



ANUMUKTI

A JOURNAL DEVOTED TO NON-NUCLEAR INDIA

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"Every truth passes through three stages before it is recognized. In the first it is ridiculed, in the second it is opposed, in the third it is regarded as self-evident."

Arthur Schopenhauer

A few days back, I was talking to Suresh, a friend of long standing who has lived deep in the jungles and worked amongst tribals. "Who are these PEOPLE that you are trying to reach?" he asked. "If, what you want to say does not reach the people, why bother saying it down and out, if it makes no difference to the life of the last person, why bother saying it at all? Is what you are doing, worth doing?"

To all engaged in social activism, this is the central question - the 'why bother?' or 'shaprashna'. It is a question that all of us need to ponder over. The bulldozer of development rolls on, ever more ruthlessly, crushing the weak. The marginalized person or rather unperson feels, - whether she be the housewife who has to trudge further everyday to gather fuel for the family's next meal; or the small child working his finger to the bone producing carpets out of his lost childhood; or the senile old man staring vacantly at the brand-new 'sarovar' which lies near his home - powerless facing this relentless onslaught. To empower the people, so that they don't continue living "half-lives",

Long years ago, Gandhi gave us a talisman -

"Recall the face of the poorest and the most helpless man whom you may have seen and ask yourself if the step you contemplate is going to be of any use to him. Will it restore him to a control over his own life and destiny? In other words, will it lead to Swaraj or self rule for the hungry and also spiritually starved of your countrymen?"

Birthdays are for introspection. A time to look inward and a time to look forward. Anumukti enters its third year (a bit later than it ought to have to our continuing regret) determined to carry the truth from being ridiculed to being self evident. Gandhi's talisman remains our guiding star. All must join in the task to make the truth recognised by the "poorest, lowliest and the lost."

CHALO HARSUD

Millions of tribals and rural poor of our country are today fighting a battle for their survival; The forces of destruction in the name of development, unleashed in our country over four decades ago have already displaced over 8.5 million people and threatened the livelihood of the majority of our countrymen.

The government is going ahead with its plans for large scale projects, ignoring the advice of those who suggest that the ill-effects on the environment, the quality of life, and indeed the very culture of our people need first to be considered. Attempts to reason with the authorities have failed time and again.

Throughout the length and breadth of India the story is the same. Dams such as Tehri, Bodhghat, Inchanpalli, Suvarnarekha, Pcoyamkutty, Koel Karo, Sardar Sarovar, Narmada Sagar, Pollavarán, etc. threaten to drown forests and displace tribals and rural poor. Missile testing sites such as Baliapal and nuclear power plants such as Kaiga, Kakrapar, Koodankulam, Narora and Nagarjunasagar besides mining sites such as Singrauli, Jaduguda and Gandhamardan serve to destroy common lands and peoples' livelihoods. These projects have not only resulted in unmitigable losses but have never accrued the benefits, which were willfully overestimated to begin with. They have only contributed to the fuelling consumerism and in increasing disparities. The simple question, "who pays and who benefits?" remains unanswered, even as those displaced more than three decades ago from Bhakra, Koyna, Pong, Ukai and a score of other projects still seek justice from the nation.

The rising tide of struggle against such state sponsored destruction has been ignored, and sometimes even crushed by the government. The time has come for all of us to unite in a mass demonstration of collective strength. To effectively focus national and international attention on this just cause it would be appropriate to meet at Harsud in Madhya Pradesh where over 250,000 people to be displaced by the Narmada project are struggling to safeguard their lives and environment.

For too long have we struggled in isolation. For too long have the exploiters prevailed. In the manner of Gandhi let us now force an uncaring powerful few to take notice of the aspirations of the majority. Let us form a human wall to stop the destruction of our life support systems.

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Dumperial Designs

Last year, doctors in the Nigerian town of Koko started seeing patients with unexplained skin rashes, vomiting and headaches. The problems were traced to a dump, where barrels of waste shipped from Italian chemical factories were leaking poisons into air and water.

The discovery touched off a chain of events unprecedented in Africa, where environmental protection is often considered a luxury. The Nigerian government impounded Italian ships, arrested businessmen and threatened death sentences. The Italians took the waste home, only to encounter angry crowds on Italian docks who tried to keep the waste from being unloaded. The incident was not the only one of its kind. There have been more reports of dangerous dumping in the Third World, • from American incinerator ash in Guinea (presumably to make bricks) to Italian chemicals in Lebanon.

Bangladesh has been the latest target. Events of the past few months, have been alarming in this regard. Attempts are being made to import toxic and even radioactive industrial and medical waste in the guise of energy supplying materials. It is proposed to burn the waste and utilise the heat produced for electricity generation. These wastes have been totally rejected by industries in the U.S. The ash from the incinerator will have concentrated amounts of toxic materials which can have catastrophic effects on surface and ground water. The project had reached a sufficiently advanced stage of processing through the government when some officials and journalists raised an alarm. The government has now set up a committee to look into the matter. There are also strong rumours to the effect that a ship named Felicia/Khian Sea has dumped 15,000 tons of toxic wastes in the Bay of Bengal.

Hard figures on the trade in toxic waste are sparse. It is estimated that in the U.S. alone, 275 million tonnes of

industrial waste is produced each year. 135,000 tonnes are exported. But the pressure to export is increasing. Greenpeace reports that 3.7 million tonnes of waste of all sorts was shipped from industrialised to developing countries between 1986 and 1988.

The biggest incentive to export waste is money. As environmental regulations in rich countries have become more demanding, the cost of burying hazardous waste has risen sharply. In the U.S., it has increased from \$15 in 1980 to \$250 today. Incineration can cost \$1500 per tonne.

