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*International Rivers Network*

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Volume 12, Number 5 / October 1997

## **Special Focus: Mining the World's Rivers**

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# World Rivers Review

Published by International Rivers Network

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## **Bakun Dam "Delayed Indefinitely"**

*by Patrick McCully*

Malaysian Prime Minister Dr. Mahathir Mohamad announced on September 4 that the controversial Bakun Dam would be "delayed indefinitely." Mahathir Mohamad has been a vigorous promoter of the US\$5.4 billion project. The dam delay was part of a package of austerity measures intended to restore rapidly falling investor confidence in the Malaysian economy. Other postponed megaprojects include a new airport and port, several highways, and a two-kilometer-long edifice called the Linear City.

Financial analysts in Malaysia and overseas reacted favorably to the announcement of the delay in the 2,400-megawatt Bakun project. One Malaysian analyst told the Malaysian daily *The Star* that "foreign investors had always felt the project was not viable as it put too much of a strain on the country's resources."

A 20 percent fall in the value of the Malaysian currency and a 40 percent drop in the Kuala Lumpur stock market in the seven months since its February peak had put to rest any existing hopes that investors would find the massive project a good investment. Attempts to sell shares in the Bakun Hydroelectric Corporation had already been postponed several times since mid-1996.

The announcement of the delay came a day after the Malaysian company implementing the project, Ekran Berhad, canceled its contract with the consortium which was to have built the project, led by Swiss-Swedish engineering giant ABB Asea Brown Boveri. Ekran and ABB had been disputing the terms of the contract for several months.

The multi-billion dollar contract was the largest ever signed by ABB, which had robustly defended its involvement in the project from its many critics. *The Financial Times* of London reported that the cancellation was a "considerable setback" for ABB and its chief executive Goran Lindahl, who had personally supervised contract negotiations. The newspaper also called the cancellation "a big blow to the prestige" of Mahathir Mohamad.

Nongovernmental organizations in Switzerland and Sweden have called on ABB to learn the lessons of

Bakun and to withdraw from other destructive and uneconomic dam projects, in particular China's Three Gorges Dam. ABB recently won contracts to supply electrical equipment to China's 18,000 MW dam (see back page).

Since the Bakun announcement, a swirl of conflicting statements on the project's status have appeared in the strictly controlled Malaysian press. A September 9 story in *The Star* stated that the government would undertake a "rigorous re-examination of the country's development projects" and that "mega-projects É will now have to undergo independent feasibility studies to determine their financial viability."

Other stories, however, quoted the chairman of Ekran, Ting Pek Khiing, as saying that he was finalizing a new contract with another construction consortium and that a new financing package for the project would be worked out. The companies named as "likely contenders" to replace ABB are Siemens of Germany and Alcatel Alsthom of France. Observers, however, believe that it is highly unlikely that the project can be financed in the foreseeable future. *The Financial Times* predicts that "it could be years at least" before the scheme may be revived.

German engineers Lahmeyer International, whose involvement with the project dates back two decades, were the lead consultants on feasibility and design studies for the dam. Lahmeyer also played a lead role in drawing up the project's controversial construction contract and on supervising construction on its problem-stricken diversion tunnels. Chicago-based Harza Engineering advised the Malaysian government on the economic, technical and financial aspects of Bakun.

Ting has also stated that construction on Bakun's disaster-prone and long-delayed diversion tunnels would continue. It is feared that logging of the reservoir area - by companies owned by Ting - and resettlement of the 10,000 people living there may also continue.

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- Visit the [Bakun Campaign Page](#) for more information.



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## Undermining Rivers

"To dig under the earth to get to that gold, to pump out that water to get that gold, is a crime. It's a crime against humanity, a crime against life. . . We have the deer, we have the eagle, we have the rabbits, we have all life out there and the gold mining today is going to destroy that, it is destroying that, the life for future generations is going to be gone."

*-Carrie Dann, traditional Western Shoshone elder from Nevada*

*by Danny Kennedy & Pratap Chatterjee*

The peaceful serenity that has lasted for millennia in the sagebrush desert of the Shoshone's traditional lands was broken last summer when Oro Nevada, a Canadian mining company, arrived to prospect for gold. Today the night sky is filled with the lights and sounds of the drilling rigs as the miners dig deep under the people's sacred hot springs. Nevada, in the midst of a gold mining boom, is seeing its freshwater resources dry up due to mining activities.

The story has become a familiar one to traditional peoples around the world. Multinational companies are leading a gold rush unseen since Pizarro arrived in the Andes to sack the Inca kingdom in the 1530s. Just this year, Cambior of Montreal helped spark the eviction of the Maroon people in the Surinamese Amazon, and Diamond Works of Vancouver helped finance mercenaries in the diamond fields of Angola and Sierra Leone. Freeport McMoRan of New Orleans is planning to almost triple its dumping of toxic mining waste in New Guinea (see page 7), Mitsubishi of Japan wants to mine for copper in Ecuador and French nuclear interests are behind newly planned uranium mines on aboriginal land in Australia.

Much of the boom is a quest for gold (80 percent of which goes to jewelry), which occupied 53 percent of the industry's exploration budget last year. Minewatch, a non-governmental group in London, estimates that two decades from now, one in five of the prospects will be on indigenous lands, portending yet more criminal treatment of indigenous peoples in the coming years.

The extraction of metals, minerals, gems, uranium and fossil fuels as a cumulative phenomenon is as great a threat to the planetary ecosystem as any other form of bad development. Although industry and

government have thus far managed to depict mining's ills as a local problem, in fact it could become the global version of death by a thousand cuts.

As WorldWatch pointed out in a 1992 report, "Few people would realize that a copper mining operation has removed a piece of Utah seven times the weight of all the material dug from the Panama Canal. Few would dream that mines and smelters take up a tenth of all energy used each year, or that the waste left by mining measures in the billions of tons, dwarfing the total accumulation of more familiar kinds of waste, such as municipal garbage. Mining projects now threaten 4 out of 10 national parks in tropical countries. The smelting of ores pumps millions of tons of sulfur dioxide and other pollutants into the atmosphere each year."

