

# ANUMUKTI

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## *Koodankulam Reactors : - A Bad Bargain !*

Megaprojects never die. Neither do they, like old soldiers, just fade away. But sometimes like an incurable cancer, they have periods of remission. With luck, these periods of remission can last for years. But then the inevitable follows and the prognosis is not good.

Nuclear reactors at Koodankulam are a case in point. They have been in the news for donkey's years. Even during Breznev's time there was talk galore. A memorandum of understanding was signed and the site surveyed for transport of heavy equipment as early as 1988. That was the time when the people had a lucky break. Soviet Union, which was to supply the two thousand Megawatt reactors, collapsed due to its own internal contradictions of being a closed and autocratic system. The nuclear disaster in a newly built Soviet reactor at Chernobyl in 1986 and attempt by the Soviet leadership to suppress information about the catastrophe, also contributed. However, this time people have not been *so* lucky. If only the cardiac arrest of Deve Gouda government had come a few weeks early,

people of Koodankulam and the rest of India would have been spared this assault for some more time. Now, there is no alternative but struggle.

Regular readers of Anumukti are well aware that no kind of nuclear power plant is safe enough or clean enough or cheap enough for any society in the world. However, in the following, for the sake of discussion, let us grant that India is in such a dire need of electric power (a very dubious thesis in the first place) that there is no alternative but to have nuclear reactors at Koodankulam. Even granting these absurd propositions, these reactors are a bad bargain by any reckoning.

First of all for the next twenty years at least they will intensify the power crisis. Studies have conclusively shown that nuclear power plants, if run very efficiently are net producers of energy only in the last few years of their existence. Indian nuclear power plants, which histori-

cally have run at 41 per cent of their rated capacity, are never going to be net producers of energy. Thus undertaking to build a nuclear power plant is the surest way of deepening a power shortage into an immediate crisis.

Secondly, these proposed reactors are the wrong size. A study done in the US regarding the optimum size of a power station with respect to the grid size showed that for a 57,000 Megawatt grid, the best size of the plant was 100 to 150 Megawatts. Having a huge sized plant in a midget sized grid is the surest way of ensuring that the supply is going to be even more unreliable than at present. The unreliability of the present supply, means an additional 15 percent loss of electricity as people (who can pay for it) try to ensure reliability through use of inverters and batteries. And industry and small businesses try to exploit the kerosene—diesel subsidy by going in for diesel based generating sets.

Thirdly, Koodankulam is a bad site. It is located in the extreme south of

## *A Fate Worse than Chernobyl?*

The diktat of the producers over the consumers was later identified by glasnost as the main weakness of the Soviet economy. Lest we forget in Koodankulam, we are the consumers.

Soviet industry was incapable of building large pressure vessels required for the VVER (the type proposed for Koodankulam). That is why priority was given to the RBMK (the Chernobyl type) design. To provide an industrial base for VVER systems, Atommash was established to manufacture pressure vessels and other components.

Atommash was a key project in the Soviet energy programme. Due to political considerations (the region's party secretary was a close friend of Breznev), it was decided to locate the plant in Rostov region. Planners and builders were in such a hurry to build that they had omitted to make a proper geological survey of the site. It turned out to be unsuitable for the plant and the new town of Volgodonsk. They were built below a hydroelectric dam across the river Don. The chernozem soil was a poor protection against the pressure of the water mass above the level of the site. The area around the town gradually became a swamp. This was a fairly common problem with Soviet hydroelectric projects. (Tawa dam engineers- you are not alone!) By the time the project was nearing completion, Volgodonsk was already a town of 100,000 people. So the problem was simply covered up.

In 1983, sinking foundations caused one of the plant's huge walls to collapse suddenly.

From Zhores Medvedev's *The Legacy of Chernobyl*

*It is on the assumed competence of people with such an outstanding past record that we are willing to put not only ourselves but more so, our neighbours in Sri Lanka in jeopardy. - Editor.*

the country in a drought prone region. Water used for cooling the reactors (and huge amounts are required) is to be taken from a dam which was meant for irrigation in this water scarce area. The farmers of the region were already up in arms against this hijacking in 1988.

Nuclear power plants by their very nature need large steady customers for their power. There are none such anywhere in the vicinity, thus the power produced here would need transportation over large distances to consuming centres thus contributing to the already huge transmission and distribution losses.

There are also international ramifications of siting the reactors at Koodankulam. The Sri Lanka coast is just 20 kilometres away, and the decision is bound to create an additional source of friction in a relationship which shows signs of some improvement after being many years in the doldrums.

Fourthly, the reactors are the wrong design and have many safety associated problems. Indian nucleocrats will no doubt point to the fact that they are not the Chernobyl kind. But it is a fact that before the disaster at Chernobyl, Soviet nucleocrats were convinced

that the Chernobyl design was in fact safer and better than the presently proposed VVER kind. (See Box) These have a narrow pressure vessel, with the result that the fuel elements lie much closer to the surface of the vessel. Constant impinging of high speed neutrons causes the vessel to become brittle with time and this could lead to catastrophic failure.

Having a large number of different reactor systems in India is in itself a safety hazard. Personnel have to be trained in handling these different systems and they are then of not much use in handling problems in other reactors. For a small nuclear programme like in India this diversification introduces additional unnecessary vulnerabilities.

But all these points are mere academic quibbling. In reality, nuclear power plants are a dead technology. And costly to boot! In countries which allow the markets to decide the choice of technology, nuclear power is well on the way to joining the dodo. In USA, many even very efficiently run plants are finding it increasingly difficult to survive in an open and deregulated market. Every month brings news of some group of utility executives deciding to shut down an

operating nuclear plant and dash for gas and cogeneration. It is only in countries where bureaucrats and politicians have an incurable habit of squandering public money, that nuclear power gets considered.

If India wants to play Santa Clause to our poor cousins the Russians, let us by all means gift them two billion dollars. But why should we saddle ourselves with a non performing and dangerous poison producing plant in exchange?

Surendra Gadekar

### ***Anumukti Family News:***

By this time you may have received the Chernobyl Special Issue. As promised, the Aug./Sept 1996 issue is in your hands. We have not heard from most of you for over a year. The postcard price is still 15 paise, so do drop us a line confirming your correct address and communicate to us your interests and comments.

We are in the process of upgrading our address lists and we find that many of you are yet to renew your subscriptions.

Anumukti Team  
30/4/97

# The Selge of Gorleben

The facts and figures are self-evident and telling. It took the largest security operation in postwar German history—the mobilization of 30,000 police—to move six radioactive waste transport canisters a few hundred miles from southern Germany to the northern farm town of Gorleben.

There, the casks are placed in "interim storage, inside a building that from the outside looks like nothing so much as a soft drink bottling warehouse.

Along the way to the small city of Dannenberg, the casks faced rail saboteurs, people blockades, and two people who cemented themselves to the tracks (the police couldn't remove them, and eventually removed and replaced the tracks instead).

At Dannenberg, the casks were lifted by a huge crane from the rail cars to trucks, in preparation for the final 14 miles of road transit into Gorleben. When the casks finally reached their destination 36 hours later, the costs were just beginning to be tallied.

More than 150 demonstrators and 20 police were injured. Some 500 people were arrested. At least 20,000 protestors were involved in the final stages, although the number across the country was probably far higher. The transport cost Germany, according to newspaper accounts, \$100 million, not to mention the support of the police union, which has called for no more waste shipments.

And northern Germany, in an area known as Wendland, had become a war zone.

