Folder Title:	President Wolfensohn - Briefing Book for President's Meetings and Events - Dr Jay Hair - April 29, 1997
Folder ID:	30487840
Series:	Meeting and event briefing materials
Dates:	12/18/1996 – 04/29/1997
Subfonds:	Records of President James D. Wolfensohn
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Meeting: Dr. Jay Hair

Tuesday, April 29, 1997
6:00 - 7:15 p.m.
JDW Office & Conference Room

REVISED
4/29/97

Archive Management for the President's Office

Document Log

Reference # : Archive-01410

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A. CLASSIFICATION

- [x] Meeting Material
- [ ] Trips
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- [ ] Communications with Staff
- [ ] Phone Logs
- [ ] Calendar
- [ ] Press Clippings/Photos
- [ ] JDW Transcripts
- [ ] Social Events
- [ ] Other

B. SUBJECT: MEETING: DR. JAY HAIR / AGENDA: REVIEW OF REPORT ON IFC PANGUE PROJECT (B) (N) (Confirmed)
VENUE: E1227 (OFFICE & CONF. RM.)
CONTACT: DR. JAY HAIR @ 206-583-8478 / FAX: 206-583-8500
WB ATTENDEES: JDW, SHIHATA, LINDBAEK, C.LEE, SANDSTROM, KOCH-WESER, (STRONG-Not attending), HANY
EXTERNAL ATTENDEES:
DR. J. HAIR
MR. BEN DYSART
MEETING FORMAT:
6:00 - 6:15 P.M.: JDW, HAIR, SHIHATA (ROOM E1227)
6:15 - 7:15 P.M.: JDW, HAIR, SHIHATA, LINDBAEK, C. LEE, SANDSTROM, C. KOCH-WESER, M. STRONG (4/24), HANY (CONF. RM. E1227)
(4/23) MEETING CONFIRMED BY FAX & EMAIL
(B) LINDBAEK // DUE: FRIDAY, APRIL 25
EXC: HANY // ALI (4/23)
Brief Includes note from Jannik Lindbaek and tabs:
- IFC/Empresa Letter to Skandinaviska Enskilda Banken
- 4/19-25 Economist Article on Dams
- 4/4 Letter to JDW from Jay Hair
- 4/8 Letter to JDW from GABB
- 4/15 Letter to JDW from CONADI
- Correspondence with Mr. Theodore E. Downing, University of Arizona

DATE: 04/29/97

C. VPU

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D. EXTERNAL PARTNER

E. COMMENTS:

File Location	Cleared By	Date:
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File Title	Barcode No.
President Wolfensohn - Briefing Book for President's Meetings and Events - Meeting Material - Dr Jay Hair - April 29, 1997	30487840

Document Date	Document Type	
April 29, 1997	Memorandum	

Correspondents / Participants
To: Carol F. Lee@CLED@IFC
From: Suellen Lazarus@CEXVP@IFC

Subject / Title
Suggested mandate for an IFC Board Subgroup-Hair Report

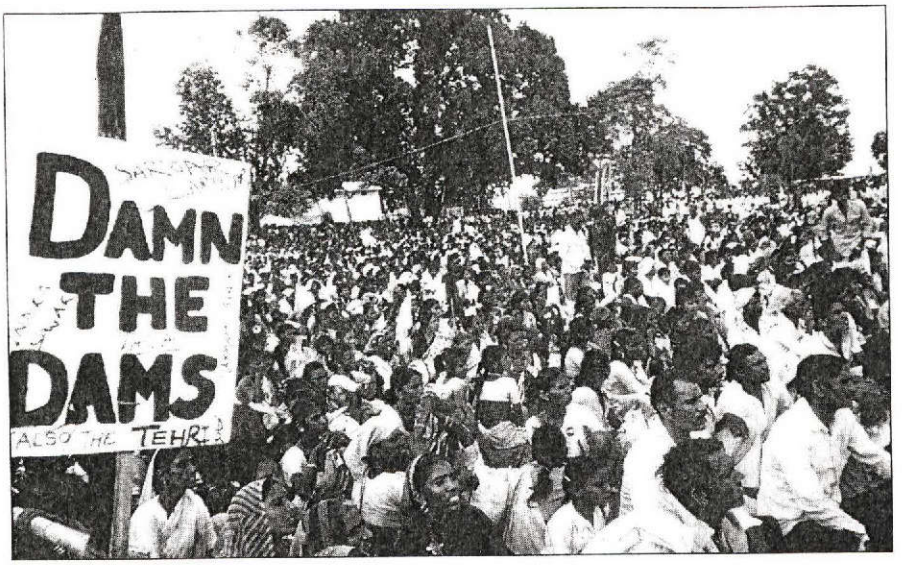
Exception(s)
Information Provided by Member Countries or Third Parties in Confidence

