

THE SIDOARJO DISASTER

Clear as mud

It is said that mixing science and politics makes a strange brew. The two are often thought to be polar opposites, with science focused on the pursuit of empirical truth, and politics the pursuit of interests. But as scientists throughout the ages have discovered, politics and sciences habitually collide, sometimes to the detriment of both disciplines. Witness Galileo, the acclaimed 17th Century astronomer, who was tried for heresy in Rome after he proved that the sun revolved around the earth, rather than vice versa.

Indonesia's latter day Galileos, scientists caught up in a whirlpool of interests, are the geologists and engineers who have commented on the Sidoarjo mudflow, known locally as Lusi, a contraction from the Indonesian *lumpur panas*. Emanating from around a commercial gas drilling operation, the mudflow has so far engulfed more than 400 hectares of farmland, homes and businesses, forcing 12,000 people into temporary shelters.

LOCAL AND INTERNATIONAL SCIENTISTS ARE CAUGHT UP IN THE CONTROVERSY OVER THE SIDOARJO MUDFLOW.

But something strange has been happening since the mudflow first began. Almost a year into the disaster, the assessment of what triggered the eruption and who is therefore responsible for its costs has become less, rather than more, clear. While in some ways the scientists may appear to be at the centre of the debate, what has become increasingly apparent is that liability is being allocated through a chaotic process of political negotiation. But, like the mudflow itself, what exactly these negotiations are being based upon remains opaque.

LIABILITY FOR THE MUDFLOW IS CURRENTLY BEING ALLOCATED THROUGH POLITICAL PROCESSES.

As Lusi's one-year anniversary approaches and the term of the government team created to handle it ends, the *Report* takes stock of the current situation. First, it details the current level of compensation paid to the mudflow victims and who is likely to bear the brunt of the disaster's costs. Then it features an interview with three international scientists, who have differing opinions on the trigger of the mudflow (see *The Scientific Debate*, p.13).

The art of escapology

Just three weeks into the mudflow, the residents of Sidoarjo were already beginning to get desperate. Left to watch helplessly as the ever-rising deluge took possession of their homes, some villagers began to frantically dismantle dams to divert its flow. This prompted Indonesia's leaders to swing into action, with Vice President Jusuf Kalla visiting the site on June 20 to calm frayed nerves.

JUSUF KALLA PROMISED SIDOARJO'S RESIDENTS IN JUNE 2006 THAT LAPINDO WOULD COVER ALL COSTS.

Kalla assured the residents that "All losses affecting local residents from the mudflow, such as to their homes, will be borne by [gas prospecting company] Lapindo Brantas ... as well as compensation for the damage to a nearby turnpike, rice fields, schools and other public buildings."

"Whatever the amount asked for, whether it is Rp 5 billion (US\$533), Rp 10 billion or more, Lapindo will pay it," Kalla said.

NOW, WHO WILL BE HELD LIABLE IS NOT SO CLEAR.

Just weeks later, however, that message began to change. At the same time the owners of Lapindo went into emergency mode. But they did not confine their attempts to disaster mitigation and helping the victims of the mudflow; also on their list of priorities was saving their business interests.

AT FIRST, LAPINDO LOOKED IN TROUBLE WITH A PENDING LAWSUIT BROUGHT BY PARTNER MEDCO.

At first Lapindo looked to be in deep trouble. Days after the deluge began, one of its business partners, Indonesian oil and gas company Medco, accused Lapindo of gross negligence in its drilling operations. The company, Medco said, had failed to put proper casing on its well, an industry-standard procedure that some say could have prevented the disaster. Filing for arbitration in the US to prove its case, many believed that as an inside party Medco would be able to produce the evidence necessary to clear up just exactly what happened.

MEDCO HAS NOW DROPPED THE LAWSUIT.

Fast forward to March 2007, and it looks likely that Medco's arbitration will no longer be pursued. Not due to a lack of evidence or a change of opinion, but because Medco's shares and therefore liability were recently bought by a firm owned by the same company that owns Lapindo. In effect, Medco has bargained the lawsuit in exchange for escaping their share of the liability.

LAPINDO'S PARENT COMPANY WAS STOPPED FROM SELLING LAPINDO TO ANOTHER COMPANY.

The purchase of Medco's shares by Lapindo's parent company, Energi Mega Persada (EMP), followed hot on the heels of several attempts to sell Lapindo to other companies also owned by EMP. Blocked by the Indonesian stock market regulator, these attempted sales were seen by many as an EMP effort to escape liability for the mudflow. Others, however, have pointed out that it is "good business practice" to isolate a troubled firm from its parent company.