## ANUMUKTI SALUTES THE PEOPLE OF WENDLAND

### WHAT PRICE THE ATOMIC STATE?

SIX CASKS

173 INJURED

300 ARRESTED

20,000 PROTESTORS

30,000 POLICE

ONE HUNDRED MILLION

The facts and figures are easy: it is the atmosphere, the sounds, the feelings, the experience, that is much harder to describe...

*Wednesday, March 5, morning  
No Roads, No Waste*

Mona, a German student and activist, and I walk to a small farming village about 2 miles from Dannenberg. The CASTOR (Cask for Storage and Transport of Radioactive Material) casks have not yet begun moving, but they will soon—but not on this, the preferred road.

In the center of the village, about 80 tractors are parked together—some are chained together—in a barricade passable only by brute force.

A mile down the road, there are more barricades, made up of downed trees, dirt, concrete, and whatever local people could find. Underneath the barricades, the road has been completely dug out—just a few inches of road and then holes several feet deep. If the 100-ton CASTOR casks are to move down this road, it will collapse. No, the CASTOR casks will not be using this road today, indeed, no one will be using this road for weeks, perhaps months to come.

Above us, police helicopters circle constantly, the noise of their blades is so common by now that it is just background. Over a public address system set up in a car parked in a farmer's front yard, there is an announcement. Mona translates for me: the helicopters may be landing, don't panic.

But a few farmers do panic, and suddenly tractors are moving everywhere. There is far more danger from the chaotic tractor movements than from anything else we have so far seen.

The helicopters land, and 40-50 not-equipped German police jump out and run toward the tractor barricade. Before anyone can react, they begin slashing the tires and trashing the lead tractors—the lifeblood of these farmers.

The townspeople quickly regroup and charge the police, who retreat running, perhaps embarrassedly, down a country lane. The helicopters land again in a nearby field, and to taunts and angry gestures, the police climb back in the helicopters and fly away.

The US couldn't have done it better in Vietnam. And the police have made enemies for life of the people who grow their food. And the casks are not even going to move through here, the road is completely impass-

able and has been for days. It is harassment and destruction by the police, pure and simple. Someone yells out in black humor: call the police, someone is damaging our tractors. But here, a few miles from Gorleben, in the midst of an undeclared war zone, the atomic stale has revealed its true colors: it is a police state,

*Lueneburg. Saturday, March 1*

*International Problems*

*Demand International Actions*

Lueneburg is a beautiful, peaceful city of 60,000. Untouched by Allied bombing, many of its buildings date to the 14th and 15th centuries, and have been lovingly restored. There is a university, and an activist student union which a couple of years ago decided there needed to be better international contacts among grassroots anti-nuclear activists.

The first conference, held in March 1996, was not well-funded, but nonetheless brought together activists from about a dozen countries. It was considered a success, and this year, with a little more funding in hand, the conference titled simply the 2nd international anti-nuclear conference" brings together about 60-70 activists from 28 countries.

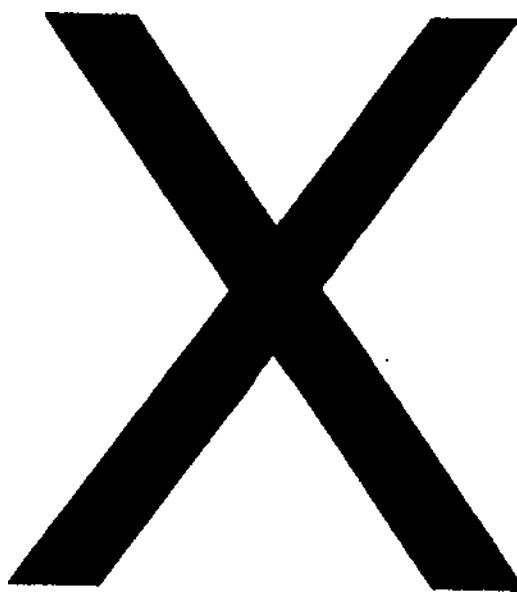
The conference was planned months ago. It wasn't until the last couple of weeks that organizers learned the CASTOR casks would be moving to Gorleben, just 40 miles away, around the same time. The conference goes on, but with a bit of an edge to it.

On the first day of the conference, there is a large rally in Lueneburg. 15,000 people gather in a town square to oppose the radioactive waste transport. Myself and Mario Wan/a from the South African Mineworkers Union, were asked to speak.

The day before, the Bonn government had warned protestors not to disrupt the CASTOR shipments. I tell the crowd that we in the U.S., and indeed, the whole world, will be watching

what happens this week. The crowd needs no German translation, it roars its approval.

On the way to the rally, I did a little quick math. The CASTOR protestors are trying to stop the shipment of specuclear waste casks. I point out that in the U.S., we are facing the possibility of the transport of six casks through Las Vegas every day for 30 years. The crowd boos and yells. And I conclude by saying that this is an international problem and demands international action. The crowd agrees. A few years ago, I didn't think that. Now, it is very clear: our concerns are the same, the companies involved are the same, the solutions are the same. We must knit into a solid international movement if we are to beat the nuclear industry at its own game.



### *Gorleben Will Live*

At the same time as the rally in Lueneburg, 10,000 more protest in Dannenburg. Meanwhile, in Dannenburg, the police attempt to requisition a schoolhouse to serve as a temporary barracks. Too late: the schoolchildren have barricaded themselves inside the building and refuse to allow the police in. But the police move in force, and throw the children out of their school. The Dannenburg officials are unhappy with the police. They refuse to provide them with water or electricity.

*Tuesday, March 4*

*Every House Says NO!*

We have become an official "observer" team, which mostly means that we can get through police lines. And there are plenty of police lines to get through. Roads are blocked off for miles leading to the Dannenberg/Gorleben area. But the police, mostly from out-of-the-area, don't know the region, and every direction sign has been blacked out by protestors. A few roads, mostly one-lane farm roads, remain passable.

Traveling through the area, one fact quickly becomes clear: the opposition to the waste transport, and to nuclear power generally, is virtually unanimous. The battle has been going on here for 20 years, since the government first announced it would build a reprocessing center at Gorleben, as well as interim and permanent waste dumps, and perhaps a reactor to power it all.

The area was considered to be conservative and not nearly as likely to block the government's plans as the more activist-oriented South. But proposed nuclear projects have a way of turning conservatives into activists. The reprocessing center has long been cancelled, and the resistance to the waste dumps is massive.

The symbol of the movement is an X. Every farmhouse, every townhouse, every household displays an X. Some are quite elaborate, many are yellow, made of wood. Some are glass, some are metal. Almost every house also has anti-CASTOR posters in its windows; many have anti-nuclear banners as well.

The War Zone demarcations become clear: police convoys barrel down two-lane farming roads while the residents promote active resistance.

Near the town of Guzborn, we have to stop. A mud and tree barricade straddles the entire road. Behind it, in the center of the road, is a 15-foot tall

X. made of steel girders, welded and cemented into the road. This baby animating.

100 yards further on begin the serious barricades, one after another, about 20 in all. In between them, the road has been hollowed out from underneath. There is nothing but air. In some places, the protestors have put in logs to hold up the road so they won't cave in on the people digging (hem out. A 100-ton nuclear waste cask cannot possibly go over these roads in the near future; indeed, no vehicle can. The CASTOR will have to go on the less-preferred, twisting route through several towns, or it cannot go at all.

