 th August 2007	About 500 families from Perumtas 1 want to relocate.	Residents willing to accept the remaining 80% compensation in the form of a new property.
14 th August 2007	MLJ gives rewards to a resident who honestly returned an overpayment of Rp 429 million.	This situation highlights the issues facing Lapindo and the government in the distribution of compensation.
15 th August 2007	4 people from Perumtas 1 take people from Kedungbendo village hostage.	The 4 people are demanding the withdrawal of the signature requirement in relation to compensation approval.
17 th August 2007	New bubble appears in a field in Besuki.	
18 th August 2007	BPLS hold a fishing competition in a Jatirejo pond.	This is to help demonstrate that the sludge/mud is non toxic.
22 nd August 2007	More oaths are sworn.	About 450 residents from Renokenongo, Jatirejo and Kedungbendo have sworn an oath to facilitate their compensation claims.
24 th August 2007	Pertamina removes section of pipe from November 2006 explosion.	BPLS request removal as pipe was blocking mudflow.
26 th August 2007	Residents protest about the dumping of mud to the Porong river.	
28 th August 2007	The process of paying the 20% initial compensation accelerates.	
29 th August 2007	Mud overflows dike.	The volume of mud unexpectedly increased causing an overflow. One theory as to the cause is a partial eclipse of the moon.

30 th August 2007	121 families from PBP refugee camp receive housing contract compensation.	
31 st August 2007	40 representatives of families outside the affected map area want equal treatment to those within the area.	This would mean a change or revocation of the Presidential regulation 14/2007.
3 rd September 2007	Residents from outside the affected map area take their claim to the House of Representatives.	
	Another resident, Ahmad Lubis, from Renokenongo village returns an excess payment to MLJ.	Further highlighting the difficulties with the scale of compensation payments, an overpayment of Rp 25.5 million is uncovered.
	Hydrogen Sulphide (H ₂ S) gas from the main eruption site decreases.	In an encouraging sign, H ₂ S gas erupting falls below the threshold of 13 parts per million.
5 th September 2007	731 more people take the oath to facilitate compensation payments.	
6 th September 2007	BPLS records show that 10,877 (amended on September 14 th to 10,370) families have registered as having land or buildings affected.	The estimate of those affected was up to 12,000 families which would mean that over 1,000 families have yet to enter the verification process.
7 th September 2007	MLJ and BPLS asked to accelerate the verification and payment process.	
10 th September 2007	BPLS brings a dredger to the Porong river.	Silting of the Porong river has been a concern and BPLS is seeking to address this by dredging. Eventually many dredgers will be used especially at the mouth of the Porong.
12 th September 2007	H ₂ S gas levels rise sharply again.	Levels from the eruption site rise to their highest level to date of 30-35 parts per million.
13 th September 2007	Volume of mud/sludge rises to critical levels.	Storage pond on the north side overflows. Mud threatens rice fields in Sengon area.
14 th September 2007	Presidential deadline for payment of initial 20% compensation for original 10,000 cases.	Dozens of Siring residents are unhappy at not yet receiving the 20% payment.

15 th September 2007	<p>Progress of the 20% initial payment is as follows:</p> <ul style="list-style-type: none"> • Verification by BPLS of as many as 11,370 properties. • PIJB by MLJ as many as 9,463 properties. 	PIJB value of 20% said by MLJ to be over Rp 500 billion.
18 th September 2007	Some residents of Renokenongo reject the deadline for submissions to the verification teams.	These residents reject the compensation schemes proposed, such as in the 14/2007 Presidential regulation and want instead an advance payment of 50% and 30 hectares of land for their use.
19 th September 2007	The deadline for submissions for those wishing to enter into the buying and selling process is to be before the Islamic holiday of Lebaran.	BPLS confirmed that compensation claims must be submitted to the verification teams before Lebaran. They also state that the 50% upfront compensation claims by some Renokenongo residents cannot be accepted as this would upset the entire process.
	H ₂ S gas levels decline to between 18.25 parts per million in an area localized around the eruption site.	Scientists believe that the original spike may have been caused by earthquakes in Situbondo.
20 th September 2007	Payment of the initial 20% compensation continues.	After the passing of the final deadline of 14 th September 2007 for payment of initial compensation, MLJ continue the process of compensation.
	Parliamentary committee asks for clarification as to when public and social facilities will be replaced.	MLJ state that this will be done once the process of buying and selling of residents land and buildings is complete.
23 rd September 2007	Resident's representatives deliver a deadline for payment of the initial 20% compensation to be no later than 2 nd October 2007.	Residents of Jatirejo, Siring, Renokenongo, Kedungbendo and Kalitengah threaten to blockade roads in Porong if this does not happen.
24 th September 2007	Residents of Jatirejo choose a relocation option as their compensation package.	They choose a 6 hectare site in the village of Sariogo in the Sidoarjo district. Down payments also to be made to residents of between Rp 10.5 to 24 million.

25 th September 2007	Dikes in Siring & Jatirejo completed.	Some delays were experienced due to protests concerning the slow payment of the initial compensation. The dike is now 11 metres high, 5 meters wide at the top and 30 metres wide at the base.
26 th September 2007	Once again residents of Perumtas 1 demand equal compensation payments relating to the 2 year housing compensation program.	
27 th September 2007 ^h	The pipe running along Raya Porong Road bursts again.	The pipe burst at Ketapang area once again.
30 th September 2007	Pipe burst again about 100 metres from the previous rupture.	Cost of repair is estimated to be up to Rp 20 million. Indosat cables are also affected.
1 st October 2007	Monies donated on 26 th June 2007 by various organizations (Banpress) begin to be distributed.	Rp 10 billion in aid is to be distributed by way of cash payments of Rp 500,000 per family to an estimated 10,277 households affected by the mud.
2 nd October 2007	Relocation of Navy personnel underway.	Housing complex at Kramatjegu village is completed for Navy personnel. Complex is for those affected by the mud and others currently without housing.
3 rd October 2007	President expresses hope that the initial 20% payment to residents will be completed before Lebaran.	He also stated that the payment had already been made to 95% of those affected.
5 th October 2007	The payment of the Banpress aid monies is delayed.	Some politicians and community groups wanted changes to the distribution of the Rp 10 billion. They finally agreed that Rp 5.1 billion be distributed in cash and the remainder to be used for training and mentors programs.
	PT Osaka personnel block road access in protest.	PT Osaka demand that Lapindo immediately pay compensation of Rp 57 billion for 7.7 hectares of land and 6000 square metres of factory and equipment. PT Osaka has 200 employees.
	BPLS brought back dredger.	This is part of a series of dredgers which will help to clear the Porong river of silt build up.

7 th October 2007	Refugees at PBP write to the President. They demand part of the Rp 10 billion Banpress aid payment.	They protest that they should be given this assistance regardless of whether they have agreed to the Lapindo compensation deal.
16 th October 2007	Dike at section 42 in Siring breaks.	For the second time in 2 days the dike here has burst and a sinkhole formed.
	BPLS begins operating dredger.	
17 th October 2007	About 700 residents of Renokenogo village return to homes within the affected map area.	Although they have received the 20% initial payment they refuse to leave, despite the dangers, before they receive the remaining 80%.
18 th October 2007	BPLS build a new 60 hectare settling pond.	This was built to cope with overflows of the dike at point 42 as this was a frequent happening.
21 st October 2007	Government minister visits Sidoarjo.	He asserts that BPLS will be able to overcome the sedimentation in the Porong river. He also stated that it is not possible to stop the mudflow with any available technology.
	The dike overflows at points 25-47.	This was caused by subsidence.
23 rd October 2007	Rail lines at one point buckled slightly.	The trains are still able to pass but at a slower speed.
	Dozens of residents not included in the Banpress aid payments protest to the Sidoarjo Parliament.	
	Residents ask for a review of regulation 14/2007.	25 residents of Renokenongo, Permisan and Jatirejo submit to the Supreme Court that a review be held of regulation 14/2007.
24 th October 2007	Sedimentation in the Porong river is at 4.5 metres.	
	Point 42 of the dike collapses again.	A gap of about 15cm opens up on a Porong bridge.
25 th October 2007	The President makes statements regarding a number of issues. Among other things he instructed that:	<ul style="list-style-type: none"> • The dredging of the Porong River be intensified. • Payment of the remaining 80% compensation to begin in May 2008.
	Residents of Glagaharum reject the building of a new sediment pond there.	They are concerned this pond would make their village more prone to flooding.

28 th October 2007	Rail line damaged.	
31 st October 2007	Residents of 4 villages in Pasuruan blockade roads from Surabaya to Malang/Pasuruan demanding cessation of mud being dumped into the Porong river.	Hundreds of villagers from Carat, Gempol, Japanan & Legok take part.
1 st November 2007	BPLS state they can overcome sedimentation issues in the Porong River.	
2 nd November 2007	About 100 residents of Mindi demand BPLS continue to dump mud into the Porong river.	
	A member of the house of Representatives, Muhaimin Iskandar, reviews the disposal of mud to the Porong river.	He wants the government to change the Presidential regulation 14./2007 to expand the affected area
4 th November 2007	Mud sediment begins to enter the sea in greater quantity.	
	With the dikes at critical levels, BPLS increases the mud flow to the Porong river.	
6 th November 2007	Residents of Besuki demonstrate about crop failures.	About 100 people blocked access to a stone quarry used to fill 'bubbles'. This action was stopped when a counter demonstration from residents of other villages occurred.
8 th November 2007	BPLS bring a third dredging machine to the Porong river.	
11 th November 2007	Dredging intensifies.	
12 th November 2007	Residents of Gempolsari demonstrate asking that the 20% initial payment be made for 91 parcels of land.	They state: <ul style="list-style-type: none"> • Of 93 claims only 2 have been paid by MLJ. • All have passed the verification process. • They want claims paid as garden plots although its actual use is as rice paddies.

13 th November 2007	Residents of Pejarakan ask to be included in the affected map area.	
	BPLS stated that mud will again be dumped into the Porong river on a large scale.	This will start from 14 th November and will continue unabated as weather allows.
	Rail lines buckle again due to subsidence.	
14 th November 2007	An outlet pipe is added to facilitate mud disposal to the Porong river.	
15 th November 2007	The Attorney General states that the government can take criminal action against Lapindo and not just civil action if disaster found to be the fault of drilling.	
	Dozens of GPKLL (Association of Victims of Lumpur Lapindo) reject compensation offers.	They block access to dikes at 3 points demanding compensation for factories submerged by mud.
16 th November 2007	Aburizal Bakrie contradicts the statement made by the Attorney General.	He denies that the Lapindo case could be classified under the criminal code.
	Besuki villagers continue to demonstrate concerning crop failures due to mud damage.	Villagers desperate for compensation and approach the East Java provincial government.
	Drainage of mud to be directly through pipes.	The dumping of mud to the Porong river will now be through a dedicated pipeline rather than through the spillway in the village of Pejarakan. It is hoped that this will speed up the disposal process.
	A pontoon used in the dredging process of the Porong river is lost.	The pontoon is washed away by the heavy flow of the Porong river.
17 th November 2007	Besuki villager's claims are agreed.	Those claiming for failed crops as a result of mud inundation are relieved as compensation for 32 hectares of agricultural land is approved from the east Java budget.
18 th November 2007	Renokenongo villages demand 100% payment of compensation.	They reject the compensation packages offered and now demand 100% payment for losses and 30 hectares of land for relocation.

20 th November 2007	10 houses in Siring are swamped with water. The 'bubble' lasted about 10 minutes.	It is assumed the water came from underground in the area of RT3RW1 in Siring village.
	BPLS states that the 'bubble' was not caused by water seepage from nearby storage ponds.	
21 st November 2007	Village relocation committee urges clarity regarding social and public facilities.	The committee is concerned that there is still no clarity in addressing compensation and rebuilding of social and public infrastructure.
23 rd November 2007	UN Environment Program interested in investigation utilization of mud.	
24 th November 2007	MLJ release a statement: 'Ready to build 6030 housing units'.	MLJ expressed its willingness to build 6030 housing units for mud victims. It has bought about 200 hectares of land in Sukodono, Sidoarjo for this purpose.
25 th November 2007	New 'bubble' appears on the premises of CV Candi Oxygen in West Siring.	
27 th November 2007	Judges reject Yayasan Lembaga Bantuan Hukum Indonesia, (YLBHI - Indonesian Legal Aid Foundation), lawsuit.	Judges rule that Lapindo and the government have performed their obligations in full and reject the entire claim.
	75 victims trained in silk screening.	Training takes place in Sidoarjo and organized by the AL Falah Social Foundation.
30 th November 2007	MLJ pay compensation for failed harvest to Besuki farmers.	77 families from Besuki are paid compensation: <ul style="list-style-type: none"> • Total value Rp 138 billion. • Land area about 3.8 hectares.
1 st December 2007	Parliamentary review of the mud situation in Sidoarjo is undertaken. It requires BPLS and Lapindo to complete 3 things in 2008: <ol style="list-style-type: none"> 1. Relocation of infrastructure (highways, rail lines, water & gas pipes). 	<ol style="list-style-type: none"> 2. Complete compensation for at least 10,000 affected. 3. Better handle the disposal to the Porong river (ensure Porong river is not adversely affected by the volume of mud).
2 nd December 2007	Porong river flushed out.	River is flushed out with 100 m ³ of water per second from the dam at Mojokerto.

3 rd December 2007	Renokenongo citizens lower their demands regarding compensation.	Now prepared to accept the 20/80 compensation package but total to be paid within 5 months not 2 years.
	BPLS strengthening dikes in preparation for the coming rainy season.	
	67 families from PBP refugee camp accept house rental compensation package from MLJ.	This leaves about 622 families remaining in the PBP camp.
4 th December 2007	School in Jatirejo flooded after 7 hours of heavy rain.	Residential areas were also affected in this part of Jatirejo which was not originally affected by mud.
	ITS team attempt to use a vacuum pump to suck mud directly to the Porong river.	The previous attempt failed due to pipes bursting.
6 th December 2007	About 200 residents rally claiming they have not received the 20% compensation promised.	They state they have already filed compensation claims.
7 th December 2007	Rail lines relocated.	Rail lines to be replaced between Sidoarjo and Bagil.
9 th December 2007	Dike breaks at point 67 in the area near the village of Gempolsari.	Mud flows into a pond that is incomplete.
10 th December 2007	YLBHI appeal the loss of their lawsuit against the government and Lapindo.	
11 th December 2007	MLJ release payment of 20% compensation to 79 more properties.	
12 th December 2007	Residents of Gempolsari rally in Sidoarjo.	They demand clarity over 92 parcels of land that have been submerged by mud. They have stated that the land is garden plot land however verification team claimed it is wetland (rice paddies).
	The toll road relocation plans still unable to proceed.	There is disagreement over the price of land that the government is prepared to pay. Residents want same price as mudflow victims are receiving. Government refuse.
14 th December 2007	Continuing development of dike ring N ^o 3.	BPLS press on with the construction of the dike on the outer ring of the affected map area.

17 th December 2007	New small eruptions about 50cm tall and 300m from the central eruption occur.	
18 th December 2007	2 additional villages proposed to get compensation for failed harvest.	These villages are Glagaharum and Gempolsari and are outside the affected map area.
19 th December 2007	Government decided that the land needed for the relocation of infrastructure will attract the same price as that given to mudflow victims.	The price to be Rp 120,000 per square metre.
23 rd December 2007	Pipe for disposal of mud to the Porong river is clogged.	Back up and running 2 days later.
26 th December 2007	Bubble appears on a football field in Perumtas 1.	The puddle of hot water which was also accompanied by some smoke was declared not to contain any harmful gasses by Fergaco.
27 th December 2007	Forum for Environment Foundation (WALHI) Lawsuit Rejected	Central Jakarta District Court judges, at a hearing decided to reject the suit filed by WALHI against Lapindo and the other defendants. The decision was that the defendant took no action against the law and that the mudflow in Sidoarjo is a natural phenomenon.
	Porong River flood Alert	Heavy rain continued to fall in the region of Surabaya, Sidoarjo and surrounding areas. Porong River continues to rise and is put on alert. Two villages declared flood-prone.
28 th December 2007	Mud Ponds Critical	Heavy rain also caused the mud ponds to be in danger of overflowing or breaking.

14 th April 2008	BPLS was tasked with providing clean water to residents in 12 villages, namely Siring, Jatirejo, Renokenongo, Kedungbendo, Ketapang, Kalitengah, Gempolsari, Glagaharum, Besuki, Kedungcangkring, Pejarakan and Mindi.	Clean water intended for drinking provided to the communities at a rate of 20 litres per person per day.
25 th June 2008	An agreement was made between Lapindo and members of Gabungan Korban Lumpur Lapindo (GKLL) to join the <i>cash & resettlement</i> scheme	
July 2008	A USGS report is released entitled ' <i>Preliminary Analytical Results for a Mud Sample Collected from the LUSI Mud Volcano, Sidoarjo, East Java, Indonesia</i> '	This report analysed mud and water samples from LUSI finding some High levels of potentially harmful Chemicals. However it concluded that more work needs to be done.
6 th July 2008	Following the lead of refugee representatives group GKLL, refugees at PBP finally to join the <i>cash & resettlement</i> scheme.	
17 th July 2008	A further Presidential regulation (PP 48/2008) is declared.	This regulation was an addendum to the previous Presidential regulation 14/2007 and provided for compensation for another three villages (Besuki, Kedungcangkring and Pejarakan), with almost 13,000 households to be compensated. The responsibility for the compensation and social issues for these villages falls to the Government through BPLS

3 rd December 2008	An agreement was signed between victim's representatives and Lapindo on the 3 rd December 2008	This agreement gave effect to the instalment process for the remaining 80% compensation payment
23 rd September 2009	Presidential Regulation 40/2009 is released	This further updates the role of the government, BPLS and Lapindo and redefines the compensation for the villages outside the 22 nd March map of affected areas
April 2010	Humanitus Directors visit LUSI and sign a cooperative working agreement with BPLS	
August 2010	Russian scientists from the Russian Institute of Geological Studies and the Institute of Electro Physics [Geo-Research Services] release their LUSI Research Summary Report	This report recommends further research into LUSI and also concludes that the eruption was likely caused by earthquake activity.
29 th October 2010	BPLS figures show that at the end of October 2010 there were 77 active bubble areas of varying size and intensity	The good news is that in September 2010 there were 94 active bubbles throughout the area which means a decrease in activity at least for this period

3.4.0 Initial Impacts

The devastation and disruption of property and lives caused by the eruption of LUSI cannot be compared to many other disasters that occur around the world each year. With a cyclone, forest fire, earthquake, etc there is an initial massive impact on the environment and population dependent upon the severity of the event. Lives may be lost, property damaged or destroyed and infrastructure and services disrupted, usually within a short but dramatic period of time. Media interest is high and donations of aid pour in from Governments and the public (via NGOs and Aid Organisations) around the world.

Ultimately those affected by these types of disasters would, in most cases, rebuild houses and replace lost possessions. People would of course grieve for those who had been lost and most would struggle financially and in many cases emotionally for some considerable time, however the community would remain.

The situation with LUSI was different, undoubtedly there was an initial impact on both properties, disruption to peoples' lives and health issues (e.g. respiratory problems from the inhalation of gases such as hydrogen sulphide) but it was relatively slow moving and followed a path of gradual inundation from the mudflow. There was of course media interest particularly as the situation became steadily worse, however the focus of attention was split between the growing number of victims and the controversy surrounding the cause or trigger (and therefore the responsibility) of the eruption. The distraction of the cause or trigger was heightened by the fact that Lapindo, the drilling company blamed by some, was owned by the Bakrie family and that Aburizal Bakrie, one of the owners of Lapindo was at that time the Coordinating Minister for Social Welfare.

As a result of the slow moving nature of the disaster coupled with the controversy and uncertainty there was not initially a coordinated response from government or the international community. This did change over time, at least from a domestic perspective, with the government directing Lapindo to pay compensation for lost property and social disruption and itself establishing the mudflow mitigation agency, BPLS, to oversee the compensation and handle an increasing number of social issues.

Perhaps the most devastating and defining aspect of this disaster, as opposed to others, has been the loss of community experienced by the victims. Indonesian people in general have a very strong sense of community and in particular local community. Families often live for generations in the same village or at least in close proximity to that village. Also people not only make their homes there but many also operate small businesses and earn their incomes directly from the village and its surrounds. When the spewing mud from LUSI inundated entire villages and indeed regions, it became increasingly clear that victims would never be able to move back even to their land let alone the houses that once stood there. This meant that no matter what level of financial compensation was received the community was still to a large extent lost.

We can get a sense of the nature of this disaster through the refugee numbers forced to move to the New Market refugee camp in Porong. Initially between June 2006 and October 2006 around 3000 refugees came from the villages of Siring, Jatirejo, Kedungbendo, and Renokenongo. Later in 2006 through to mid 2007 as the mud continued to spread another 4500 refugees were forced out of their homes in the villages of Kedungbendo, Perumtas I (a housing estate), Ketapangkeres, Kalitengah, and Glagaharum. Then between mid 2007 and mid 2008 another 3000 people mostly from the village of Renokenongo were forced to go to refugee camps.

The Sidoarjo Regency is a densely populated area with 2,843 person/square kilometre, 1/3 of the density of Hong Kong (6,294 persons/sq.km). This area is a buffer zone of Surabaya, the capital city of East Java Province and the second largest industrial zone in Indonesia after Jakarta (Auditing the Hot Mud Eruption in Sidoarjo).

Table 1 the Characteristics of Sidoarjo Regency

1. Area of Land	
a. Rice field	28,763 Ha
b. Sugar cane plantation	8,000 Ha
c. Fishpond	15,729 Ha
d. Others (manufacturing and residence)	10,998 Ha
Total the area of land	63,490 Ha
2. Population	1,682,000 persons
3. Population Density (in 2003)	2,843 persons/sq. km

From Auditing the Hot Mud Eruption in Sidoarjo

Ultimately we can see from table 2 below that many thousands of people and their entire communities were decimated or in some way affected by this disaster. Of the 70,000 people living in these villages it is estimated that around 40,000 have been displaced and we can safely assume that all have been affected in some way.

Table 2 Land area and population affected

District	Village/ Ward	Total Area and Population		
		Village area Ha	Families	Persons
PORONG	Mindi	63.41	1,272	4,553
	Siring	74.97	212	905
	Jatirejo	94.49	234	796
	Glagaharum	165.60	1,399	5,419
	Renokenongo	195.40	1,808	6,437
TANGGULANGIN	Kalitengah	119.00	2,500	9,314
	Ketapang	134.45	1,162	5,009
	Gempolsari	155.32	1,135	4,342
	Kedungbendo	156.60	9,665	24,513
JABON	Besuki	166.48	1,135	4,954
	Kedung Cangkring	120.80	1,151	3,872
	Pejarakan	44.84	495	1,696
Total		1,491	22,168	71,810

Source BPLS PowerPoint Presentation *update Kegiatan Deputi Bidang Sosial December 2010*

There has also been significant loss to government infrastructure, not the least of which is the Toll road that ran directly through the eruption zone. The road was permanently closed due to the mudflow on 21st November 2006. A new Toll road is now being built at significant expense and more people are being displaced as a result

In addition to the thousands of homes and infrastructure lost to the mud there were; 33 schools, 15 Islamic Centres, 65 Mosques, 30 factories, 4 village offices, Sugar Cane Plantations, Rice fields and other plantations all buried under many metres of mud.

3.5.0 Mudflow Management Efforts

Initially Lapindo in consultation with government agencies was tasked with the responsibility of managing the mudflow from the LUSI eruption site. Ultimately BPLS would take over the primary tasks in coordinating and mitigating the effects of the mudflow.

With the volume of mud in the initial period of the eruption exceeding 100,000 cubic metres per day and averaging over 40,000 cubic meters over a long period of time the task of managing this mudflow has been enormous.

Lapindo has spent up to the end of 2010 a total of Rp 2,224,924,034,943 (approx US\$ 250 million) in mud management costs plus another Rp 384,866,905,678 (US\$ 42 million) in operational costs

The government through BPLS has also spent a considerable amount on mudflow management since taking on the bulk of the responsibility in April 2007, estimated at around \$US 100 million.

A number of methods have been employed over the years since the 2006 eruption to either control the mudflow or attempt to stop it all together. These included:

- relief well drilling,
- the insertion of high density chained concrete balls into the eruption site,
- the construction of enormous dikes to restrict the mudflow,
- The trucking of mud to the ex sand quarry at Ngoro
- channelling and piping mud to the Porong River
- extensive dredging and embankment work on the Porong River to facilitate the flow of mud to the sea
- even some not so conventional methods were employed such as animal sacrifices and other traditional/spiritual rituals



Fig 5 Disposing solid material to ex sand quarry at Ngoro and traditional attempts at stopping the mudflow

Relief wells and snubbing were attempted in 2006 and early 2007. The original Banjarpanji well was eventually plugged and abandoned in August 2006. Two relief wells were attempted in June 2006 and August 2006 respectively with 1500hp rigs. Both attempts failed due to various technical difficulties. The following picture shows the various locations of relief drilling.



Figure 6 well locations - Lapindo

In March 2007, 10 months after the eruption began multiple 40 cm diameter and larger concrete balls were inserted into the eruption site, despite some initial minor easing of the mudflow the attempt proved ultimately unsuccessful.