More material is now stripped from the earth by mining than by all the natural erosion of the earth's rivers. In the United States, more river miles - over 12,000 - have been devastated by acid mine drainage than are protected in the highly touted National Wild & Scenic Rivers System. As the map on pages 8-9 reveals, watersheds on every continent are threatened by mining.

In addition to mining's environmental impacts, its boom mentality can also leave economic scars on developing economies. Nations overly dependent on mining are loath to rein in the industry, and often leave clean-up costs to future generations rather than to the companies themselves. World Bank data shows that natural-resource-rich economies such as Papua New Guinea and Nigeria are less likely to continue an upward development curve than a human-resources-rich nation such as Singapore.

The good news is that communities are fighting back. This year Haitian peasants evicted a Canadian company who wanted to mine for gold, while Turkish courts sided with local people to evict Eurogold, a multinational mining company. Canadian courts also sided with the Innu and Inuit in Labrador to slow down a giant nickel mine.

Even the United Nations has joined the debate. Razali Ismail, president of the UN General Assembly, recently said, I am sure we all recognize that mining can never be 'sustainable,' and remains one of the most unsustainable economic practices that threatens communities and the environment."

A more eloquent comment on mining's wrath comes from one who has lived it. Davi Kopenawa Yanomami, indigenous leader of the Brazilian Amazon, says, "Why do your people hoard the gold they have bought where it can't be seen? I believe it is because they are ashamed that they have destroyed our rivers and forests and killed our peoples."



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## **Why Mining Is Bad For Your River**

*by Pratap Chatterjee*

Some 1,500 people on Marinduque island in the Philippines were stranded for several days in late March 1996 when 1.5 million tons of waste from the Marcopper copper mine gushed out of a storage pit into a local river. Company officials say that the pit started "emptying like a bathtub into a drain."

Less than a year before, in August 1995, the holding pond at the Omai gold mine in Guyanese Amazon broke. In what was probably the worst cyanide spill in history, some 3.2 billion litres of cyanide-laced waste poured into a tributary of the Essequibo River, killing all the fish in the river.

These are not isolated incidents. With few or possibly no exceptions, behind the glitter of diamonds, gold and silver unearthed by mining invariably lies environmental devastation. Ecosystems often suffer for decades from mining pollution, often well after the miners have taken the money and run. The main types of mining pollution include contamination from heavy metals produced by mining (including arsenic and mercury), from process chemicals like cyanide, and acid mine drainage. All of these can kill aquatic life and make water undrinkable for humans. The sheer volume of mining waste can also choke river beds and destroy crucial riparian habitat. In addition, mining companies have in numerous cases robbed local communities of land rights, and rarely offer adequate compensation to people affected by their activities.

One of the problems with mining pollution is conflicting standards for acceptable levels of particular pollutants, a problem that is compounded by the lack of research on how the pollutants affect riverine ecosystems. World Bank standards, which are often used by mining companies in developing countries, are notoriously weak. For example, the Bank's maximum levels for arsenic contamination are 100 times weaker than the World Health Organisation's maximum recommended levels for arsenic in drinking water, while the US Environmental Protection Agency (EPA) advises communities to investigate mercury contamination at levels that 160 times stricter than those suggested by the Bank.

### **An Acid Bath**

But there is some agreement over which type of mining pollution does the most harm. Biologists say that the biggest problem caused by mining is acid mine drainage, also called AMD. This happens when



sulphur-bearing ore from under the earth is exposed to water and oxygen, causing a chemical reaction that produces sulphuric acid. The acid in turn can dissolve heavy metals in the rock and wash them into local water systems. AMD can continue for centuries if the mining operations allow water to seep into the exposed waste piles or into abandoned tunnels. Certain bacteria sometimes found in soils can help speed up the process, while the presence of alkaline materials like lime can slow it down by neutralising the acid. However, the acid drainage starts up as soon as all the alkaline materials have been used up. One of the world's worst examples of AMD is from the abandoned Iron Mountain mine in northern California. The pH of waters seeping from the mine has been measured as low as minus 3 (pure water is 7), which is 10,000 times more acidic than battery acid. The mine has been killing fish and other river life since the 1920s, and is expected to leach acid for another 3,000 years, according to federal scientists.

Miners traditionally used highly toxic mercury to extract gold, but new technology allows the use of very low concentrations of process chemicals like cyanide (used in large scale gold mining operations) and sulphuric acid (used in large scale copper mining) to profitably extract metals. These extremely toxic chemicals can be broken down under the right conditions, making them marginally less problematic than other byproducts of mining, such as the naturally occurring heavy metals such as arsenic, copper, lead and iron in the ore which are left behind after the ore is extracted and do not break down.

One such metal that is often discarded in the mining process is arsenic, which is a known human carcinogen. At concentrations of 50 parts per billion (ppb), this metal has been known to cause malformed frog embryos and to kill slugs and snails. Low doses of arsenic are known to cause a variety of problems for humans ranging from hemorrhages to seizures and comas. In the long-term, these levels can cause cardiovascular toxicity, liver toxicity, and skin problems including cancer. Women may experience higher rates of miscarriages or malformed babies.

Mercury, a byproduct of mining as well as a processing chemical for small-scale gold miners, affects the kidneys and can also be damaging to the brain and the nervous system. Mercury is particularly worrisome because it bioaccumulates, meaning that low levels in fish can build up in life forms higher up in the food chain, such as humans. The US EPA suggests that action should be taken if four-day average concentrations in water exceed 0.012 ppb, the level at which chronic aquatic impacts on fish have been shown to occur.

Not to be discounted is the massive dumping of finely ground waste rock from mining operations, known as tailings, into local rivers or into the ocean. In the United States an estimated three million tons of waste is generated for every ton of gold produced. The accumulation of such sediment from Gold Rush-era hydraulic mining significantly raised the bed of California's Sacramento River, prompting the US Army Corps of Engineers to build high levees adjacent to the river channel to help flush the excess sediment to the San Francisco Bay. The too-close levees eliminated the river's natural floodplain, thus increasing flood damages in recent years. Thus, one environmental travesty led to another many years later.