Through side roads and police checkpoints, we eventually make our way to Dannenberg, where the casks sit on trucks awaiting movement. It is about 6 pm, the casks cannot move at night, so they won't move soon.

On the lane leading to the road from the crane, hundreds of people are lying in two-foot tall mounds of straw. They are the front lines: to reach the road, the police must move them first.

But for now, all is peaceful. Music is in the air, drummers play, people cheer. The police throw candy to the people in the straw

The casks are remarkably unprotected. Only a few police nervously walk up and down a very small fenced-off area I walk to within about 12-15 feet of the six casks, radiation detector in hand. Within a minute, the detector has risen to more than 600 counts per minute, then more than 700—about 50 times background radiation levels. The radiation levels decline rapidly with distance though, at 50 yards, it is only five times above background, at 100 yards, there is no discernible radiation increase. Later, I learn that a Greenpeace scientist got a bit closer to the casks, and measured

levels around 4,000 counts per minute—even above the levels near Chernobyl.

The thing is, in Germany houses are built right on the street, with just a narrow sidewalk in between. These giant casks, tomorrow, will travel on narrow roads within just a few feet of bedroom windows and children's playgrounds.

But tonight the air is almost festive: one can almost forget about the sounds of the helicopters circling overhead. We walk from the crane to the largest camp—there are many camps spread



out across the 14-mile route. Each camp plans something different for the final transport.

Along the road, people walk up and down, milling around. There are bratwurst, soda and t-shirt vendors, it has the aura, if not the music, of an impromptu Woodstock. But as the night wears on, temperatures drop precipitously. Thousands of people are now in the straw area between the crane and the road, thousands more block the only road left. We have to leave, and after an hour's drive and an endless meeting, agree to be back to the area in six hours. Time for just a little sleep.

Wednesday, March 5

*Water Cannons and Harking*

*Dogs*

By 9 AM the removal of the people in the road is well underway. We were quickly updated about I am, the police began moving and arresting people. After three hours, they had only cleared 150 feet of people, so they turned on their water cannons.

These water cannons are mounted on giant armored, Star Trek-looking green tanks. The cannons are operated by remote control from inside the bullet-proof protected cabs. Their power is quite strong, but the protestors have come prepared, and are covered with plastic. As long as they don't receive a direct hit, it doesn't hurt too much and they don't even get too wet.

The police train the cannons on a small group, to break down their assistance, then move in to move and/or arrest them one-by-one. But there are 9,000 people in the way now, so arrests become impossible.

Susan Lee, camera in hand, gets picked up by her hair and thrown across the road. Krista, an activist now working in the Czech Republic against the Temelia reactors, gets clubbed. Others get off easier. Still, tension is building.

During the night, a group of Autonomen—radicals perhaps not organized enough to be anarchists—engage in serious street fighting near the town of Quickborn along the only road the CASTOR can now travel. That road has not been torn up, and the radicals want time to set up barricades and dig under the road.

The police are not inclined to provide that. Tunc Rocks and slingshots are used, and molotov cocktails. According to one report, a woman is critically injured. Many are hurt and/or arrested. The barricades and digging don't take place. The CASTORS eventually will move.



Back in Dannenberg, we watch the water cannons pelt the people in the street. The police are clearing about one yard of street per minute now.

Above the road, four people have tied themselves into the trees, with a giant banner. The police try to shoot them down with water cannons, but it doesn't work. The CASTORS cannot legally move underneath them, so a team of police goes up and tries to cut them down. This takes at least a half-hour, to the boos of thousands.

The understanding was that the protest would be non-violent. People would block the street, but once moved would not try to reclaim it. They want to show that the violence is caused by the police. The police use their water cannons, billy clubs and shields; here, the protestors simply join arms in resistance until they are moved off the road.

Finally the road is cleared, and thousands of police stand shoulder-to-shoulder to protect the casks. As the casks move out, we are cheered by reports that there are 2,000 more people sitting in the road at Quickborn, and 5,000 more chained across the road, at Gorleben

Nearby, there are various small confrontations between protestors and police, nervous, the police bring out dogs. The barking reaches an ear-splitting crescendo, but there is no serious trouble.

*Thursday, March 5, Braunschweig  
Chernobyl is Everywhere*

That night, Ilya Popov of the Socio-Keological Union in Moscow and I speak to a gathering of people from the area, about our experiences in our own countries. Then, one-by-one, other members of our international delegation speak.

The First Nation Canadians speak in moving terms about what uranium mining has done to their communities. Otis, in exile from Papua New Guinea for the past 20 years, brings tears with

his tale of repression and death squads. From the Phillipines, Korea, Turkey, from across the world, activists tell their stories; they unload their fears and reveal their hopes. In front of these young German activists, the emotions of the past few days pour out.

The stories are similar: we truly are in the same movement, but it has taken us longer to understand that than it has Westinghouse, or GE, or ABB, or Siemens or the other multinational nuclear corporations which buy and sell politicians like pork-belly commodities.

We each have our local and national battles and concerns, but tonight we truly have become an international movement, understanding each other, and united. It's a feeling unsaid, but shared, and one we hope will stay with us.

*Sunday, March 9, Washington DC  
The Sunset of the Atomic State*  
Back in the USA, having dealt with lost passport and plane ticket—the less said the better...

Most countries, including the U.S., are not yet attempting to move radioactive waste across their nations. Thus, the Siege of Gorleben is hardly an end, it is just a beginning. The first CASTOR shipment into Gorleben took place less than 18 months ago; it brought out about 2,000 protestors and cost the German government about \$15 million. The second shipment cost more than \$40 million, with 9,000 protestors and more than 15,000 police.

Crowd estimates are notoriously unreliable even in a small area, over a 14 mile road, they are impossible. But there were at least 20,000 protestors, and admittedly 30,000 police to usher the new casks into Gorleben

So it has cost Germany more than \$150 million to move eight casks—and the original plans call for the shipment of 412 more casks to the Gorleben "interim" site.

Where does it stop? At what point does the German government, or any government, say 'this is it, we can't do it anymore.'

In Germany, even the police are rebelling. At Lueneberg, and again at the gates of Dannenberg, the "Critical Police" appeared—police refusing to take part in the quashing of the demonstrations; refusing to walk for hours next to the highly-radioactive CASTOR casks. Indeed, the police have called for an end to the shipments.

Without the police state on its side, how can the nuclear industry expect to take its lethal garbage anywhere?

The CASTOR casks only traveled about 300 miles. In the U.S., if radioactive waste transportation begins, many casks could travel nearly 3,000 miles. Eventually, we all will have to make our stand, and it may be sooner rather than later. Most politicians in the US want radioactive waste transportation to begin, because they are beholden to the nuclear industry.

The transportation of radioactive waste is not just a routine industrial maneuver. It is a defining moment. It is our opportunity to expose the nuclear age, and to assert its end.

No government can withstand the costs of Gorleben for long. No government can long withstand the divisions among its people, the alienation of its farmers, the devastation of a War Zone inside its borders.

There is but one obvious path, one poorly-understood by the Governments, but well and truly grasped by the farmers of Gorleben: we must stop making lethal poisons simply in order to generate electricity: our lives, our nations, our futures are all too important for that.