Additional Comments

The item(s) identified above has/have been removed in accordance with The World Bank Policy on Access to Information or other disclosure policies of the World Bank Group.

Withdrawn by	Date
Diego Hernández	May 7, 2025

4/19-25 Economist
Article on Dams



Dambuilders and dambusters

GLAND, SWITZERLAND

Should dams be built? Forging a consensus will be tricky

IT MUST once have seemed like power for free, a gift from the heavens. A dam creates electricity from nothing other than the falling of water through its turbines. The supply is replenished in perpetuity by the munificence of nature. Nothing is used up. Nothing is contaminated. No pollutants are belched into the atmosphere.

The lake that forms behind a dam, meanwhile, should allow a country to make the best use of what is often its most precious resource. It lets people have water when they want it (for irrigation), and holds it back when they do not (by preventing floods). Often the lake is a tourist attraction, a rich source of fish, and a fallback in times of drought, when the river would have been reduced to a trickle.

However, dams have well-publicised vices. They are notorious for causing great environmental change. And they force massive human resettlement, mostly of people who live where the lake is due to appear. The World Bank estimated in 1994 that the 300 "large" dams—those over 15 metres (50 feet) high and some of those over 10 metres high, though the biggest are ten times that size—built every year force some 4m people to leave their homes, often ancestral lands. The resettlement is almost always badly planned and executed.

Nonetheless dams are seen, by many poor countries in particular, as the only cost-effective way to generate power (and often to export it as well) and husband water. They also create jobs and are often status symbols. Their true value has been made impossible to judge by decades of development prejudiced in their favour. The real impact they have on the environment and on people has rarely if ever been included in a dam's cost-benefit analysis. The benefits are generally taken for granted, and are not properly measured against the outcome of refraining from building a dam.

But fashion changes. In recent years protests against dams have grown more common. Having stopped the building of nuclear reactors in rich countries, public opposition is starting now to alter the predilection for dams in poor ones. Some big dam projects have been abandoned halfway through (see box on next page); funding for new ones is not so easy to find. Even the World Bank, formerly a fan of dams and still their single biggest financer, has become cautious. Hence its request for a meeting of interested parties, from dambuilders and financers to conservationists and anti-dam protesters, which took place on April 10th-11th in Gland, Switzerland.

The aim was to seek a consensus on whether, and how, dams should continue to be built. The difficulty is that the social and environmental costs and benefits of dambuilding are still extremely hard to measure reliably.

Many of the worst environmental effects of dams stem from their supposed benefits. For instance, the constant and reliable irrigation a dam provides can waterlog the ground. The water brings underground salt to the surface, then evaporates and leaves it behind. Eventually the soil becomes too salty for crops to survive. Even the prevention of floods is a mixed blessing. The silt that was once carried downstream by a swollen river, replenishing the soil and nutrients, no longer makes its journey. Instead it clogs up the reservoir.

To these and other problems (such as the plant and animal life lost by stifling a river and filling a forest with water), there are some partial fixes. Underground drainage may prevent salinisation; channels in the dam can allow some of the silt through; fish-ladders allow certain migrating fish, such as salmon, to continue their journeys. But even with these in place, the effect of a dam is unpredictable. The Aswan dam and the Aswan high dam, both on the Nile, are commonly held up as exemplars of planning. But the arable land downstream is being eroded away, partly because it is not getting enough silt.

The protection from floods that dams offer turns out to be one of their most troubling drawbacks. Traditionally, much land near a river has been irrigated by floods and planted as they recede. A dam can stop this from happening and so rob millions of people downstream of their livelihood. It is usually assumed that the dam's irrigation of other land will make up for the economic loss, but a study of the Kainji dam on the Niger reckoned that the dam reduced rice production downstream by 18% and the fish catch by 60-70%. Another study estimated that the economic benefits of the Bakolori dam, on a tributary of the Niger, were outweighed by the loss of crops, fish and livestock by villagers downstream.