## **Slow Leaks, Slower Official Responses**

Such accumulation of waste often becomes a matter of public concern only when disaster strikes. In both the Marinduque and the Omai cases the tailings-dam failures hit national and even international headlines. Panic-stricken government officials issued warnings to villagers not to eat or drink from the river. Yet slow leaks that cause similar catastrophes happen all the time at mines that do not provoke alarm until years later.

Take Marinduque. The mine's problems became national news only after the accident, yet over the past decades the mine had dumped some 145 million tons of mine tailings into the Calancan Bay, killing marine life over almost 50 square kilometres of the sea floor and threatening the main source of income for some 12,000 fish workers and their families. Local people complained of skin ailments and respiratory diseases, nausea, vomiting, dizziness, and even paralysis after eating shellfish from the bay.

A similar story is playing out at the Alamosa River in southwestern Colorado, where a slowly leaking toxic soup of cyanide and metals from the mine killed a 27-kilometer-long stretch of the river. Colorado Department of Health Inspector Jim Horn commented, "Literally, there was 1,000 to 2,000 pounds of heavy metals leaving the site daily in dissolved form. It was like adding half a Buick a day to the Whiteman Fork that flows into the Alamosa." In December 1992, the mining company responsible for the toxic leak, run by gold speculator Robert Friedland, declared itself bankrupt and the US EPA began to clean up the site. Today the agency estimates the clean-up will cost \$150 million.

"The Porgera File: Adding to Australia's Legacy of Destruction," a report by the Mineral Policy Institute, documents up to 133 unusual deaths that occurred between 1991 and 1993, which were reported by local administrators near the Placer Pacific mine in Porgera, Papua New Guinea. Many locals believe these deaths were due to contamination of water and riverside gardens from the mine, the only industry in the region. Indeed studies show that the discharge from the mine has caused toxic metals like zinc, lead and mercury to be measured in the river at levels three to 3,000 times the Australian and Papua New Guinean standards.

There are many more stories like these, affecting watersheds around the world, some well known but many more kept under wraps by governments beholden to large mining companies for revenues. Activists point out that some of mining's impacts are hard to spot. "The attitude (is) if you don't see corpses, everything is okay. There is good reason to suspect that a compound as aggressive as cyanide in lethal doses also has serious health effects in long-term chronic exposures at low levels," writes Philip Hocker, president of the Washington-based Mineral Policy Center, in a paper entitled "Heaps of Gold, Pools of Poison."

The disasters at Marinduque and Omai have caused some regulators to sit up and take notice. In May 1997 the United Nations Environmental Programme held an international meeting to examine the safety of dams that hold toxic mining waste. The resulting awareness may help prevent some future problems.

Meanwhile, problems at abandoned and existing mines continue to come to light. For example, Coeur

d'Alene mining corporation abandoned the Golden Cross mine near Waihi in New Zealand in February 1997 after discovering that the ground under the mine's four million tons of toxic waste was beginning to slip, threatening local waterways. Walking away from the problem is hardly unusual. In the United States there are an estimated 557,000 abandoned hard rock mine sites in the western United States alone that are slowly poisoning the local environment.

"There is a time bomb in the Coromandel hills and it is ticking." said Judith Tizard, a New Zealand Labour member of parliament. Indeed, such time bombs are ticking all over the planet while others have quietly gone off.



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## **Freeport Fouls the Water in Irian Jaya**

*by Danny Kennedy*

The Grasberg gold mine in Irian Jaya, operated for the past 30 years by US-based mining company Freeport McMoRan Inc., is, as Freeport CEO Jim Bob Moffett likes to boast, the biggest open-pit gold mine in the world. Despite much corporate PR, it is clear that the mine is also having big impacts on the social and physical environment of the island.

In April, the provincial environmental promotion bureau announced it had given the Ajkwa River - into which Freeport dumps 125,000 tons of rock waste every day - a "D" pollution rating, meaning it failed government public health standards. The bureau said that the river water could not be consumed because of contamination from mining waste - a reversal of the normally steadfast government support for Freeport's operations.

Then, in July, a subcontractor revealed that it had found indications of heavy metal content in the Ajkwa River in 1996. The company, PT Sucofindo, had conducted laboratory tests at the Ajkwa River and found mercury at a level of 0.004 milligrams per liter (four times the standard set by the Indonesian government at 0.001 mg./liter, and 280 times the US EPA public health standard).

WAHLI, an Indonesian environmental group, asked that the government take firm action against the company, and investigate for cyanide and arsenic contamination as well since these metals are likely to exist in association with ore processed by the mine. No independent monitoring has yet taken place. Meanwhile, Jim Bob Moffett himself inadvertently identified another pollution problem at the Grasberg mine when he admitted at the annual shareholders meeting in April that the company fails to extract 200 tons of copper per year produced by the mining process. Large quantities of this toxic metal are therefore polluting the massive tailings deposition area in the rainforest downstream from the mine.

### **Dying River, Dead Forests**

To date, Freeport admits to having drowned 50 square kilometers of this catchment. The flooding occurs because the dumped tailings have changed the course of the Ajkwa, which now has breached its banks and forced the river to sheet eastward into the forest. Since the company estimates that it will dump 1.5 billion tons of rock in this fashion over the 40-year life of the mine, the ultimate extent of this "sacrifice

zone" will grow to 130 square kilometers of rainforest.

No wonder then that the local communities, bearing the brunt of this environmental assault, are unhappy. A recent offer of compensation by Freeport has largely been seen by local communities as an attempt to buy their silence. The offer, an annual payment of one percent of future profits (equivalent to a third of Moffett's salary, to be divided among thousands of traditional landowners) was refused last month by communities until problems caused by the mine are adequately addressed.

Also in August, two people mysteriously died in an accident allegedly involving a Freeport vehicle. Community members felt provoked by the incident and gathered at the road to Tembapapura, the mine town, to protest their grievances. They blocked transport to and from the area on the August 21 until soldiers were brought in to "re-establish normal operations." (Freeport feeds, clothes and houses 2,000 soldiers on site). Two men were shot dead. Despite the fact that participants made it clear that they were protesting the mine-related military presence in the region, a subsequent human rights investigation by the government made did not assign any blame for the violent outcome on the military forces involved nor on the company for its military associations.