*Michael Marriot  
The Nuclear Monitor  
March 17, 1997*

Sweden gets around 43 per cent of its electricity from nuclear power. On March 19, 1980, the Swedes held a referendum on whether to continue down the nuclear path. The result was a victory for a scenario for a phase-out of nuclear energy by 2010. The nuclear industry invested 20 million SwK (6 million 1980 US\$) in the referendum but got only 18.7 per cent of the votes. The antinuclear line (rapid phase-out) received 38.6 per cent, but the Social Democrat line (long-term phase-out scenario) got 39.8 per cent. Long term phase-out meant that business could continue to proceed as usual and big businessmen and politicians felt that in time people would get "educated" on the benefits of this wonderful source of power.

Unfortunately, for these power brokers, things haven't worked according to plan. The accident at Chernobyl in 1986, severely affected parts of Sweden's forest land and especially the reindeer herding Lapp community. That put paid to any hopes that the referendum result could be overturned in the future.

But despite the people's verdict, not much action had taken till now as politicians bickered amongst themselves and felt that there was no "viable" alternative to replacing half the country's electricity supply.

However, with time running out, there has suddenly been some movement in the right direction. The nuclear power plant at Barsebaeck, located in South Sweden and only 20 kilometres away from the Danish capital Copenhagen, will be turned off. The first of its two 600MW reactors will be stopped before July 1998, the second before July 2001. This decision was arrived at a midnight meeting on February 4, 1997 in Stockholm between

Social Democrats, Centre party and the Left wing party. The parties have a majority in the Swedish parliament. The agreement came after months of intrigue and is a major victory for the antinuclear Centre Party. The ruling Social Democrats were prepared to wait until early in 2000 to begin decommissioning on 1998 as deadline. This victory of the Centrists is likely to change the face of Swedish politics since till now the Centrists have usually been part of a block in opposition to the governing Social Democrats. The news was a special treat for the Danish population who celebrated with relief. They had been opposing the plant for well over twenty years.

However, the fight is by no means over as yet. Sydkraft, owner of both Barsebaeck reactors, says it would seek compensation for loss of electricity production. According to VEBA, the German energy conglomerate which owns 27 per cent share in Sydkraft via its 100-per cent subsidiary Preussenelektra AG, is satisfied that the whole affair is a bag of wind—and are betting that despite the decision the reactors would not be prematurely closed. After the announcement of the decision, Sydkraft's shares rose sharply as investors perceived that it would not have to bear liability for the decommissioning of these old reactors.

The negotiating politicians agreed that reactor owners should be liable for all costs in the event of an accident, instead of the government stepping in to cover costs above a certain low ceiling. Currently, reactor owners are liable for a maximum of 1.2 billion Kroner (US \$ 17 million) in third party damages per accident. The idea behind the proposed change is to make it economically infeasible to run the older

reactors—for whom accident risks are presumably higher and thus force the utilities themselves to decide to close the units, rather than the government specifying which unit should be shut first.

Big business showed its contempt for democratic values explicitly. Beril-Olof Svanholm, who is chairman of Volvo AB and head of the Federation of Swedish Industries has said that any decision to close Barsebaeck will be fought, and we will never accept that the country unnecessarily throws away SwK 20 to 30 billion (US\$ 2.7 to 4.05 billion) while we chop wood to meet our energy needs.

### *Meanwhile in Japan*

Over half of all Japanese citizens have lost confidence in their governments' statements concerning the safety of nuclear power, according to the latest survey conducted by the Research Council for Energy and Information Technology in October last year. The figures which showed that 57% of people surveyed had little or no confidence in government statements on nuclear energy, comprise the lowest vote of confidence since the surveys began (*The Aikket Weekly*, 1 March 1997).

A petition to permanently close down the Monju fast breeder reactor which suffered a serious accident from a liquid sodium leak and resultant fire gathered over a million signatures. On May 14, 1996 Science and Technology White Paper, a publication that usually gives an overview of the general research scene specifically scolded Monju's owner, the Power Reactor and Nuclear Fuel Development Corporation for its inappropriate post-accident behaviour.

*Nucleomax Week May 16 1996,*



# *Upsurge of Revisionism Regarding French Nuclear Success*

*France is the model nuclear "success" story. A country which following the Arab oil shock of J 973, decided to go in for nuclear and went with vengeance. The nuclear establishment was given a free hand and it "delivered". But hindsight as they say is 20-20. It does offer a better perspective. Energy experts, the courts and the research community are now finding that may be this headlong rush into nuclear wasn't such a bright idea after all.*

## *Et Tu IEA!*

It is time for reorientation of French energy policy, the OECD International Energy Agency (IEA) said in a new review.

In the view of the experts who authored 'Energy Policies of IEA Countries: France, 1996 Review, French energy policy "has reached a watershed" and needs deep reform if the country is to meet IEA policy goals associated with open markets, energy efficiency, and fair competition among fuels. In essence, experts say. France's emphasis on nuclear power has led to a lopsided, inflexible supply structure in which electricity use is excessively promoted, creating severe interfile! price distortions.

Further, they say, the concentration of 90% of government research funding, 80% of commissariat a l' Energie Atomique expenditures, and 50% of Electricite de France's (EDF) research budget on nuclear has starved other sectors for research and development funds and pulled qualified people away from other areas of scientific research, including energy conservation and renewables.

The IEA reviews on France, the second the agency has done since France joined in 1992. was led by Hans Schimid, deputy director of Switzerland's Federal Energy Office. Susan Harrison, of the Electricity Division of the UK's Department of Trade & Industry, was co-rapporteur.

The team had members from Norway, the OECD Nuclear Energy Agency, and the IEA secretariat.

In looking specifically at France's nuclear program, the IEA experts observe that "decision on its development have been taken centrally, with little or no public participation or involvement of the parliament." They say this situation probably cannot continue if France is to renew its nuclear installation in the future, and recommend steps towards greater openness and public participation in energy decision making.

The review also warns that the "inflexible and the rigid power production system" resulting from nuclear plant overbuilding "may be exacerbated by the addition of four reactors currently under construction." The experts note that choice of future generating technology will "in principle be decided by Market" and that nuclear will have to compete alongside non-nuclear options "even for baseload capacity"

The IEA team also recommends that France "finally decided on the future role of Superphenix as an experimental facility, taking into account the age and technical characteristics of the reactor and related investment and operating costs."

*Source: Nucleonics Week*

## *Come Hell or High Irregularities*

As it is nuclear power is usually the most expensive option. But fast breeders take the cake. The electricity they produce is more than twice as expensive as that produced by other (non-breeding) nuclear plants. The French for militaristic reasons went in with a great deal of nationalist fervour in launching Superphenix—the only commercial sized breeder in the world. Breeder reactors produce more plutonium than they consume uranium and thus can theoretically produce large amounts of electricity from very limited supplies of raw material. However, ever since its launch in 1986, Superphenix has been plagued with problems. It never even managed to run consecutively for six months together. It spent most of its time in a state so familiar to reactors in India—shutdown. French regulations require relicensing of power plants which have remained in a shutdown state for more than two years. In 1994, the French atomic energy establishment finally gave up the ghost of breeding. However, with billions already down the drain, they were loath to take the sensible option and let it all go and decommission the plant. Superphenix was resurrected as a non-breeder for research and demonstration purposes. Recently, France's supreme court has annulled the operating licence for Superphenix on the grounds that the licensing decree issued in 1994 assigned the reactor with a 'new' pur-

pose - research and demonstration - not covered in the 1992 restart application and dossier submitted for public inquiry by operator NERSA. The 1240 MWe reactor is currently offline. The French government has re-emphasised its commitment to keep the reactor operating, and is considering either holding a new licensing process to support the 1994 decree, or issuing a new decree more in line with the 1992 documents, which emphasise the reactor's use for electricity generation  
*Sources: Nucleonics Week*

## We De Have An Address!

*In fact, we have two. A regular postal address and an email address for the other set. Although the cost of writing even a post card has gone up considerably, a letter does feel nice. So do let us know if you like what is in your hands and even more if you don't like it. But most of all definitely let us know in no uncertain terms if you don't receive your regular copy every two months. It is usually our fault.*

## LEUKAEMIA AROUND LA HAGUE NUCLEAR FACILITY

French Environment minister Corinne Lepage and Secretary of State for Health Herve Gymard announced January 10, 1997 that they will commission a thorough epidemiological study of cancers around the La Hague reprocessing plant in Normandy. Their decision followed publication in the latest issue of the British Medical Journal (BMJ) of data claiming that children who played on beaches near La Hague at least once a month exhibited almost a three fold increased risk of developing leukaemia.