But the thorniest problem is the uprooting and resettlement of people. Those most likely to be evicted by a dam—ethnic groups that are not too querulous—are those least good at adapting to new conditions. They often have to change their way of life as well as their location. The World Bank itself reckons that only in a handful of

cases have most of the people displaced by a dam ended up better off.

Thayer Scudder, an anthropologist at the California Institute of Technology, in Pasadena, argues that even this finding makes matters look better than they are, since some of the dams the World Bank took into account had been completed only a few years before. His long-running study of people ousted by the Kariba dam on the Zambezi, which separates Zambia from Zimbabwe, found that although their lives improved initially, the farmland they were given turned out to be poor and relations with their new neighbours worsened. The second generation were distinctly worse off than their parents had been.

Although they are still hard to quantify in advance, the social penalties that dams impose are nowadays much better understood. What is still lacking is a mechanism that enables them to be taken into account when a dam is planned. Governments keen on a dam being built are often reluctant to force up its costs by insisting on too many environmental or resettlement measures. And when an external agency such as the World Bank tries to attach such conditions, governments (and the Bank) are often bad at enforcing them, and good at covering up.

All this has conspired to give dams a bad name. Even the World Bank came close to giving up on dams a few years ago, and has already shifted its emphasis towards coal as a source of power. But burning fossil fuels has unpleasant side-effects of its own.

That is why the Bank remains interested in dams, and keen to find a way to make them acceptable. In Gland, all the participants agreed that if an international commission were created to set standards, if everybody affected by a dam were involved in the planning process, if the option of building a dam were weighed against all alternatives, if all the costs were accounted for, and if everyone benefited from the dam ... then it could go ahead.

This is hardly a breakthrough, amounting as it does to an agreement to accept the building of any dam so long as its construction is wholly uncontroversial—an improbable eventuality. Nor does it deal with the waning power of the Bank to ensure that dambuilding is socially responsible. The Bank finances only a small fraction of all new dams. And investors who prove to be overly sensitive to the environment or the impact on local people are frequently dumped in favour of those with fewer scruples. Maybe only when the world runs out of profitable places to put dams will the building of harmful ones stop.

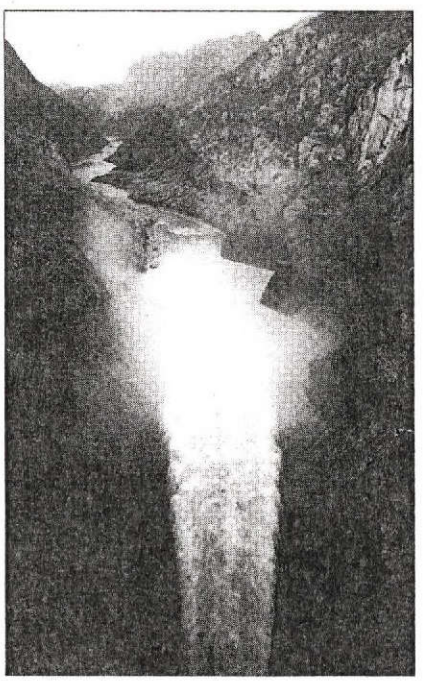
A flood of fiascos

GLAND, SWITZERLAND

THE **Sardar Sarovar** dam on the Narmada river, in India, is a stark example of how the World Bank's conditions on resettlement and environmental damage—which were attached to its loan in 1985—could fail. An independent report found that, among other things, the benefits were over-estimated, environmental impact assessments were not done and resettlement conditions were not met. The Bank's own India department altered a study criticising the resettlement, to hide the problems from the Bank's directors. The loan was cancelled in 1993 and India's Supreme Court suspended construction in 1995. The angry protests against Sardar Sarovar became a model for others and focused attention on how bad dams could be.

The **Pangue** dam on Chile's Bio Bio river was initially seen as a coup for the International Finance Corporation (IFC)—the affiliated arm of the Bank that lends to privately financed projects—since it was to be its first big dam. However, a recent report commissioned by the Bank's president, James Wolfensohn, is said to criticise the IFC for failing to enforce environmental conditions. In March Mr Wolfensohn put pressure on Chile's dambuilding agency to comply with the conditions. Instead, Chile repaid the IFC loan and borrowed, at lower interest rates and with fewer constraints, from Dresdner, a private German bank.