The affected communities last year took their grievances outside their borders, to the home of the company itself. In 1996 Amungme leader Tom Beanal filed a \$6 billion lawsuit in Louisiana Federal Courts. The case now is nearing the discovery stage. If it gets that far, the lawsuit may force the company to sit down and talk to the thousands of plaintiffs the class-action represents. As well, Beanal has been recognized in the United States for his lifetime of struggle with Freeport by being awarded the Jane Begley Lehman Award for Excellence in Public Advocacy. While unable to accept the cash prize in person at a ceremony in San Francisco on September 8 Beanal let it be known that he hopes he can live up to the purpose of the award which was for "winning corporate accountability in the global economy."



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## ***Book Review:*** **New Book A Gold Mine of Information**

*Golden Dreams, Poisoned Streams: How Reckless Mining Pollutes America's Waters, and How We Can Stop It*, Edited by Philip Hocker. 1997. From Mineral Policy Center, 1612 K Street, NW, Suite 808, Washington, DC 20006; Tel: 202.887.1872. \$24.95.

If you live in a watershed that includes mining activity, you need this book. That accounts for just about anyone living in the western United States and in much of the rest of the US as well, residents of Brazil's Amazon basin, and the inhabitants of big swaths of Peru, Chile, southern Africa, Australia, China, Indonesia, and on and on around the globe.

*Golden Dreams, Poisoned Streams* offers the most comprehensive picture to date of the threat to freshwater resources from hardrock mining (which includes metals, minerals, and other nonfuels). The book is written in a highly readable style appropriate to both lay readers and water-resource experts alike, and perfectly blends hard facts with wrenching case studies. It describes in detail how bad mining practices damage streams, rivers and groundwater. It's a widespread problem; in the US alone, mining has contaminated more than 12,000 miles of rivers and streams and 180,000 acres of lakes. Best of all, the book offers solutions on how to fix the problem, including management methods that can control mining pollution, regulatory fixes to prevent future damage, and ways to clean up existing pollution. As the authors point out, mining pollution is preventable: "We know how to mine and refine metals without polluting precious water resources. The technology exists, and it is affordable. All we lack is the resolve to compel the mining industry to use it."

So what does hardrock mining do to rivers and streams? Four basic types of pollution cause the most damage: acid runoff from ore and mine waste rock exposed to the elements (called acid rock drainage, or ARD); contamination from toxic heavy metals unearthed by the mining process, pollution from process chemicals used to separate minerals from ore, and sedimentation from eroding mine sites. In addition to pollution, mining uses prodigious amounts of water, both in production and by diverting water from mines below the water table. This "dewatering" process is often done in desert areas with finite water supplies: "In Nevada, the center of the current US gold mining boom, some mines dewater at a rate of thousands of gallons per minute. . . This causes wells and springs to dry up, depriving other

users of access to water and sometimes causing land subsidence."

Although *Golden Dreams* primarily focuses on the US, its descriptions of how careless mining practices harm waterways and how mine operators can prevent the problem are useful around the globe. An international roundup chapter describes a few notorious problem mines, and offers a ray of hope by describing a number of nation's attempts to slow the problem by legislating environmental protections and otherwise regulating the mining industry and other water polluters.



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## Mining in Lesotho Harms Water Project

by Lori Pottinger

Polluted runoff created by 600 individual diamond miners working individual claims in the mountains of Lesotho threatens the water quality of the in-progress Lesotho Highlands Water Project (LHWP), reports the South African newspaper *The Independent* (August 17, 1997). The two rivers most affected, the Kao and Malibamatso, feed the recently completed Katse Dam, which is expected to start water deliveries to South Africa early next year. "A fine sediment travels from Kao to Katse," the article states. "It has left streams lifeless in its wake." It could also cut royalties to Lesotho, if the sediment badly harms water quality in the reservoir, as a project scientist predicts could happen.

But W. S. Croucamp, Director General of the South Africa Department of Water Affairs, said he believes the sediment can be mitigated and will not do permanent harm. "A March 1997 biology report states that 6 Orders and 12 Families were found in the Kao stream. The lack of diversity is a clear indicator of the detrimental influence of the sediment, but it definitely isn't lifeless," Croucamp said. "We are confident that greater biodiversity will return to Kao as soon as mitigation measures are in place." He noted that the Government of Lesotho is supposedly working to implement such measures, although they have been aware of the problem for at least four years.

Scientists studying the problem predict that warmer temperatures in summer could lead to algal blooms in Katse reservoir, especially in the area of the dam's intake tower, where water is piped to South Africa. The article quoted LHWP Project Limnologist Victoria Qheku saying that the pollution, if left untreated, "will cost the Highlands water project a lot," by reducing water quality and, in turn, the amount of clean water available to sell to South Africa.

"The riverine aquatic ecology has been adversely affected," Qheku said. "Most life in the Kao River has been wiped out. Something must be done now."

The miners use picks and shovels to mine the steep, highly erodible mountain claims, moving about 100 tons of soil to produce 8-9 carats of diamonds, according to a miner working the area.

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- See the [Southern Africa Campaigns Page](#) for more information.



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## **Mine Threatens Pristine Taku River Watershed**

*by Bill Wareham*

A Canadian company wants to reopen an old mine in one of the largest undisturbed (and unprotected) wild river watersheds in North America. According to the Vancouver Sun, Redfern Resources Ltd. of Vancouver hopes to reap C\$495 million in pre-tax profits from the old Tulsequah Chief mining claim in northern British Columbia, which was abandoned in the 1950s when the copper market took a dive. The company believes the claim could annually produce up to 56,000 ounces of gold, 2.4 million ounces of silver as well as copper, zinc and lead. The mine has a nine year life expectancy. At risk is the Taku River, the heart of a 7,000-square-mile watershed in British Columbia and Southeast Alaska. The Taku is one of the largest salmon-producing streams in Alaska, supporting a fishery worth millions of dollars. In British Columbia, the river has been nominated for inclusion in the Canadian Heritage Rivers system.