Were these sales an attempt to reduce EMP's future liability? "It's difficult to say," environmental lawyer Achmad Santoso told the *Report*, "it would depend on the sale agreement."

LAPINDO'S PARENT COMPANY MAY STILL BE LIABLE FOR COSTS EVEN IF LAPINDO GOES BANKRUPT.

The degree to which Lapindo's parent company could be held liable for costs incurred by its subsidiary is vital to the issue. EMP is one of Indonesia's richest energy companies with declared assets worth US\$1.08 billion in 2006. Meanwhile the total cost of the mudflow's compensation and clean up has been estimated as high as US\$800 million. Santoso notes that even if Lapindo declares bankruptcy in the future, the company's costs could be passed on to EMP through a provision in the company law called "piercing the corporate veil."

LIABILITY IS LIKELY TO BE ALLOCATED THROUGH BACK-ROOM DEALS.

However, with Indonesia's recent experience of holding the shareholders of troubled companies to account, one cannot be too optimistic. In the aftermath of the 1998 Asian financial crisis similar attempts were made to pass responsibility for huge debts to the shareholders of companies and banks. At that time, some shareholders did accept responsibility. But most tellingly, the process through which this occurred relied on non-transparent deals between the government and the business people concerned. Indeed the ultimate majority owners of Lapindo—the Bakrie family—were subject to just such a deal. At the time though, current Minister for People's Welfare and powerful political player, Aburizal Bakrie, headed the family firm.

In addition to these business contortions, Lapindo began a full-scale media

campaign to change public opinion about the trigger of the mudflow, which included sponsoring a scientific workshop in February this year. Leaving aside all prior evidence, the workshop concluded that the mudflow was a “natural disaster”, caused by natural processes. These remarks, publicised in part through Lapindo’s specially created media centre, were widely reported. However, Lapindo’s “star witness” Jim Mori, the US scientist widely credited for proposing the earthquake-eruption theory, told the *Report* that such language simply confuses the issue.

LAPINDO HAS ALSO BEEN BUSY SPINNING THE NEWS IN THEIR FAVOUR.

“We have to differentiate between the cause and the trigger of the eruption. The cause is a natural phenomenon: there is something very large, hot and volatile underneath the site there, which is causing the eruption. It only begins to get contentious when you start talking about the trigger, or what actually initiated the eruption,” he said.

LAPINDO’S SPIN HAS ONLY LED TO FURTHER CONFUSION.

Despite an ongoing debate between scientists of what prompted the deluge, many local and some international media are now reporting that the mudflow was triggered by the earthquake as a matter of fact.

The liability foxtrot

In Indonesia, everything is open to negotiation and nothing stays fixed for long. Determining just who is going to be held responsible for the mudflow is no easy task because statements about the costs of the disaster and who should be made to pay have shifted from month to month.

The most solid evidence that Lapindo is being held culpable for the disaster is a presidential decree issued in September 2006, which stated Lapindo must pay Rp 3.8 trillion (US\$416 million) to deal with the mudflow. This figure includes compensation and alleviation efforts, with Rp 1.3 trillion (US\$142 million) due before the end of March and another Rp 2.5 trillion (US\$274 million) to be paid afterwards. But has the company really paid up?

THE PRESIDENTIAL DECREE CLEARLY STATES HOW MUCH LAPINDO SHOULD PAY.

According to the government team set up to handle the mudflow, Lapindo has spent Rp 900 billion (US\$99 million) on the mudflow until this March, around US\$40 million shy of the figure in the presidential decree. Of the Rp 900 billion so far paid, around 60 percent has been spent on failed efforts to stop the mudflow. Far less has been spent on the affected residents. The information released by Lapindo’s media centre records just Rp 40 billion paid in compensation to the mudflow’s victims until February 20. An additional Rp 9 billion has been paid for the rent of land used to alleviate the mudflow. This leaves a mysterious Rp 310 billion unaccounted for.

LAPINDO HAS FAILED TO MAKE THE FULL PAYMENTS WITHIN THE TIME GIVEN.

As for the other shareholders in the gas concession, Medco appears to have paid nothing and in view of its recent deal, it does not seem likely that it ever will. The Australian firm Santos has paid US\$16.3 million towards costs until January 2007. Santos executives have publicly complained that the firm is being kept at arm’s length and that getting information on developments has been difficult.