Malaysia's $6 billion **Bakun** dam in Borneo is a favourite project of the prime minister, Mahathir Mohamad. A lukewarm report on its profitability along with protests by various pressure groups have deterred foreign investors. Even so, Ekran, the company promoting the project, is said to think that it can raise enough money from Malaysian sources alone.



Not a natural wonder

The massive **Three Gorges** dam which China started to build in 1994 will displace up to 1.3m people. America's Export-Import Bank, dissatisfied with China's guidelines on resettlement and the environment, refused to finance the project three years ago. But the dam is going ahead with Swiss, Japanese and German money.

Namibia's government will soon decide where on the Cunene river to build the **Epupa** dam. A World Bank study some years ago said that building it would be economic lunacy. The government's consulting engineers recommended the cheapest and most environmentally friendly of four alternative dams, but the mining and energy ministry is keen on the big expensive one. It would displace relatively few people (between 6,000 and 10,000), and lots of jobs are promised, but most of these will probably go to skilled workers from overseas.

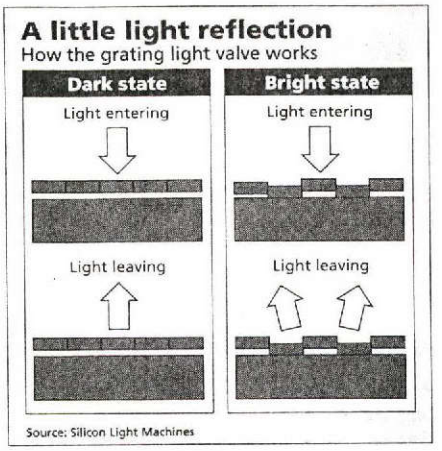
By contrast, **Nam Theun 2**, in Laos, is being trumpeted as the way all dams should be planned. The World Bank will decide whether to finance it only after three intensive studies: one to make sure that it will benefit all concerned; one to compare it with alternatives; and one to see whether the area within the dam's watershed (ie, the area from which water will run into the reservoir) can be turned into a national park.

Flat-screen displays

When size matters

SUNNYVALE

AFTER more than 50 years, the cathode-ray tube is still the king of table-top screen displays. But there is now a huge market for truly miniature displays, just millimetres in diagonal—far smaller than the tube could ever be. At the other end, cheap devices that can easily project a gigantic image from a tiny package are much in demand. What is needed is the elec-



tronic equivalent of a 35mm slide.

Previous attempts to do this range from cautious extensions of existing liquid-crystal technology to bizarre leaps forward, such as using a million tiny mirrors that pivot from side to side to redirect light in order to form an image. But the latest idea is even weirder than this.

Based on research by David Bloom, the chairman of Silicon Light Machines, in Sunnyvale, California, the so-called "grating light valve" is essentially a silicon chip with moving parts. The surface consists of thin silicon ribbons, each a few millionths of a metre wide, suspended above a minute air gap. The ribbons are either fixed or moveable, alternating across the surface.

As in all display screens, the image is built up out of pixels—tiny dots that, when viewed from a suitable distance, fool the eye into seeing a seamless picture. In the case of the light valve, each pixel is made up of four ribbons, two fixed and two moveable (so to have a lot of pixels, you need a lot of ribbons). Pixels are switched on and off by pulling on the ribbons that move up and down. When a pixel is off (that is, it is to appear dark in the image), the ribbons line up to produce a flat, reflective surface. Any incoming light is just sent straight back out again (see diagram). When a pixel is turned on, however, the active ribbons are drawn down into the air gap by electrostatic attraction, producing a set of grooves.

Diffraction and interference, two basic properties of waves, determine the fate of light hitting the grooves. Diffraction is what happens when waves are squeezed through a narrow gap, such as that produced when a moveable ribbon has been pulled down. When the waves emerge from the gap (in this case they bounce back out of the groove) they spread out.