Eating local fish and shellfish at least once week was tied to a similar increased risk, according to the study by Jean-Francois Veil, a professor of biostatistics and epidemiology, and Dominic Pobel, a research epidemiologist, at Besancon University's Faculty of Medicine, France.

The two French scientists claimed 'convincing evidence' of a causal role played by exposure to environmental radiation at the seaside, but found no association with parental occupational radiation exposure. They recom-

mended that researchers look for new environmental radiation pathways, particularly in the marine ecosystems

They had originally set up their study to investigate any association between La Hague and local cases of childhood leukaemia. In a previous study, Viel had been unable to establish any clear statistical link

The scientists' methodology came under immediate criticism in the influential newspaper, *Le Monde*, by Jacqueline Clavel, an epidemiologist with France's National Institute for Health & Medical Research (Inserm), which co-financed the Viel work.

Inserm's name has been linked by the French media to the newly announced study, but neither Inserm nor government ministries would confirm that the organisation had been chosen to conduct the project. Details are expected to be announced in early February.

La Hague encompasses several facilities. Adjacent to La Hague reprocessing complex is a site now operated by national waste agency ANDRA, the centre de stockage de La Manche,

which began receiving radioactive waste (all except highly active waste) in 1967 and was closed permanently in 1994. Both sites have been long under attack from environmentalists who allege pollution of the environs. The Andra site has been shown in an Institute de Protection et de Surete Nucleaire (IPSN) study to have been leaking radionuclides, notably tritium, into two small rivers which cross it, one of which flows to sea.

In addition, a nuclear power station is situated some 16 kilometres away, while the navy dockyards, where submarine nuclear fuel is handled, are 19 km away. Both these facilities are well within the 15-km radius of La Hague set by the study.

Clavel faulted Viel's mode of recruiting control group witnesses via medical general practitioners and questioned the "quality" of this group. But 'the main question,' she said, is that of the applicability of the case study group to the problem raised whether the leukaemia cases were linked to the radioactive discharges

She said the study didn't say how far from the sea the ill children or the control group lived, and didn't name the beaches. The doctors should have tried to estimate the doses that could have led to the effects observed, she said.

Catherine Hill, another Inserm researcher, suggested that the method used to recreate activities—interviewing parents of children with leukaemia—was "dangerous" because not every one can remember how often he or she went to the beach 20 years ago, for example, nor know for sure the origin of shellfish eaten.

Viel told *Nucleonics Week* that it was "absolutely wrong" for outside observers to suggest that the leukaemia subjects were living closer to the sea than the controls, thereby being more prone to play on the beach and eat seafood more often.

The cases of leukaemia diagnosed between 1978 and 1993 in people under 25 and the 192 controls were matched for sex, age, place of birth, and residents at the time of diagnosis, he said.

Matched residence meant that they were living within the same electoral ward, he said because of the criticism by such experts as Clavel, he is preparing map markings of the individual dwellings to prove no geographic bias exists, he said, "I'm totally sure that we won't find anything of significance," he insisted, adding that he expects to present the results in a future issue of the *BMJ*.

As for quality of controls, a glance through the tables should be enough to confirm very little difference between both sets of parental social classes, he said.

Veil said the strong link between leukaemia occurrences and the sea had taken the researchers by surprise. The more frequently a child visited the beach or ate seafood, the higher the risk the child faced of contracting leukaemia, he said. Such a dose/response relationship could not be put down to chance alone.

His and Pobel's research also does not stand in isolation, he said. The same marine phenomenon had been

shown to be present near the Dounreay reprocessing plant in northern Scotland, he said in a study by James Urquhart of the Scottish Health Service published in 1991.

Viel said criticism such as not naming beaches were obviously easily made by others after the study's completion, "I was absolutely not expecting such a result regarding the use of the beaches to be so significant," he said. The researchers had therefore not compiled a detailed breakdown of beaches visited by the children. "On the other hand, I have been criticised because I have already used 173 different items. So there are two opposing criticisms I have to face."

As for Hill's concern about possible bias in recalling past recreational activities, Veil said he thought it unlikely to be a factor as both case and control mothers had not been aware of the significance of beach usage until after the data had been compiled and conclusions drawn.

*Source: Nucleonics Week*

## *Reclaiming Community Accountability*

**A**s a result of an open-records program initiated by the United States Department of Energy (DOE) Secretary Hazel O'Leary, information is being made available for the first time which is useful in calculating the radiation and hazardous chemical exposures of worker populations and ordinary citizens in communities which are home to nuclear weapons plants and related facilities. Until now, few have recognized the national scope of health effects studies which are likely to become more significant over time.

A virtual constellation of federal health agencies are now conducting "dose reconstruction" and parallel health effects studies at Hanford, Idaho Falls, Fernald, and Savannah River. Other sites will soon follow. The agencies include the Centre for Disease Control (CDC), National Institute for Occupational Safety and Health (NIOSH), and the Agency for Toxic Substances and Disease Registry (ATSDR). While the Department of Energy's open-records program has made these studies possible, the work by federal health agencies has befuddled citizens' groups now isolated from each other by geographic dis-

tances and a lack of understanding that a national health research program has grown up in their midst without anyone realizing it. Workers and citizens who encounter researchers from the federal agencies have asked four common questions:

1. Are we exposed?
2. Are we affected?
3. Did exposure contribute to or cause disease?
4. If we are not affected now, will we suffer later?

It may be difficult for citizens to get answers. The scientific work being done by these agencies to document and calculate exposures to radiation and hazardous chemicals is fraught with uncertainty, politics, organisational confusion, and doubt that anything more than "inconclusive" results will be the outcome of years of effort. The responses of federal health agencies have been inconsistent, and in some cases, downright hostile, in terms of answering the four questions.

Some of the reasons are lack of funding, weak management, the arrogance of scientific researchers uncomfortable over answering fundamental questions from lay persons, and the bureaucratic agendas that distract the focus of otherwise sympathetic agency managers inward like the gravity field of a black hole.

Perhaps most daunting is the fact that there is no national independent clearinghouse that pulls together information on progress being made or collects and distributes information on lessons learned on the most effective ways citizens can respond to the conduct of health effects studies and federal agencies. Several efforts which deal broadly with environmental health studies have been developed, such as the Science and Environmental Health Network (SEHN). What has not yet happened is for citizens to organise a national response to a national program of health effects studies being conducted at nuclear weapons complex sites. This article suggests a next step for non-governmental organisations.