Reopening the Tulsequah Chief mine would bring a 160-km road into a vast wilderness, where grizzlies and wolves far outnumber the 5,000 human inhabitants living at its fringe. The road would run through an area that is subject to a land claim by the Taku River Tlingit First Nations people. The Tlingit are currently involved in treaty negotiations with the British Columbia Government. Mine opponents fear the road would open up the area to logging and other types of development, and that the mine itself would increase the risk of acid mine drainage (AMD) pollution in the Tulsequah River. The British Columbia government has stated that "reactivation of the mine could result in chronic discharge of effluent contaminated with acids, heavy metals, petroleum products and/or toxic reagents."

Acid mine drainage leaching from the existing abandoned mine continues to pollute the river, a liability Redfern inherited when it purchased the claim in 1987. Two years ago, the Environmental Protection Branch for the region notified Redfern that it was violating the federal Fisheries Act for failing to limit pollution from the old mine. Three areas were sampled near the mine, all of which were "acutely toxic to fish," the agency wrote. Although the company has spent \$17 million exploring the area's mineral deposits, it has spent little to clean up the old mine, choosing to wait until it has permission to reopen the mine to perform clean-up measures recommended by the environmental agency. The provincial government has waived the requirement to clean up the site now and will wait to press the company to fulfill its legal obligations until a mining permit is issued.

The Tlingit do not want a road development permit issued until a land protection plan for the Taku watershed has been approved by the Tlingit people. Ed Anderson, a Tlingit living in Atlin, said that the Tlingit are very concerned about who would control the access and use the road. The Tlingit are not opposed to all development in their traditional territory, and in fact are struggling to find ways to stabilize their economy and ensure employment for their people. But they want to have greater say in deciding what type of development and economic activity is best for their people.

In 1996 Redfern submitted a detailed impact assessment to the British Columbia Environmental Assessment project review committee. The report was rejected for failing to adequately analyze transportation options, and cultural, social and economic issues. Redfern subsequently resubmitted the report, which was approved. On September 5 the project report was released for public review. The public has until November 6, 1997 to make their concerns known to the Environmental Assessment Office. After the public review period the Environmental Assessment has 70 days to make a recommendation to the minister of Employment and Investment, who decides either to approve the project or call for public hearings to gather more information. If the project is approved, road construction could begin as early as spring of 1998.

#### **What Can You Do?**

Send comments on the project to Norm Ringstad, Project Committee Chair, Environmental Assessment Office, 2nd Floor, 836 Yates Street, Victoria, BC, V8V 1X4

To get involved in the struggle against the project, contact the Taku Network, P.O. Box 142, Atlin, BC V0W 1A0 Don Weir: Tel/Fax: 250.687.0047; email: [tw@ibm.net](mailto:tw@ibm.net) or

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## **Manantali Dam Changes Will Make a Bad Situation Worse**

*by Lori Pottinger*

The Manantali Dam in Africa's Senegal River Valley is a "poster child" of bad dams. When it was built in the 1980s, it put an end to 1,000 years of successful flood-recession farming; created major economic impacts for downstream farmers, fishers and herders; harmed fisheries, ground water resources and riverine forests, and turned an area with a low incidence of water-borne disease into one of the worst-infected in Africa. Besides all the problems it caused, it also failed to provide promised benefits. The conversion from flood-recession farming (i.e., the cultivation of riverbank areas enriched by silt from retreating annual floods) to irrigated agriculture has been much slower and costlier than expected. In addition, irrigated agriculture has actually been less productive than flood-recession farming, and contributes to water-borne diseases via irrigation canals and water-storage areas. The project has yet to produce any power, and navigation benefits have been virtually nil.

In late June, despite serious environmental and socioeconomic concerns raised by a host of critics, the World Bank approved a US\$38 million loan to help finance installation and operation of the dam's turbines. (The Bank was not a lender for the original construction of the dam.) The plan is to increase power output at the expense of other uses, with hydropower having first priority when reservoir levels fall.

### **Management Plan Crucial**

Critics were especially concerned that power production (which has been increased to 200 MW from the originally planned 76 MW) is moving ahead with no guarantee that project authorities will implement a much-needed, comprehensive water management plan. A well-designed plan would reduce incidence of disease and re-create a regular "flood" large enough to restore downstream livelihoods and ecosystems. Although the Bank says it supports the need for such a plan, it took few positive steps toward this goal before approving the loan, promising only to study the matter and consult with stakeholders while the power infrastructure is installed. It created no incentive and no funding mechanism to redistribute water for non-power uses, did not link power start-up to preparation of a water use plan, and provided no mechanism for timely and effective consultation with affected persons. In fact, Bank staff met with a few hundred people in 16 communities to discuss the project, when more than 100,000 households could be affected by it.

The Bank's ability to push project authorities to adopt a more comprehensive water-management plan will be much reduced after power production begins. The Bank's plan is apparently to endorse, with token changes, an existing dam-management plan that does not even meet minimum agreed-upon flood inundation goals, much less address health or ecological impacts.

## **Deadly Dams**

Better water-management planning for health is an urgent need that the Bank was well aware of when it approved the loan. Water-related diseases such as malaria and schistosomiasis have increased dramatically in the valley since the Manantali and the downstream Diama dams were built, and now claim 8,000 lives a year. It is estimated that adequate measures to manage flows from the dam could reduce the number of deaths by 2,500. The increase in schistosomiasis results from the creation of bodies of fresh water, such as irrigation canals and ponds, that breed disease-bearing snails previously controlled by seasonal fluctuations and salt inflows. A distinguished panel chaired by WHO recommended a water-management plan to manage these diseases. The Bank will rely instead on a program of pier construction (to reduce water contact), monitoring and drug-treatment. There is little reason to think that this program will succeed in reducing water contact.

Another major failing in the project is the meager amount of water it will require for downstream needs. Before the dam disrupted the natural flooding cycle, tens if not hundreds of thousands of hectares were fished, farmed and browsed the flood recession zone. Dam construction reduced this significantly, and, as the Bank admits, the power project will reduce annual flooding by another 15,000 hectares annually even under optimistic rainfall assumptions. A long-standing official planning target is to allow for a minimum of 50,000 hectares to be farmed with reasonable frequency. The Bank agreed to a plan that will result in an average flood cultivation of only 30,000 hectares, and that for only two out of three years. It makes no provision at all to restore ground water or forest resources or the 350,000 hectares of downstream fish habitat that was destroyed by the dam.