MEDCO HAS PAID NOTHING AND SANTOS US\$16 MILLION.

But as the sole operator of the gas concession, Lapindo has been the main focus of compensation claims and, judging from the above data, the company

IT IS ALSO UNCLEAR WHAT THE MONEY SPENT SO FAR HAS GONE TOWARDS.

has failed to meet the presidential deadline. Also unclear is the exact use of the funds already spent. Meanwhile, many Sidoarjo residents have protested angrily about the unfulfilled promises of compensation, staging increasingly desperate demonstrations in Jakarta and Sidoarjo.

LAPINDO CLAIMS PAYMENTS CAN NOT BE MADE WITHOUT LAND CERTIFICATES.

Nevertheless, some funds are coming through from Lapindo, and on its part the firm claims compensation has been held up by the residents' lack of land titles. This is indeed a problem in Indonesia, where an estimated 75 percent of landowners do not have the requisite papers. Because of these problems, Lapindo now has some more wriggle room, with the company saying certification must be obtained first before it will pay out. This was then contradicted by the head of the Indonesian Land Agency, who said the mudflow victims did not need the certificates to claim compensation.

LAPINDO HAVE ALREADY ANNOUNCED THAT THEIR FUNDS HAVE RUN OUT.

Meanwhile at the end of January, Lapindo began to publicly state it could only pay Rp 1.3 trillion toward the mudflow's costs. If the total bill exceeded that figure, the government would have to pay the remainder, a Lapindo spokesperson said.

THE ISSUE OF LIABILITY HAS RECENTLY MOVED TO WHO WILL PAY FOR THE DESTROYED INFRASTRUCTURE.

By March 5 of this year, however, the issue of liability had moved again. This time the Minister of Public Works Djoko Kirmanto announced the original estimation of Rp 3.8 trillion would not be enough to cover all the mudflow's costs. Grumbles had already been heard from senior bureaucrats in the Ministry of Finance as early as two months after the presidential decree was issued. Once the number crunching by officials began, it became quickly apparent that the price tag of the disaster would more than double to Rp 7.6 trillion (US\$835 million) once the cost of rebuilding roads, rail links and power infrastructure was factored in.

AGUNG LAKSONO ANNOUNCED THAT THE GOVERNMENT WOULD PAY FOR INFRASTRUCTURE.

Immediately after the release of the revised figures, House of Representatives (DPR) Speaker Agung Laksono declared the government would pay for the extra costs. But Minister of Finance Sri Mulyani did not seem so certain. "There is no more money available to finance the restoration," she said on the same day as the announcement.

THE FINANCE MINISTER SEEMS LESS KEEN TO COVER THE COSTS.

According to Mulyani any government liability in the disaster should be settled "through a legitimate political process," using "...a presidential decree or an agreement between the government and the House" before she would put it into the mid-term budget revision.

SOME NGOs THINK THE GOVERNMENT SHOULD STEP IN.

Despite Mulyani's reservations, some NGO activists interviewed by the *Report* agreed that the government should pay for rehabilitating Sidoarjo up front, since the situation called for immediate action. However, they also emphasised the public money spent should be claimed back from Lapindo once the question of liability was settled.

"I think Lapindo can use the government's money as a loan, but this must be reimbursed later if Lapindo is found to be negligent," Ivan Agueng, an advocate for the Indonesian Forum for the Environment said. Santosa agreed, adding "but it is crucial that the public knows exactly who is paying for what, and that it doesn't get submerged."

Everyone, it seems, is still waiting for the final decision on who will be held liable. But what kind of information will such a decision be based on, and who will make it?

BUT IT IS CRUCIAL THAT THE PROCESS IS TRANSPARENT.

Moment of truth

Most observers are currently pinning their hopes on a slowly moving and poorly funded police investigation. East Java Police officers have so far detained 13 suspects from Lapindo and its subcontractor company, the majority of whom are low-level on-site managers. This, says Ivan, is patently unfair. “In the mining industry there is a site report filed with all the executives of the company every day, so everyone knows what’s going on. The executives all knew that the drilling was going ahead without the necessary casing,” Ivan told the *Report*, referring to the alleged lack of protection in the well.

MANY ARE WAITING THE RESULTS OF A POLICE INVESTIGATION.