Citizens with basic interests in the outcome of the health effects studies face several essential challenges:

1. Make sense of the scientific knowledge and methods being used by federal health agencies.
2. Focus on the four questions of concern which are being asked by those still living in communities around the site.

3. Pressure federal health agencies which are not doing their job to get their act together.

#### *What Should Be Done?*

1: Convene a national conference of NGOs and citizens is to achieve several objectives. These are:

- (a) Understand the current and future scope of federal health studies related to the legacy of the cold war.
- (b) Establish a national agenda involving performance and qualitative standards for openness, public participation, and accountability for health effects studies
- (c) Mount a lobbying campaign with Congress to embed these requirements in enabling legislation for federal health agencies
- (d) Develop oversight mechanisms to ensure that federal health agencies are responsive to their congressional mandate
- (e) Obtain resources for and roll out a national communications strategy to alert the news media about the national health effects study program. Develop communications tools, such as the Internet, to alert citizens' groups about lessons learned and more effective ways to interact with federal health agencies
- (f) Develop mechanisms for recognising the contributions which can be made by citizens interested in pursuing environmental science. This should include training and technical assistance program for citizen activists on how to collect, analyse and distribute scientific information. Most importantly, citizens need help in recognising the significance of scientific findings, knowing what to look for, and how to critically engage scientific experts in dialogue which would produce shared understanding of the results of health effects studies. Funding will be needed to ensure grassroots participation in the conference and in the implementation of an action agenda, described below

2: Develop a clearinghouse of NGOs and citizens groups to carry out these tasks. This can be a virtual or-

ganisation rather than a physical one, but each NGO must put its oars in the water. The clearinghouse must put up an Internet presence via email, WEB site, etc. and also publish a hardcopy bulletin of news, resources, and action items for a national, co-ordinated response to federal health effects studies at nuclear weapons sites. The clearinghouse must function as an "honest broker" despite the many priorities and agendas of NGOs and grassroots groups.

V Engage federal health agencies in a dialogue to change the behaviour of people as well as their respective organisations it makes no sense to address policies without the people. Hearts and minds of agency staffs, and their contractors, inevitably follow the leadership of the agency organisations. The mindset and credibility of federal managers must be examined, and changed for the better, if the resulting health effects studies are to be successful in achieving their goals. Citizens can call for "boycotts" of agencies, such as a Virginia group did with ATSDR, but there is no long-term future in death spirals of reciprocal allegations of deception and rancour. Everyone loses.

4 Commit to the long haul. Environmental epidemiological studies are like rocket science. Achieving shared understanding of the scientific methods and citizens' concerns will take years. After all, the horrors of the nuclear weapons complex took more than four decades to come to light. It may take a lifetime to recover.

*Source and Contact Dan Yurman, P.O. Box 1569, Idaho Falls, ID 83403, US e-mail yurman@igc.apc.org Dan Yurman is a member of a citizens advisory committee which advises the Centre for Disease Control, Atlanta US*

## Studies Find Gene Mutations Higher in Chernobyl Victims

In our last issue (Special issue on Chernobyl had an article by Dr. Rosalie Bertell on "Nuclear Thinking". It argued that radiation injury issues are actually human rights issues and hence political issues. Solution to such problems can only come through political action. Specifically, radiation injury issues are not technical issues any longer. The following article taken from Nucleonics Week—a trade journal—is a good example of Nuclear Thinking. The radiation community finds radiation related activities so profitable, that it refuses to accept studies which show the effects of radiation to be far more detrimental than postulated by these worthies.

**A** Russian-Belarusian-British research team has found twice as many genetic mutations in the offspring of parents living on contaminated territories around the Chernobyl plant site than in a control in the UK

The team, which includes Yuri Dubrova and Alec Jeffreys of the University of Leicester, studied 79 families inhabiting heavily polluted rural areas of the Mogilev district of Belarus, about 250 kilometres north of Chernobyl, among which all the children were between February and September 1994, and a control of 105 families in the UK. Using a technique developed by Jeffreys that measures the mutation rate of "mini-satellites"—specific genome sites that feature an usually high number of repetitions—the research team found a statistically significant twofold increase in mutation frequency in the offspring of irradiated parents, "they wrote in April 25, 1996 issue of the British journal *Nature*. The mutation was measured compared to the parents' genes,

The scientist said that the mutation rate in the Mogilev families was correlated with the level of caesium-137 surface contamination, thus concluding that the mutations have been induced by radiation. However, they were not correlated with individual doses received by the population

In the same issue of *Nature*, a team from Texas Tech University and the Savannah River Ecology Laboratory, led by Robert Baker of Texas Tech, reported "high levels of genetic change" in rodents—two species of vole—living next to the Chernobyl plant, in comparison to a control group living in a relatively clean area about 32 kilometres Southeast of site.

The results had not been predicted by existing models of the effects of radiation. In the case of voles, "the estimated substitution (mutation) rates were at least two orders of magnitude greater than any previously reported for mitochondria protein-coding genes," said David Hills of the Department of Zoology at the University of Texas, Austin in accompanying *Nature* commentary

But observes cautioned against drawing firm conclusions about the eventual impact of the genetic changes on the health or gene pool of either animals or humans in the area. Especially in the case of the study of human gene mutations, they said, it would be necessary to follow up the work by Dubrova et al. to confirm that the mutations indeed correlated with radiation dose and are not caused by other environmental aggressors which were not studied specifically.

The publication of these results on the eve of Chernobyl accident's 10th anniversary was certainly not by-

chance, said one French Scientist, adding, "*Nature* played its cards right." Nothing was said about their work of the two research groups in the major multi-agency conference on "Chernobyl: One Decade Later." held in Vienna April 9-12. Working papers from that conference did, however, highlight the genetic change observed in animals and plants close to the reactor site—which were said not to threaten the region's ecosystems—as well as the potential for genetic mutations in humans, probably also not posing a significant threat.

Philip Vision, a geneticist at the French Institute for Nuclear Safety & Protection (IPSN), said that gene mini-satellites were discovered in 1980 and five years later. Jeffreys pioneered their use by confirming parental relationships between individuals by studying "genetic fingerprints". The mini-satellites vary greatly between unrelated individuals, with very slim chances of finding the same pattern, but they are quite stable from parent to child. The length of mini-satellites can be measured by probe, establishing whether they contain the correct number of repetitions or not: in the later case, the researchers say a mutation has occurred

In the study of Mogilev residents, Dubrova et al. found that length changes in nuclear mini-satellite loci were about twice as common in the Belarus children (compared to the par-

ents; loci) than in their UK counterparts. They found good correlation between the highest mutation rate and the areas in the highest median ground contamination. The total mutation rate was 1.5 times higher in more-contaminated areas (over 6.8 curies per square km) than in less-contaminated ones (under 6.8 Ci/km<sup>2</sup>), they said.

However, the research team members acknowledged they had not been able to correlate their findings with individual doses received by the study group—those dose levels "are not known," they wrote. Moreover, although the correlation with surface contamination is consistent" with the possibility of Chernobyl-caused mutations, they added, "it is possible that other non-radioactive contaminants from Chernobyl, such as heavy metals, could be responsible for the observed, apparently dose dependent increase in mutation rate."

IPSN's Voisin said it was "a pity" that the scientists had not made a greater effort to find a control group within Belarus, rather than going to a rural area in the UK that would not be expected to have the same spectrum of: contaminants, either radioactive or

chemical. Because the role of chemical pollutants had not been taken explicitly into account in the study, he said, the results "are to be considered with caution." even if the study represents "an interesting, advance" in knowledge about the h effects of radiation.