"The lesson of experience with large, Bank-funded dams is that this approach to mitigation--build now, plan later--is doomed to failure," says Maïke Rademaker of the German NGO Urgewald. "This project as approved with condemn hundreds of thousands of Senegal River Valley people to avoidable impoverishment, nutrition deficiencies and disease."

Co-financing for the US\$445 million turbine retrofit is either committed or expected from the European Union, Canada, Germany, France, the Nordic Development Fund and the African Development Bank (AfDB), EIB, Islamic Development Bank, FADES, the West African Development Bank and local governments. Citing the health concerns raised above, the Nordic Development Fund declined to give expected support for the project this summer. The AfDB is expected to make a decision later this year, possibly mid-November.

### **What Can You Do?**

Write to the AfDB or other funders to express your concern. AfDB: Omar Kabbaj, President, African Development Bank, African Development Fund and Chairman, boards of directors, 01 B.P. 1387, Abidjan 01, Cote d'Ivoire, Fax: 225.20.4909; Tel: 225.20.4444. Call or email Lori Pottinger for a list of other donor addresses: 510.848.1155; email: [lori@irn.org](mailto:lori@irn.org).

# World Rivers Review

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## Mekong Roundup

Scores of dams are on engineers' drawing boards for the Mekong River system. Some are mere pipe dreams, while others, with the help of powerful backers, are more likely to proceed. But as these projects move forward in the planning process, they are subject to more careful scrutiny, revealing serious concerns over economic viability, environmental impacts and social issues. Here, Aviva Imhof offers an update on some of the most immediate threats to the watershed.

The ongoing crisis in the Thai economy has seriously shaken the economic viability of hydro schemes in the Mekong watershed, including the controversial Nam Theun 2 hydropower project in Laos. The Thai economic crisis has led to drastic downward revisions in projections of Thai economic growth and power demand. This will have a major impact on the hydro projects planned for the Mekong watershed as Thailand was seen as the main source of demand for the electricity they would produce.

Siridat Klankwamdee, deputy governor on policy and planning for Electricity Generating Authority of Thailand (EGAT), told the Bangkok newspaper *The Nation* that Thailand's energy demand is expected to decline by nearly half of original forecasts, resulting in oversupply and a revenue reduction for EGAT. He said that of three power projects proposed by Laos for power export to Thailand - the 681-megawatt Nam Theun 2, the 600-MW Xe Pian-Xe Nam Noy hydropower project and the Hongsa lignite project - EGAT will pick only one. "Nam Theun 2 will have to compete with the other projects. We will buy power from the one that offers the cheapest price," Siridat said.

But this is not the only problem facing the US\$1.5 billion project. The recent indefinite postponement of the Bakun hydropower project in Malaysia (see page 1) highlights the economic unattractiveness of hydro projects. The demise of Bakun leaves the Nam Theun 2 as the largest private hydropower project in Asia seeking investors.

The World Bank is due to make a decision on the project's future as this issue goes to press. Neither the project's private developers nor the potential commercial lenders are able to move forward with the dam unless World Bank guarantees are in place to protect their investment. If the Bank decides in favor of the project, it must still formally enter the project into the appraisal stage and then present it to the Bank's Board of Directors for approval. The project is not expected to go to the Board until early 1998.

But after four years of studies, negotiations and consultations, Nam Theun 2 looks increasingly risky, and anticipated benefits are steadily shrinking. The recently released Economic Impact Study by consultants Louis Berger International says the project will generate US\$38 million in annual revenue for Laos, a vast difference from the \$176 million promised by the developers in 1991.

Even this could be optimistic. A review conducted by Dr. Wayne White of Foresight Associates reveals that the Louis Berger study systematically underestimates the project's risks. Dr. White states that it is "fundamentally misleading" for Louis Berger to conclude that "the net present value of the project remains positive under all but the most pessimistic of scenarios." Indeed, Dr. White finds that there is a "very real possibility of the project ... subjecting the GoL [Government of Lao] to loss of its total investment while incurring environmental, social and opportunity costs."

Some of those costs have been articulated by Dr. Guy Lanza, Professor and Director of the Environmental Sciences Program at the University of Massachusetts. Dr. Lanza was commissioned by IRN to review the project's Environmental Assessment and Management Plan by SEATEC International. Dr. Lanza concludes that the project "will produce major irreversible ecological, cultural and economic damage to the region" and that it "would represent a large scale alteration of the natural structure and function of the Nakai Plateau watershed and greatly diminish the biodiversity of the region."

The impact on fisheries is expected to be substantial. David Wegner of Ecosystem Management International was also commissioned by IRN to review the EAMP. Wegner writes that "the Nam Theun flow release of 2 m<sup>3</sup>/sec is too low to sustain fish or invertebrate species." As a result, "aquatic and riparian species ... will die." The EAMP claims that the reservoir will produce a fishery that will offset the loss of riverine species. However, Wegner states that "native species will not likely repopulate the reservoir ... resulting in losses of native diversity, loss of native species and loss of natural processes." According to Wegner, "Exotic fisheries, developed for reservoirs typically do not result in long-term viable fisheries."

Witoon Permpongsacharoen, Director of the Bangkok-based group TERRA, said "The project has huge risks for the Lao people and government. The private sector will be insured by the guarantee, but who will insure the risks of the government and people?"

### **ADB Studies Continue**

The Asian Development Bank, a regional multilateral development bank based in Manila, has been a key player in the push to build dams in the six countries of the Mekong watershed. Bank-financed studies have identified the potential for over fifty large dams on the Mekong River and its tributaries. The ADB, together with interested donors, has conducted feasibility and detailed engineering design studies, directly financed some projects, and is mobilizing resources from donors and the private sector, as part of its program to promote economic cooperation in the Mekong region.

The ADB's latest exercise in dam promotion is the \$2.5 million Sekong, Se San and Nam Theun River



Basins Hydropower Development Study, approved by the Bank in August 1996. The Sekong and Se San basins run through Vietnam, Laos and Cambodia, while the Nam Theun basin is in central Laos. The study's Inception Report, prepared by UK consultants Sir William Halcrow and Partners, states that the "primary objective of the study is to formulate a sustainable, least-cost plan of hydropower development of the three basins from the projects which have been identified so far ... or will be identified."