Figure 7 efforts to plug LUSI

Since 2006 over twenty kilometres of Dikes up to eleven metres in height, ten meters wide at the top and 30 metres wide at the base, have been constructed around the eruption zones. The resources involved in the construction were of course enormous involving millions of cubic metres of gravel and large numbers of heavy equipment. The job of maintaining this dike is not to be underestimated due to subsidence and other factors and BPLS receives a significant allocation of public funds just for this purpose.

Getting the mud from the eruption zone to the Porong River and then the over 20 km journey to the sea without adversely affecting people's lives, livelihoods and the environment has also been a complex and difficult challenge for Lapindo and now BPLS.

Whilst visiting the area in 2010 Humanitus personnel toured the river and the mouth of the river to attempt to see any obvious damage to the ecosystem there. We talked to local fishermen who were fishing around the new island at the mouth of the river (created from the mud being dredged from the bottom of the river). They assured us that the local fishing had not been adversely affected and this was the anecdotal advice also given by BPLS. Whilst we are encouraged to hear this we believe that the situation must continue to be carefully monitored.



Figure 8 Dredger and fisherman at the mouth of the Porong River

3.6.0 Presidential Regulations Relating To LUSI

During the course of the Sidoarjo mud volcano disaster the President of Indonesia issued a number of Decrees / Regulations which helped to govern the management of all aspects of LUSI. The regulations covered responsibilities and actions of the various groups involved, such as Lapindo, mud mitigation agencies and other Government authorities.

We have attempted here to roughly translate and summarise these regulations to allow a better understanding of the regulatory aspects of the social response to this disaster.

3.6.1 Presidential Decree 13 / 2006

*DECREE OF THE PRESIDENT OF THE REPUBLIC OF INDONESIA
NUMBER 13 YEAR 2006
ABOUT
NATIONAL TEAM IN THE MUD SHOWER SIDOARJO
BY THE GRACE OF GOD ALMIGHTY
PRESIDENT OF THE REPUBLIC OF INDONESIA*

Considering:

- a. that in order to control mud flow in the vicinity of the Banjar Panji-I Well Sidoarjo in East Java it is necessary to implement population-saving measures in the vicinity of the disaster area to maintain basic infrastructure and resolution of the mudflow problem and minimising environmental risk;*
- b. that based on the considerations referred to in 'a' need to set up the National Response Team to the Mudflow in Sidoarjo;*

Given:

- 1. Article 4 paragraph (1) of the Constitution of the Republic of Indonesia Year 1945;*
- 2. Law Number 22 Year 2001 on Oil and Gas (State Gazette of the Republic of Indonesia Year 2001 Number 136 Gazette of the Republic of Indonesia Number 4152) as has been changed by the decision of the Constitutional Court Number 002/PUU-I/2003 on December 21, 2004 (News of the Republic of Indonesia No. 1 of 2005);*
- 3. Government Regulation Number 19 Year 1973 concerning regulation and Supervision of Safety in Mining Sector (State Gazette of the Republic of Indonesia Year 1973 Number 25 Gazette of the Republic of Indonesia Number 3003);*

4. Government Regulation Number 11 of 1979 on Occupational Safety in Refining and Oil and Gas (State Gazette of the Republic of Indonesia Year 1979 Number 18 Gazette of the Republic of Indonesia Number 3135);

5. Government Regulation No. 35 of 2004 on the Upstream Oil and Gas (State Gazette of the Republic of Indonesia Year 2004 Number 123 Gazette of the Republic of Indonesia Number 4435) as amended by Government Regulation No. 34 of 2005 (State Gazette of the Republic of Indonesia Year 2005 Number 81 Gazette of the Republic of Indonesia Number 4530);

DECIDED:

DECREE OF THE PRESIDENT ON THE NATIONAL TEAM eruption.

FIRST:

Establishing the National Team in Sidoarjo Mudflow mitigation hereinafter in this Presidential Decree is called the National Team.

SECOND:

Membership of the National Team is as follows:

a. Steering Team:

1) Chairman / member: Minister of Energy and Mineral Resources;

2) Members:

1. Minister of Public Works;

2. Minister of Maritime Affairs and Fisheries;

3. Minister of Environment;

4. Governor of East Java;

5. UB Regional Military Commander;

6. East Java Regional Police Chief;

b. Implementation Team:

1) Chairman / member: Head of Research and Development Department of Public Works;

2) Vice Chairman / member:

1. Director General of Oil and Gas Ministry of Energy and Mineral Resources;

2. Deputy Head of the Executing Agency for Oil and Gas;

3) Members:

1. Director General of Highways Ministry of Public Works;

2. Deputy Minister of the Environment Division of Environmental Management Capacity Building for Territorial;

3. Head of Marine and Fisheries Research Ministry of Marine Affairs and Fisheries;

4. Zeni Commander Kodam UB;

5. Sidoarjo regent;

6. General Manager of PT. Lapindo Brantas.

THIRD:

National Team has a duty to take operational steps in an integrated manner in order to control mud flow in Sidoarjo, including:

a. closure of the mud flow;

b. mudflow management;

c. managing social problems.

FOURTH:

In implementing its duties as stipulated in the Third Dictum National Team to invite and / or ask for opinions as well as technical assistance from relevant agencies and the community.

FIFTH:

With the formation of the National Team with the duties as stipulated in the Third Dictum not reduce the responsibility of PT. Lapindo Brantas to conduct prevention and restoration of environmental damage and social problems it causes.

SIXTH:

Costs required for performance of duties charged to the budget of the National Team to PT. Lapindo Brantas.

SEVENTH:

National team working period starting from the enactment of this Presidential Decree shall be valid for 6 (six) months and are renewable.

EIGHTH:

This Presidential Decree shall come into force on the date of enactment.

Stipulated in Jakarta

on September 8, 2006

PRESIDENT OF THE REPUBLIC OF INDONESIA

DR. H. Susilo Bambang Yudhoyono

Presidential Decree 13/2006 establishes the National team for the management of the disaster know as TimNas. It sets out the responsibilities of TimNas and also places the financial burden on Lapindo.

3.6.2 Presidential Regulation 14 / 2007

PRESIDENT OF THE REPUBLIC OF INDONESIA
REGULATION OF THE PRESIDENT OF THE REPUBLIC OF INDONESIA
NUMBER 14 OF 2007
ABOUT
PREVENTION AGENCY SIDOARJO MUD
BY THE GRACE OF GOD ALMIGHTY

Considering:

- a. that the impact of mudflow in Sidoarjo is so great in the surrounding community life, it needs a more comprehensive national policy;
- b. that in order to continue the rescue measures of the population, the managing of social issues and infrastructure in the vicinity of the disaster which caused a mudflow in Sidoarjo, need to improve the management of this problem, with the minimum environmental risk;
- c. that based on the considerations referred to in paragraphs a and b and the end of the National Response Team for Mudflow in Sidoarjo, it is necessary to form Sidoarjo Mud Mitigation Agency;

Given:

1. Article 4 paragraph (1) of the Constitution of the Republic of Indonesia Year 1945;
2. Act No. 24 of 1992 on Spatial Planning (Republic of Indonesia Year 1992 Number 115, Supplement to the Republic of Indonesia Number 3501);
3. Law No. 23 of 1997 on Environmental Management (State Gazette of the Republic of Indonesia Year 1997 Number 68, Supplement to the Republic of Indonesia Number 3699);
4. Law Number 22 Year 2001 on Oil and Gas (State Gazette of the Republic of Indonesia Year 2001 Number 136, Supplementary State Gazette of the Republic of Indonesia Number 4152) as has been changed by the decision of the Constitutional Court Number 002/PUU-I/2003 on December 21, 2004 (News of the Republic of Indonesia No. 1 of 2005);
5. Law Number 32 Year 2004 regarding Regional Government (State Gazette of the Republic of Indonesia Year 2004 Number 125, Supplementary State Gazette of the Republic of Indonesia Number 4437) as amended by Act No. 8 of 2005 on Stipulation of Government Regulation in Lieu of Law No. 3 of 2005 on the Amendment of Law Number 32 Year 2004 on Regional Government to be a Law (Gazette of the Republic of Indonesia Year 2005 Number 108, Supplement to the Republic of Indonesia Number 4548);

DECIDED:

REGULATION OF THE PRESIDENT CONCERNING NATIONAL MUD MITIGATION BODY IN SIDOARJO.

Article 1

(1) With this Presidential Regulation is established the Sidoarjo Mud Mitigation Agency, hereinafter called Management Agency.

(2) Management Agency in charge of managing the mudflow prevention efforts, handle the mudflow, addressing social and infrastructure problems caused by the mudflow in Sidoarjo, with the attention to minimising environmental risks.

(3) Management Agency reports the performance of its duties to the President.

Article 2

Management Agency consists of:

1. Steering Council; and
2. Executing Agency.

Article 3

(1) The Steering Board is responsible for providing direction, guidance and supervision of the implementation of prevention efforts in mudflow management, the managing of social and infrastructure problems caused by the mudflow in Sidoarjo, which conducts the Executing Agency.

(2) The Advisory Board consists of:

- a. Chairman: Minister of Public Works and Member;
- b. Vice Chairman: Minister of Social Affairs and Member;
- c. Members:
 1. Minister of Finance;
 2. Minister of Energy and Mineral Resources;
 3. Minister of the Interior;
 4. Minister of Maritime Affairs and Fisheries;
 5. Minister of Transportation;
 6. State Minister for National Development Planning / Head of BAPPENAS;
 7. Minister of Environment;
 8. Head of National Land Agency;
 9. Governor of East Java Province;
 10. Commander of Military Region V / UB;
 11. East Java Regional Police Chief; and
 12. Sidoarjo Regent.

Article 4

The Steering Board may establish a Secretariat that is responsible for providing administrative support activities to the council.

Article 5

Executing Agency organizational structure, consisting of:

- a. Head of the Executing Agency;
- b. Deputy Head of the Executing Agency;
- c. Implementing Agency Secretary
- d. Deputy for Operations;
- e. Deputy Social Affairs;
- f. Deputy of Infrastructure.

Article 6

The Executing Agency is responsible to the Governing Board.

Article 7

(1) Chief Executive has the task of leading the Implementing the Agency in the management of the mudflow mitigation, mudflow, and social and infrastructure problems caused by the mudflow in Sidoarjo.

(2) Deputy Head of the Implementing Agency has the task to represent and assist the Executing Agency chief duties daily.

Article 8

Secretary of the Implementing Agency has the task:

- a. carry out general administrative duties for the smooth implementation of the Executing Agency;
- b. managing employees, planning work, funding, work equipment, documentation, legal, public relations, and security and information systems Implementing Agency;
- c. held management and labour relations Implementing Agency in the administration with relevant agencies;
- d. carry out other tasks given by the Head of the Executing Agency.

Article 9

Deputy for Operations has the following tasks:

- a. organize coordination of efforts to control the operation and management of the mudflow;
- b. formulate a strategy and plan for technical operations and control efforts for mudflow management;
- c. perform the operations and control mud flow reduction efforts undertaken by PT Lapindo Brantas;
- d. implement mudflow management;
- e. conduct evaluation and reporting efforts to control the operation and management of the mudflow.

Article 10

Deputy Social Affairs has the task:

- a. organize coordination of social problems;
- b. formulate strategies and plans for managing social problems;
- c. implement assistance and protection and social recovery;
- d. supervising the management of social issues held by PT Lapindo Brantas;
- e. conduct evaluation and reporting of the management of social problems due to mudflow.

Article 11

Deputy of Infrastructure has the following tasks:

- a. organize coordination of infrastructure issues;
- b. formulate strategies and plans to mitigate the problem of infrastructure;
- d. carry out the construction of infrastructure, including infrastructure for managing mudflow;
- e. preserve and secure infrastructure;
- f. conduct the evaluation and management reporting infrastructure problems due to mudflow.

Article 12

In the domain of the Secretary and Deputy of the Executing Agency, to form a working group established by the Head of the Executing Agency.

Article 13

(1) Procedures Management Agency shall be further regulated by the Chairman of the Advisory Board.

(2) Details of the organization and mechanism of the Executing Agency for the performance of duties shall be regulated further by the Head of the Executing Agency

(3) Head of Executive Agency to prepare a report on the implementation of their duties regularly or occasionally to the Steering Board.

Article 14

(1) Cost Management Agency funded the administration of the State Budget (APBN).

(2) Remuneration of employees assigned by the Head of the Executing Agency Executing Agency after approval of the Minister of Finance.

Article 15

(1) In order to handle social problems, PT Lapindo Brantas buying land and building communities affected by mudflow in Sidoarjo with payment in stages, in accordance with a map of affected areas March 22, 2007 with the deed of sale which include proof of land ownership and land area location approved by the Government.

(2) Payment is gradual, as it has been approved and implemented in the regions involved in the map of the area affected by December 4, 2006, 20% (twenty percent) was paid in advance and the balance paid no later than one month before the two (2) year house contract period finished.

(3) The cost of social problems outside the affected area maps dated March 22, 2007, after the signing of this Presidential Regulation, charged to the state budget.

(4) Map of affected area as referred to in paragraph (1) and paragraph (3) are as listed in the Annex to this Presidential Regulation.

(5) Cost reduction efforts for the mudflow including the management of the main embankment up to the river Porong charged to PT Lapindo Brantas.

(6) Costs for efforts to address infrastructure issues, including infrastructure for managing mudflow in Sidoarjo, chargeable to the state budget and other legitimate funding sources.

Article 16

(1) The Chief, Deputy Chief, Secretary, Deputy and working groups within the Executing Agency, can be derived from elements of Civil Servants (PNS), professionals, and experts.

(2) Civil servants who are placed on the Executing Agency as referred to in paragraph (1) status conjunct.

(3) Civil servants referred to in paragraph (2) of organic removal from office at the parent institution without losing status as civil servants.

(4) The process of rank civil servants referred to in paragraph (2) conducted by the agency concerned parent, according to the legislation.

(5) Civil servants referred to in paragraph (2) promoted a higher level each time without being tied to levels of rank, according to the legislation.

(6) civil servants referred to in paragraph (2) that quit or was terminated terms of office, back to its parent institution, if not yet reached the retirement age.

(7) Civil servants referred to in paragraph (2) honourably discharged as a civil servant if it has reached the retirement age and were given employment rights, according to the legislation.

Article 17

(1) The Chief, Deputy Chief, Secretary, and Deputy Executive Agency in the environment, appointed and dismissed by the President.

(2) Head and Deputy Head of the Environmental Executive Agency, dismissed from office by the President, if:

- a. permanently absent;
- b. based on performance appraisal are not able to perform tasks well;
- c. legally proven criminal act of corruption, collusion and nepotism, and other offenses; or
- d. resign.

Article 18

The preparation of work plans and budgets are managed by the Head of the Executing Agency as Budget User within the Executing Agency.

Article 19

With the enactment of this Presidential Regulation, the implementation of a National Team duty in Sidoarjo Mudflow established by Presidential Decree No. 13 of 2006 followed by the Sidoarjo Mud Mitigation Agency established by this Presidential Regulation.

Article 20

Before Implementing Agency referred to in Article 2 is formed, the task undertaken by the Executing Agency for the National Response Team personnel Mudflow in Sidoarjo, as established by Presidential Decree No. 13 of 2006 as it has been extended by Presidential Decree No. 5 of 2007.

Article 21

Presidential Regulation comes into force on the date of enactment.

Stipulated in Jakarta

on 8 April 2007

PRESIDENT OF THE REPUBLIC OF INDONESIA

DR. H. Susilo Bambang Yudhoyono

Presidential Regulation 14/2007 establishes the Mud Mitigation Agency BPLS and sets out its roles and responsibilities. It also clarifies the role Lapindo will play in the disaster and confirms the housing purchase/sale compensation packages and timelines already agreed between Lapindo and Victims representatives in December 2006.

3.6.3 Presidential Regulation 48 / 2008

PRESIDENT OF THE REPUBLIC OF INDONESIA
REGULATION OF THE PRESIDENT OF THE REPUBLIC OF INDONESIA
NUMBER 48 YEAR 2008
ABOUT
AMENDMENT
PRESIDENTIAL REGULATION NUMBER 14 YEAR 2007 CONCERNING PREVENTION AGENCY
SIDOARJO MUD
BY THE GRACE OF GOD ALMIGHTY

Considering:

- a. that the surge of mud in Sidoarjo has social impacts for communities outside the Affected Area Map dated March 22, 2007, located in the village of Besuki, Village Penjarakan, and the Village Kedungcangkring, Jabon district, Sidoarjo regency;
- b. that to overcome the problem of overflow Lumpur Sidoarjo as referred to in letter a which is a disaster, the Government consider the need to do a step by step management of social problems;
- c. that the societal costs of managing social problems in Sidoarjo Mud overflow for the community outside the Affected Area Map dated March 22, 2007 has been allocated in the budget of the State of Change (APBN-P) Fiscal Year 2008;
- d. that based on the considerations referred to in paragraphs a, b, and c, need to promulgate the Presidential Regulation on Amendment of Presidential Decree No. 14 of 2007 regarding the Sidoarjo Mud Mitigation Agency;

Remembering ...

Given:

1. Article 4 paragraph (1) of the Constitution of the Republic of Indonesia Year 1945;
2. Law Number 17 Year 2003 regarding State Finance (State Gazette of the Republic of Indonesia Year 2003 Number 47, Supplement to the Republic of Indonesia Number 4285);
3. Law No. 1 of 2004 on State Treasury (State Gazette of the Republic of Indonesia Year 2004 Number 5, Republic of Indonesia State Gazette Number 4355);

4. Act No. 45 of 2007 on State Budget Year 2008 (State Gazette of the Republic of Indonesia Year 2007 Number 133, Republic of Indonesia State Gazette Number 4778) as amended by Act No. 16 of 2008 (State Gazette of the Republic of Indonesia Year 2007 No. 63, Supplement to the Republic of Indonesia Number 4848);

5. Government Regulation No. 6 of 2006 on the Management of State / Regional (State Gazette of the Republic of Indonesia Year 2006 Number 20, Supplementary State Gazette of the Republic of Indonesia Number 4609) as amended by Government Regulation number 38 of 2008 (State Gazette Republik Indonesia Year 2008 Number 78 State Gazette of the Republic of Indonesia Number 4855);

6. Presidential Regulation No. 14 of 2007 on the Sidoarjo Mud Mitigation Agency;

DECIDED:

REGULATION OF THE PRESIDENT OF THE AMENDMENT TO THE PRESIDENTIAL REGULATION NUMBER 14 YEAR 2007 ON THE CONTROL BOARD SIDOARJO MUD.

Article I

Several provisions in the Presidential Regulation No. 14 of 2007 on the Sidoarjo Mud Mitigation Agency amended as follows:

1. The provisions of Article 15 paragraph (3) be deleted and paragraph (4) be amended so that the whole of Article 15 reads as follows:

"Article 15

(1) In order to handle social problems, PT Lapindo Brantas buying land and buildings from communities affected by mudflow in Sidoarjo with payment in stages, according to the Affected Map Area dated March 22, 2007 by deed of sale which include proof of land ownership and land area location approved by the Government.

(2) Payment in stages as referred to in paragraph (1), as had been agreed and implemented in the regions involved in the Affected Area Map dated December 4, 2006, 20% (twenty percent) were paid in advance and the balance paid no later than one month before the contract period house 2 (two) years out.

(3) Removed ...

(4) Map of Affected Area as referred to in paragraph (1) are as listed in the Appendix to this Presidential Regulation.

(5) Cost reduction efforts of the mudflow, including the management of the main embankment to the Porong River, charged to PT Lapindo Brantas.

(6) Costs for efforts to address infrastructure issues, including infrastructure for managing mudflow in Sidoarjo, chargeable to the state budget and other funding sources are legitimate. "

2. Between Article 15 and Article 16 inserted 3 (three) articles, namely Article 15 A, Section 15 B and C of Article 15 reads as follows:

"Article 15 A

The cost of managing social problems outside the Affected Area Map dated March 22, 2007 is charged to the budget. "

"Article 15 B

(1) Area mudflow management outside the Affected Area Map dated March 22, 2007 as referred to in Article 15 A is the village of Besuki, Pejarakan Village, and Village Kedungcangkring, Jabon district, Sidoarjo regency, with the boundaries as follows:

- a. the north side dike boundary Affected Map Area
- b. East: Porong toll road - Gempol
- c. the south: Kali Porong
- d. west: Pejarakan village boundary with Mindi Village.

(2) Map mudflow management areas outside the Affected Area Map dated March 22, 2007 as referred to in paragraph (1) are as set out in Appendix A of this Presidential Regulation.

(3) In order to handle social problems in the area as referred to in paragraph (1), made the purchase of land and buildings in the region with the deed of sale which include proof of ownership of land and location approved by the Government.

(4) Sale and purchase referred to in paragraph (3) is special, so do not apply the provisions of the calculation basis as stipulated in Presidential Regulation Number 36 Year 2005 on Land Procurement for Development for the Implementation of Public Interest as amended by Presidential Regulation Number 65 Year 2006.

(5) Payment of managing social problems in the area as referred to in paragraph (1) has done with the scheme 20% (twenty percent) in Fiscal Year 2008 and the remainder to follow the stages after such repayment by PT. Lapindo Brantas as referred to in Article 15 paragraph (2).

(6) Fund managing of social problems in the form of social assistance and the purchase of land and buildings to the public to be received in 3 (three) villages as referred to in paragraph (1), the amount discussed by considering the sense of justice by the Executing Agency with reference to the amount paid by PT.Lapindo Brantas as referred to in Article 15.

(7) Procedures like managing payment of social problems as referred to in paragraph (5) and subsection (6) shall be further regulated by the Head of the Executing Agency BPLS. "

"Article 15 C

(1) The effect of purchasing land and buildings in the area as referred to in Article 15 paragraph B (1), land and buildings in the region to switch status to State Property.

(2) The State Property as referred to in paragraph (1), the Minister of Finance as Manager of State Property and the Head of the Executing Agency BPLS as Users of State Property. "

Article II

Presidential Regulation comes into force on the date of enactment.

Stipulated in Jakarta

on July 17, 2008

PRESIDENT OF THE REPUBLIC OF INDONESIA

Signed.

DR. H. Susilo Bambang Yudhoyono

Accordance with the original copies

Presidential Regulation 48/2008 further defines the roles of BPLS and Lapindo and importantly includes three new villages to be included in the sale/purchase compensation scheme.

However, the government now takes responsibility for the funding of the compensation for these villages. The villages now included are Besuki, Pejarakan Village, and Village Kedungcangkring, Jabon district, Sidoarjo regency.

3.6.4 Presidential Regulation 40 / 2009

PRESIDENT REPUBLIC INDONESIA
REGULATION OF THE PRESIDENT OF THE REPUBLIC OF INDONESIA
NUMBER 40 OF 2009
ABOUT
SECOND AMENDMENT
PRESIDENTIAL REGULATION NUMBER 14 YEAR 2007 CONCERNING
PREVENTION AGENCY SIDOARJO MUD
BY THE GRACE OF GOD ALMIGHTY

Considering:

that in order to streamline efforts mudflow prevention and treatment mudflow and the managing of social problems in the community, need to promulgate the Presidential Regulation about the Second Amendment to the Presidential Regulation Number 14 Year 2007 regarding Sidoarjo Mud Management Agency;

Given: 1.

Article 4 paragraph (1) of the Constitution of the Republic Indonesia Year 1945;

2. Act No. 24 of 2007 on Disaster Management (State Indonesia Year 2007 Number 66, Supplement State of the Republic of Indonesia Number 4723);

3. Law No. 2007 on Spatial 26 year Room (State Republik Indonesia year 2007 No. 68, Supplement Indonesia Number 4725);

4. Law act number 41 year 2008 concerning Revenue and Expenditure budget in 2009 (Gazette Republic of Indonesia Year 2008 Number 171, Gazette of the Republic of Indonesia Number 4920) as amended by Law Act No. 26 of 2009 (State Gazette Republic of Indonesia Year 2009 Number 118, Supplement Republic of Indonesia State Gazette Number 5041);

5. Presidential Regulation No. 14 of 2007 on the Board Sidoarjo Mud Mitigation as amended by Presidential Regulation No. 48 Year 2008;

DECIDED:

Set : REGULATION OF THE PRESIDENT ON THE SECOND AMENDMENT PRESIDENTIAL REGULATION NUMBER 14 YEAR 2007 CONCERNING MUD CONTROL BOARD SIDOARJO.

Article I

Several provisions in the Presidential Regulation No. 14 Year 2007 on mud Management Agency Sidoarjo, as amended by Regulation President No. 48 of 2008 amended as follows:

1. The provisions of Article 9 letter c and d modified, so that the whole Article 9 reads as follows:

"Article 9

Deputy for Operations has the following tasks:

- a. carry out operations to coordinate efforts mudflow prevention and mudflow management;
- b. formulate a strategy and plan of operation regarding technical efforts to control mud flow and mudflow management;
- c. operation for reduction of mudflow efforts;
- d. mudflow management to River Porong;
- e. conduct evaluation and reporting operations on mudflow prevention efforts and mudflow management. "

2. The provisions of Article 15 paragraph (5) deleted, paragraph (6) amended, and added 1 (one) paragraph, namely paragraph (7), so that the whole of Article 15 reads as follows:

"Article 15

(1) In order to handle social problems in society, PT Lapindo Brantas buy land and building communities affected Sidoarjo mudflow with payment gradually, according to Area Map Affected by March 22, 2007 with the deed of sale and purchase of land ownership proof that includes land area and location approved by the Government.