Scientists studying radiation health effects have stressed that, although genetic mutation were observed in offspring of survivors of the Hiroshima and Nagasaki atomic bombings, no lasting hereditary were observed In the case of Chernobyl contamination, that may also prove to be the case, they say.

Indeed, few people realise the size of the background rate of genetic mutations, said Fred Mettler of the radiology department at the University of New Mexico. He told journalist attending the Vienna meeting that about 2% have a serious one. and 1%. a defect that can be fatal

More generally, there is growing recognition in the scientific community that the health-effects lessons of the Hiroshima and Nagasaki bombings may not be applicable to the other radiation accidents. In his Nature coin-

mentary. Hills argued that the fallout from Chernobyl is so different in both diversity and extent from the Japanese fallout that "predictions from one to the other arc not likely to be very meaningful The studies of Chernobyl." he went on, are therefore providing the first glimpses of genetic effects of severe nuclear accidents' - effects he suggested bolt down, at least in the case of the Chernobyl rodents, to the "compression" of millennia of genetic change into a few years

While scientists generally agree that more research is needed on the question, some wonder where the emphasis should be placed Voisin said that, at the annual meeting of the International Radiological Protection Association immediately following the Vienna Chernobyl-consequences conference. Dan Benmson, former chairman of the International Radiological Protection Commission, publicly raised the question of whether vast new studies of the effects of low-level radiation are really worth the money and effort that they will necessarily entail

*Ann Macliachlam.*

*Nucleonics Week May 2 1996*

### "Not Now Not Ever"

## ***Thoughts From An Australian Abolitionist***

**I** has been a very exciting year for abolitionists of nuclear weapons. We have seen in succession, the International Court of Justice decision on the illegality of nuclear weapons, the passage of the CTBT. the report of the Canberra Commission, the Malaysian resolution in the UN General Assembly, and statements by top military people in favour of abolition. All this has made it appear as if progress toward the abolition of nuclear weapons is no more than a matter of time. Yet recently, much of the

impetus toward abolition has seemed to wane, at least at official governmental and UN levels. The Malaysian resolution' welcoming the IC J decision passed the UN General Assembly with the expected comfortable majority, but most of the western nations (including my own. Australia) either voted against it or abstained (India voted in favour.) On the other hand, preliminary negotiations to set up a verification regime for the CTBT have ended in disagreement, progress towards a fissile material production ban

scents to have stopped altogether, and other measures toward abolition recommended by the Canberra Commission (taking weapons away from their delivery mechanisms, and taking no clear forces off alert as well as further deep reductions in US and Russian weapons levels do not seem to be taking place at any discernible speed

Meanwhile, a number of negatives have appeared on the scene, of which the greatest is probably US plans for subentical nuclear tests in India.

there are rumblings to the effect that if the US indulges in subcriticals, India may start testing. People I spoke to in Delhi attested to this.

#### *The ICJ Decision*

The decision of the International Court of Justice on the legality of the use or threat of nuclear weapons had in effect three components: (1) The ICJ found no situation in which it could conclude that the use of nuclear weapons in war, or the threat of their use, was legal. (2) The ICJ concluded that the use or threat of nuclear weapons in war is generally illegal because it violates internationally agreed laws of war that have stood since the 1920s. The only caveat that the ICJ made to this was that it was unable to agree that the use of nuclear weapons could be legal in the most extreme circumstance of self-defence. (3) The ICJ concluded unanimously that there exists a legal obligation on the part of the weapons powers to negotiate in good faith and to conclude an agreement to eliminate nuclear weapons. It was this that the Malaysian resolution' tried to turn into practical reality later in 1996.

The ICJ decision has potential implications that are very far reaching indeed, but they have yet to be tested in a court of law. For example, it has been argued since the decision in the UK, that the UK's nuclear submarine patrols are illegal as they represent a threat of use' of nuclear weapons. It is argued that NATO first strike' doctrines are illegal, and that changes in US and NATO nuclear doctrine to no first use', argued for in the report of the Canberra Commission, are the only legally correct response to the ICJ decision short of actual elimination of nuclear weapons. It has already been argued successfully by 'For Mother Earth' in a Belgian court in a case of trespass on a NATO weapons bunker, that civil disobedience against nuclear installations is legal because the installations are in fact illegal.

However, the weapons powers, after trying to prevent the resolution under which the question of the legality of the use or threat of use of nuclear weapons was referred to the court in 1995 from being passed, and after alternately arguing before the court that the court had no jurisdiction and that the use of nuclear weapons was a legitimate use of the right of self-defence under the UN charter, have done their best to ignore or evade the consequences of the ICJ decision. The US, UK, and France, have all argued that since their nuclear weapons are all of a 'defensive' nature, and all make use of the doctrine of deterrence, that the ICJ decision has no consequences whatever for them. It is significant and disturbing, that General Sundarji argues in the May 1996 number of 'AGNI', the journal of the Forum for Strategic and Security Studies that 'The international Court of Justice has recently ruled that the possession of nuclear weapons is not illegal'. True, the ICJ decision does not say that, but the ICJ opinion comes very close to that in saying that use or threat of use is illegal, except under very narrowly defined circumstances where the court can't make up its mind! What General Sundarji (like the major weapons powers) did not acknowledge is that the ICJ came up with an opinion in which no legal use of nuclear weapons is identified, and says so explicitly.

Only Canada so far has suggested that it may have to 'review' its position under the US nuclear umbrella as a result of the ICJ judgement. Time will tell however, whether the ICJ decision will be tested in national courts of law, and whether in particular, doctrines of 'first strike' could be found illegal.

#### *The Comprehensive Test Ban Treaty*

The CTBT has been hailed as the way to universal salvation from nuclear damnation or at least as the first step toward abolition, and damned as a

machiavellian attempt by the weapons powers to hang on to their existing monopoly by preventing others from testing.

India has refused to sign the CTBT 'not now and not ever', claiming quite correctly that it allows the nuclear powers to continue warhead development. However, India's criticisms cover a scarcely-veiled desire to test itself, and my discussions with some influential people in Delhi certainly made it plain that this desire is very real in at least some quarters. The thinking there is that India, if it tested, could well withstand the resulting embargo, and that Pakistani capabilities could safely be ignored. In addition, a need to test if India is to weaponise the device it tested in 1974 is argued.

This may be dangerous nonsense, but some at least do believe it. The Forum for Strategic and Security Studies, a Delhi 'think-tank' argues that had the 1996 session of UNGA failed to pass a resolution in favour of a nuclear weapons convention. India should look to its strategic interests' -and test. Whether the Malaysian resolution, which advocated negotiations toward a nuclear weapons convention, is deemed to be sufficient is a good question. The series of subcritical tests planned by the US might be the next 'trip-wire'.

The CTBT is neither exactly salvation nor damnation. Depending however, on what happens after the CTBT, it may become a rather early milestone on the road toward salvation if indeed we are headed in that direction at all.

What the CTBT actually does is simply to prevent explosive nuclear tests in which the quantity of fission energy released exceeds that of any high-explosive charge used to implode the fissile material. In effect, this works out at about 4Kg of TNT. This means that explosive above-ground or underground tests of the kind that recently were undertaken by France at Mururoa atoll and very most recently (on the very eve of the signature of the

CTBT in fact) by China at Lop Nor, are now illegal. Whatever the other flaws of the CTBT, this has to be a plus for abolition.