According to the report, the study must "assess and take into account the individual and cumulative environmental and sociological impacts which will result from the construction of the projects."

However, a closer look at the report reveals that there is little discussion of how the consultants will actually assess the cumulative impacts of the proposed projects. In fact, the main aim of the study is to "identify six suitable projects for further study" from a total of 37 projects already identified. The environmental analysis will "provide only an initial environmental evaluation of potential impacts," which should be adequate for "writing the terms of reference for future ... environmental and social impact assessments." Halcrow concludes that "the cumulative impacts of basin-wide development ... need to be examined in future analysis."

The consultants have already identified lack of information as a significant stumbling block. Adequate hydrological data is missing for the Se San and Se Kong basins, which means that "considerable extrapolation of data is required" and there is a need for "the estimation of substantial amount of missing data." Information on sediment yield is scarce, with Halcrow forced to rely on "extrapolation of the sediment yield in other rivers in the region, coupled with theoretical approaches." Fisheries information is also "extremely sporadic in coverage."

In terms of participation, the study envisages three workshops to discuss the study at its various stages. But not a single NGO representative was invited to the first workshop, held in Phnom Penh in May 1997. The consultants will also "discuss relevant issues with members of communities liable to be affected by proposed developments at informal, locally-based meetings." What remains unclear is exactly how this consultation will work, and whether local people will be given the opportunity to make informed decisions about their livelihoods and futures.

But perhaps the most important issue unanswered by the study is that of demand for the power from these dams. It is unclear precisely how Halcrow intends to estimate demand, but what is explicit is that the plan of development recommended by the consultants will be based on a fixed demand forecast. In a rapidly changing economic climate, this means that the study will most likely rely on highly inflated demand projections. It seems the ADB is intent on promoting these dams regardless of whether or not there is a market for their power.

### **Nam Leuk Encounters Problems**

The ADB's most recently funded dam in Laos - the Nam Leuk Hydropower Project - has run into serious hot water. The ADB approved a \$52 million loan to the Lao Government for the 60MW dam and water diversion scheme in August 1996. Japan's Overseas Economic Cooperation Fund co-financed the dam with a 3,900-million-yen loan. A visit by IRN last May revealed serious problems with sediment run-off into the river from the access roads and construction site. The river had become brown and muddy

downstream of the project site, and was affecting villagers who get fresh water from the river. China International Water and Electric Corporation, a Chinese engineering company, was awarded the civil engineering contract with a bid that was more than \$6 million less than the nearest competitor.

In July of this year Robert Dobias, Environmental Specialist at the ADB, told IRN that the ADB was "not satisfied with the work being done" at Nam Leuk and had suspended construction activities on the site until a "number of measures are taken by the contractor to improve their operations." A Special Review Mission is due to visit Laos from 12-17 September to assess whether these measures have been "acceptably implemented." The mission is due to coincide with the first visit to the site of the Board-appointed Panel of Experts.

"The events at Nam Leuk call into question the ability of the ADB to acceptably monitor projects," says Lee Rhiannon, Director of the Australian group AID/WATCH. "It is quite clear that the construction company has been cutting corners - this is the only way its bid could have been so low. The ADB should have predicted this would happen."

### **Japanese Aid Criticized**

The ADB and World Bank are not the only funders interested in developing the Mekong with dams. Japan has its own plans for the watershed, which recently drew fire from international NGOs. In a mid-September letter to the Japanese Ministry of Foreign Affairs, NGOs from Asia, Europe, Australia and North America called for the suspension of all non-humanitarian aid activities in the Mekong watershed.

The letter questions the Ministry of Foreign Affairs development assistance strategy for the Mekong since its release of "Strategies for Development of the Mekong Area" in July of last year. This report, authored by Japanese construction and consulting companies, emphasizes a large-scale infrastructure approach to development of the Me-kong watershed. The letter states: "the strategies advanced by this Task Force ... promotes a flawed development model designed to maximize short-term economic benefits to Japan, while thoroughly frustrating efforts to promote sustainability in the region."

In developing this strategy, no effort was made to ascertain what type of development assistance people of the Mekong watershed might want or need. NGOs therefore called for a new strategy to be developed through consultation with local people.

IRN recently commissioned Dr. White to conduct an independent review of the report. Dr. White concluded that despite the objective of establishing a comprehensive development strategy, the Japanese Mekong strategy "... had an explicit preoccupation with infrastructure and promoting construction ... [which] raises concerns about two forms of bias: that the form of the infrastructure recommended may not be truly beneficial, and that infrastructure implementation will occur in isolation rather than being well integrated with development efforts."

Since the report's release, the Japanese government has begun funding dam projects and river development studies, including the controversial Nam Leuk Dam in Laos.

## New Reports on Region's Dams

Generating Power and Money: Australia's and Thailand's roles in hydro projects in Laos. Published by the Australian Council for Overseas Aid (ACFOA), 1996. These essays, from a 1996 workshop held in Australia, discuss hydroelectric development schemes proposed for Laos, and the impacts of such proposals on local communities and their environment. Available for AUS\$13.00 from ACFOA, 14 Napeir Close, Deakin Act 2600, Private Bag 3, Deakin Act 2600 Australia. Fax: 06.285.1720. Email: [acfoa@acfoa.asn.au](mailto:acfoa@acfoa.asn.au)

Hydroelectric and Trans-basin Water Diversion Projects in the Salween River Basin. Compiled by Towards Ecological Recovery and Regional Alliance (TERRA), 1997. Describes construction of dozens of large dams on the Salween and Moei rivers on the Thai-Burma border. "These projects are being proposed as a source of electricity and water for Thailand and to provide revenue to the ruling State Law and Order Restoration Council (SLORC) of Burma (Myanmar)." The report details the social, environmental and human rights costs of such projects. Available for US\$10 from TERRA, 409 Soi Rohitsook, Pracharaj-Bampen Rd., Huay-Khwang, Bangkok 10310, Thailand. Fax: 66.2.691.9714. Email: [terraper@coment.ksc.net.th](mailto:terraper@coment.ksc.net.th)

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- See the [Mekong Campaign Page](#) for more information.