If these spreading-out waves meet waves just bouncing straight back off the "up" ribbons, they interfere with each other. Where two wavecrests meet, they reinforce each other to produce a bright spot; where a crest and a trough coincide, they cancel each other out producing darkness. This complicated interaction—the same thing that takes place in a hologram—means that as light leaves a pixel, it is split into two identical beams, moving off at equal but opposite angles. And if all the beams from all the pixels are captured—something that can be done by reversing a standard device known as a "beam splitter cube"—they can be optically recombined to form an image.

Though this is a rather fancy way of switching pixels off and on, the system has several advantages. It can be used for big displays or small ones depending on how the final image is projected. Because the grating ribbons are so small and light, they can be switched on and off extremely quickly: up to 50m times a second. Slow switching has long been the bane of liquid-crystal displays, so the light valve scores good marks here.

Its inventors claim that it should also lose much less of the light that arrives from the light source, whether a light bulb or a laser, recapturing as much as 81% of the incoming light for the final image—although some people doubt it will be that good. And best of all, according to Silicon Light Machines, the grating light valve is extremely cheap to make. But it may be bulkier than its rivals. The throne for tiny screen technologies has not yet been claimed. Bitter wars will doubtless be fought.

The ultimate fridge magnet

GADOLINIUM is one of the more obscure elements of the periodic table, but it may yet have its 15 minutes of fame. For gadolinium has a strange property that could prove useful: when put into a magnetic field, it heats up; when demagnetised, it cools down.

Karl Gschneidner, a materials scientist at Iowa State University, in Ames, is using this effect to create a new principle in refrigeration (or, rather, to revive an old one that has not worked well before). He is cooling things down with magnets.

Most modern refrigerators function by circulating a fluid with a low boiling point through their freezer compartments. Evaporation requires heat, and this heat is drawn in from the surrounding environment. By pumping the fluid into a freezer in such a way that it expands and evaporates, heat is "sucked" out of the compartment.

Conversely, condensation from vapour to liquid liberates heat. In a refrigerator, condensation takes place in an external radiator, chucking the heat from the freezer out into the room where the fridge is located. This way, heat is pumped from the inside of the fridge to its outside.

This system works well. But there is a drawback. The fluids of choice are either chlorofluorocarbons (better known as CFCs, which are implicated in ozone depletion and global warming and have been outlawed by international agreement); their cousins, hydrofluorocarbons (HFCs, which contain no ozone-damaging chlorine, but which still add to the greenhouse effect); or ammonia (which is unpleasant if it leaks). Dr Gschneidner's fridge has a circulating fluid, too. But it is just water with a little antifreeze added. The cooling is done not by the expansion and compression of a fluid, but by the magnetisation and demagnetisation of gadolinium.

A prototype gadolinium refrigerator, based on Dr Gschneidner's ideas, has been built by Carl Zimm, at the Astronautics Corporation of America, in Madison, Wisconsin. It works by pushing two cylindrical "beds" containing small gadolinium spheres into and out of a magnetic field in opposition to one another.

As a bed enters the magnetic field, it heats up. The heat generated is allowed to dissipate into the environment and the bed is then pushed out of the magnetic field. Deprived of magnetic stimulation, it cools down—and cools the water, which is then pumped around the refrigerator's freezer compartment. And while this is happening, the other bed is in the magnetic field being heated. So far, the Astronautics refrigerator has run for over four months without any problems.

Ultimately, like most refrigerators, the gadolinium fridge runs on electricity. Power is needed to move the bed and to keep the water circulating. But there are reasons to think that a commercial version would use significantly less electricity than a more conventional refrigerator. No energy is lost in the expansion and compression of the working fluid, and the magnet that generates the field is based on a superconductor, and thus consumes negligible quantities of electricity. The maximum energy efficiency of a conventional refrigerator is about 40%. Theoretically, a magnetic fridge could achieve 60% efficiency.

Such an efficient fridge is, Dr Gschneidner reckons, five to ten years away from industrial applications, and rather further from the shops. And gadolinium is quite expensive. But if it proves commercially viable, it may be the coolest fridge around.

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Document Date	Document Type	
April 4, 1997	Letter	

Correspondents / Participants
To: Mr. James D. Wolfensohn, President
From: Jay D. Hair, Ph. D., Independent Advisor

Subject / Title
Pangue Hydroelectric Project (Chile): An Independent Review of the International Finance Corporation's Compliance with Applicable World Bank Group Environmental and Social Requirements

Exception(s)
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Additional Comments

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