(2) Payment in stages as referred to in paragraph (1), as has been approved and implemented at regional included in the Affected Area Map dated 4 December 2006, 20% (twenty per cent) paid in advance and the balance paid at least later than one month before the contract period house 2 (Two) years out.

(3) Deleted.

(4) Map of Affected Area as referred to in paragraph (1) above is given in the Annex to this Presidential Regulation.

(5) Deleted.

(6) Cost reduction efforts of the mudflow to the Porong, mudflow management infrastructure, including infrastructure management mudflow in Sidoarjo, chargeable to Budget and other funding sources which are legitimate.

(7) The cost of mitigation actions undertaken by the Agency Executing BPLS to protect the safety of society and the infrastructure is chargeable to Budget. "

3. The provisions of Article 15 paragraph B (5) amended, between the verses

(1) and paragraph (2) inserted 1 (one) paragraph, namely paragraph (1a), and add 2 (two) paragraph, namely paragraph (8) and paragraph - (9), so that the whole of Article 15 B reads as follows:

"Article 15 B

(1) Areas outside the mudflow management Map Area Affected by March 22, 2007 referred to in Article 15 A is Besuki Village, Village Pejarakan, and Villages Kedungcangkring, Jabon District, District Sidoarjo, with the boundaries as follows:

- a. the north side, brick embankment Area Map Affected;
- b. East: Porong toll road - Gempol;
- c. the south: Porong River;
- d. west: Village boundary Pejarakan with Mindi Village.

(1a) Includes the management of the mudflow outside the Affected Area Map referred to in paragraph (1), several Neighbourhoods (RT) in West Siring Village, Village Jatirejo, and Mindi Village consisting of RT 1, RT 2, RT 3 and RT 12 in Pillars of the scope of the Citizen (RW) 12 Village Siring West, RT 1 and RT 2 in the scope of the RW 1 Village Jatirejo; RT 10, RT 13 and RT 15 in local area RW 2 Mindi Village affected bursts mud in the form of subsidence and gas bursts dangerous that it becomes not suitable for living.

(2) Map of the area outside the mudflow handling Affected Area Map dated March 22, 2007 referred to in paragraph (1) is as set out in Appendix A This Presidential Regulation.

(3) In order to handle social problems community in the areas as referred to in paragraph (1), made the purchase land and buildings in the region with deed of sale and purchase of land proof of ownership include the area of land and location approved by the Government.

(4) Sale and purchase referred to in paragraph (3) specific so as not to apply the provisions basis of calculation as set forth in Presidential Regulation Number 36 Year 2005 on Procurement of Land for Implementation Development for Public Interest as amended by Regulation President Number 65 Year 2006.

(5) Payment managing social problems community in the areas as referred to in paragraph (1) conducted gradually with the scheme:

- a. 20% (twenty percent) on Fiscal Year 2008;
- b. 30% (thirty percent) on Fiscal Year 2009; and
- c. adjusted for the remaining stages payment made by PT Lapindo Brantas as referred to in Article 15 paragraph (2).

(6) fund for managing social problems a form of social assistance and social purchase of land and buildings given to the public in 3 (three) villages as referred to in paragraph (1), the amount discussed by considering sense of justice by the Executing Agency BPLS with refers to the amount paid by PT Lapindo Brantas as defined in Article 15.

(7) Procedures like managing payment problems referred to social in paragraph (5) and subsection (6) shall be further regulated by Head of the Executing Agency BPLS.

(8) In order to handle community social problems in the areas as referred to in subsection (1a), the region emptied for the sake of public safety for more than 2 (two) years.

(9) For people living in the areas as referred to in subsection (8) when the region are left empty, given the social assistance follows:

- a. contract assistance home for 2 (two) years;
- b. assistance living allowance for 6 (six) months;
- c. evacuation costs. "

Article II

Presidential Regulation comes into force on the date determined. Stipulated in Jakarta on date 23 September 2009

PRESIDENT OF THE REPUBLIC

DR. H. Susilo Bambang Yudhoyono

Presidential Regulation 40/2009 further updates the role of the government, BPLS and Lapindo and redefines the compensation for the villages outside the 22 March map of affected areas.

3.7.0 Agreements To Date On Social Funding Contributions

We can see above the Presidential Decrees/Regulations that form the basis of or define the agreements relating to social funding or compensation.

The first Decree 13 / 2006 does not go into specifics regarding social funding or compensation plans but does place the burden for this in the future on Lapindo. The non specific nature of this decree can be attributed to the timing of it just 4 months after the first eruption. The full extent of the disaster was still not fully appreciated at this time.

The second - regulation number 14 / 2007, handed down on the 8th April 2007, forms the basis of subsequent agreements for compensation.

For example Article 15 of this regulation, which relates specifically to property losses, compels Lapindo to pay compensation to villagers, who have suffered a loss of property due to the mudflow, in two instalments:

1. First a 20% advance payment based on the total value of the property lost. This was to be distributed to affected households without delay,
2. The remaining 80% was to be distributed one month before the end of a two-year period. During this time a housing allowance was to be provided by the company.

The regulation used the agreement already proposed in a letter from Lapindo No. 1098/P/AAAY/L06, dated December 4, 2006.

The eligibility for this scheme was determined by loss or damage suffered within a defined map area dated 4th December 2006 and 22nd March 2007.



Figure 9 map area dated 4th December 2006 and 22nd March 2007

The price paid for property lost was determined by a standard calculation of the size of the property in square metres (m²). Because of this standard value for compensation the values proposed needed to reflect the highest common denominator (i.e. make the price reflect the value of the best houses in the area affected). To Lapindo's credit most commentators acknowledge that the agreement reached for the value of properties certainly achieved this. The values are as follows:

- Buildings Rp 1,500,000 per m²
- Land Rp 1,000,000 per m²
- Rice fields Rp 120,000 per m²

Whilst Lapindo made good progress on paying the first 20% payment the scheme hit some significant hurdles. Perhaps one of the biggest problems was the issue of verification. Proof of ownership was of course required but many victims either did not have the required certificate of title or it had been buried under tons of mud. A verification team was then established to attempt to overcome this problem; this is discussed further under the social protection section of this document. (5.2.1.2)

The remaining 80% payment started to become due in 2008 in the midst of the global financial crisis. Lapindo claimed that the huge financial burden of these payments coupled with the growing global economic conditions was overstressing its resources. The company then suggested two additional alternative schemes. First was a scheme to provide resettlement in new homes at the Kahuripan Nirvana Village housing estate (KNV) plus compensation for property lost (less the value of the new home) paid in instalments of Rp 15 million per month. The second scheme was compensation for property lost paid in instalments of Rp 15 million per

month without resettlement to new homes. The housing compensation schemes were referred to as *'cash and carry'* and *'cash and resettlement'*. An agreement was signed between victim's representatives and Lapindo on the 3rd December 2008 that outlined these alternatives.

BPLS were also given responsibility for compensation for property losses in the three villages of Kedungcangkring, Besuki and Pejarakan. This was stipulated in regulation 48 / 2008 and the compensation was to be paid in accordance with the Lapindo agreement of cash and carry. This was slightly amended under Regulation 40/2009 to read payment of 20% (twenty percent) in Fiscal Year 2008, 30% (thirty percent) in Fiscal Year 2009 and the remainder in line with the repayment schedule of Lapindo. There was and still is considerable controversy and protests from people living in some areas of the villages of West Siring, Jatirejo and Mindi. They were denied this compensation scheme despite their homes being declared unfit for habitation for at least two years. Instead they were provided with social assistance in the form of; home rental assistance for two years, an extra living allowance for six months plus evacuation costs. It is important for the government to continue to monitor the situation surrounding these people and respond appropriately if conditions change in these villages, either to increase the house rental period or provided a cash and carry compensation scheme.

Apart from the housing compensation schemes mentioned above there were a number of other social assistance measures agreed to both by Lapindo and BPLS. These included:

- The provision of compensation to farmers for mud affected crop failure,
- Compensation to workers affected by plant layoffs,
- Compensation to small businesses and factories,
- Temporary/Permanent Relocations for factories/companies/small businesses,
- Provide amenities and facilities at shelter locations,
- Free medical services & facilities and set-up medical centres for displaced villagers,
- Cost of life assurance and assistance to affected communities,
- 2-year house lease assistance of 5,000,000 Rp per family,
- Monthly living assistance of 300,000 Rp per month per person for 9 months,
- Moving cost of 500,000 Rp per family,
- Compensation to villagers due to bad smells, dust, noise, etc of 300,000 Rp per person,
- Provided food (3 times/day) at shelter locations,
- Assistance with the transportation costs for school children within the area,
- Provision of Clean water to affected communities,
- Free health care,
- Skills training,
- Counselling.

The following Table 3 may help clarify the basic roles of Lapindo and BPLS and how compensation agreements were affected by the Presidential Decrees/regulations.

Table 3 Presidential Regulations and the changing roles of Lapindo and BPLS

Regulation 14/2007 8 April 2007	Regulation 48/2008 17 July 2008	Regulation 40/2009 23 September 2009
Tasks Lapindo: <ul style="list-style-type: none"> • Managing social issues within the 22 March 2007 map area • Make efforts to control the eruption and facilitate the flow of mud to the Porong River 	same	same
Task BPLS: <ul style="list-style-type: none"> • Monitor and control the activities of Lapindo • Dealing with social problems, and infrastructure outside map dated March 22, 2007 with costs charged to the state budget 	BPLS extra: Managing social problems in the map area on July 17, 2008 covering 3 villages (Kedungcangkring, Besuki and Pejarakan). Costs charged to the state budget.	BPLS extra (charged state budget): <ul style="list-style-type: none"> • For the three villages the payment of 80% payable by 30% in 2009, the rest following the progress payments made by Lapindo • Make efforts to control the eruption and facilitate the flow of mud into the Porong River • Provide social assistance to 9 neighbourhoods in the 3 Villages of West Siring, Jatirejo and Mindi.

PLS PowerPoint Presentation updates Kegiatan Deputi Bidang Sosial Desember 2010

4.0 CURRENT STATE OF LUMPUR SIDOARJO AND POSSIBLE FUTURE SCENARIOS

4.1.0 Current Geological and Environmental Conditions

Initially the volume of mud spewing from the eruption zone reached up to 140,000m³/day. However the mudflow has been intermittent and has changed a number of times from being extremely active to being almost dormant. For example in April of 2010 a few days prior to a visit by Humanitus personnel a significant increase in the volume of mud erupting from LUSI was experienced. This was manifested in a smaller second eruption site close to the main eruption site. This activity soon subsided to a point at which in late 2010 the volume of mud / water erupting was estimated to be no more than 10,000 m³/day. It is very difficult to predict how long or how active LUSI will be in the future.

Subsidence is a continuing concern for the area and there have been many instances of serious subsidence occurring over the last 4.5 years, particularly in the region of the Dikes around the eruption site.

The USGS report from 2008 entitled '*Preliminary Analytical Results for a Mud Sample Collected from the LUSI Mud Volcano, Sidoarjo, East Java, Indonesia*' stated that it has been projected that more than 30 m of subsidence will occur in the next several years within several km of the central eruption crater.

Also a study by the Badan Meteorologi Dan Geofisika in Jakarta from 2008 predicted that subsidence could reach up to 176.6 meters by 2017. This is illustrated by figure 10 and figure 11 below.

Fig 10 Subsidence Dec 2008

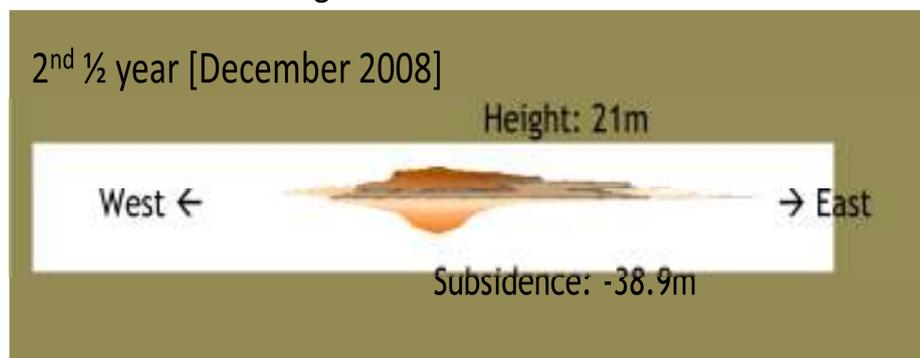


Fig 11 Subsidence June 2017



In addition to monitoring and responding to subsidence issues BPLS also closely monitor water quality throughout the area. This has led to over Rp 600,000,000 being spent on clean water delivery to up to 12 affected villages. BPLS use a number of measuring instruments to test water quality such as; pH meter, DO (Dissolve Oxygen) meter, TDS, Salinity and EC (Electrical Conductivity) meter, etc.

The Environment Team at BPLS monitor the quality of the water supply (AB) and the Water Agency (ABA). Water sampling locations include areas:

- Glagah Arum (Mosque at Glagah Arum),
- Pejarakan (Mosque at Pejarakan),
- Mindi (Mosque Al-Ikhlash),
- Santa Rita (Mosque Nurul Azhar)
- Pamotan (Mosque Bringin Pamotan),
- West Siring (Mosque West Siring), and
- Ketapang (Post Ketapang BPLS),

While the sampling sites of water bodies include

- Porong River (Spill Way),
- Porong River (Dam Pejarakan)
- Jatirejo River, Pamotan.

Environmental quality monitoring activities around the Affected Area Map can be seen on the Map 13 below.

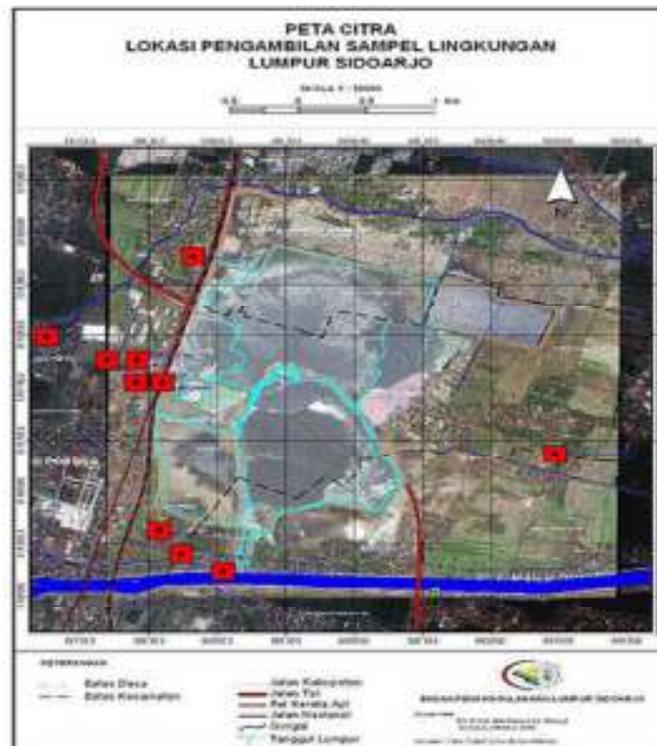


Figure 12 Environmental quality monitoring courtesy BPLS

A UN report of 2006 entitled ‘*Environmental Assessment Hot Mud Flow East Java, Indonesia*’ talks about the risk of toxic gasses and in particular hydrogen sulphide (H₂S). **Hydrogen sulphide** is a colourless, toxic, flammable gas that is responsible for the foul odour of rotten eggs. It often results when bacteria break down organic matter in the absence of oxygen, such as in swamps, and sewers. It also occurs in volcanic gases, natural gas and some well waters. Source: http://en.wikipedia.org/wiki/Hydrogen_sulphide. The report stated that ‘measurements, reported by the Indonesian Ministry of Environment, stated that hydrogen sulphide levels reached 700 parts per million (ppm) on the first day (apparently at the source), while the concentration dropped to 3 ppm on the second day of the events, down to 0 ppm on the third day. Although no further information about these measurements is known, the concentration of 700 parts per million would suggest a direct and acute impact on human health – and can be fatal’.

By September 2006 H₂S gas levels around the eruption site were up and down with levels up to 30-35 parts per million and below 13 parts per million. The levels of H₂S gases and other toxic gases have been of major concern to the Government over the last 4.5 years. It is of particular concern when bubbles (eruptions of gas / water / mud) occur in the midst of surrounding communities. BPLS continue to closely monitor this situation and prepare contingency measures should evacuation of a particular area be deemed necessary. Most bubbles are handled by filling in the area of subsidence that has occurred and sealing off the bubble area where possible.

There are significant dangers inherent in the eruption or leaking of flammable gases surrounding the area. Although in some cases this is seen as a benefit as some residents have harnessed the natural gas coming from the ground for use as free cooking fuel. Humanitus personnel visited one such home in the village of Siring in April 2010 and talked to the owner concerning the possible dangers this posed to the occupants of the property. During a subsequent visit in December we found the premises closed as a result of an explosion due to the gas leaking and building up. Unfortunately the owner was also badly injured in this incident. We understand that the poorer members of the community see free energy in the form of natural gas as a tempting resource but we would seriously caution the authorities against encouraging this practice.

BPLS figures show that at the end of October 2010 there were 77 active bubble areas of varying size and intensity. This causes disruption to the community and of course can be a serious danger to the health of residents from the possibility of toxic gas leakage. The good news is that in September 2010 there were 94 active bubbles throughout the area which means a decrease in activity at least for this period.

The tables 4, 5 and 6 below show the activity for September and October 2010 and the changes in bubble activity.

Table 4 Distribution and level of bubble activity - status 30 September 2010

No	Village	Total	Active	Dormant	Distribution %	Active%
1	Jatirejo	24	7	17	11.06%	29,170%
2	Mindi	17	7	10	7.83%	41.18%
3	Pejarakan	8	5	3	3.69%	62.50%
4	Kedungcangkring	12	12	0	5.53%	100.00%
5	Pamotan	51	22	29	23.50%	43.14%
6	West Siring	50	26	24	23.04%	52.00%
7	East Siring	12	1	11	5.53%	8.33%
8	Ketapang Keres	25	7	18	11.52%	28.00%
9	Wunut	15	5	10	6.91%	33.33%
10	Besuki	3	2	1	1.38%	66.67%
	Total	217	94	123	100%	

Source BPLS Website 2011

Table 5 Distribution and level of bubble activity - status October 31, 2010

No	Village	Total	Active	Dormant	Distribution %	Active%
1	Jatirejo	25	3	22	11.06%	12.00%
2	Mindi	19	5	14	8.41%	26.32%
3	Pejarakan	8	5	3	3.54%	62.50%
4	Kedungcangkring	13	1	12	5.75%	7.69%
5	Swipe	3	3	0	1.33%	100.00%
6	Pamotan	51	21	30	22.57%	41.18%
7	West Siring	50	26	24	22.12%	52.00%
8	East Siring	12	1	11	5.31%	8.33%
9	Ketapang Keres	25	6	19	11.06%	24.00%
10	Wunut	16	3	13	7.08%	18.75%
11	Besuki	4	3	1	1.77%	75.00%
	Total	226	77	149	100%	

Source BPLS Website 2011

Table 6 Changes in bubble activity September - October 2010

No	Village	Total	Active	Dormant	% Distribution	Active %
1	Jatirejo	24	7	17	11.06%	29,170%
2	Mindi	17	7	10	7.83%	41.18%
3	Pejarakan	8	5	3	3.69%	62.50%
4	Kedungcangkring	12	12	0	5.53%	100.00%
5	Pamotan	51	22	29	23.50%	43.14%
6	West Siring	50	26	24	23.04%	52.00%
7	East Siring	12	1	11	5.53%	8.33%
8	Ketapang Keres	25	7	18	11.52%	28.00%
9	Wunut	15	5	10	6.91%	33.33%
10	Besuki	3	2	1	1.38%	66.67%
	Total	217	94	123	100%	

Source BPLS Website 2011



Figure 13 bubble- courtesy BPLS

The above Bubble (fig 13) appeared on September 24, 2010 near levee P42 in Besuki village. It formed a large hole with a depth of up to 5 metres and a diameter of 5 metres.

Another area of concern is the state of the Porong River as a result of the volume of mud being dumped into it from the eruption zone. LUSI is over 20km up river from where the Porong River meets the sea and therefore the state of the river, river mouth and the surrounding sea needs careful monitoring. We discuss this in more detail later in the report.

4.2.0 Scientific evidence for future Geological activity

In a January 2011 report by the Department of Earth and Planetary Science, University of California, Berkeley, CA USA entitled '*A prediction of the longevity of the Lusi mud volcano*' the authors predicted through analysis and simulations that there was '*...a 50% chance of the eruption lasting <40 years and a 33% chance that it lasts >87 years*'.

Russian scientists from the Russian Institute of Geological Studies and the Institute of Electro Physics [Geo-Research Services] in their report entitled **LUSI Research Summary Report** August 2010 have expressed concern that the entire area adjacent to LUSI is in danger of further eruptions- particularly one site to the South West and another to the North East of the LUSI location. Using 3D mapping technology based upon seismic work performed prior to the eruption they have identified that there are 2 main channels with 3 potential eruption points around the main LUSI eruption site.

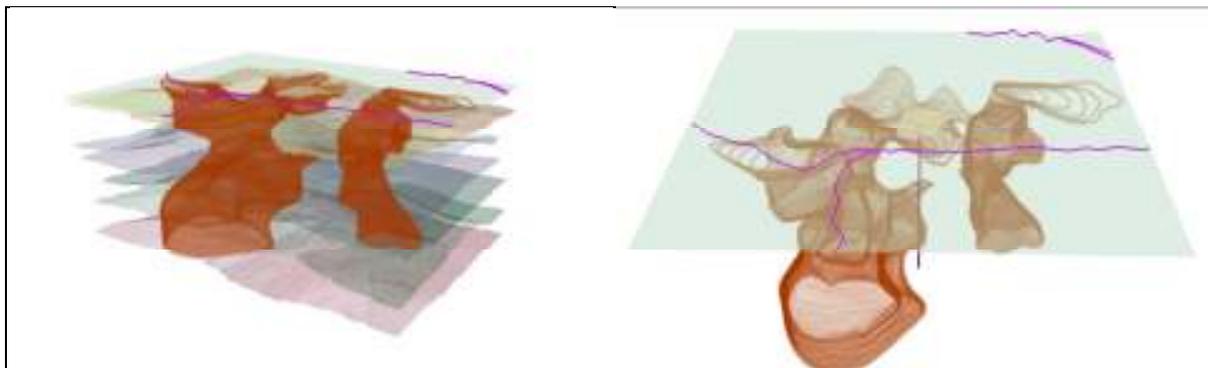


Figure 14 3D map of 2 main mud channels or diapirs – Russian report

Without further current in-depth studies of the sub terrain around the LUSI site it will be difficult to predict with any accuracy the likely future duration and activity of LUSI.

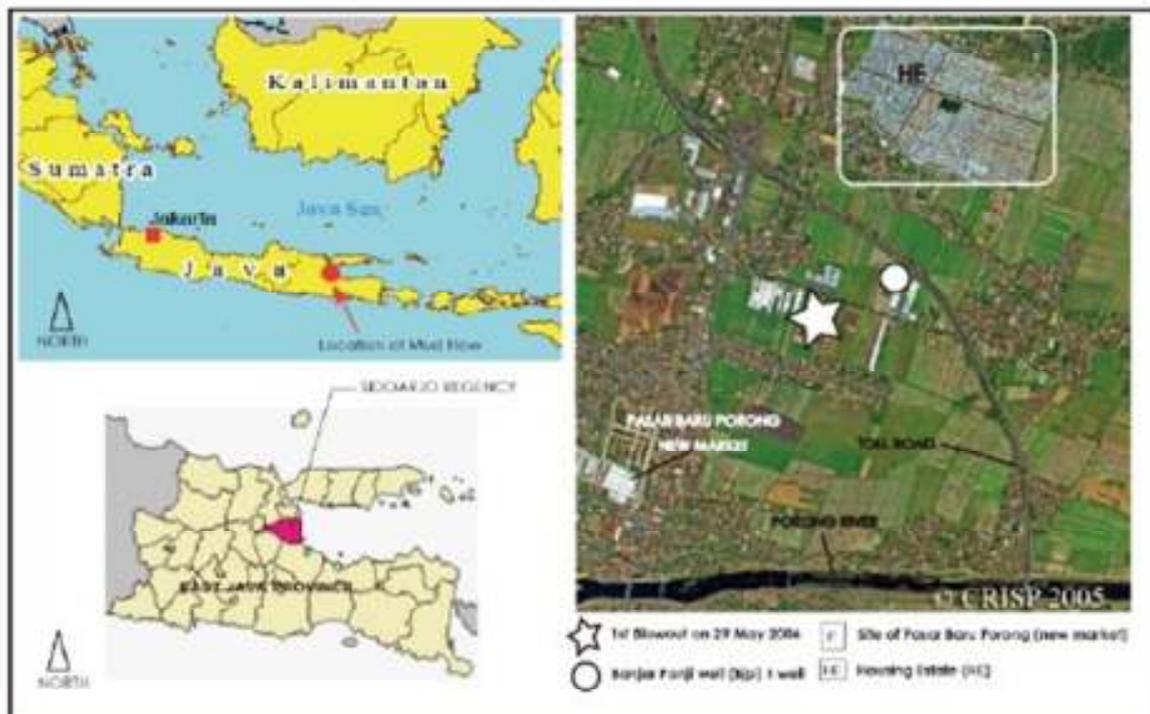
Humanitus Sidoarjo Fund is arranging a symposium for scientists from around the world to be held in May 2011 in Surabaya. The focus of this symposium is to evaluate the best methods to investigate the eruption zone and formulate a plan to achieve this. The type of equipment required includes; geodynamic data accumulation and evaluation sets which include online seismic monitors, recorders, satellite modems and information processing units.