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## **Southeast Asia's Biggest Dams Must Go**

*The following editorial appeared in The Nation, Bangkok's English-language daily newspaper, on September 13, 1997.*

When 15 leaders of the 9,500 indigenous communities affected by Malaysia's Bakun Dam received their compensation last month, they sent the cheques back to the government. One said he received a token Bt4, which made the cost of issuing the cheque higher than the compensated amount. No wonder the opposition to Southeast Asia's largest dam project continues despite the fact work has already begun.

Last week, the anti-dam advocates got what they wanted.

In a dramatic reversal, Prime Minister Mahathir Mohamad said the dam would be "indefinitely delayed". That meant the mammoth project was as good as dead, for now. Mahathir's backflip came not because of a new-found concern for the plight of the indigenous people who will see a pool big enough to sink Singapore in their ancestral home, but rather because the ringgit and stock market took a severe beating from investors who are wary of his grandiose projects.

Also scrapped are the ambitious "floating" airport off the northern coast, the three-kilometre-long Linear City which snakes above the Klang River - dubbed the world's longest building - and highway which cuts through the ecologically sensitive mountainous region in the heart of the peninsula. All of this is good news for the environment.

It is not good news for the indigenous people though. Their relocation will go ahead regardless. In an attempt to save face, the government is now arguing that Bakun's woes will not affect future energy supplies. There are alternatives. But that begs an important question. Why Bakun if it is not necessary? The answer could lend support to the dark suggestion that Bakun was a sick excuse to log the rainforests and convert them into oil palm plantations.

With the Bakun Dam effectively shelved, all eyes are on what is now the biggest dam project in Southeast Asia - the Nam Theun 2 (NT2) in Laos. Planners hope that NT2 will catapult this poor and landlocked nation into the 21st century. But as with Bakun, the recent economic hiccup in Southeast

Asia has also dealt a serious blow to NT2. Economically hobbled Thailand - the main importer of electricity from NT2 - is now less able and willing.

That spells trouble for NT2. Even without the economic crises, NT2 will pose problems for Laos. After all, big dams involve big risks. And big debts too. NT2 is expected to incur a debt four times that of Laos' national budget. And with Thailand on a belt-tightening regime, it is clearly suicidal for Laos to press ahead with NT2. What's more, this is only one of 20 dams planned for the country.

The future of NT2 now lies with the World Bank. Laos needs the bank to give a "risk guarantee" before it can seek to raise US\$1.5 billion from the private sector. The guarantee means that while the dam is funded privately, the bank will assume the risks of Laos negating its contractual agreements. This would be the first time that the World Bank would provide such a guarantee, in the hope that it would spur private investments in poor economies.

The World Bank has made major blunders with big dams before. Recently, the bank was forced to pull out of the Narmada Dam in India and the Arun III Dam in Nepal. This time, the bank vows to do it right. If right is what the bank wants to do with NT2, then it should withdraw support for the project.

Over the past few decades, the West has been making a hard sell on two major electricity technologies to power hungry developing countries - nuclear and hydro power. As harnessers of power, both have evoked great awe and admiration as human conquerors of nature. In addition, such billion-dollar projects promise great wealth for the political elites - from lucrative contracts to graft.

While nuclear power has created widespread fear of radiation leaks, hydro power enjoys the reputation of being a cheap, clean and renewable energy. That opinion, however, is now being seriously challenged. Big dams, like nuclear power plants, have the potential to do great damage to the ecosystem, culture and livelihood of the indigenous peoples they displace.

The sooner the World Bank and the powers-that-be in Third World countries realise this, the better.

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- Visit the [South East Asia Campaign Page](#) for more information.



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# World Rivers Review

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## Three Gorges Dam Gets International Boost

by Owen Lammers

The international assistance China desperately needs to build the gigantic Three Gorges Dam is now materializing. Information is surfacing about bonds being sold in the US and Japan for construction financing, and in August it was announced which international companies won contracts to supply the initial set of turbines and electrical generators.

The State Development Bank of China is working with Lehman Brothers and J.P. Morgan & Co. to sell bonds in the US totaling \$300 million, which most likely will be used to fund the construction of Three Gorges. Bloomberg Business News reported in January that documents filed with the Securities and Exchange Commission reveal that the State Development Bank is committed to providing approximately \$3.6 billion for dam.

Dr. Kazu Sumi, a professor at Yokohama City University in Japan and author of the recently published book *Japanese Involvement in the Three Gorges*, reports that a similar \$300 million bond issue for the State Development Bank of China was offered through Nomura Securities in Japan last year. A second offering was scheduled this year, but was scrapped after it was discovered that Nomura was violating Japanese securities law by not adequately disclosing the ultimate purpose of the bonds. According to Dr. Sumi's research, nearly all the capital raised by this bank is being funneled to Three Gorges. Dr. Sumi speculates that this withdrawal may have cost Japanese companies lucrative contracts for the dam's initial set of turbines and generators. When the Three Gorges Project Development Corporation announced in August which companies had been chosen, the Mitsubishi-led Japanese consortium was not part of the group.

Several European and one Canadian company will be supplying 14 of the 26 700-MW turbines and power generators. The remaining 12 units will not be put out to bid for several years. Chosen companies include GEC Alsthon from France, which will supply eight of the turbines; ABB of Switzerland, to supply eight generators, and a consortium comprised of General Electric Canada and Voith and Siemens of Germany, which will be providing the other six turbines and generators. US companies were not involved in part because the US Export Import Bank decided last year that it would not provide export credit guarantees for US companies vying for Three Gorges contracts.



Public campaigns aimed at reversing these companies' involvement are already well underway. The Toronto-based Probe International sent a letter endorsed by North American environmental organizations calling on GE Canada to cancel its contract. Similar efforts are underway by the Bern Declaration Group in Switzerland to force ABB to withdraw its support. Meanwhile, work to complete the cofferdam continues at a feverish pace. China's Premiere, Li Peng, is planning a major ceremony in November to announce that the river has been diverted, and construction of the main dam will soon get underway. Critics are concerned that because construction on the cofferdam is being rushed, it may not be safe. Some 50,000 workers lives are at risk if it fails. The main dam is scheduled to be complete in 2009.

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- See the [Three Gorges Campaign Page](#) for more information.
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