Even so, Ivan is hopeful that the police investigation could bear fruit. On the other hand, this too could end up as part of a bargain. In a statement before a DPR commission, provincial police chief Herman Suryadi Sumawirdja, declared that the police investigation showed the eruption to be triggered not by negligence, but instead by “human error”.

“We have documentary proof as well as drilling instruments,” he told a press conference on March 7.

However, in a potential taste of things to come, he also complained that the Attorney General’s prosecuting team had already returned the police’s case files against the defendants twice.

THE POLICE AND THE PROSECUTORS DISAGREE ON THE TRIGGER OF THE MUDFLOW.

“The prosecutors have said that the situation was a natural occurrence, whereas our suspects tell us it was due to human error,” he said.

Under the best of circumstances, a case such as Lapindo’s can take a long time to resolve. But if the prosecutors obstruct the proceedings, the government will be faced with paying Lusi’s costs over the medium term with no clear mechanism for how this money will be reimbursed. “The President should make some indications about who he thinks is responsible while the legal process is continuing. In Indonesia the legal process depends on politics,” Ivan told the *Report*.

SOME ARE CALLING FOR A POLITICAL DECISION.

While waiting for the court decision, the situation has recently come to a complete impasse. With Lapindo’s payments to the national team already stopped, the Minister of Mines and Energy, Purnomo Yusgiantoro, has publicly stated his unease with the current lack of direction on the issue. “We need clarification on the status. Whether we will be using the state budget from now on or not will depend on that decision,” Purnomo said recently.

CURRENTLY THE ISSUE OF LIABILITY REMAINS ADRIFT.

With all three of the scientists interviewed by the *Report* saying that they have not been contacted by the Indonesian government, just what that decision will be based on remains to be seen. □

INTERVIEW

The scientific debate

The degree to which Lapindo or the government are taking responsibility for the costs of reconstructing Sidoarjo has shifted over time. At the beginning of the disaster in May 2006, the blame fell squarely on the shoulders of Lapindo as news began to break of several major irregularities in the drilling operation.

However, this perception changed gradually with Lapindo's launch of a full media campaign, culminating in a scientific workshop at the end of February. Held by the government's technology agency, the BPPT, with some sponsorship by Lapindo, the main message to come from the workshop was that it was not the drilling, but the earthquake that caused the mudflow.

"According to data and analysis, the Sidoarjo mudflow is a natural activity," the chairman of BPPT, S. Jenie, said at the end of the workshop, adding that the "central

government must therefore handle the situation." Seemingly in support of this position, **Jim Mori**, a US scientist working in Japan who spoke at the workshop, was widely quoted as saying that "the mud volcano would still have happened without any drilling."

But this was not the end of the matter. Perceived by many as being at best one-sided and at worst a deliberate manipulation of scientific theories, critics lined up to question the validity of the workshop's findings. Two British scientists, **Richard Davies** and **Richard Swarbrick**, were among those who contested the workshop's main message.

In an effort to bring some clarity to this debate, the *Report* contacted Mori and the British team for further comments, bringing together the three scientists for the first time. What follows is an edited excerpt of the discussion.

VZR: *Jim, can you say something about how you came to be invited to the workshop? Were the organisers aware of your position about the role of the earthquake in the mudflow before you were invited?*

Mori: I was invited to attend the conference by a Lapindo representative and the company paid for my travel. They were aware of my interest in the possibility of the earthquake triggering the mudflow since I had talked with Lapindo people in Sidoarjo when we visited the area in December. Besides the travel for this conference, I have not received any other support from Lapindo.

VZR: *Are you happy with the main message that has come out of the workshop: that the mudflow was caused by the earthquake and not the drilling?*

Mori: It is probably not reasonable to expect 'independent' or 'fair' conclusions from any conference. Consensus type statements are always

judged considering the participants. I do not think the main message that came out of the workshop was, 'the mudflow was caused by the

"I THINK THE CONCLUSION
OF THE BPPT CONFERENCE
WAS 'UNFORTUNATE' AND
TO BE QUITE HONEST I HAVE
DIFFICULTLY WORKING OUT
HOW THIS CONCLUSION WAS
ARRIVED UPON."

— **DAVIES**

earthquake'. My impression of the main point of the concluding discussion (which was in Indonesian so I did not understand it) was that it was a 'natural phenomenon'. This means the cause was a natural

reservoir of hot fluids and mud (the reservoir was not created by the drilling). I am not sure what was concluded in regards to the effects of the drilling or the earthquake.