5.0 SOCIAL ASSISTANCE TO DATE

5.1.0 Social responsibility - Lapindo

PT Lapindo Brantas (Lapindo), the Indonesian government through BPLS and private parties were given responsibility for the social and environmental mitigation of the Sidoarjo mud disaster and its associated impacts. This responsibility was initially set out in accordance with Presidential Regulation No. 14 Year 2007. This regulation stated that Lapindo's area of responsibility fell within a map area as defined by the area affected by the mud flows as at March 22 2007.

Figure 15 Maps show the location of the LUSI eruption, Sidoarjo Regency, East Java Province
<http://ipsdismp.files.wordpress.com/2008/02/02-lapindo0.jpg>



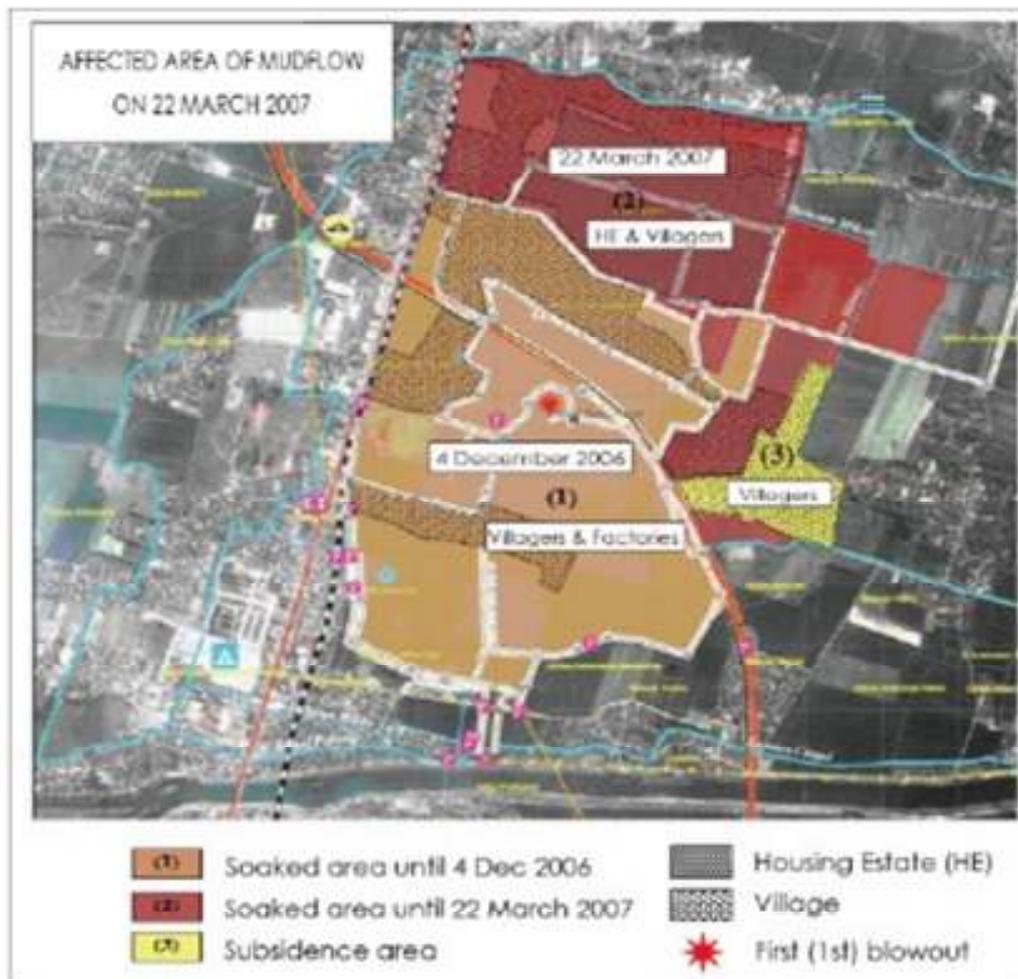


Figure 16 Affected area until March 2007 (Source: Planning and Development Board, Sidoarjo Regency)

Shown on the above Map (Fig 16) of affected areas to the 22nd March 2007 are:

- The point of first eruption indicated by a red star symbol
- Affected area (1) which was inundated by the mud flow by the 4th December 2006. This area contained villages, farmland and factories.
- Affected area-(2) which was inundated by the mud flow by the 22 March 2007. This area contained a housing estate and villages.
- Affected area (3) is the subsidence area from 22 March 2007.

Lapindo was deemed to have some responsibility as gas drilling at the Banjar Panji 1 well some 200 metres from the initial eruption site was thought to be the trigger for the mudflow at that time. Lapindo have until now remained responsible for compensation and the management of social issues within this area despite various favourable court cases and some disagreement in scientific circles concerning the triggering mechanism.

Within this affected map area Lapindo was held responsible for managing 2 main areas:

1. Social issues within the affected area. This was in the form of:
 - Land and building purchases from communities affected by the mudflow,
 - The provision of compensation to farmers for mud affected crop failure,
 - Provide compensation to the farmers whose rice fields were used for mud ponds and water treatment facilities
 - Compensation to workers affected by plant layoffs,
 - Compensation to small businesses and factories
 - Provide Temporary/Permanent Relocations for factories/companies/small businesses to be able to continue their activities
 - Compensation for affected housing
 - Provide amenities and facilities at shelter locations
 - Provide medical services & facilities and set-up medical centres for displaced villagers
 - Cost of life assurance and assistance to affected communities.

Payment for the purchase of affected land and buildings was to be in stages and based on the claimant providing supporting evidence of ownership. The evidence required included:

- The property land title
- deed of sale- purchase of land
- proof of legitimate ownership of land including the area of land and location approved by the Government

These requirements, whilst essential to the avoidance of corruption and the legitimacy of compensation payments, would nevertheless be a significant source of friction between Lapindo, claimants and the Government in the future. We discuss this later in the report.

This verification was a huge task for a national or regional government institution let alone a private corporation. As such the government stipulated in a regulation subsequent to the Presidential Regulation 14/2007 that a land and building verification team be established by BPLS that consisted of the following agencies:

- National Land Agency Regional Office of East Java
- East Java Regional Police
- Large City Territorial Police, Surabaya
- Sidoarjo Land Office
- Sidoarjo Police
- Sidoarjo District Attorney
- Sidoarjo District Development Planning Agency
- Department of Licensing and Investment Sidoarjo
- Institute for Community Research and Development,
- Institute of Technology 10 November Surabaya (ITS)
- The village (sub-district head in the three districts and 12 Village chief's).
- Lapindo.

Lapindo also provided ancillary social assistance payments to affected families and individuals. This included:

- Provided monthly wage compensation to unemployed labourers amounting to Rp 700,000 per month per person;
- 2-year house lease assistance of Rp 5,000,000 per family;
- monthly living assistance of Rp 300,000 per month per person for 9 months;
- evacuation cost of Rp 500,000 per family;
- paid compensation to villagers due to bad smells, dust, noise, etc of Rp 300,000 per person;
- provided food (3 times/day) at shelter locations at a cost of Rp 15,000 –20,000 per person;
- Assistance with the transportation costs for school children within the area.

In 2008 the House of Representatives revised the regulation relating to compensation. This included three more affected villages, namely - Besuki, Kedungcangkring and Pejarakan, however responsibility for compensation for these villages fell to the Government.

2. Lapindo was also initially responsible for mudflow prevention efforts including the management of the main levee and drainage of the mudflow to the Porong River. However the responsibility for the management of the mudflow was given to BPLS through the Presidential Regulation 14/2007. This was a positive step in the process as Lapindo was clearly not equipped with the expertise to effectively manage such a monumental task.

5.2.0 Social responsibility – Government/BPLS

5.2.1 BPLS

Badan Penanggulangan Lumpur Sidoarjo (Sidoarjo Mud Management Agency) or BPLS was established as a result of the Presidential regulation 14 of 2007. This regulation and subsequent additions and alterations, such as regulation 48/2008 and 40/2009, form the basis of the roles and responsibilities of BPLS.

The presidential regulation 14/2007 defines the structure of BPLS as follows:

1. Steering Council; and
2. Executing Agency.

Article 3 of the regulation defines the roles and makeup of the agency

- 1) The Steering Board is responsible for providing direction, guidance and supervision of the implementation of; mudflow prevention efforts, mudflow management, the managing of social and infrastructure problems caused by the mudflow in Sidoarjo.

- 2) The Advisory Board consists of:

A. **Chairman:** Minister of Public Works;

B. **Vice Chairman:** Minister of Social Affairs;

C. **Members:**

1. Minister of Finance;
2. Minister of Energy and Mineral Resources;
3. Minister of the Interior;
4. Minister of Maritime Affairs and Fisheries
5. Minister of Transportation;
6. State Minister for National Development Planning / Head of BAPPENAS;
7. Minister of Environment;
8. Head of National Land Agency;

9. Governor of East Java Province;
10. Commander of Military Region V / UB;
11. East Java Regional Police Chief; and
12. Sidoarjo Regent.

In addition to their other extremely difficult task of containing and managing the mud flow of LUSI, BPLS has a comprehensive role in managing the social issues in the Sidoarjo region as they relate to the mud volcano disaster. The areas of responsibility attributed to BPLS through the Presidential Regulations were brought about as a result of consultation between affected residents and Governments of all levels.

BPLS split their responsibilities for social management into three main areas. These are **Social Assistance**, **Social Protection** and **Social Recovery**.

5.2.1.1 Social Assistance

BPLS define social assistance as being; *intended to reduce the social impact in an emergency, whether that occurs because of the impact of a blast or as soil degradation and to implement a precautionary measure as a form of preparedness in case of disaster.* (BPLS Website)

BPLS has five (5) main areas of responsibility in relation to their social assistance program. These are:

1. Supervise the provision of social assistance

Monitor the provision of social assistance provided by PT Lapindo Jaya Minarak (MLJ/Lapindo). This is separate from the sale and purchase contracts Lapindo are required to execute. The social assistance provided to affected villagers is:

- life insurance amounting to Rp. 300.000.00 for 9 months
- evacuation payment per family of Rp. 500.000.00 and
- House rental contract monies per family of Rp. 5.000.000.00 for 2 years.

2. Carry out monitoring and implementation of the evacuation of mudflow victims

The majority of these evacuees went to the New Market evacuation centre in Porong (PBP). There were three stages to the evacuation process:

- (1)** The first stage was the period June 2006 to October 2006, with around 3000 refugees coming from the villages of Siring, Jatirejo, Kedungbendo, and Renokenongo
- (2)** The second stage was the period November 2006 to April 2007, when about 4500 refugees came from the villages of Kedungbendo, Perumtas I (a housing estate), Ketapangkeres, Kalitengah, and Glagaharum. These refugees included permanent residents and a number of seasonal residents. These refugees are, in the main, willing to move from the PBP after receiving social assistance in the form of cash, home contracts, life insurance and moving expenses (seasonal residents are not given life insurance assistance).
- (3)** The third stage was the period from April 2007 to June 8, 2008. Some 3000 refugees came mostly from the village of Renokenongo. The majority of these refugees reject the social assistance and compensation offers outlined in Presidential Regulation 14 / 2007 as inadequate and they chose to remain in PBP until they could negotiate a better deal.

3. Provide social assistance based on the Presidential regulation 48 / 2008

Social assistance as mandated by Presidential Regulation 48/2008 is to provide assistance to residents in 3 villages namely Besuki, Kedungcangkring, and Pejarakan. The government's plan was to use the land within the area of these villages as mud storage ponds. This is where mud and water is stored before being discharged into the Porong River. The process of disbursement of social assistance to these villages was to be completed on September 28, 2007. The social assistance took the form of payment for home rental assistance, moving expenses and life insurance. Over 1600 families from these villages were provided with grants totalling around Rp 5 billion.

4. Water Aid

Many clean water sources for residents surrounding the disaster area were polluted or damaged by the eruption and mud flows. As a result BPLS was also tasked with providing clean water to residents in 12 villages, namely Siring, Jatirejo, Renokenongo, Kedungbendo, Ketapang, Kalitengah, Gempolsari, Glagaharum, Besuki, Kedungcangkring, Pejarakan and Mindi. Implementation work began on 14 April 2008, with clean water intended for drinking provided to the communities at a rate of 20 litres per person per day.

5. Help Empowerment

A number of programs have been initiated to enable refugees and those affected by the disaster to improve their lives. For example In 2007 BPLS purchased coconut grating equipment which provided gainful employment to as many as 50 people from Besuki, Mindi, Pejarakan, Kedungcangkring, Gempolsari, and Glagaharum.

5.2.1.2 Social Protection

The principal activities of the Social Protection program are the protection of affected citizens' rights with respect to property that is lost or damaged due to the impact of the mudflow. This protection is provided within the framework of the implementation of compensation through the sale and purchase of land and buildings (PIJB), compensation for loss of income caused by the loss of equipment, jobs, farms or because businesses can no longer continue. BPLS have six (6) main areas of focus with respect to the social protection area. These include:

1. Supervision and Facilitation of the Sale and Purchase of affected Land and Buildings

It is the responsibility of BPLS to oversee and where possible facilitate the sale of land and buildings owned by residents in the affected map area, to Lapindo who are the purchasers.

One of the key tasks of BPLS throughout this process was to establish verification teams and administrative support staff for these teams. These teams facilitated the settlement of compensation through the sale and purchase of land and buildings. As part of this process BPLS set up offices and facilities to enable the verification teams to work effectively. The verification team and its procedures for verification were formed as a result of extensive consultation between all parties involved in the process. The verification process was one of the most difficult and controversial tasks for the government and Lapindo. Many home owners had either lost deed of ownership papers due to inundation or simply did not have them.

The parameters for verification of ownership changed and developed over time as a result. The progression was from the initial position of requiring a deed of ownership to lesser documentation (such as tax receipts) and oaths sworn in the presence of government officials. Homeowners did not initially understand why, when their families had lived in a property for a number of generations, the teams would not accept their word that firstly, there was a property inundated there and that secondly, the house was owned by them. The task was made more difficult by the fact that many areas were rapidly and completely inundated by mud making it impossible for verification teams to even sight the property to be verified. At the start of the process Lapindo claimed that a small number of claimants had in fact never lived in the area and were trying to exploit the process through fraudulent claims. It is interesting to note that one of the methods of verification used at that time to combat this was to interview neighbours to the claimant to ensure that at the least they had in fact lived in the property they were claiming for. The individuals and organizations involved in administering the verification process can be seen at section 5.1.0.

The initial target, in accordance with the directives of the President, was the completion of the advance payment of 20% for land and property of 10,000 affected households. This process was directed to be completed within 10 weeks, starting in June 2007. The process for the majority of claims did in fact occur within this time frame, however as a result of logistical problems, such as those mentioned above and even due to some residents refusing to accept the compensation deal negotiated, the completion of this process took much longer.

The verification teams identified a total of 13,237 claims for loss of property under the buying and selling compensation process. In addition to this there was a requirement for compensation for crop failure, compensation for factory workers and providing social assistance to 34,000 people in villages within the affected areas of the map dated March 22, 2007. The responsibility for payment for compensation for these claims rested on Lapindo.

2. Monitoring and facilitating compensation for failed harvests

In order to facilitate the compensation process for failed harvests within the affected areas, BPLS assisted with the formation of the Wetland Condition Survey Team. This team was commissioned by the Governor of East Java and is made up of representatives from; the East Java / Sidoarjo Department of Agriculture, East Java Provincial Irrigation Office, Lapindo and BPLS.

3. Compensation for companies that have been forced to cease operating

BPLS monitor and facilitate compensation for as many as 25 companies that have ceased operations due to LUSI. 14 of the affected companies have received compensation; the remaining 11 companies have been in negotiation with Lapindo and are working towards a settlement agreement.

4. Coordinate compensation for Small and Medium Enterprises (SMEs)

This group consists of owners of small stalls and micro traders who in the main operated from their houses. Stall owners totalled 393 people with 347 micro traders. The stall owners sued for compensation in accordance with the purchase price of their business. The average value of stalls is estimated by industry representatives to be around Rp. 4.5 million per square meter. Micro traders who operate from their homes only require the replacement of lost goods as homes would be covered under the buying and selling of land and buildings compensation scheme.

BPLS hold meetings with affected traders and provide information about; the compensation process, BPLS and regulation 14 of 2007. They also speak individually with small business owners or their representatives to better understand their concerns. In effect BPLS act as the mediator or middle man between SMEs, Lapindo and interested government authorities.

There are also a number of market traders within the affected area seeking compensation from Lapindo. This is complicated by the fact that most of these traders have also received aid from the Presidents aid allocation.

5. Managing Rallies

Many demonstrations and rallies have been carried out by affected residents over the years since the first eruption. This is of course completely understandable and indeed within their rights in democratic Indonesia. However with tensions running high due to; the scale and nature of the losses experienced and the complexity of the compensation system some demonstrations have the potential to turn violent and/or destructive. BPLS take on the responsibility to ensure that demonstrations and rallies remain peaceful. They do this by forming a network of cooperation with relevant parties in order to coordinate, monitor, or mediate as the situation requires, for example:

1. At one time the Police in Sidoarjo were worried that a planned rally would turn violent and requested extra security forces to ensure the safety of all involved
2. Working and coordinating with local government agencies (especially in Sidoarjo regency), provincial and district parliament, such as the special Committee for the Sidoarjo mudflow in Sidoarjo, especially in relation to solving problems or obstacles that arise with land and property restitution
3. Working with Lapindo to ensure as best as possible the smooth and timely processing of payments
4. Making it easier for affected residents to deliver their demands directly to Lapindo

In addition to the steps above BPLS also conduct meetings or make informal approaches to the representatives of affected citizens to give various explanations or receive clarification regarding their demands or grievances. They do this to hopefully avoid the need for demonstrations and achieve the desired outcomes for all the parties through negotiation rather than confrontation. If the communication process fails then BPLS control (as best they can) and monitor demonstrations so that they can proceed in an orderly and safe manner.

6. Refugee Management in New Market Porong (PBP)

BPLS have had the difficult task of consulting with, negotiating and persuading refugees to agree with the compensation packages offered and submit claims in accordance with Presidential Regulation No. 14 / 2007 to the verification teams where appropriate. As a result of this consultation the refugees in PBP began to become more cooperative and willing to participate in the compensation process. In July 2008 more refugees began to submit claims to the verification teams and agreed to move from the camp once the initial 20% payment was made by Lapindo.

In its strategic plan for 2007 through 2010 BPLS has been set four main targets in relation to social issues arising from LUSI. These are:

1. Reduce social impacts experienced by residents, including a community development role in the mudflow prevention activities in 12 villages.
2. Reduce social impacts arising as a consequence of geological deformations such as bubbles (eruptions of gas / water / mud) that threaten the safety of residents, as well as the pollution of soil and irrigation water in 16 villages
3. Implementation and eventual fulfilment of the evacuation and relocation of affected residents outside the March 22, 2007 map of affected areas to a safer place.
4. Compile information that will assist in forming a basis for future policy direction in managing social issues

5.2.1.3 Social Recovery

The Social Recovery area focuses primarily on the areas of; emotional stress caused by the loss of homes and livelihoods, general and remedial education, environmental factors, general health of the population and the dissemination of useful information.

The Social Recovery team's goals are;

- to assist people to better deal with the emotional stresses and go back to being a happy and productive member of their society,
- Ensure the people have adequate information, education and counselling to deal with these issues.

Activities undertaken include:

1. Information dissemination and informal discussions

The greatest need identified by BPLS for information within the groups that they deal with is information and discussion surrounding the sale and purchase of land and buildings in Pejarakan, Kedungcangkring, and Besuki. However, information is distributed widely regarding clean water issues, personal empowerment and counselling services.

2. Observation and Information Gathering

BPLS perform periodic observations of the overall situation and social conditions of communities in the 12 villages of; Kedungbendo, Glagaharum, Renokenongo, Besuki, Pejarakan, Kedungcangkring, Gempolsari, Minda, Jatirejo, Siring, Ketapang and Kalitengah.

The intention is to monitor and respond to the dynamics of environmental change, the movement of individuals and communities and general social changes and issues that occur.

3. Managing Education Issues

With the financial support of Lapindo, BPLS assisted school children from displaced families in New Porong market to get to school. This was done by providing vehicles from the Sidoarjo Government and the army to shuttle them to school.

Adult education in the affected area is also important so that people have access to information regarding claims and a forum for airing complaints and concerns. BPLS also facilitated meetings between representatives of education foundations / boarding schools and Lapindo.

4. Managing Health Problems

BPLS continues to coordinate the opening of the Sidoarjo district health centre and the 24 hour Porong health centre.

5. Managing Emotional and Spiritual Problems

Managing emotional and spiritual problems is aimed at early detection of emotional instability disorders within victims. Groups of volunteers, both psychiatrists and psychologists and counsellors, have donated their time and expertise to help deal with these problems. In addition, BPLS has also been carrying out social healing sessions with individuals and small groups of residents who have indicated that they are experiencing emotional issues.

The contribution of these volunteers and the better understanding of emotional problems have led to the improvement of the emotional state of residents.

6. Empowerment

BPLS arranges skills training for victims allowing them the opportunity to gain meaningful employment. Examples of this training includes: shoe making, food processing, and carpentry.

5.2.2 Local Government

BPLS continually consults and coordinates with the provincial governments of East Java and the Sidoarjo regency government. Also the local governments each have a member on the BPLS Advisory Board.

Local governments have a very important and diverse role to play in the Sidoarjo mud disaster, both in managing social problems as well as in procuring land for the relocation of infrastructure.

Examples of the roles local government takes in managing social issues are:

- Provision of temporary shelter to the displaced population in the PBP refugee camp.
- Opening of the community health posts.
- Transportation assistance for school children whose parents have sought refuge in the PBP refugee camp.
- Information dissemination, mediation, and one on one help in the form of clarification of issues and consultation with the affected population.
- Assistance to farmers for crop failure.
- Providing staff for the Verification Teams.
- Provision of water tanks in some villages with polluted groundwater.
- Contribute expertise to the disaster management agency – SATLAK.
- Venture capital assistance for ex-trainees trained through programs organised through BPLS.

5.3.0 Social Funding Expenditure - Lapindo

Lapindo is responsible for claims for compensation and social assistance within the 22nd March 2007 map area according to the Presidential Regulation 14 / 2007. As mentioned this is an enormous undertaking even for an organization with the backing that Lapindo has. They were also initially responsible for the management of the mudflow cessation and mitigation efforts. In this section we look at the progress and level of compensation made by Lapindo to date.

5.3.1 Land and Buildings Compensation Scheme

There are a total of 13,237 compensation claims under this scheme for Lapindo to deal with. These are made up of 12,886 claims from phase I and phase II (before and after the gas pipeline explosion) and 351 claims for Phase III (supplementary claims). The Land and Buildings compensation scheme takes the form of a buying and selling contract where Lapindo is the buyer and the affected owner is the seller.

The original stipulation for payment of these claims was a one size fits all scheme for a 20% initial payment and the remaining 80% within two years of the original payment. Due to a number of factors, discussed elsewhere in this report, a number of options/variations were added specifically relating to the final 80% payment. These included a relocation scheme to the newly built Nirvana village housing complex (KNV), progress payments of the 80% and a combination of cash and resettlement.

Firstly we look at the 20% initial payment progress up to January of 2011. Of the 12,886 claims for those affected in phase I and phase II, 12,879 claims have been paid the full 20%. Of the seven remaining possible claims Lapindo has said that they have invited them to claim but there has been either; no response to date, no record of the whereabouts of the potential claimants or they refuse to join in the claim process. We have made representations to Lapindo to ensure that all these potential cases are not forgotten or at least to resolve the reasons behind the non claims (i.e. the possibility of administrative errors). However we can see from these figures that all the claims that have been submitted with documentation have been paid the 20% initial payment for phase I and phase II claimants.

For Phase III there are a total of 351 potential claims of which Lapindo has paid the 20% payment for 264 claims, with the remainder being made up of:

- 6 invited to claim but there has been no response and/or no record of their whereabouts.
- 2 claims pending realisation (cemetery and religious buildings).
- 79 claims are still being processed through BPLS with;
 - 12 claims in the verification process
 - 64 claims in the process of either family disputes or disputing the nature of the land function
 - 3 claims in the hands of the police

Of the potential 13,237 claims Lapindo has completed the process for 13,143 (94 not able to be completed for reasons outside of the control of Lapindo see above) and completed full payment for 13,136 claims as at January 2011.