The CTBT does not contain any commitment to a timed framework' for abolition of nuclear weapons, or for negotiations toward abolition. Nor does the CTBT place any restraint whatsoever on testing other than explosive and 'hydronuclear' testing (where it is ambiguous). The US, technically, is thus quite within its rights to conduct a series of subcritical' tests of zero or near-zero fission yield (whatever that may mean) at the LYNER facility in Nevada.

In fact, subcriticals are the least of what is allowed under the CTBT. A whole range of multibillion dollar facilities now exists in the US. under the Science-Based Stockpile Maintenance' programme, including the Dual Axis Radiographic Hydrodynamic test facility (DAHRT) which takes high-speed 3-d x-ray photos of plutonium and uranium bomb components under explosive deformation, an essential component of weapons design and the high-powered laser facility\ nominally for use in fusion research, which may also be of use in weapons design. France also has similar laser facilities. The lack of any restraints in the CTBT over testing of this type, has resulted in accusations that the CTBT merely institutionalises the dominance of the existing weapons states.

Besides, the CTBT has an opt-out clause. This allows a state to test simply because for whatever reason it feels it no longer has confidence in some component of its nuclear arsenal

Finally, there is the question of the Entry into Force' (EIF) of the CTBT, which as so much vexed India. The current provision for entry-into-force(EIF). whereby 44 named countries must ratify the treaty before it can actually become fully legally binding was included at the insistence of the

UK and Russia, precisely in order to fatally weaken if not sabotage the treaty. There is thus a great deal of truth in the arguments that the CTBT fails to deliver on a timed framework for the elimination of nuclear weapons, and that it allows to of the kind that the weapons power are best equipped to do.

Other nations besides India, (notably Bangladesh for financial reasons), have indicated reservations about ratifying the treaty. Indeed, while it might be possible to induce Bangladesh to ratify with some form of financial 'sweetener', big questions exist over whether in fact, the US congress, still dominated by the republican right which has explicitly damned the CTBT as contrary to US National interest' will allow ratification and of course whether a paranoid and nationalist Russian Duma will do so

The fact that the CTBT will most likely never enter into force docs not wholly rob it of value. It still provides a very strong political barrier to actual explosive testing and to some extent even to subcritical testing Any nation that tested from now on would be faced with international opposition and condemnation (and probably sanctions) that would make the storm over French testing look like one in a very small teacup. In other words, for all its flaws, and there arc many, the CTBT does provide a political and to some extent a legal, barrier against testing. The real impact of the CTBTs failure to enter into force lies in the fact that until it docs so, the CTBT verification regime will function on a voluntary basis only.

*John Hallam*



### *Last and final call?*

Another All Fools Day and the reactors at Tarapur (Rhymes with Bhago—Dur in Hindi) are a year older They are already well past their 25 years design lifetime, and Dr. Gopalakrishnan had informed the nation more than a year ago. that they badly need to be inspected Tor core shroud damage and India docs not have the technology to do so However, our nuclocrats have blithely continued to operate them while giving Dr Gopalakrishnan the boot The following story from Japan is another reminder that old reactors don t just fade away

On 26 November 1996. during a regular inspection at Tokyo Electric s Fukushima reactor (BWR. 460MW. 1971). inspectors discovered cracks in the pipe inside the reactor pressure vessel. Having been in operation for years, the cracks are perhaps a manifestation of the reactors age

The cracks appeared near the welds in two neighbouring pipes that earn coolant from the pressure vessel jet pump, and it appears that the direct cause was stress corrosion In all. five cracks of lengths varying from 2 to 19 cm were discovered in almost identical places on the pipes. very close to the inside wall of the pressure vessel

TEPCO (Tokyo Electric Power Company) has decided to deal with the cracks by simply clamping on steel supports and bolts and not by replacing the pipes. This is. however, obviously a stopgap measure providing no long-term guarantee of safety The clamped pipes could rupture at any moment.

#### *Difficulty of Repairs*

The pipes are located below the area between the nuclear fuel core and the pressure vessel An area that is very confined and highly radioactive There arc limits to the possibility of repair work by remote controlled robots because of the difficulty of working in such a tight space, and the difficulty



of controlling robots in a high radioactive environment. Thus, the replacement of these pipes will pose not only technical difficulties, but will also entail a lot of work involving heavy radiation exposure to labourers.

If the in-core piping is replaced in Fukushima 1-1, it will be the first time such work has been carried out. meaning the job have to be done without any technical corroboration whatsoever. Since these pipes were not designed or installed under the assumption that they might one day be replaced, the task is likely to be a very difficult one.

Naturally, other reactors with piping made of the same material should be shut down and inspected, but new problems could conceivably crop up, even where corrosion-resistant materials have been used. Nucleocrats must henceforth anticipate such age-related problems in all nuclear power stations.

#### *Replacing entire BWR shroud*

The Nuclear Power Engineering Corporation and Hitachi, Ltd. are developing technologies to enable replacement of in-core structures in boiling water reactors in order to keep ageing reactors on-line. This is part of the "Nuclear Power Plant Maintenance Technology Reliability Demonstration Tests" commissioned by the Agency of Natural Resource and Energy (ANRE). Currently they are running tests on replacing guide tubes for neutron flux measurement instrument. They are planing subsequent tests for replacement of core shrouds, control guide tubes, and jet pump riser braces.

In addition, we have received information that Toshiba has placed an order with a British company for three units of a large remote-controlled machine to be used in the replacement and the installation of shrouds. According to the information source, the replacement work may soon be carried out for a number of older Japanese BWRs.

Replacing a whole shroud- a large in-core cylindrical steel structure surrounding the BWR fuel assemblies- would no doubt be a job of considerable scale.

Replacing PWR steam generators is also a major construction job that entails making a large opening in the reactor containment.

Replacing, a shroud would be an even big because it should be performed inside the pressure vessel. This would require opening the pressure vessel cover, taking out all components including the steam dryer, lattice, and fuel assembly, loosening and extracting the shroud, then inserting the new shroud, and finally performing the welding and other tasks inside the core. Although workers would probably be shielded by lead plates set up around the inside core wall, they would still be exposed to extremely high radiation levels.

#### *Critically*

#### *Ageing Reactors and Their*

#### *Decommissioning*

There are no distinct criteria for the operation of aged reactors or for making decisions on when they should be decommissioned. We therefore have a strange situation in which development of the technology proceeds without consideration of how to handle old facilities.

Assessing the state of nuclear power plants should at the very least be done in a disinterested manner, instead of according to arrangements like the "regular safety reviews" that are internally managed by the utilities themselves.

The problems occurring in aged nuclear power plants are of kind that are hard to discover during regular inspections, or which such inspections are not even meant to find. To properly assess the degree of ageing, there should be a requirement for an overhaul-like inspection in which plant after, for example, 10 or 20 years of operation is shut down for two or three years. It could perhaps be mandatory at that point to declare the plant decommissioned if it cannot satisfy certain criteria, the formulation of which would of course be another problem.

*Source: Nuke Info Tokyo*

### **Subscription Information**

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*Editor Anumukti*

*Sampoorna Kranti Vidyalaya*

*Vedcnni, 394 641 India*

*Tel: 02625-22074*

*Email:*

[Admin@Amimukti.ilbom.ernet.in](mailto:Admin@Amimukti.ilbom.ernet.in)

*Anumukti Team: Zahir, Su mesh,  
Sahadevan, Hansa, Santosh Peter,  
Sanghamitra and Surendra*

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