Davies: I think the conclusion of the BPPT conference was 'unfortunate' and to be quite honest I have difficulty working out how this conclusion was arrived upon. Yes - volcanoes occur in this area naturally, but this volcano was most likely not a natural one, that occurred 200 metres from an exploration well that had (by coincidence?) also been having significant well-control issues.

VZR: *Can you all briefly describe your explanations of what caused the mudflow and raise any points of contention?*

Mori: I don't really have any well-formulated model or explanations of how it started. But I think first of all we have to differentiate between the cause and the trigger of the eruption.

The cause is a natural phenomenon: there is something very large, hot and volatile underneath the site there, which is causing the eruption. It only begins to get contentious when you start talking about the trigger, or what actually initiated the eruption. The question then becomes ‘would the eruption have happened anyway even if there had not been drilling or an earthquake?’ I think it would have. We do not know the size or the time scale of such an eruption, but it might have been hundreds to thousands of years.

And then you get into the question ‘What is the relationship of the eruption with the drilling and the earthquake. Well I think it’s very reasonable to say that the drilling had some effect. It does seem too much of a coincidence that the drilling happened 200 meters away from where the eruption occurred. In the same way, I think that the earthquake also had an effect. Again just because of the timing. The earthquake happened and then six minutes later there was some change in the pressure of the well. Both those things seem to me to be more than just coincidences so that’s why I think that both the drilling and the earthquake had some effect on triggering this particular eruption.

Davies: We think that the well was drilled very close to a major aquifer to a depth of 9297 feet and that there were some issues with well control at that depth which led to a sub-surface blowout. This blowout meant that the fluid in the rocks then caused a fracturing of the rock that they drilled through. Because the well was not protected by casing, these rocks were fractured by the pressure of the fluid that they drilled into. There are records of well control issues on May 27 which provides evidence they were having problems controlling the

pressure of the well, and there is also evidence that operational problems led to a loss of control of the well. I think they tried to pull out of the hole and when doing so they finally lost control of the well.

This kind of drilling site problem has happened before, in Brunei in the 1970s, for example. There is nothing particularly remarkable about the geology or the processes which started the mudflow in Sidoarjo, so we don’t believe that you need an earthquake to explain what happened.

In response to the idea that problems began just six minutes after the eruption, I understand that 25

“I THINK THAT THE
DRILLING ALSO HAD AN
IMPORTANT EFFECT.”

—*MORI*

barrels of mud were lost in the well just 10 minutes after the earthquake. That’s new information that has just come out recently. The first information released was that problems occurred six hours after the quake. So various bits of information are coming out that didn’t come out initially. The first information was that it was six hours, then ten minutes and now I hear that it was six minutes, so the timing between the earthquake and the accident is certainly getting less.

I also want to respond to Jim’s idea that the mudflow would have happened anyway at some point in the future with or without the

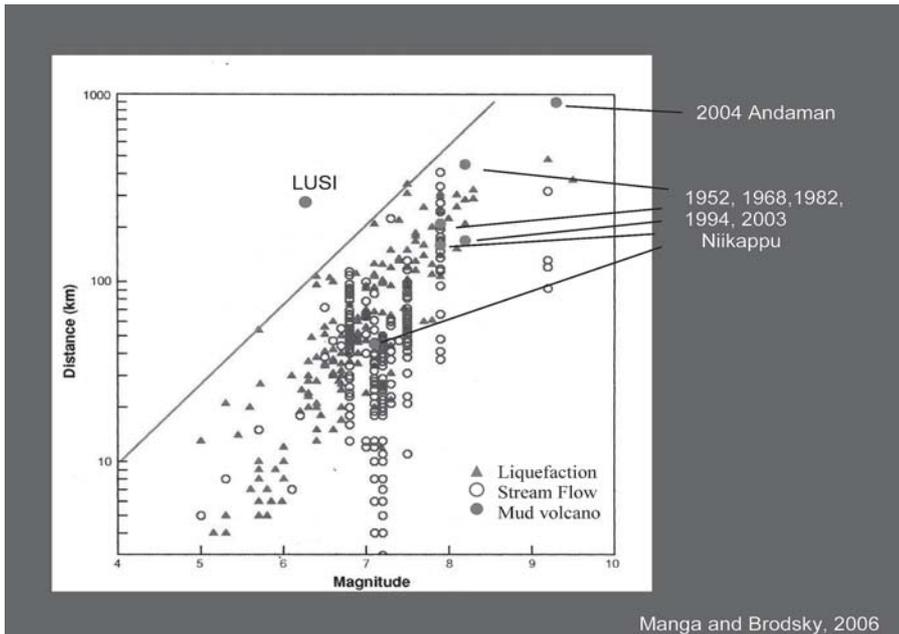
drilling. The natural failure of a rock seal normally occurs at the structurally highest point. This is not actually at Sidoarjo, but at or near the Porong-1 well, a few kilometres away—where there is evidence for natural rock seal failure already. In other words, East Java is susceptible to mud volcanism but Sidoarjo is not the natural location for this. Local geological conditions would favour eruptions elsewhere, near the Porong-1 well for instance.