Secondly we look at the progress of the remaining 80% payment for the 13,143 current claims completed up to January of 2011:

- 12 947 claims have completed the process and have been approved for the 80% payment
- 29 claims are waiting for the payment maturity of the claim certificate
- 167 non-certificate claims are in the process of confirmation with details;
 - 94 claims currently have various disputes surrounding the claim, i.e. disagreement regarding the land function, inheritance disputes, claims court, dispute regarding the land size, dispute regarding the building size, etc
 - 73 invited to claim but there has been no response and/or no record of their whereabouts.

This can be seen expressed as a Table 7 showing the progress of claims and payments made by Lapindo up to January 2011

Table 7 - Status January 2011

20%	Category	Target 20%		Land and Building compensation 20%		Payment	
		Total Claims	Rp (millions)	Total Claims	Rp (millions)	Total Claims	Rp (millions)
		Certificate	8,190	340,819	8,173	340,055	8,173
Non Certificate	5,047	394,154	4,970	385,768	4,963	385,512	
Total Target	13,237	734,973	13,143	725,823	13,136	725,568	

80%	Category	Target 80%		Land and Building compensation 80%		Payment	
		Total Claims	Rp (millions)	Total Claims	Rp (millions)	Total Claims	Rp (millions)
		Certificate	8,190	1,363,274	8,144	1,317,548	8,140
Non Certificate	5,047	1,958,179	4,803	1,658,348	4,743	894,902	
Total Target	13,237	3,321,453	12,947	2,975,896	12,883	1,960,704	

Grand Total	13,237	4,056,426		3,701,719		2,686,272
--------------------	---------------	------------------	--	------------------	--	------------------

Note:

Source PT. Minarak Lapindo Jaya Progress Report January 2011

- 1) 8,225 claims have already been settled for a total of Rp 1,462,641,607,437
- 2) 4,911 claims have been paid instalments totalling Rp 1,223,630,170,227
- 3) Certificate or non certificate refers to the type of documentation the claimant has.

Table 8 - Actual Progress of the 20% Payment

Category	Target 20%		Claims at BPLS		Realisation of PIJB 20%				Payment Completed	
	Claims	Rp (Mil)	Claims	Rp (Mil)	Realised		Not yet realised		Claims	Rp (Mil)
					Claims	Rp (Mil)	Claims	Rp (Mil)		
Certificate	8,190	340,819	10	460	8,173	340,055	7	158	8,173	340,055
Non Certificate	5,047	394,154	69	6,154	4,970	385,768	8	430	4,963	385,512
TOTAL	13,237	734,973	79	6,614	13,143	725,823	15	588	13,136	725,568

Note:

Source PT. Minarak Lapindo Jaya Progress Report January 2011

The nominal difference between the target figures, a claim within BPLS and the realization of PIJB will not be the same because there are disputes regarding land usage and building classification which have the potential to change the claims.

Table 9 - Actual Progress of the 80% Payment

80%	Target		REALISATION (Value in Millions of Rupiah)									Not Yet Realised		
			Claims	Transaction value	Value Susuk	Value KNV	Already Paid		Not Yet Paid		Extra Payments			
	Claims	Value					Claims	Value	Claims	Value	Claims	Value		
Certificate	8173	1349007	8144	1317548	1207116	112100	8062	1056652	4	251772	78	9150	29	31460
C&C			7040	1153063	1153063	-	7036	903675	4	249387	-	-		
C&C to KNV			1104	164485	54054	112100	1026	152977		2395	78	9150		
Non Cert	4970	1724,580	4803	1658348	565081	1082322	4686	863747	60	763649	57	11155	167	65232
C&R GKLL			2027	820465	317554	502911	2027	460068		360398	-	-		
C&R non GKLL			462	204051	53336	139769	405	186435		6664	57	11155		
C&R non GKLL II			2314	633832	194190	439642	2254	237245	60	396587	-	-		
TOTAL	13143	3,073,588					12748	1,940,399	64	1015421	135	20,305	196	97691

Source PT. Minarak Lapindo Jaya Progress Report January 2011

We also have information from BPLS as of December 2010 regarding the Land and Building Compensation paid by Lapindo. This acts as a cross check to information sourced from Lapindo.

The following table 10 shows this information.

Table 10 - BPLS Information For Lapindo Compensation Payments
Status December 2010

TYPE OF PAYMENT	TARGET FOR COMPLETION		PAYMENT REALISATION		
	TOTAL CLAIMS Rp (Million)		TOTAL CLAIMS Rp (Million)		
ADVANCE 20%	13,237	733,016	13,136	99.24%	725,200
REPAYMENT 80%		3,101,131	12,827	96.90%	1,924,872
TOTAL	13,237	3,834,147			2,650,072

NOTES:

Source BPLS PowerPoint Presentation updates Kegiatan Deputy Bidang Sosial December 2010

1. Of the 13,237 claims, that have been submitted to Lapindo a total of 84 claims are still in the process of administration with BPLS
2. Of the 12,827 claims, 8,118 claims have been settled 100% with a value of Rp 1.14 Trillion
3. Lapindo's target for completion of 100% of all instalments is in 2012

To summarise we can see that up to January 2011 Lapindo had paid Land and Building compensation to a total of **Rp 2,686,272,000,000** (around Rp 2.7 trillion or US\$ 300 million), with the remaining claims either in the instalment payment process, awaiting verification or in a dispute process. Of the **13,143** claims that are currently able to be processed, **196** are still pending and **12,947** have been paid or are in the process of being paid.

5.3.2 General Social Assistance Payments

In addition to the house and land compensation payments Lapindo has been responsible for a number of other social assistance programs.

1. Farming & Plantation Aid

Table 11 Farming & Plantation Aid

Number of Claimants	Rice Field (Rp)	Farms (Rp)	Total (Rp)
1,882	12,664,773,120	1,602,406,315	14,267,179,435

2. Free medical services have also been provided in cooperation with 4 hospitals, 4 village medical centres, and 10 medical posts. This has resulted in:
- 70,861 claims of outpatients
 - 1,665 claims of hospitalization

The cost to Lapindo to date has been Rp 2.95 Billion

3. The compensation package also included:

- A payment for rental assistance for two years (Rp 5.000.000/Families),
- Monthly Living Assistance for 9 months (Rp 300.000/person/month)
- Moving Cost Assistance (Rp. 500.000/Families)

20,399 families participated at a cost to Lapindo of **Rp.133.024.363.667**

4. **Business Assistance** - Although Presidential Regulation 14/2007 did not stipulate compensation for companies as it did with residents Land and Buildings Lapindo has paid some compensation to twenty nine affected companies.

Temporary Relocation & Compensation to Impacted Factories/Business Owners

- Temporarily Relocations for 10 factories - **Rp. 5,269,240,302**
 - Permanent Relocations for 9 factories - **Rp. 1,180,000,000**
 - Evacuation support - **Rp. 320,000,000**
 - Compensation to 306 Small Businesses: **Rp 4.3 billion**
 - 12 Companies signed the MOU (claims settlement) - **Rp. 73 billion**
 - Salary assistance for workers of affected factories @ Rp 700,000 / worker / month.
Paid to 2,288 workers at a total cost of - **Rp 6,188,800,000**
5. 9-month life insurance money (at Rp 300,000/person/month) for 37,151 People
6. **School Services:**
- Relocate some schools inundated by the mudflow to safer locations
 - Renovate damaged school buildings
 - Provide transportation for school children
 - Educational Assistance = **Rp. 435,114,000**
7. **Burial Assistance** - Temporary Cemetery at Mindi Village with Compensation of Rp. 1,000,000/person
8. Other assistance included the provision of meals, water, etc at the evacuation centre.

5.3.3 Total Compensation to January 2011

The following table 12 shows the total cost of the LUSI mud volcano to Lapindo up to March 2011.

Table 12 Cost to Lapindo to date

COMPENSATION/ASSISTANCE	TOTAL COST
Social Assistance	361,027,127,505
Eruption Management	873,000,000,000
Mudflow Management	1,351,924,034,943
House & Land Compensation	
20% Realisation	724,999,440,700*
80% Realisation	1,998,789,227,907**
Business to Business	49,187,285,093
Operational	384,886,905,678
TOTAL	5,743,794,021,826

Source PT. Minarak Lapindo Jaya Progress Report March 2011

Note:

* March 2011 adjusted figures.

** 1. The total expected cost for the 80% realization of house and land compensation is **Rp 3,073,587,557,720** with total payments to March 2011 of Rp **1,998,789,227,907**.

2. Payments are ongoing and Lapindo have stated that they expect to have finalised the payment of a further Rp 1,100,000,000,000 (1.1 trillion) in outstanding 80% compensation in 2012.

*** There is an additional Rp **104,000,000,000** (104 billion) in dispute related to business to business compensation issues. Lapindo have stated that they intend to settle the remaining 80% house & land compensation & outstanding contractor amounts before they will commit to further business compensation issues.

5.4.0 Social Funding Expenditure – Government/BPLS

As discussed earlier in this report BPLS is responsible for a number of areas in the provision of compensation and social assistance. Specifically compensation for property lost in the three villages of Besuki, Kedungcangkring and Pejarakan and various forms of social assistance payments in these three villages and in the villages of Siring, Jatirejo, Renokenongo, Kedungbendo, Ketapang, Kalitengah, Gempolsari, Glagaharum, and Mindi.

In this section we look at the progress of these payments to the affected communities over the last few years and up to 2011.

5.4.1 Social Assistance Payments - Besuki, Kedungcangkring and Pejarakan

Firstly we will look at the progress of Social Assistance payments for Besuki, Kedungcangkring and Pejarakan as stipulated in Presidential Regulation 48 / 2008. In Table 13 below we see that this is for 2008 and includes details of evacuation payments, home contract payments and three months of life insurance.

Table 13 Status December 2008

Village	No families	People	SOCIAL ASSISTANCE			TOTAL
			EVACUATION	HOME CONTRACTS I	3 MONTHS OF LIFE INSURANCE	
			(Rp)	(Rp)	(Rp)	(Rp)
Besuki	1,064	3,941	532,000,000	2,660,000,000	3,543,900,000	6,735,900,000
KEDUNGANGKRING	151	507	75,500,000	377,500,000	456,300,000	909,300,000
Pejarakan	451	1,646	225,500,000	1,127,500,000	1,481,700,000	2,834,700,000
TOTAL	1,666	6,094	833,000,000	4,165,000,000	5,481,900,000	10,479,900,000

Source BPLS Website 2011

In Table 14 below we see that this is for 2009 and includes details of home contract payments and three months of life insurance (evacuation payments already completed).

Table 14 Status December 2009

Village	No Families	People	SOCIAL ASSISTANCE		TOTAL
			Home Contracts II	3 Months Of Life Insurance	
			(Rp)	(Rp)	
Besuki	1,064	3,941	2,660,000,000	3,544,500,000	6,204,500,000
KEDUNGCRANGKRING	151	507	377,500,000	457,200,000	834,700,000
Pejarakan	450	1,646	1,125,000,000	1,483,800,000	2,608,800,000
TOTAL	1,665	6,094	4,162,500,000	5,485,500,000	9,648,000,000

Source BPLS Website 2011

In Table 15 below we see that this shows the total social assistance payments made up to December 2010 and includes details of all payments made under this program.

Table 15 Status December 2010

Village	No families	People	SOCIAL ASSISTANCE			TOTAL
			EVACUATION	HOME CONTRACTS I	3 MONTHS OF LIFE INSURANCE	
			(Rp)	(Rp)	(Rp)	
Besuki	1,064	3,941	532,000,000	5,320,000,000	7,088,400,000	12,940,400,000
Kedungcangkring	151	507	75,500,000	755,000,000	913,500,000	1,744,000,000
Pejarakan	450	1,646	225,500,000	2,252,500,000	2,965,500,000	5,443,500,000
TOTAL	1,665	6,094	833,000,000	4,165,000,000	10,967,400,000	20,127,900,000

Source BPLS Website 2011

5.4.2 Social Assistance Payments - Siring Barat, Jatirejo, & Mindi

Secondly we will look at the total Social Assistance payments to be made by BPLS up to December 2010. This is for 9 neighbourhoods in the villages of Siring Barat, Jatirejo, & Mindi as stipulated in Presidential Regulation 40 / 2009.

Table 16 Status December 2010

Village	No families	People	Nominal Realisation of Social Assistance			TOTAL
			EVACUATION	HOME CONTRACTS	3 MONTHS OF LIFE INSURANCE	
			(Rp)	(Rp)	(Rp)	
Siring	326	1136	163,000,000	1,630,000,000	2,045,400,000	3,838,400,000
Jatirejo	251	758	107,500,000	1,062,500,000	1,361,300,000	2,531,300,000
Mindi	289	1030	144,500,000	1,220,000,000	1,765,500,000	3,130,100,000
TOTAL	830	2924	415,000,000	3,912,500,000	5,172,200,000	9,499,700,000

Source BPLS Website 2011

5.4.3 General Social Assistance Payments

In addition to the evacuation assistance, home rental contract assistance and life insurance within the affected areas under the responsibility of BPLS there is also the provision of health care and the distribution of clean water.

The table 17 below shows the approximate costs of supplying these services to the affected areas.

Table 17 Status December 2010

Type of aid	The form of assistance	YEAR	Nominal
Health	Provision of drugs - drugs through district health office. Sidoarjo residents to health care around the mudflow	2008	Rp. 48,378,000
	Treatment	2009	Rp. 12,099,000
Clean Water	Provision of clean water to 12 affected villages	2008	Rp. 185,238,000
	Provision of clean water to 12 affected villages	2009	Rp. 250,002,000
	Provision of clean water to 8 affected villages	2010	Rp. 152,298,000

BPLS PowerPoint Presentation *updates Kegiatan Deputy Bidang Sosial Desember 2010*

There are still areas surrounding the affected region which the Government and BPLS are closely monitoring with respect to the provision of further social assistance and compensation.

An example of this is a review of over 50 neighbourhoods in Siring, Jatirejo, Mindi, East Besuki, Ketapang, and Pamotan with a possibility of declaring these areas as unfit for habitation and thereby changing the compensation offered.

There are a number of reasons for this review, such as:

1. Bubbles of flammable, odourless and poisonous gases threatening the villages of Mindi, Jatirejo, Siring, Ketapang, Ex. Pamotan, and Eastern Besuki.
2. Land subsidence and/or soil erosion has occurred in all the villages around the levee, with the most significant impact appearing in the villages of Ketapang, Jatirejo, Siring and Glagaharum
3. Pollution of ground water has occurred to varying degrees in all villages
4. Air pollution has also occurred in all villages with daily intensity depending on wind direction.

Other disaster-prone areas:

The potential for continual overflow of mud and/or water from the dikes in the villages of; Ketapang, Jatirejo, Siring, Glagaharum and Gempolsari is also a concern to the Government and we are told is being closely monitored particularly during the wet season.

5.4.4 Land and Building Compensation

Thirdly we will look at the compensation payments for Land and Buildings in the 3 villages of Besuki, Kedungcangkring and Pejarakan as stipulated in Presidential Regulations 48 / 2008 and 40 / 2009. Again this is a buying and selling of land and buildings scheme.

In Table 18 below we see that this is the status of the total land and building areas to be paid in the three villages as at August 2009.

Table 18 Status August 2009

VILLAGE	LAND AREA (m ²)			BUILDING AREA (m ²)
	Dry Land	Rice field	TOTAL LAND AREA	
	Total	Total		
Besuki	198,460	199,934,281	398,394,281	69,762
Kedungcangkring	26,050	75,518,815	101,568,815	10,092
Pejarakan	76,448	46,308,000	122,756,000	33,862
TOTAL	300,958	321,761,096	622,719,096	113,716

Source BPLS Website 2011

Table 19 below shows the progress of the 20% initial payment for land and buildings in the three villages.

Table 19 Status August 2009

Land and Building Area (m ²)	Villages			Total m ² Paid	20% Payment (Rp)
	Besuki	Kedungcangkring	Pejarakan		
Dry Land Total (Rp 1 million / m²)	198,460	26,050	76,448	300,958	60,191,600,000
Rice field Total (Rp 120,000 / m²)	199,934	75,519	46,308	321,761	7,722,264,000
Building Area (Rp 1,500,000 / m²)	69,762	10,092	33,862	113,716	34,114,800,000
TOTAL	468,156	111,661	156,618	736,435	102,028,664,000

Note:

Source BPLS Website 2011

There are a total of 1744 claims giving an average initial 20% payment of Rp 58,502,674 per claim, depending upon the ratio between the different types of land.

Table 20 below shows the progress of the next 30% payment for land and buildings in the three villages as stipulated in Presidential Regulation 40 / 2009. This is as at July 2010.

Table 20 Status July 2010

Land and Building Area (m ²)	Villages			Total m ² Paid	30% Payment (Rp)
	Besuki	Kedungcangkring	Pejarakan		
Dry Land Total (Rp 1 million / m²)	198,439	26,050	76,436	300,925	90,277,500,000
Rice field Total (Rp 120,000 / m²)	199,403	86,543	46,308	332,254	11,961,144,792
Building Area (Rp 1,500,000 / m²)	69,711	10,129	33,781	113,621	51,129,580,500
TOTAL	467,553	122,722	156,525	746,800	152,989,202,844 *

Note:

Source BPLS Website 2011

1. There has been a refund of funds back to the government after there was an excess land measurement in the village of Besuki. The error was an area of 1,102 m² which equates to Rp 26,440,000 in the initial 20% payment and Rp 39,660,012 for the next 30%. The total repayment was Rp 66,100,012.

2. There are 6 claims which have not received the payment of 30% due to family disputes surrounding beneficiaries. These claims total an area of 6,429,068 m² (rice farms 5,870 m² and dry land 559m²) with a total value of Rp 379,022,448*

3. There are a total of 1738 claims (1744 less the 6 claims with a family dispute) giving an average for the next 30% payment of Rp 88,026,009 per claim, depending upon the ratio between the different types of land.

Table 21 below shows the progress payments for land and buildings in the three villages up to December 2010. This shows the ultimate target and the amount paid to date (70%).

Table 21 Progress payments

TARGET		PAYMENTS COMPLETED						
		INITIAL 20% (2008)		NEXT 30% PAYMENT (2009)		PAYMENT 20% (2010)		TOTAL (70% of claims total)
Claims	RP (Mil)	Claims	RP (Mil)	Claims	RP (Mil)	Claims	RP (Mil)	RP (Mil)
1788	520,722.40*	1,744**	102,271.90	1,738***	153,028.80	1,723	101,047.60	356,348.30

Source BPLS PowerPoint Presentation updates Kegiatan Deputy Bidang Sosial December 2010

Notes:

1. **It is interesting to note that with a target of 1788 claims at a cost of Rp 520,722,400,000 the ultimate approximate average payment per claim for these three villages once 100% has been paid will be around Rp 300 million or US\$33,000.*

2. *** 44 claims with a value of Rp 9,362,850,000 have not yet been paid the 20% instalment due to:*

- *29 claims with a land dispute*
- *7 claims are disputing the land classification of "wetland rice farm"*
- *8 claims for cemetery land have not yet been paid due to there being no precedent for this.*

3. **** 6 claims have stalled before the 30% instalment, amounting to Rp. 379,022,448 because of an ongoing family dispute.*

5.4.5 Materials Buyback Scheme

The materials buyback scheme is a supplementary program to the sale and purchase of affected property in Besuki, Kedungcangkring and Pejarakan whereby the government sells back the housing materials (bricks, tiles, wood, etc) to the claimants for 1.5% of the compensation sale price. The 1.5% is not paid by the resident but is instead deducted from the compensation to be received. It is then the responsibility of the resident to demolish the property and sell or store the materials in a new location.

Table 22 materials buyback scheme

VILLAGE	TOTAL BUILDINGS				NOMINAL VALUE OF MATERIALS		
	TOTAL	Purchased	Not Purchased (*)	No Info (*)	Purchased (Rp.)	Not purchased and no info (Rp.)	TOTAL (Rp.)
Besuki	778	737	30	11	1,490,322,375	78,172,200	1,568,494,575
Kedungcangkring	123	122	0	1	226,784,700	1,117,575	227,902,275
Pejarakan	352	299	34	19	678,151,125	81,931,050	760,082,175
TOTAL	1253	1158	64	31	2,395,258,200	161,220,825	2,556,479,025

Note:

Source BPLS PowerPoint Presentation *updates Kegiatan Deputi Bidang Sosial Desember 2010*

** It is still possible for those who have not joined the scheme to participate at a later time.*

5.4.6 Total Expenditure For 2009, 2010, 2011 (Budget) - BPLS

In addition to the social funding responsibilities that BPLS has they are also responsible for mudflow management and mitigation. This includes the costs of transferring the mudflows to the Porong River and ultimately to the ocean and government infrastructure costs such as moving the Toll Road to a new location.

5.4.6.1 BPLS 2009 Expenditure

For **2009** the total budget for BPLS was a little over **Rp 1.1 Trillion** of which they spent 61.5%. The budget allocation was split into the 4 main areas:

1. Settlement of Land and Buildings in 3 villages of Besuki, Kedungcangkring and Pejarakan (80% repayment scheme): Rp 227 billion.
2. Settlement of arterial highway relocation Porong, including completion of land acquisition: Rp 523 billion.
3. Continuing the mudflow handling infrastructure, including monitoring and handling of geological deformation: Rp 241 billion.
4. Social Assistance: Rp 59 billion.

5.4.6.2 BPLS 2010 Expenditure

For **2010** the total budget allocation was a little over **Rp 1.2 Trillion** of which BPLS spent 52.37%. The following Table 23 shows the areas of expenditure and various budget allocations and actual expenditure.

Table 23 BPLS 2010 Budget & Expenditure

ACTIVITIES		Budget	Realization of Budget for 2010	PROGRES%
I	FIELD OPERATIONS			
	a. Advanced transfer of mud into the Porong River	127,922,798,000	48,678,728,184	38.05
	b. Advanced Procurement of Heavy Equipment and Instrument Labs	50,428,306,000	39,732,545,368	78.79
	c. Geological studies	1,144,291,000	67,992,600	5.94
	d. Monitoring & Evaluation of the Impact of subsidence	2,841,258,000	1,438,739,446	50.64
	e. Administrative and Other Financing Activities	92,400,000	10,816,175	11.71
	SUB TOTAL	182,429,053,000	89,928,821,773	49.30
II	SOCIAL AFFAIRS			
	a. Education and Technical Training	1,166,550,000	761,745,030	65.30
	b. Outreach and Information Dissemination	586,025,000	297,898,000	50.83
	c. Disaster Assistance & Riots	9,021,208,000	5,248,892,110	58.18
	d. Continued sale and purchase of Land and Buildings	184,917,046,000	101,317,395,596	54.79
	e. Administrative and Other Financing Activities	1,482,399,000	892,229,044	60.19
	SUB TOTAL	197,173,228,000	108,518,159,780	55.04

Table 23 (cont) BPLS 2010 Budget & Expenditure

III	INFRASTRUCTURE SECTOR			
	a. Infrastructure Relocation	348,858,400,000	180,637,747,964	51.78
	1) Relocation of Infrastructure	193,913,800,000	65,634,807,391	33.85
	2) Supervision of Relocation of Infrastructure	3,900,000,000	3,477,402,500	89.16
	3) Advanced Acquisition of Land Relocation	147,799,607,000	110,103,286,413	74.49
	4) Administrative and Other Financing Activities	3,244,993,000	1,422,251,660	43.83
	b Infrastructure for Mudflow Management	470,115,062,000	240,997,062,605	51.26
	1) Advanced stages Flood Control Infrastructure	408,198,714,000	232,924,272,851	57.06
	2) Supervision of Flood Control Infrastructure	4,000,000,000	3,661,336,938	91.53
	3) Technical Education , Evaluation & Policy Studies	401,350,000	235,604,600	58.70
	4) Operation & Maintenance of Flood Control Infrastructure	2,133,300,000	1,394,212,196	65.35
	5) Land acquisition. Appraisal of land	52,550,000,000	297,989,848	0.57
	6) Preparation of Guidelines and Information Dissemination	572,368,000	468,828,805	81.91
	7) Administrative and Other Financing Activities	1,848,285,000	1,616,512,367	87.46
	8) Renovation / Repair Facilities and Infrastructure of Buildings	411,045,000	398,305,000	96.90
	SUB TOTAL	818,973,462,000	421,634,810,569	51.48

Table 23 (cont) BPLS 2010 Budget & Expenditure

IV	AGENCY SECRETARIAT			
	a. Payroll Processing, Honorarium and Allowances	13,181,152,000	12,752,515,418	96.75
	b. Implementation of Operations and Maintaining Office Facilities	4,333,745,000	3,994,979,831	92.18
	SUB TOTAL	17,514,897,000	16,747,495,249	95.62
	GRAND TOTAL	1,216,090,640,000	636,829,287,371	52.37

Source BPLS Website 2011

5.4.6.3 BPLS 2011 Budget

In 2011 there are again 4 main areas of focus for BPLS. These are:

1. The transfer of mud into the Porong River.
2. Relocation of the Toll Road consisting of construction services and supervision of consulting services, construction of *road frontage* along the new arterial roads and the construction of a *Flyover*.
3. Mudflow management infrastructure construction consisting of construction services and consulting services, the development / maintenance of embankments, media relations, management of the drainage system, management of the estuary, and improvement of roads to the estuary.
4. Management of social issues

Apart from the 4 main areas of focus BPLS will also conduct activities such as; geological studies, bathymetry, procurement of satellite imagery maps and management activities such as preparation of performance reports, SOPs, training of personnel, etc.

The following Table 24 shows the areas of expenditure and various budget allocations for 2011.

Table 24 BPLS 2011 Budget Allocations

ACTIVITIES		BUDGET
A	TECHNICAL MANAGEMENT OF MUDFLOW AND OTHER DUTIES	
	1. Improvement and management of planning, programs and Budgets	90,000,000
	2. Improvement and management of Civil Service and Public Affairs	21,907,735,000
	3. Law, Public Relations and information systems	555,070,000
	4. Oversight and accountability - Institute improvements	200,000,000
	SUB TOTAL	22,752,805,000
B	MUD DISASTER PROGRAM - SIDOARJO	
	1 Mudflow operations planning	9,712,045,000
	2 Mudflow management	77,230,626,000
	3 Geological disaster mitigation and environmental monitoring	2,715,829,000
	4 Planning and management of social recovery	2,971,680,000
	5 Social assistance management	35,866,428,000
	6 Improved management of social protection	569,532,985,000
	7 Infrastructure development planning	1,096,350,000
	8 Mudflow infrastructure development and maintenance	240,630,905,000
	9 Relocation of infrastructure development	324,081,472,000
	SUB TOTAL	1,263,290,400,000
	GRAND TOTAL	1,286,043,205,000

Source BPLS Website 2011

2. Map dated 22 March 2007
 640 Ha were inundated, affecting 12 villages in 3 sub-districts
 9,385 families totalling 35,701 people were affected

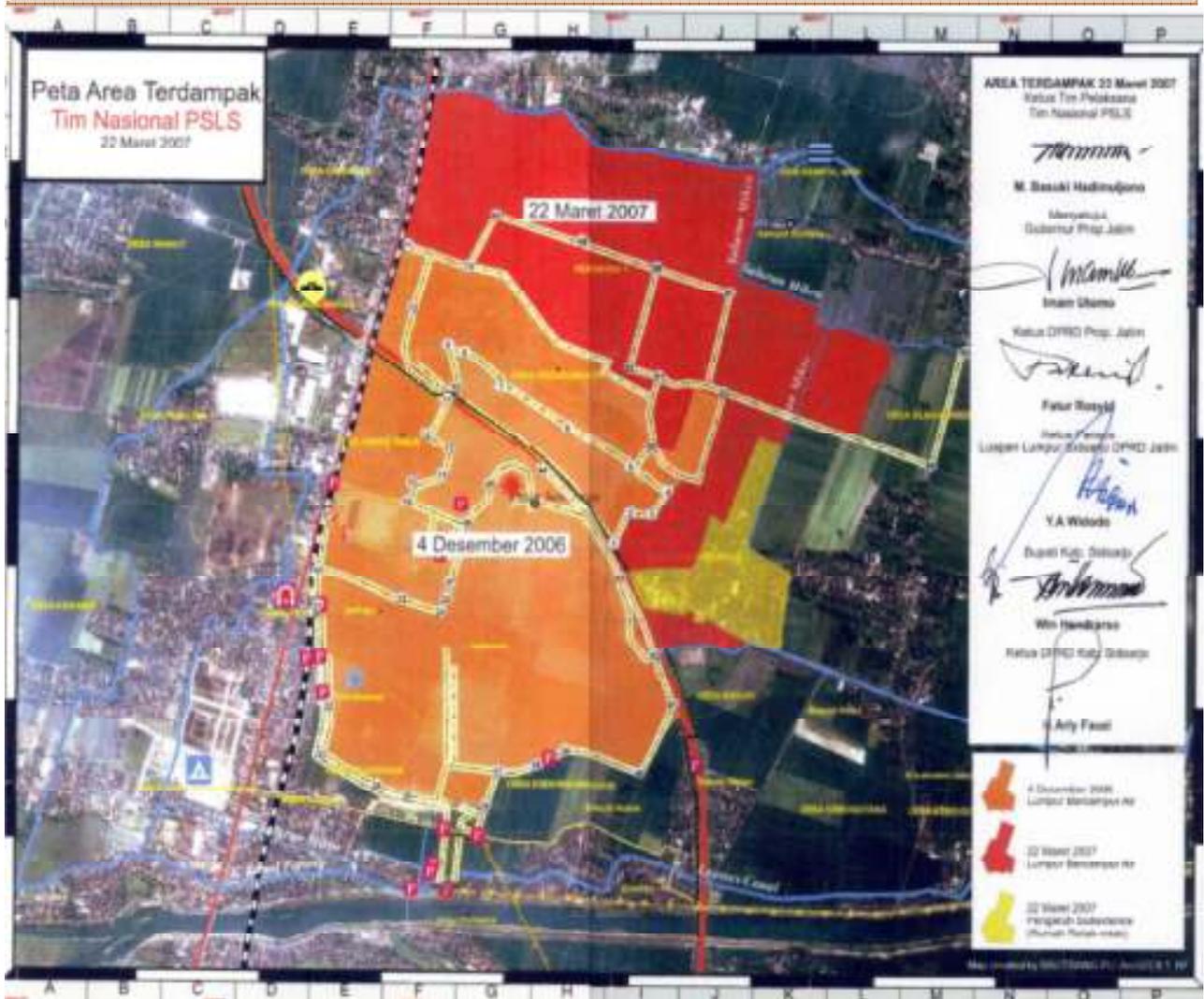


Figure 18 Map dated 22 March 2007 courtesy BPLS

6.0 SOCIAL PROGRAMMES AND IMPACTS

6.1.0 Housing & Land

The compensation process surrounding the loss of victim's houses and/or land has been the most controversial and complex of the social compensation programs associated with the LUSI mud volcano.

There are several reasons for this including:

- The enormous scale of the compensation required both in terms of numbers of properties inundated or damaged and in terms of the amount of money involved. Lapindo were responsible for the majority of compensation claims (those within the March 2007 map area) and even such a large company as this claimed it had difficulty financing the payments in the midst of the 2008 global financial crisis.
- Land ownership records were in many cases inadequate, incorrect or lost under tons of mud. This of course made the payment of compensation much more complex and time consuming
- The differing needs and desires of a disparate group of people. The mudflow did not differentiate between rich and poor or farmer, office worker or labourer. Housing estates, village communities, factories and farm land were all destroyed or damaged and a one size fits all solution was always going to be difficult.
- Corruption, although not widespread, was present and contributed to the verification of land and building claims being more complex and time consuming than it would otherwise have been.
- Politics, both national and regional also played a part in the controversy. The issue of natural vs. manmade disaster was of course critical to the eventual nature and size of the compensation packages offered. Add to this the social welfare minister of the time having a substantial interest in the company accused of triggering the disaster and you have a perfect recipe for political turmoil.

- The longevity and escalation of this disaster was also a contributing factor to the complexity of this compensation process. A good example of this is the gradual inclusion of new villages and properties into the compensation process as either the mudflow engulfed them or the land was needed for management of the mudflow (i.e. Pond areas).

In order to establish a compensation agreement there were discussions and negotiations in November of 2006 between community leaders, Lapindo and the government which led to a consensus agreement of “Cash and Carry” on 4 December 2006.

This original “Cash and Carry” agreement for compensation was defined in the Presidential Regulation No. 14 of 2007 dated 8 April 2007. As mentioned previously this took the form of a buying and selling contract.

The main points of this agreement were:

- It was a purely cash compensation deal for physical loss or damage of property
- There was an initial 20% down payment to be paid immediately upon proof of ownership
- The value of the property to be compensated was determined by one formula. This of course did not take in account the relative values of properties due to location, quality or age and as a result was set at the high end of property values at that time. The values were; buildings @ Rp 1,500,000 per m², land @ Rp 1,000,000 per m² and rice fields @ Rp 120,000 per m².
- The remaining 80% was to be distributed one month before the end of a two-year period after June 2006 (i.e. to begin May 2008).
- There were some other elements to this compensation package such as a payment of Rp 5,000,000 over the initial 2 year period to be cover the rental of a property (whether the victim rented a house or lived with family), moving cost of 500,000 Rp per family and monthly living assistance of 300,000 Rp per month per person for 9 months

Whilst Lapindo made good progress on paying the first 20% payment the scheme hit some significant problems. One of the biggest was the issue of verification. Proof of ownership was of course required but many victims either did not have the required certificate of title (Akta Jual Beli - AJB), as stipulated in Article 15 section 1 of Presidential Regulation 14 / 2007, or it had been buried under tons of mud.

After lengthy negotiations there was an agreement to accept another type of land tenure known as “*Girik*”/”*Petok D*”/”*Letter C*”. These are basically tax receipts. Land must be registered for taxation with the village administration, these documents therefore declare that the land holders pay land tax regularly, proving customary ownership. However, this ownership was not often registered by the National Land Agency (*Badan Pertanahan Nasional/BPN*) or it was not certified by BPN. So, in order to legitimize landownership, “*Girik*”/”*Petok D*”/”*Letter C*” had to be registered to BPN. A verification team was then established to attempt to work through all these various forms of proof of ownership so that the claim could be passed on to Lapindo for payment.

The remaining 80% payment started to become due in 2008 in the midst of the global financial crisis. Lapindo claimed that the huge financial burden of these payments coupled with the growing global economic conditions was overstressing its resources. The company then suggested additional alternative schemes.

First, was a scheme to provide resettlement in new homes at the Kahuripan Nirvana Village housing estate (KNV) plus compensation for property lost (less the value of the new home) paid in instalments of Rp 15 million per month. This was termed ‘*cash and resettlement*’.

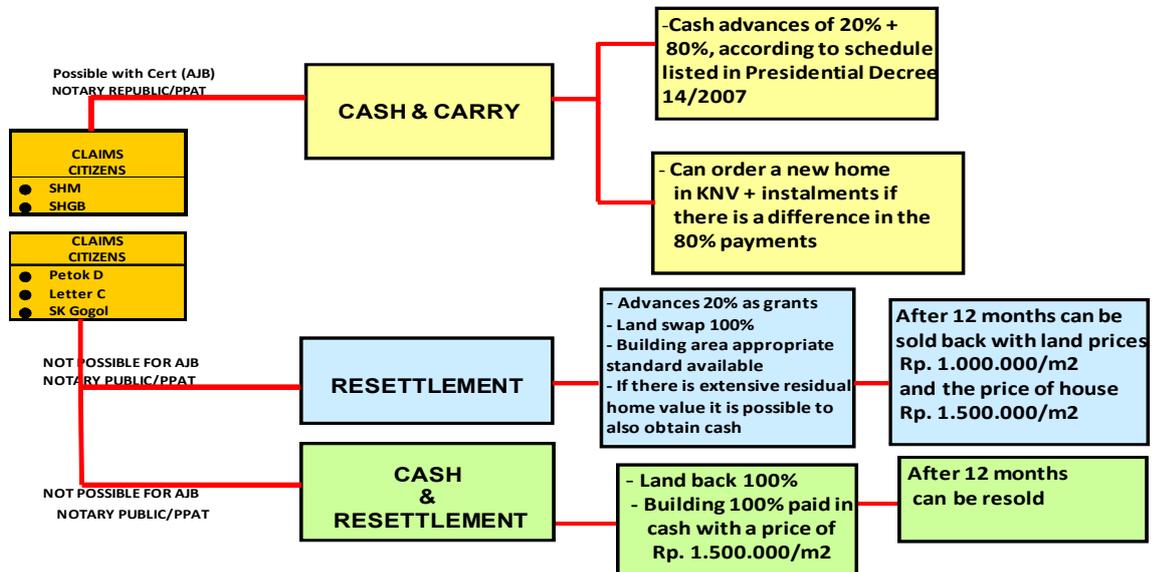
In an agreement signed between Lapindo and one of the victim’s advocates groups – GKLL, two of the key features under this scheme were;

1. Settlement of the remaining 80% of **house** purchase is made in cash and
2. Settlement of the remaining 80% of **land** purchase is made through resettlement scheme

The second scheme was compensation for property lost paid in instalments of Rp 15 million per month without resettlement to new homes. This alternative was still referred to as ‘*cash and carry*’. An agreement was signed between victim’s representatives and Lapindo on the 3rd December 2008 that gave effect to the instalment process for the remaining 80% payment.

This can be seen in the charts below:

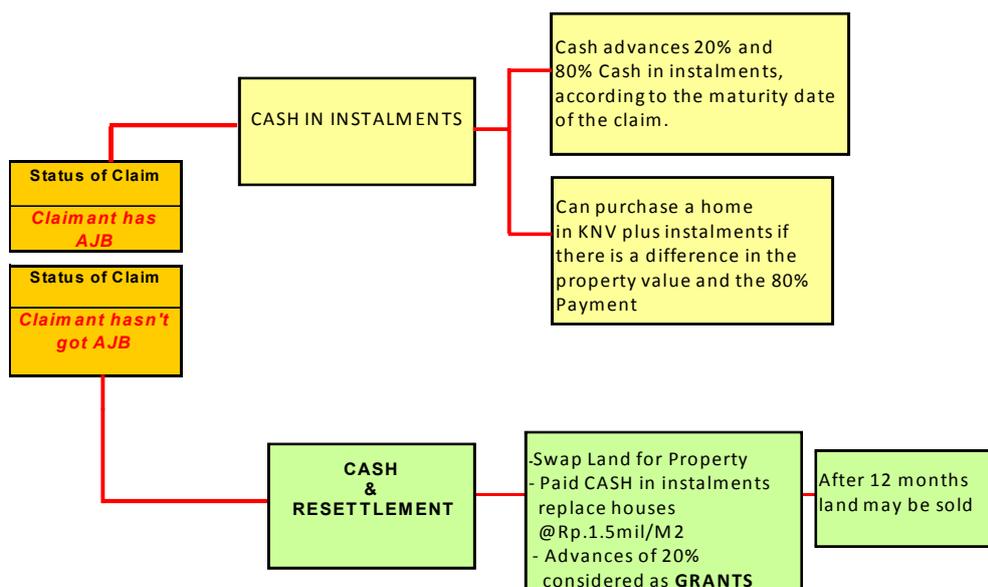
Settlement Scheme of 80% Land & Building Purchase



Note:

- 1) AJB is the certificate of Title for a property that a significant proportion of claimants could not produce.
- 2) The certificate called "Hak Milik" (SHM) denotes ownership rights which are almost the same as freehold. The certificate called "Hak Guna Bangunan" (SHGB) means the right to develop the land and to hold the land for a period of 20 or 30 years, equivalent to land leasehold
- 3) For the cash and resettlement scheme Lapindo agreed to treat the original 20% instalment as a grant and not calculate it as part of the overall settlement amount.

The Scheme of December 3rd, 2008 Agreement



There have been a number of victims groups that have organised themselves to advocate and negotiate compensation deals that suit their particular aspirations. As discussed earlier the different requirements of varying groups was another key reason that Lapindo, in consultation with victims groups, proposed the alternate schemes.

Some of the key groups are;

GEPPRES - '*Movement to Support Presidential Regulation Number 14/2007*'. Members of GEPPRES refused to sell their land under any scheme other than the one stipulated in Regulation 14/2007. Members come from the four villages of (Jatirejo, Kedungbendo, Siring and Renokenongo).

Tim 16 Perumtas (Housing Estate 16 Team) is another group with thousands of members. The majority of members lived in the same housing estate within Kedungbendo village. Members of this group chose the second scheme providing instalments of 15 million rupiah per month.

Pagar Rekorlap or **Wong Pasar** (the Market People) is another group of victims from Renokenongo. Members chose instalments of Rp 15 million /month, although later around 500 households broke away from the group and decided to build a new village and move together to Kedung Solok, land which at that time was used for sugar cane cultivation. They have named the new town Renojoyo. The photograph shown below (fig 20) was taken in this village during a visit by Humanitus and BPLS personnel.



Figure 20 - New village of Renojoyo

GKLL - Lapindo Mud Victims (Gabungan Korban Lumpur Lapindo) accepted resettlement to KNV and compensation paid in instalments. An agreement was made on 25th June 2008 between Lapindo and members of GKLL to join the *cash & resettlement* scheme. A copy of this letter can be seen below:

**NOTA KESEPAHAMAN
PT. MINARAK LAPINDO JAYA
DAN
GABUNGAN KORBAN LUMPUR LAPINDO**
Tentang
**PENYELESAIAN PEMBAYARAN 80% CASH AND RESETTLEMENT
KORBAN LUMPUR SESUAI PETA TERDAMPAK TANGGAL 22 MARET 2008**

Didanari semangat untuk menyelesaikan berbagai permasalahan yang dihadapi korban lumpur, dan dalam rangka membangun kembali budaya masyarakat yang selama ini terabaikan, Gabungan Korban Lumpur Lapindo (GKLL) dan PT. Minarak Lapindo Jaya (PT. MLJ) melaksanakan berbagai upaya untuk mencari solusi yang melegakan kedua pihak.

Melalui pendekatan budaya yang digagas Bapak Emha Ainun Nadjib (Cak Nun) yang telah diberi mandat oleh korban lumpur, telah banyak permasalahan yang terselesaikan dengan *win-win solution*. Salah satu diantaranya adalah tentang penyelesaian pembayaran 80%, dengan kesepakatan dan kesepahaman sebagai berikut :

- Untuk bukti kepemilikan tanah berupa Petok D/ Leter C/ SK Gubernur pembayaran dilaksanakan dengan cara *cash and resettlement*, yaitu :
 - Cash, untuk bangunan Rp. 1,5 juta/m yang dapat dielekan maksimal 2 (dua) bulan setelah penandatanganan
 - Resettlement, untuk tanah dengan perbandingan 1:1
 - Terletak di Kawasan Kelurahan Nirwana Village (KNV), dan di Desa Sembibulu Kecamatan Sukodono (untuk tanah sawah). Tanah sawah dapat dikonversi ke tanah subur dengan perbandingan tertentu.
 - Tanah bersertifikat atas nama masing-masing pemilik yang akan diserahkan maksimal 1 (satu) tahun setelah penandatanganan
 - Tanah kavling dapat serahkan ke pemilik maksimum 8 (delapan) bulan.
 - Tanah dapat dijual kembali ke MLJ dengan harga 1 juta/m setelah 1 tahun dan dijual dengan akas Nohurist.
 - Tanah yang luasnya di bawah kavling yang tersedia akan dilakukan konversi.
 - Uang muka 20% yang telah dibayarkan MLJ ke warga dianggap hibah (tidak dihitung)
- Ketentuan sebagaimana tersebut di atas, berlaku hanya untuk anggota GKLL. Untuk itu mekanisme pencairan akan dilakukan oleh PT. Minarak Lapindo Jaya dengan mendapatkan rekomendasi dari GKLL.
- Pelaksanaan penandatanganan pembayaran 80% dengan *cash and relokasi* dilaksanakan mulai tanggal 1 Juli 2008.
- PT. Minarak Lapindo Jaya akan melaksanakan percepatan pembayaran atas tanah dengan bukti kepemilikan SHM/SHGB bagi warga terdampak sesuai peta 22 Maret 2007 setelah proses *cash and resettlement* selesai, yang mekanismenya akan dikordinasikan dengan GKLL.
- PT. Minarak Lapindo Jaya tidak akan melaksanakan pembayaran *cash and carry* kepada warga korban lumpur yang bukti kepemilikan Petok D/ Leter C/ SK Gogol dalam kondisi dan situasi apapun.
- Hal-hal diluar kesepahaman di atas yang bersifat kondisional, akan dilakukan kebijakan-kebijakan dengan persetujuan kedua pihak yang difasilitasi oleh Bapak Emha Ainun Nadjib (Cak Nun).

Demikian, nota kesepahaman ini dibuat untuk menjadi pedoman kedua pihak.

Sidoarjo, 25 Juni 2008

<p>PT. Minarak Lapindo Jaya</p> <p style="text-align: center;"></p> <p>Andi Darussalam Tabussala</p> <p>Turut Menyaksikan</p> <p style="text-align: center;"></p> <p>Emha Ainun Nadjib</p>	<p>Gabungan Korban Lumpur Lapindo</p> <p style="text-align: center;"></p> <p>H. Djoko Suprastowo</p> <p>Menyetujui, Perwakilan Warga Desa/ Kelurahan</p> <ol style="list-style-type: none"> Bambang Haprianto (Siridjo) H. Suprapto (Jatikerto) Khomsan (Renokenongo) Imron Rosyadi (Kedung Bendo) Agus Cahyo (Kali Tengah) Ishadi (Gempol Sari) Tasrin (Ketapang) Abdul Kodir (Kedungcangkring) Kees Sulaksana (Perumas) Edwin (TCCP)
--	--

Figure 21 Compensation agreement dated 25 June 2008

Figure 22 Map of KNV from April 2009



The Kahuripan Nirvana Village allows victims who desire it, the opportunity to reconnect with community groupings similar to the situation before the disaster. However, this was not for everyone. Some of the victims who had lived and worked in villages where the main occupations were farming or rural based work of some kind found the prospect of living in a large housing estate in the middle of suburbia a daunting and undesirable prospect. There were also issues, particularly within the GEPPRES group, where some victims had already used the prospect of the 80% cash payment as collateral on a loan for a new property. Should the cash then not become available they would face the prospect of losing the money they had already invested to date. So whilst it was an excellent alternative for many it needed to be selectively applied. Lapindo did address these concerns to the best of their ability given the financial conditions of 2008/9, by providing the instalment payment option of Rp 15 million per month for the 80% payment.

Humanitus personnel in an interview with residents of KNV also found that residents have an issue concerning the certificate of title (AJB) for their houses in the KNV. Most have not received this certificate apparently because of a dispute between Lapindo and the Estate developers. This situation needs to be resolved as the residents require certainty of title for peace of mind and the ability to sell the property or apply for bank loans.

In an excellent study entitled - ‘*Gap between Victims’ Preferences and Housing Compensation Schemes after the Mudflow Disaster at Sidoarjo in Indonesia*’ By Turniningtyas Ayu RACHMAWATI, Chikashi DEGUCHI and Tetsunobu YOSHITAKE from the University of Miyazaki the authors look at, among other things, the housing relocation preference of victims.

As part of this study a questionnaire by direct interview was performed with 100 affected families at the PT Lapindo office at the time they received the initial 20% compensation payment.

The first question from this survey we will look at is the type of ownership that the two distinct groups of victims had. The victims for the sake of this study are placed into either those coming from an affected village (V) or Housing Estate (HE). This can be seen in table 25 below

Table 25 Land ownership

Land ownership	V	%	HE	%
Private (<i>Hak Milik</i>)	15	21	-	
Lease (<i>Hak Guna Bangunan/HGB</i>)	-		29	100
Lease (<i>Hak Pakai</i>)	-		-	
<i>Petok D</i>	56	79	-	
TOTAL	71	100	29	100

The meanings of “*Hak Milik*”, “*Hak Guna Bangunan/HGB*” and “*Girik*”/”*Petok D*”/”*Letter C*” were explained earlier in this section. “*Hak Pakai*” means the right to use land for a specific purpose for a definite period up to a maximum of 10 years, similar to tenancy

This table clearly demonstrates the requirements for alternative forms of proof of ownership other than the certificate of title with 79% of villagers having only the tax receipt *Petok D* as proof. It also clearly highlights the differing circumstances between Villagers and Housing Estate residents.

The study also looked at factors influencing relocation preferences. These preferences were classified into five categories and the respondents again classified into Villagers and Housing Estate residents. The responses can be seen in table 26 below.