Mori: If weak zones already exist around the well, this means the ‘triggering’ (maybe from an earthquake) can be possible. Is it possible that the earthquake unclogged vertical fractures at Porong that started a process leading to the eruption?

Let me just go through some of the reasons why I think the earthquake should also be considered as a trigger to the eruption. A pressure change was recorded in the well just a few minutes after the earthquake. This could have led to a cascading effect, where small changes in pressure can lead to a rock fracture opening and the eruption.

Another nearby well apparently had a flow rate response to the earthquake. So there are indications that the earthquake did affect the local pressure conditions.

I agree there are many good reasons that indicate the eruption is related to the drilling, so I am not saying that the earthquake is the only trigger. I think that the earthquake may *also* be a contributing factor in addition to the drilling. This is a very unusual occurrence. I don’t know of any other examples where an eruption has occurred several hundred meters from the well site. An unusual event may need an unusual set of circumstances.



VZR: Jim presented a graph at the BPPT workshop that seemed to suggest no other recorded mudflow has ever been triggered by an earthquake as small as the one felt in Sidoarjo (see above). Is it therefore fair to say that, while scientific opinion can differ on the exact trigger of the mudflow, it is statistically highly improbable that the earthquake had any impact on the mudflow at the time it erupted?

Davies: Correct. I think anyone introducing the earthquake has to provide a clear and well-founded geological argument for the exact processes they expect occurred. Other studies show that the Sidoarjo mudflow is an anomaly if we conclude it was triggered by the May 26 earthquake. Michael Manga and Robert Mellors authored two papers which support the idea that in comparison with other mudflows around the world, the earthquake which hit Yogyakarta on the 26th May was too small and too far away to have an impact on the Sidoarjo mudflow.

Mori: The point I was trying to make is that we see pressure changes, earthquakes, and other fluid related activity, that are triggered by very small

“OTHER STUDIES SHOW THAT THE SIDOARJO MUDFLOW IS AN ANOMALY IF WE CONCLUDE IT WAS TRIGGERED BY THE MAY 26 EARTHQUAKE.”

— DAVIES

motions from earthquakes at very large distances. Then, the pertinent question is whether or not these small changes can trigger an eruption.

I think that the drilling also had an important effect. Maybe, the drilling perturbed the system, and the earthquake was the final ‘straw the broke the camel’s back’. Other mud volcanoes probably did not have both drilling and an earthquake occurring at the same time.

It’s just one of those intriguing questions that is just difficult to prove one way or another but there are more

and more examples of triggering with the kinds of levels of earthquake that you might not expect. Earthquakes that are not felt have had very large effects all over the world.

VZR: Economics Minister Boediono is on record saying that ‘the government has yet to decide the status of the mudflow in Sidoarjo, pending inputs from experts from Japan and UK.’ Have any of you been contacted by the Indonesian government for your input?

Mori: No
Davies: No
Swarbrick: No

VZR: Have you received full cooperation from Lapindo?

Davies: Lapindo rang us after our paper came out and told me that some of the detail of our paper was not correct—but nothing they said changed our model. I also informally chatted to one of the Lapindo staff at the Feb 2007 Jakarta conference. That’s the only contact—very little. This was one month after our paper came out in the journal *GSA Today*.

Mori: My associations with Lapindo have been only informal discussions in Sidoarjo and recently in Jakarta.

VZR: Do you have any advice on what can be done to alleviate the mudflow? Are relief wells or the concrete balls the better option?

Davies: It is possible to calculate the volume of the aquifer and use the information to estimate the mudflow’s life-span. Then a dam system could be designed which is more significant than the earth dams currently used to cope with the upper estimate of the mudflow’s life-span. The mudflow can then be left to die out naturally. □