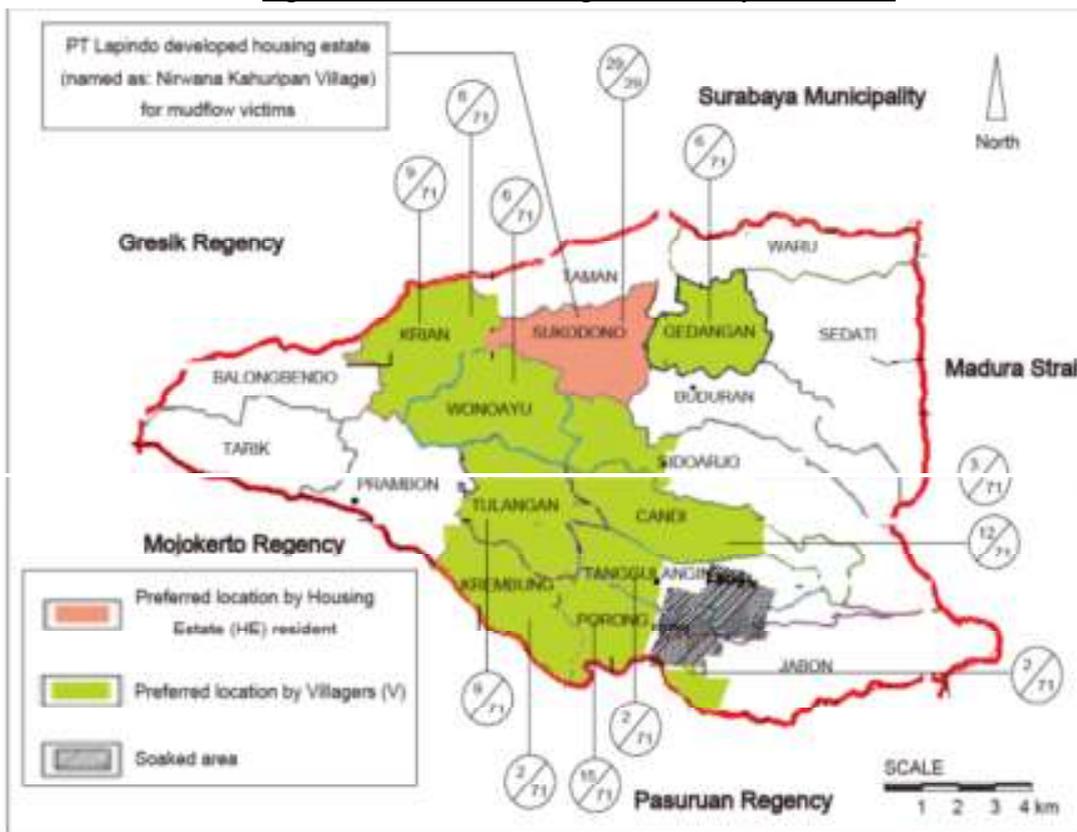
Table 26 Factors for relocation

FACTORS FOR RELOCATION	VILLAGERS	%	HOUSING ESTATE RESIDENTS	%
Price	0	0	15	51.8
Workplace	0	0	5	17.2
Accessibility	0	0	5	17.2
Environment	20	28.2	4	13.8
Near Relative	51	71.8	0	0
TOTAL	71	100	29	100

Again we can clearly see the differences between the preferences of Villagers and Housing Estate residents, with 100% of Villagers in the sample choosing either the environment or being near relatives as the main driving factors and Housing Estate residents having a variety of desires regarding the choice of location, although with the majority choosing price as the main factor. The differences can be explained in part due to the economic situations of the two groups with Villagers generally earning their living from a rural or semi rural occupation and Housing estate residents being generally employed in an urban setting.

The following figure 23 shows this clearly (the denominator 29 being HE residents and 71 being V).

Figure 23 Victims housing relocation preferences



We can see from this that Housing Estate residents from the survey preferred the area of Sukodono, near the centres of Sidoarjo Regency and Surabaya Municipality. This most likely reflects the location of their work places within the urban environment. Villagers however, prefer to be near their original locations and communities within more rural or semi rural environments.

This study although small in sample size shows clearly the disparate needs of individuals and families of varying socio economic or cultural circumstances.

Another impact of the disaster on housing in the area has been significant artificial fluctuations in property values. Initially property values surrounding the eruption zone dropped to almost zero as properties with the prospect of being inundated by mud were of course seen to have little or no value. As victims began receiving compensation and looking for new areas to live some property prices in other areas around Sidoarjo increased in value in response to higher demand. Property values around the disaster area are today still depressed due to uncertainty and potential dangers of subsidence and gas emissions.

In a Paper entitled '*Displacement and Changing Gender and Intergenerational Relations: Experience of Hot Mudflow Affected Families in East Java, Indonesia*' by Achmad Uzair Fauzan and Bosman Batubara, the authors conducted a number of interesting interviews which provide some insights into the issues already mentioned here. Some of these interviews are shown here:

...all of the respondents are from families which still do not have permanent residence or do not have new house on ownership basis. Of 19 families interviewed, 9 now live in formal settlements or perumahan (7 of them rent houses in the same compound) located less than 3 km away from the eruption site and where many of houses built are vacant. 2 others decided to live on the same roof with their extended families, and the rest rent house in different villages (kampong).

Many of the partners interviewed admitted that, since they could no longer stand staying in a refugee camp and needed to find their own family place, they did not thoroughly discussed about choices of place to stay. In this situation, it was the males who mostly decided where to live while waiting for the compensation to be paid. Among the husbands, several factors which determined their choice of place to stay are the rent price, immediate availability of houses to rent, and existing networks of mud victims. Considering those three factors, most of them concluded to move in to the same formal settlement called Perumtas II Tanggulangin. "Moving in this settlement would keep us informed about what happened with our compensation, since many mud victims now live around this settlement complex," said Khoirul.

Moving in to formal settlements which are geographically not far from their native village also facilitated them to stay connected with their old social bonds. "I do not want to move away from here, because I want my child to stay in the same school with the same friends. Although his school would likely be closed since the number of students kept declining after the eruption," said Mulyadi whose son was at grade 3 when they had to flee their home. Maesaroh, a mother of three grown-up children, said that she like moving in this perumahan settlement to live next to her siblings who had rented houses before her. "It is good to stay closer to families, since we can comfort each other if we have something to meet," she said.

Meanwhile, for those who chose to stay further away from their original village, they did so to get closer to the place where they still work (majority of families chose to stay in Perumtas II now have no permanent jobs after the factories where they used to work are now closed down because of the mud). Many of these respondents realized that their decision is at the expense of losing social networks they used to have. Sumiati, a grandmother who followed her son in law to move to a different sub-district (more than 10 km away from their original village), admitted that she now has no immediate social networks. "I remembered clearly when we had mass demonstration in Jakarta. Here, I do not know the progress of our struggle (for compensation). Please let me know if there is a meeting of mud victims. I would love to come," asked Sumiati to us. Feeling of losing social environment was also shared by Sumiati's husband. She said that her husband now spends more of his time in the mosque to comfort himself.

Materials buyback scheme

The materials buyback scheme is part of the overall Building compensation scheme and as mentioned earlier in this report is a supplementary program to the sale and purchase of affected property in Besuki, Kedungcangkring and Pejarakan. The Program operates whereby the government sells back the housing materials (bricks, tiles, wood, etc) to the claimants for 1.5% of the compensation sale price. The 1.5% is not paid by the resident but is instead deducted from the compensation to be received. It is then the responsibility of the resident to demolish the property and sell or store the materials in a new location.

The social impact of this scheme is twofold. Firstly it is a generous scheme as can be seen by the take-up rate of over 92% by residents in these affected villages and so allows residents who have the time, desire and physical ability to have short term lucrative employment (i.e. the demolition and materials sales of their properties). Secondly it creates a large supply of second hand building materials and new entrants into this market creating more employment opportunities.



Figure 24 Besuki village demolition process

6.2.0 Health

One of the most critical aspects of maintaining a healthy community is the provision of a clean drinking water supply. Many clean water sources for residents surrounding the disaster area were polluted or damaged by the eruption and mud flows. As a result BPLS is providing clean water to residents in 12 villages, namely Siring, Jatirejo, Renokenongo, Kedungbendo, Ketapang, Kalitengah, Gempolsari, Glagaharum, Besuki, Kedungcangkring, Pejarakan and Mindi. Clean water intended for drinking is provided to the communities at a rate of 20 litres per person per day.

The tables below show the volume of clean water delivered from the start of the program in 2008 up to 2010.

Table 27 Volume of Clean Water Delivery 2008

	Month	Volume (m³)	Nominal (Rp)
	April	223	4,014,000
	May	422	7,596,000
	June	416	7,488,000
	July	1,327	23,886,000
	August	1,310	23,580,000
	September	1,511	27,198,000
	October	2,290	41,220,000
	November	2,114	38,052,000
	December	678	12,204,000
	Total	10,291	185,238,000

Source BPLS Website 2011

Table 28 Volume of Clean Water Delivery 2009

	Month	Volume (m³)	Nominal (Rp)
	February	540	9,720,000
	March	1,128	20,304,000
	April	1,259	22,662,000
	May	1,062	19,116,000
	June	1,064	19,152,000
	July	1,131	20,358,000
	August	1,118	20,124,000
	September	1,987	35,766,000
	October	2,189	39,402,000
	November	2,061	37,098,000
	December	350	6,300,000
	Total	13,889	250,002,000

Source BPLS Website 2011

Table 29 Clean Water Distribution in 8 Villages - status 30 September 2010

Village	Volume of clean water (m ³)								Total
	Feb	March	April	May	June	July	August	Sept	
District. Tanggulangin									
Village Ketapang	54.00	87.00	77.00	83.00	85.00	124.00	110.00	113.00	733.00
Village Gempolsari	60.00	110.00	105.00	100.00	105.00	100.00	105.00	109.00	794.00
District. Porong									
Village Pamotan	193.00	341.00	341.00	300.00	346.00	377.00	392.00	376.00	2,666.00
Village Gedang	105.00	175.00	150.00	140.00	150.00	175.00	190.00	150.00	1,235.00
Mindi Village	147.00	246.00	249.00	239.00	273.00	297.00	275.00	262.00	1,988.00
Village Glagaharum	55.00	85.00	95.00	70.00	80.00	75.00	65.00	65.00	590.00
District. Jabon									
Besuki Village	40.00	50.00	60.00	55.00	50.00	25.00	45.00	40.00	365.00
Village Keboguyang	0.00	15.00	5.00	10.00	15.00	35.00	10.00	0.00	90.00
Total	654.00	1,109.00	1,082.00	997.00	1,104.00	1,208.00	1,192.00	1,115.00	8,461.00

Source BPLS Website 2011

Over Rp 600,000,000 has been spent on clean water delivery to these 12 affected villages. BPLS continue to monitor water quality in the surrounding communities and use a number of measuring instruments to test water quality such as; pH meter, DO (Dissolve Oxygen) meter, TDS, Salinity and EC (Electrical Conductivity / Electrical Conductivity) meter, etc.

Prior to the eruption many residents would have used bore water of varying quality and so if looking at this water delivery program in a positive light (setting aside the economic cost to the Government) it could be argued that in a small way this is a positive outcome for some affected residents.

Figure 25 Water container in affected area



Another area of concern is air quality as a result of leaking gases such as H₂S and methane. It was mentioned earlier in the report about the dangers of utilising natural flammable gasses in the home with the possibility of leakage and subsequent explosions. Bubbles are a concern in relation to air quality as they can be associated with harmful gas emissions. BPLS figures show that at the end of October 2010 there were 77 active bubble areas of varying size and intensity.

In a recent article *Mudflow victims education neglected by Indra Harsaputra* concern was expressed about methane gas. The article focused on the health of students at two elementary schools and two kindergartens in Pejarakan and Besuki villages, which had at that time, yet to be relocated.

Every day students and teachers have to breathe in methane and face the looming threats of the hot mudflow," said Mochamad Solichin, head of Jabon district where the two villages are located. Students and teachers at SDN Pejarakan state elementary school in Jabon have complained of trouble using lavatory facilities due to the presence of gas in the bathroom, which reportedly began at the end of September.

Student Ahmad Syarifudin, 10, appeared uneasy when it rained during a lesson. He said he could not urinate until the rain subsided. "I cannot stand being in the bathroom because every time it rains the smell of gas makes my chest hurt. I can only urinate behind the school or run to a resident's house when the rain subsides," he told The Jakarta Post Thursday.

The Feasibility Assessment and Settlement taskforce, formed by former East Java Governor Imam Utomo in 2008, said water from hundreds of resident's wells around the mudflow area was not fit for consumption because it had been contaminated with chloride, sulfate, natrium, magnesium and calcium. In addition to contaminated wells, the team also warned that hazardous exposure to methane gas could cause cancer and death (as discussed earlier BPLS is addressing this problem with thousands of litres of clean water being delivered to affected communities every day).

Methane was initially detected in Siring Barat district in Porong in early April 2008. Five people were killed and five others were rushed to the hospital for breathing disorders triggered by inhaling the gas. Sepuluh Nopember Institute of Technology (ITS) community environment and sanitation expert Eddy Soedjono said methane emitted from the mudflow is not only flammable, it could also accelerate the global warming process, thereby making its impacts not only harmful to mudflow victims, but also the international community. "Based on research conducted by ITS, methane contents emitted from the mudflow are much more dangerous than the carbon monoxide emissions of vehicles in Surabaya and Jakarta combined," Eddy said. The government had compensated many residents in Pejarakan, but had not paid attention to public facilities, especially schools around the Lapindo mudflow area, Mochamad Solichin said. Sidoarjo regency council mudflow special committee member Zainul Lutfi urged the government to immediately take swift measures to relocate the schools in order to prevent disruption of the teaching and learning process.

Apart from some isolated incidents centred on significant emissions of gas, to date we are not aware of any studies that show a general elevation in physical health issues associated with the mud volcano. However, we would recommend a study be conducted, involving hospitals and medical centres, of health complaints in the general area to ascertain whether there is in fact any elevation in respiratory or other health issues.

From talking to those affected and reviewing a number of interviews it is clear that stress associated with the loss of houses and/or livelihoods is a significant mental health problem which also needs to be better addressed by both National and local Governments.

As part of the social assistance commitment Lapindo and BPLS provide free medical care to victims of the mudflow at a cost to date of Rp. 2,986,210,248. The table below shows the treatments funded by Lapindo to 2010. We cannot say whether these numbers are related in any way to LUSI as we do not have access to medical records.

Table 30 Medical Treatment funded by Lapindo

NO	Medical Centre/ Clinic/Hospital	Out Patient	In Patient	Hospitalised
1	Public Hospital Sidoarjo	678	390	1
2	Medical Centre Porong	49,655	604	2
3	Ambulance	5,730		
4	Hospital Bhayangkara	1,789	359	
5	Medical Centre PKS	1,783		
6	Medical Centre PAN	344		
7	Medical Centre Marinir	488		
8	Hospital Siti Hajar		14	
9	Hospital Delta Surya		9	
10	Public Hospital Dr. Sutomo		13	
11	Kesdam (Military health post)	116		
	TOTAL	60,583	1,389	3

PowerPoint presentation *CORPORATE RESPONSE & HUMAN NEEDS EAST JAVA MUDFLOW DISASTER Nov 2010*

6.3.0 Education

With the financial support of Lapindo, BPLS assisted school children from displaced families in New Porong market to get to school. This was done by providing vehicles from the Sidoarjo Government and the army to shuttle them to school. To date Lapindo has spent around Rp. 435,114,000 on this and other education programs.

The mud has inundated over 33 schools in the area and disrupted the lives and schooling of thousands of school children. A number of schools have been relocated to safer locations but there is still a lot of work for governments to do to protect society's most valuable assets – Its children.

6.4.0 Employment and Skills Training

BPLS has initiated a number of employment and skills training programs for victims of LUSI. In November 2010 Humanitus personnel toured a number of training facilities and spoke to managers and trainees from affected areas.

We visited the Balai Pengembangan Industri Persepatu Indonesia (BPIPI) factory where 160 mudflow victims had been sent for training in shoe making by BPLS in 2010. The training is funded by the Indonesian government and we were told that 100% of participants who completed the training program were able to find work.



Figure 26 BPIPI training facility – Tanggulangin, Sidoarjo

We also visited the Young Tree Shoe making Factory where about 40 victims of the mudflow were working. Workers received around one million rupiah per month in wages and the manager there stated that there were jobs available for many more should they want it. One of the problems she mentioned however was that the distance from victims homes tended to be a barrier to them finding more workers from the affected areas. This highlights the fact that many victims, particularly from villages, have traditionally earned an income either from within the village area or surrounding fields and the prospect of a long commute to a factory environment is unappealing.



Figure 27 Young Tree shoe factory, Sidoarjo

In the following tables 31 from BPLS we can see the numbers of participants in the training programs funded by BPLS.

Table 31 Skills Training Year 2008

Type of Training	Total Force	Number of Participants
Sew upper shoes	7	280
Gold Trades	1	40
Processed food	3	120
Total	11	440

Source BPLS Website 2011

Table 32 Skills Training Year 2009

Type of Training	Total Force	Number of Participants
Sew upper shoes	2	80
Automotive	3	60
Processed food	3	120
Ribbon embroidery	4	160
Methods	1	20
Entrepreneurship	1	20
Sewing machine technician	1	20
Disaster Response	1	30
Total	16	510

Source BPLS Website 2011

Table 33 Skills Training Year 2010 (Until May)

Type of Training	Total Force	Number of Participants
Sew upper shoes	2	80
Ribbon embroidery	2	80
Total	4	160

Source BPLS Website 2011

Table 34 Training Activities

Type of Training	2008	2009	2010
Sewing Shoes	280	80	160
Ribbon embroidery		160	80
Gold Trade	40		
Automotive Work		60	40
Modes		20	
Food Processing	120	120	
Sewing Machine Technician		20	
Entrepreneurship		20	
Disaster Response		30	30
Total	440	510	310

Source BPLS Website 2011

Total Training participants in 2008 to 2010: 1260 People.

A number of other programs have been initiated to enable refugees and those affected by the disaster to improve their lives. For example In 2007 BPLS purchased coconut grating equipment which provided gainful employment to as many as 50 people from Besuki, Mindi, Pejarakan, Kedungcangkring, Gempolsari, and Glagaharum.

BPLS also conduct a number of seminars and meetings to disseminate information which may be of concern to those affected. This includes information on compensation issues, mudflow management, government infrastructure, bubbles and gas emissions etc.

Table 35 Information Dissemination Activities

NUMBER OF VILLAGES.	NUMBER OF TOPICS	NUMBER OF ACTIVITIES	YEAR
9	2	14	2007
10	2	17	2008
18	19	96	2009

Source BPLS Website 2011

Again in the study entitled - *'Gap between Victims' Preferences and Housing Compensation Schemes after the Mudflow Disaster at Sidoarjo in Indonesia'* By Turniningtyas Ayu RACHMAWATI, Chikashi DEGUCHI and Tetsunobu YOSHITAKE from the University of Miyazaki the authors examined the effects on income and employment of a sample of 100 of the people affected by the disaster.

The report classified the victims of mudflow Villagers (V) and Housing Estate (HE) residents. HE residents usually have a better economic status (middle income) than Villagers (middle - low income).

Table 36 shows the incomes of the victims before and after the disaster.

Table 36 Incomes before and after disaster

Income/Month \$US	BEFORE		AFTER	
	V	HE	V	HE
> \$ 200	12	29	8	29
\$100 - \$200	46	0	24	0
< \$100	13	0	39	0
TOTAL	71	29	71	29

We can see that for incomes of more than \$200/month, the number of HE residents was unchanged, while the number of Villagers at this income level decreased from 12 to 8. The proportion of Villagers at \$100-200/month decreased from 46 to 24, but those at less than \$100/month increased from 13 to 39. The regional minimum wage is approximately \$100/month.

The study also looked at changes in victims occupations from before and after the disaster. This can be seen in Table 37 below.

Table 37 Occupations of respondents

OCCUPATION	BEFORE		AFTER	
	V	HE	V	HE
Government Officer	6	19	6	19
Employee/Staff	11	6	9	6
Entrepreneur	13	0	14	0
“General Store”	19	0	26	0
Soldier	2	4	2	4
Labourer	13	0	3	0
Farmer	7	0	1	0
Jobless	0	0	10	0
TOTAL	71	29	71	29

We can see that for villagers the number of labourers decreased sharply from 13 to 3, farmers decreased from 7 to 1. This is because many factories and fields were submerged. The number of “General Stores” increased from 19 to 26. Almost all of them were street vendors and their original jobs were labouring or farming. These results show that for villagers in particular mudflows not only flooded houses but also caused unemployment, leading to decreased financial capacity.

Thousands of workers from the around 30 factories affected by the mudflows have also been impacted by the disaster. Some of the factories have been moved or rebuilt and some compensation paid to factory owners (although disputes are still ongoing regarding compensation) and workers. An example of this is that Lapindo has paid Rp 700,000 per month to around 2280 workers at a cost of Rp 6,188,800,000.

Infrastructure projects such as the mud mitigation work and work on new roads etc have provided some new employment opportunities for those affected by the mudflow. BPLS has a policy to employ as many mudflow victims as possible for these projects.

6.5.0 Environment

There is no doubt that the environment has been damaged and could continue to be damaged by this disaster. A huge area of productive land has been buried under tons of mud and there are increased dangers of flooding due to the kilometres of dike walls that surround the mudflow. Subsidence has been a problem and no doubt will continue to be in the future. However, perhaps the two most critical areas of concern are air and water quality. Air quality is affected by the potentially hazardous gasses being emitted from deep underground. Water is ejected along with the mud and also has the potential to contain hazardous materials.

There are diverse opinions on the hazardous nature of both air and water in the surrounding environment. It is clear however that fresh water sources such as wells have been affected. As discussed earlier BPLS are supplying fresh water to many villages as a result.

The toxicity of the mud and water being pumped to the Porong River and the air quality surrounding the affected area are somewhat more contentious issues. There appear to be differing views regarding mud, water and air quality.

A report entitled '*Environmental Impact of the hot mud flow in Sidoarjo, East Java*' by Agustanzil Sjahroezah concluded that in relation to air quality:

The Ambient Air Quality Monitoring refer to SK Gubernur Jatim No. 129 Year 1996 about Threshold Limit Value (TLV) of Ambient Air.

There are 9 parameters (SO₂, CO, NO₂, O₃, Dust, Pb, CH₄, H₂S, NH₃), only 1 parameter (NH₃) is above TLV. Monitoring of ambient air quality was conducted at 25 locations, but ammonia only present at one location only which was above TLV, however, there were other factories at that location.

The report also looked at the toxicity of mud samples and concluded that the mud was not toxic:

96hr-LC50 (Analyzed by Sucofindo):

- Test Result : 96 hr - LC50 is 70,631.75 mg/L
- Conclusions: The mud is non toxic (SWAN, JM, NEFF JM & YOUNG 1994)

96hr-LD50 (Analyzed by Bogor Labs):

- Test Result : Mud LD50 > 31250 mg/Kg BW.
- According to PP 18 Year 1999 jo. PP 85 Year 1999, the mud is not classified as hazardous material (LD-50 > 15000 mg/Kg-BW)

Table 38 Mud Toxicity Test

Component	Test Result (mg/l)	Standard*
Arsen	0.045	5
Barium	1.066	100
Boron	5.097	500
Lead	0.05	5
Mercury	0.004	0.2
Cyanide	0.02	20
2, 4, 5 Trichlorophenol	0.017	2
2, 4, 6 Trichlorophenol	2	400

* Standard based on PP No. 18/1999 jo. PP No. 85/1999

The report also analysed water in the ponds for such things as Temp, pH, H₂S, NH₃N, COD, Phenol, Oil and fats, etc and concluded that; *treatment was needed for elevated levels of COD (Chemical Oxygen Demand) TDS, TSS, BOD and Phenol.*

Another report entitled *Auditing the Hot Mud Eruption In Sidoarjo, East Java, Indonesia with Environmental Perspectives - A paper prepared for the Eleventh Meeting of INTOSAI-WGEA, Arusha, Tanzania, on June 28, 2007*. Was much more critical of the quality of the discharge into the Porong River and stated:

A giant volume of unprocessed mud that was pumped into the Porong River had significantly decreased the water quality therein through contaminating it with hazardous chemicals such as phenol, H₂S, and hydrocarbon (table 39).

Table 39 - Mud and Water Parameter Measurement

Parameter	Measurement
DHL	4475-6500 um/cm
COD	2350-2525 mg/L
Phenol	10,37-13,17
Chrom (VI)	0.033-200,036 mg/L
Chrom Total	0.21 – 0.93 mg/L
Amonia	4,460 -6,557 mg/L
H ₂ S	0.007-200.008 mg/L

Source: Brawijaya University Report on Environmental Impacts Assessment of the Mud Flow, 2006

In the 2008 US Geological Survey report entitled - *Preliminary Analytical Results for a Mud Sample Collected from the LUSI Mud Volcano, Sidoarjo, East Java, Indonesia* The authors analysed a sample of water and mud from LUSI and concluded:

*The analytical results for a single 1-liter sample of the LUSI mud and separated water **are not representative** of the likely substantial variations in composition of the more than 30 million cubic meters of mud that have erupted to date. Further, the mud sample is **likely not fully representative** of all the mud that was erupting at the time of collection. Given these caveats, the analytical findings to date provide some intriguing insights into the potential environmental behaviour of the mud that was erupting at the time of collection, and its characteristics of potential environmental and health concern. The solid component of the mud sample does not contain highly elevated levels of potentially toxic heavy metals. Nor does the mud sample appear to have any substantial potential to generate acid drainage due to sulfide oxidation. However, several elements, most notably arsenic, are present in concentrations in the mud that exceed USEPA 9 remedial guidelines for residential soils but that are near or below average U.S. soil concentrations. Analyses have identified a complex mixture of organic compounds likely to have been derived from petroleum source rocks. Further analyses are needed to determine*

whether concentrations of any of these organic compounds exceed known soil guideline concentrations. Particle-size analysis suggests that if erupted mud similar to the analysed sample is dried and disturbed to produce dusts, then a substantial component (around 45 percent) of the mud is of sufficiently fine size to be respired into the deeper portions of the respiratory system. Also, a substantial component of the mud sample is of sufficiently small size that it could be inadvertently ingested via hand-to-mouth contact, particularly by younger children playing in or otherwise coming into contact with wet or dried mud. Water that is derived from settling mud deposits may have the potential to adversely affect the quality of surface- or ground-water sources for drinking water, through the effects of several constituents such as fluoride, nitrate, iron, manganese, aluminium, sulfate, chloride, and total dissolved solids. Of these, fluoride and nitrate are perhaps of the greatest potential concern due to their elevated concentrations in the waters. Some proportion of the erupted mud is presently being channelled into the Kali Porong waterway, where it is eventually carried to the ocean. In addition to the effects of the mud on these aquatic ecosystems from a particulate or physical-sedimentation standpoint, further work is needed to see if any mud components pose a specific chemical threat to aquatic organisms that inhabit portions of the river and ocean affected by the mud. For example, toxicity testing of the mud and separated waters may provide insights into whether particular constituents pose toxicity threats to some aquatic organisms. Stable hydrogen and oxygen isotopic composition of the waters accompanying the mud are fully compatible with an origin as sedimentary formation waters. This result indicates that, at least at the time of sample collection, the mud eruption did not have a significant component of magmatic waters.

BPLS personnel are regularly monitoring air and water quality in the villages around the eruption site and in the Porong and other rivers around LUSI although we are unaware of any recent comprehensive studies of the water quality at the river mouth.

Anecdotal evidence to date suggests that fisheries have not yet been damaged by the mudflow. However a detailed independent study into the effects of the mudflow on the environment of the river system and the sea surrounding the river mouth is highly recommended. Below in figure 28 is a map showing LUSI on the left and the Porong River to the sea.



Figure 28 Porong River to the sea - BPLS

6.6.0 Government Infrastructure

In addition to the impact that LUSI has had on individuals and their property there has been a significant cost, loss and disruption to infrastructure throughout the area. This includes:

- Gempol/Porong segment of the Toll road
- Railway lines in Porong/Tanggulangin
- The Arterial Road at Siring/Porong
- Pipeline from Umbulan and Pandaan
- Pertamina Gas Pipeline
- Over 30 schools
- Mudflow mitigation costs
- Etc.

The destruction of the Surabaya–Gempol toll road has had a devastating impact. Not only from an infrastructure perspective but also on businesses who transport goods throughout the region.

A new section of the toll road is now under construction and this of course requires further disruption and impact on the local community (see figures 29 and 30). The Government has been forced to acquire land for this construction and have faced protests from residents adjacent to the new route particularly in the village of Kebonagung (where a flyover and bridge over the Porong river are being constructed) wanting compensation for noise and disruption from the construction process.



Figure 29 Construction of new Surabaya–Gempol toll road – courtesy BPLS

Significant disruption has also occurred to major arterial roads in the area, such as Jalan Raya Porong, as a result of increased traffic from the toll road closure.



Figure 30 Plans for Toll and Arterial roads courtesy BPLS

Rail lines have suffered damage due to subsidence and fault movements. The existing single rail line between Surabaya and Malang runs along the western dike and is at risk of being washed away should the dike be breached. As a result in the future an alternative route may need to be found.



Figure 31 Rail line near western dike.

Of course Mudflow mitigation and management has been a major government infrastructure undertaking funded in the early days by Lapindo. BPLS spent Rp 421,634,810,569 in 2010 on infrastructure and Lapindo has spent Rp 1,351,924,034,943 to date on mudflow management.



Figure 32 Mudflow Management

7.0 ECONOMIC IMPACTS

7.1.0 Business & Government

There were hundreds of small businesses and over 30 large factories directly affected by the mudflow, adversely affecting the lives and livelihoods of thousands of people. In addition to the direct impact (destruction, inundation) there has been an indirect impact on many more businesses in East Java.

It is estimated that before the mudflow the Surabaya–Gempol toll road accommodated 20,000–30,000 vehicles per day, including up to 3,000 container vehicles (Yahya 2007). The cutting of the road has heightened congestion on secondary roads to the east and west of the market at Porong and on arterial roads through the centres of Krian, Mojokerto and Mojosari to the west. As a result, the flow of goods and people from Surabaya to the city of Malang and to regions to the east and south of Malang has been disrupted. Transportation times have increased for freight from Malang, Gempol and nearby Pandaan and from Pasuruan bound for Tanjung Perak port at Surabaya. According to a foreign joint venture clothing manufacturer in Probolinggo, road congestion has increased trucking times to Surabaya from four hours before the mudflow to around 10 hours. Up to an extra day is now spent exporting finished product through the port and a further additional day is spent bringing material inputs to the factory. The additional time needed to transport goods to port or obtain deliveries of locally sourced materials implies a considerable financial burden for many companies in terms of the extra fuel used, the overtime paid to trucking operators and the requirement to pay illegal levies for the use of secondary roads. For some shippers, late delivery of goods to the container terminal at Surabaya has incurred additional demurrage costs of up to Rp 600,000 per container. It has been estimated that the mudflow has, on average, increased transport costs for individual manufacturers by 30%, and one Sidoarjo-based housing tile manufacturer claims that costs have increased by 50–60% for its raw materials sourced from the Malang region. (McMichael, Heath (2009)).

Researchers at the Surabaya Institute of Technology (ITS), in collaboration with the Indonesian Environment Ministry, estimate the total cost of the mudflow through August 2007 to be in the order of Rp 28.3 trillion (Rumiati 2007: 36–70). This figure comprises Rp 8.3 trillion in infrastructure asset losses, Rp 5.8 trillion in lost production in the Sidoarjo district, and Rp 14.2 trillion in indirect losses to the provincial economy, especially in food and leather processing, transport and the hospitality industry. Notwithstanding the difficulty of relating these losses to provincial GDP, the ITS–Environment Ministry report suggests that the East Java economy may have contracted by 4.2% between May 2006 and August 2007 (Rumiati 2007: 46–7). The scale of economic loss is borne out elsewhere: according to the author of an unpublished appraisal by the Supreme Audit Agency (BPK) in 2007, estimated total direct and indirect costs of the mudflow in its first year were around Rp 30 trillion. In any event, the economic costs generated by the mudflow are likely to continue to grow substantially. (McMichael, Heath (2009)).

Sidoarjo Regency plays significant economic roles not only for the neighbouring areas such as Surabaya municipality, Gresik Regency in the north, Pasuruan Regency in the south, Mojokerto Regency in the west and Strait Madura in the east, but also for areas such as other provinces in Java and Bali.

The disaster has brought about social and economic losses to the people in the Sidoarjo Regency and surrounding regions and so impacted on businesses and business confidence.

The economic losses and financial costs are summarized in Tables 40 to 45 from *BPK-RI Auditing the Hot Mud Eruption In Sidoarjo, East Java, Indonesia with Environmental Perspectives*

Table 40 Direct Economic Cost¹) 2006 - 2015 (US\$ Thousands)

No.	Cost Component	2006	2007-2015*	Total
1	Lost Assets	131,467	1,729,972	1,861,439
2	Lost Income	16,736	215,547	232,283
	Total	148,203	1,945,519	2,093,722

*15% Discount factor

Table 41 Indirect Economic Cost * 2006-2015 (US\$ Thousands)

No.	Cost Component	Cost	%
1	The Decrease of the value of the asset	1 459,696.84	58.96
2	Decrease of bus income	1.50	0.19
3	Decrease of Small Bus Income	0.23	0.03
4	Decrease of truck income	1.20	0.15
5	The increase of the cost for private transportation	5.70	0.73
6	The Decrease of the hotel income	5.57	0.71
7	The Decrease of Restaurant Income	1.53	0.20
8	The Decrease of the Trade income	2.21	0.28
9	The decrease of the fish Pond owner income	288 ,890.53	37.05
10	The Increase of the cost of maintaining the Porong River	13.20	1.69
	Total	748,618.51	100

* 15% Discount Factor

Table 42 The Economic Cost for Recovering the People in Inundated Area *, 2006-2015 (US\$ Thousands)

No.	Cost Component	Cost	%
1	Increase of the cost to recover the area	281,017	47.68
2	Increase the cost to recover the business	89,452	0.02
3	Increase in the cost to recover the public infrastructure	218,917	37.14
	Total	589,385	100

* 15% Discount Factor

Table 43 Proportion of the Economic Cost Charge *, 2006-2015 (US\$ Thousands)

No	Sector	Conclusive**		No conclusive**	
		Value	%	Value	%
1	Government	247,368	7.14	268,421	7.31
2	State-owned Enterprise	22,105	0.64	106,316	2.89
3	Private Company	102,105	2.95	206,421	5.62
4	People	3,091,158	89.27	3,091,789	84.18
	TOTAL	3,462,737	100	3,672,947	100

* 15% Discount Factor

** Conclusive and inclusive: definite and indefinite Indirect cost,

Table 44 Prediction of the cost for replacement based on the components (financial cost US\$ Thousands)

No	Cost Component (<i>at the end of January 2007</i>)	The prediction value	
		US\$	%
1	The expenditure for land and building :		
	1.Land	127,091	24.6
	2.Building	108,012	20.9
	3.Sub Total	235,102	45.5
2	Replacing employees wages of the inundated companies'	901	0.2
3	The cost for housing and moving:		
	1. To Contract the house	1,665	0.3
	2. Moving	174	0.0
	3. Sub Total	1,839	0.4
4	The cost for social welfare	5,611	1.1
5	The cost for replacing the productive land	47,711	9.2
6	Estimation of the cost to companies	30,865	6.0
7	The cost of infrastructure breakdown	9,140	1.8
	Sub Total 4,5,6,7		
8	Handling the Mud Cost: -		
	1. To Stop the Eruption	84,175	16.3
	2. Surface Management	99,675	19.3
	3. Social	1,272	0.2
	Sub Total	185,122	35.8
	TOTAL	516,291	100

Table 45: Prediction of Economic and Financial Costs to Sidoarjo and the Surrounding Regions in the period of 2006 – 2015

Economic Costs	Estimated Cost US\$ (Thousands)
Direct Economic Cost	2,093,722.53
Indirect Economic Cost	779,730.53
Economic Cost for Recovering	589,385.26
Total Economic Cost	3,462,838.32
Financial Cost	516,290.76
Gap (Economic Cost vs. Financial Cost)	2,946,547.56

Source: Brawijaya University Report on Economy Impacts Assessment of the Mud Flow 2006

Note:

1. Economic Cost: The value of the negative effect to the assets and people's income
2. Financial Cost: The value of cash that has been paid plus commitments
3. US\$ 1 = Rp9.500

It should be noted that the estimates of the difference between economic costs and financial costs to Sidoarjo totalled to US\$ 2,946,547,560. The gap may have to be borne by the people in and around Sidoarjo regency. This gap has decreased their quality of life and slowed the development of the regency. Higher inflation has also been observed.

7.2.0 Tourism

On a visit to LUSI the President of Indonesia Susilo Bambang Yudhoyono suggested that the site could be of interest to tourists and especially geological tourism.

The idea has definite merit and if successful would help to provide a new industry and income for those affected by the disaster. The site is impressive to look at and if it can be proved that the mud is beneficial to the skin (this is being worked on) then a whole new spa/tourism industry could be born.

"The government through the Ministry of Maritime Affairs and Fisheries has set aside Rp 273 billion for geological tourism of LUSI," said Governor of East Java, Soekarwo in Surabaya.

According to him, the location of geological tourist attraction would be located on the north side of the eruption site. "The location has been visited by President Yudhoyono some time ago," he said.

7.3.0 Future Threats

There are a number of future threats to the communities and environment in Sidoarjo as a result of the LUSI mud volcano. We have discussed these in various parts of this report and mention them again here:

- **Another eruption.** The area around East Java is volcanically active and is known to have a number of volcanos and mud volcanos in addition to LUSI. A second large mud chamber near to the one supplying LUSI was identified by Russian scientists through 3D mapping technology. This has the potential to form a new eruption site if exposed to further seismic activity, although much more extensive study needs to be done to confirm this.
- **Continued flow of mud.** Of course we do not yet know when LUSI will stop erupting or indeed at what rate it will continue to erupt. A January 2011 report by the Department of Earth and Planetary Science, University of California, Berkeley, CA USA entitled '*A prediction of the longevity of the Lusi mud volcano*' predicted through analysis and simulations that there was '*...a 50% chance of the eruption lasting <40 years and a 33% chance that it lasts >87 years*'.
- **Contamination of waterways and further contamination of ground water.** BPLS continues to monitor water quality around LUSI and supplies fresh water to over a dozen villages. There is a threat however of potential damage to fisheries in the sea near the river mouth with continued long exposure to LUSI mud. Even if we assume that the LUSI mud is non toxic and remains that way there is still a potential of disruption to fisheries as a consequence of the large artificial island being formed by dredging at the river mouth and the subsequent disruption of water flows and tidal movements. More work needs to be done to examine the potential risks involved.
- **Subsidence.** The subsidence of the entire LUSI eruption site is one potential subsidence threat which could create "Lake LUSI" in the future. However more immediate is the localised subsidence that has been occurring and will likely continue to occur around LUSI. This subsidence has damaged or destroyed billions of rupiahs worth of houses and government infrastructure to date.
- **Gas.** Gasses such as methane and H₂S are a continuing threat to the health of local residents and BPLS must be vigilant in their monitoring of this situation.
- **Health issues.** Contaminated air and water are issues, as mentioned, as is the emotional/mental health of those affected.

7.4.0 Opportunities

There are few potential opportunities from a disaster such as this. However there are some that cannot be overlooked.

We have already mentioned the potential for geological tourism associated with the LUSI site and this is being actively explored.

Another potential opportunity is the utilisation of the mud as a cement replacement material. That is using the mud as an alternative additive to cement. In a March 2010 report entitled *Sidoarjo mud: a potential cement replacement material* By Civil Engineering Dimension, M.F. Nuruddin, R. Bayuaji, M.B. Masilamani, T.R. Biyanto the authors concluded after extensive study that the mud could be utilised as a cement replacement material with 10% replacement as the optimum value. It stated that the mud can improve the compressive strengths, integrity and was able to reduce the porosity of mortar. Nevertheless, its influences on tensile, porosity and integrity are small as compared to compressive strength. Utilization of this material, as cement replacement material, that is available in abundance in Sidoarjo can not only mitigate social and environmental problems but also improve concrete properties.

There is also a study planed¹ (see below) regarding using the mud as a component for brick making. Mud bricks have been used successfully as a building material for centuries and are still used today in many new alternative construction projects in parts of Australia and the rest of the world. One of the key benefits of mud brick is its insulating properties, keeping the house cool in hot weather and warm in colder conditions (although the cold is not an issue in most of Indonesia!). One of the drawbacks of mud brick is that it performs best in a drier climate as it needs to be protected to a degree from heavy rain and moisture (which occurs frequently in tropical climates). However if this issue (and any toxicity issues) can be overcome either through house design or composition of the brick then this could be a valuable resource for the area.

Finally one of the key opportunities for the Government, as with all disasters, is the ability to learn from the handling and response to LUSI and improve procedures and policies accordingly.

Note 1: "Sidoarjo Mud Development as a Component Building to Support the Provision of Health House Simple ": Institute for Building Materials, Research Centre for Resettlement, Ministry of Public Works. Studies to assess the utilization of Sidoarjo mud as a raw material for the use of mud brick and reduce environmental impact.

8.0 CULTURAL IMPACTS

8.1.0 Community Ties

Perhaps the most devastating and defining aspect of this disaster, as opposed to others, has been the loss of community experienced by the victims. Indonesian people in general have a very strong sense of community and in particular local community. Families often live for generations in the same village or at least in close proximity to that village. Also people not only make their homes there but many also operate small businesses and earn their incomes directly from the village and its surrounds. When the spewing mud from LUSI inundated entire villages and indeed regions, it became increasingly clear that victims would never be able to move back even to their land let alone the houses that once stood there. This meant that no matter what level of financial compensation was received the community was still to a large extent lost.

Some initiatives have helped to mitigate this to a degree. An example of this is when around 500 households, who were originally from the village of Renokenongo, broke away from the victims group '*Wong Pasar*' and decided to build a new village and move together to Kedung Solok, land which at that time was used for sugar cane cultivation. They have named the new town Renojoyo.

The Kahuripan Nirvana Village housing estate established by Lapindo also goes some way to addressing this issue by at least providing a place where people from devastated villages can remain in close proximity to former friends, family and neighbours.

8.2.0 Ceremonies

In a 2009/2010 article by Bosman Batubara entitled - *The victims of the Lapindo mudflow disaster continue to assert their rights to compensation*. He talks about the disruption caused by LUSI in relation to ceremonies surrounding a drowned cemetery;

To the west of the 'football field' we came to a place where the mud has buried an entire cemetery. In the daytime, many villagers come here to recite prayers. Although it is no longer visible under the mud, the villagers have erected a sign to mark the exact spot above the grave of KH Anas Al Ayyubi. Al Ayyubi was a local man and leader of the respected Islamic organisation Nahdlatul Ulama (NU). Nyai Dewi, his wife, said that the government had asked the family to relocate the cemetery somewhere outside of the levees, but they refused because they thought it would be wrong to move those who have been buried.

On a different occasion, during a nyekar ceremony held before the Muslim fasting month in 2009, I again witnessed the people of Porong using memory as a form of social resistance. Derived from sekar, a Javanese word meaning flower, nyekar is a Javanese tradition of visiting ancestors' gravesites. Before the mudflow disaster, villagers would visit the cemeteries one or two days before the fasting began. But in recent years, since the cemetery has been swallowed by mud, villagers have only been able to observe nyekar while standing and praying on the levee above it.

9.0 CONCLUSIONS, RECOMMENDATIONS AND SUGGESTIONS

The social impact of this disaster has been devastating to thousands of Indonesians affected by the mud flow in the Sidoarjo region. Over 40,000 people have lost their homes, government infrastructure and the regional economy has been severely impacted, thousands more have lost property, employment and in some cases their lives.

Thousands of compensation claims have been made and the entire compensation process has been plagued with difficulties and controversy over the past 4.5 years.

Lapindo, who were initially blamed for triggering the eruption but have all along claimed that the trigger was not related to the operation of the Banjar Panji 1 exploration well, have nevertheless paid out almost six trillion rupiah (US\$ 600 million) in compensation and mud flow mitigation costs.

The government through the mud mitigation agency BPLS has also spent trillions of rupiah on mud flow mitigation, infrastructure, social recovery and compensation and have an ongoing commitment to spend trillions more over the coming years.

We find that, whilst compensation in relation to the purchase of land and buildings by Lapindo has been significantly behind schedule, the vast majority of claims have now either been paid in full or are currently receiving progress payments. Of the **13,143** claims that are currently able to be processed for the final 80% compensation payment (either through cash or resettlement), **196** are still pending (as a result of disputes, verification, etc) and **12,947** have been paid or are in the process of being paid. This is not to say that there are not still some outstanding issues with the compensation process. For example there are some technical issues with the regularity of the final 80% instalment payments for some claimants and an issue with the handover of the AJB by the developers of the Kahuripan Nirvana Village housing estate to residents there. Lapindo is aware of these issues and have assured us that they are working to solve them as expeditiously as possible.

Badan Penanggulangan Lumpur Sidoarjo (BPLS) also appears to be meeting its compensation commitments to victims as stipulated in the various Presidential regulations handed down in the last few years. As with the Lapindo compensation process there are however still disputes and problems with some claims relating to land verification, classification, etc.

We found BPLS staff in general to have a genuine culture of concern and compassion for the victims and for the enormous tasks of infrastructure relocation and mud flow mitigation that they are faced with.

The political situation surrounding this disaster has been extremely complex and controversial. However there are lessons that the Indonesian Government can learn with the benefit of hindsight. Putting aside the political difficulties at the time (a very difficult thing to do) we believe that the interests of the victims would have been better served by the government controlling the compensation process under existing disaster legislation and then holding Lapindo to account should the government have believed that they were responsible.

Indonesia is a country prone to natural disasters that have the potential to destroy and damage property and another lesson that can be learned from this mudflow disaster is that it is important for ordinary citizens to certify land tenure. This issue has caused extensive problems for victims and will continue to be an issue in future disasters unless people are made aware of the importance of securing their land tenure documentation.

The ongoing health of the people living and working around the area is also of some concern. The issues of most concern are air and water quality and stress related problems. Whilst air and water quality are being monitored regularly by BPLS staff it would, in our opinion, be useful for a longer term study to be conducted with the cooperation of hospitals and medical centres in the region to assess the potential longer term affects of exposure to the altered environment.

Environmental concerns also remain and in particular the issue of the volume of mud being pumped into the Porong River and its effects on the shrimp and other fisheries at the river mouth. Anecdotal evidence to date suggests that fisheries have not yet been damaged by the mudflow. However a detailed independent study into the effects of the mudflow on the environment of the river system and the sea surrounding the river mouth is highly recommended.

The economy of the region has no doubt been substantially impacted by LUSI and could continue to be for some years to come. We would therefore recommend that the central government should consider an economic stimulus package for the region that focuses primarily on the creation of new career opportunities for residents impacted by the mud flow.

The long term outlook for LUSI is still relatively unknown and more research into the sub surface geography of the area is essential. We would encourage neighbouring governments of the region to seriously consider a financial and/or technical contribution to these important tasks.

10.0 REFERENCES

USGS report from 2008 entitled '*Preliminary Analytical Results for a Mud Sample Collected from the LUSI Mud Volcano, Sidoarjo, East Java, Indonesia*' By Geoffrey S. Plumlee, Thomas J. Casadevall, Handoko T. Wibowo, Robert J. Rosenbauer, Craig A. Johnson, George N. Breit, Heather A. Lowers, Ruth E. Wolf, Philip L. Hageman, Harland Goldstein, Michael W. Anthony, Cyrus J. Berry, David L. Fey, Gregory P. Meeker, and Suzette A. Morman

'Gap between Victims' Preferences and Housing Compensation Schemes after the Mudflow Disaster at Sidoarjo in Indonesia' By Turniningtyas Ayu RACHMAWATI, Chikashi DEGUCHI and Tetsunobu YOSHITAKE from the University of Miyazaki

The Shift Of Housing Prefences Post Disaster Case Study: Lapindo Mudflow Disaster Victims by Turniningtyas A. R.

Sidoarjo mud: a potential cement replacement material Civil Engineering Dimension, March, 2010 by M.F. Nuruddin, R. Bayuaji, M.B. Masilamani, T.R. Biyanto

Muddied Waters: Lapindo Brantas' Response to the Indonesian Mudflow Crisis by Lynette M. McDonald University of Queensland

Article *Mudflow victims education neglected* by Indra Harsaputra

Studi Mikroseismik, Mikrogravity Dan Gradien Temperatur Di Daerah Lumpur Sidoarjo (Lusi), Jawa Timur Badan Meteorologi Dan Geofisika August 2008

Auditing the Hot Mud Eruption In Sidoarjo, East Java, Indonesia with Environmental Perspectives A paper prepared for the Eleventh Meeting of INTOSAI-WGEA, Arusha, Tanzania, on June 28, 2007 – BPK - RI

BPLS PowerPoint Presentation update ***Kegiatan Deputi Bidang Sosial Desember 2010***

BPLS Website <http://www.bpls.go.id/>

'Environmental Impact of the hot mud flow in Sidoarjo, East Java' by Agustanzil Sjahroezah

Article - *The victims of the Lapindo mudflow disaster continue to assert their rights to compensation* - Bosman Batubara

Article - *An unstoppable flow of mud from an explosion in a gas well in Sidoarjo, East Java, has unleashed a plethora of political issues* by Jim Schiller

'Displacement and Changing Gender and Intergenerational Relations: Experience of Hot Mudflow Affected Families in East Java, Indonesia' by Achmad Uzair Fauzan and Bosman Batubara

'Birth of a mud volcano: East Java, 29 May 2006', GSA Today Davies, R.J., Swarbick, R.E., Evans, R.J. and Huuse, M. (2007)

'Triggering and dynamic evolution of the LUSI mud volcano, Indonesia', *Earth and Planetary Science Letters* Mazzini, A., Svensen, H., Akhmanov, G.G., Aloisi, G., Planke, S., Malthe-Sørensen, A. and Istadi, B. (2007)

Yahya, K. (2007) *Tantangan Penyelesaian dan Penanggulangan Lumpur Porong* [The Challenge of Solving and Overcoming the Porong Mud Problem], PowerPoint presentation for briefing to Sidoarjo Mudflow Handling Agency, Jakarta, February 2007

McMichael, Heath (2009) *'The Lapindo mudflow disaster: environmental, infrastructure and economic impact'*, *Bulletin of Indonesian Economic Studies*, 45:1, 73 — 83

Environmental Assessment Hot Mud Flow East Java, Indonesia United Nations Disaster Assessment and Coordination mission in June & July 2006 and Follow-up mission in July 2006

PowerPoint presentation *PT. Minarak Jaya PROGRESS REPORT 20 January 2011*

PowerPoint presentation *PT. Minarak Jaya PROGRESS REPORT March 2011*

PowerPoint presentation *PT. Minarak Jaya LAPORAN PROSES JUAL BELI 30 NOVEMBER 2010*

Bantuan Sosial Kepada Warga dan Jual-Beli Tanah & Bangunan - June 2009

LUSI Research Summary Report August 2010 Russian Institute of Geological Studies and the Institute of Electro Physics [Geo-Research Services]

Pelaksanaan Penanggulangan Lumpur Sidoarjo 11 September 2008 Rapat dengan Tim P2LS DPR RI Kamis, 11 September 2008

Kepada Saudara Tutug Pamorkaton dari harian Surya Jakarta, 22 Mei 2008 Yuniwati Teryana Vice President Relations

PowerPoint presentation *CORPORATE RESPONSE & HUMAN NEEDS EAST JAVA MUDFLOW DISASTER Nov 2010*

'A prediction of the longevity of the Lusi mud volcano' A 2011 report by the Department of Earth and Planetary Science, University of California, Berkeley, CA USA 'Maxwell L. Rudolph, Leif Karlstrom, Michael Manga,