Groups such as Greenpeace want an outright ban on exports of hazardous waste. They say this will force firms to develop sound ways of recycling waste, or of changing processes to prevent its production in the first place.

In March this year, the United Nations Environment Programme (UNEP) finalised a treaty on the control of transboundary movement of hazardous waste. After much heated debate, in the end, only 34 of the 105 countries present at the convention in Basel, Switzerland, signed the treaty.

The treaty is riddled with loopholes and controversies which render it ineffective. It does not call for an outright ban on toxic waste trade. It merely regulates the trade. It only insists that the companies wishing to export waste will have to notify the government of the country importing it and receive prior informed consent. The treaty does not define what is 'hazardous'. Thus, there is little to stop an exporter from labelling waste as non-hazardous and leaving it upto the importer's detection abilities to spot the difference. There is no mechanism in the treaty to ensure that the waste can be handled adequately by the importer. A company can dump anywhere as long as it can 'persuade' a local official to say that it is all right to do so.

From:Third World Network Features

FOR THE SAKE OF PURITY OF TUNGA

Our river Tungabhadra has not dried up, it does flow through our villages even today! Nor have we felt it as unholy, in spite of the pollution; we do continue to seek her blessings, more especially on auspicious days. But we have to admit that she has suffered neglect. The people who believe that "progress" and "development" lies in using everything they set their eyes upon, came, as they came everywhere. They lured us into the belief that having a giant industry was a panacea for all our sufferings.

Thus some sixteen years ago Harihar Poly Fibres and GRASIM industries came to use our mother Tungabhadra. Their callousness resulted in multiplying our miseries. Our mother turned into a flow of chemical water - brown and stinking. Not only "large fish kills" started happening once in a while, but even our nets got devoured fast by the polluted water. Our agriculture suffered, our cattle became sick. Our women wondered where to clean clothes and utensils. Not only all of us elders, our children too became victims of "progress" loosing their health. Most sorry part of the situation was our failure to find a remedy to this.

We became absolutely helpless. This we learnt has happened everywhere, where the demon of industrialization has set its footprint. What can you do to a giant capitalist like the BIRLA? What can be done to the mighty State Government which has a Pollution Control Board and a Health Department that looks upon all this as a 'necessity for "NATIONAL GROWTH"? We talked and regretted, we fretted and feared. We felt we had no choice but to sacrifice ourselves to the satanic dance of modernizing our "backwardness"! Pure clean water of the Tungabhadra was to be a historical memory!

Some six years ago, one day our children did not return from their schools as usual. What happened? This mischievous lot that was always after us understood that if Tunga was to

"give us food" and all their unwanted demands and pranks were not to be found. They were still in the school even when darkness had engulfed the village. Something was really happening at the school. A group of trainee teachers had come from Gujarat. To be at the school those days children felt it was all fun, "nay real work and involvement!"

When our village teachers had sought help to host these teachers we supported them out of curiosity, more out of our traditional sense of hospitality. "Look upon the visitor as God himself."

But these visitors were very different people. They helped our children to handle glass test tubes and chemicals. Within a couple of days the children had selected and analysed soil of every field and that of the smallest farmer. It was amazing to see the entire plan of the village fields all prepared by our own "monkeys"! Not only the children learnt their self respect we too learnt the lessons of self discipline.

With the change in our children in less than fifteen days we too were affected. The evening discussions and the cultural programmes organised by these visitors brought more light and enthusiasm amongst us. This started slowly the rivulets of our finding out that we should not lose heart. We learnt how foolish it was to believe that a factory could give us happiness. We also felt that the mistake was to be corrected. But how?

We had gone as a mob previously under the leadership of politicians to storm the factory and seek compensation. But the result was totally devastating. Not only that some of us had to suffer physically because of police beatings but our morals too sank down. The politicians left us as they were purchased by the factory people. We lost faith in them and in ourselves and were thus doubly frustrated.

But after this teachers' camp we of government officials. This made us

purified, not someone from outside but all and everyone of us had to contribute. Our first lesson was not to have leaders. So we formed our village Parisar Samitis. These met and met again and again to think and to seek and to ask and to understand how best to start.

Luckily we thought of a "Vigil Line" in front of the factory. That was in October 1984. Some couple of hundred women and men stood there in silence to declare their unhappiness about the deterioration of the environment because of the effluents being poured into the river by the factory. Factory authorities had sought police protection and had created a scare. But looking at our peaceful nay silent demonstration understood us better. The police officer said, "how on earth could this factory management believe that these peaceful folk were going to be violent? You are within your rights to protest. We will not bother you." A current of happiness and confidence electrified us all. Perhaps this was the birth of the positive stream that started to change the waters of the Tunga.

News went round all the forty villages about this demonstration. In the next such demonstration the locally elected politicians and even the member of parliament had to join to claim empathy with the people. They had to follow the people. We gained confidence that saying 'NO' to pollution was having results. Even the factory authorities moved, sent feelers, asked for talks, agents came to pacify and discuss!

Camps in non-violent training, writing letters to concerned government officials, organising protest marches, environmental jathas, streams of action started trickling down from everywhere. We started deciding for ourselves about what next could be done.

Hiremath, a highly qualified man from Dharwad and one who had been with us since 1982 came up with the idea of burning up his man-made fibre clothes and wearing hand spun woven khadi. He was emulated by people from seven villages. Some burnt their clothes in front of the factory and some in front. How can we accept any wages? We have to

remember our fight for freedom against the British when Gandhiji gave us a call burn all foreign clothes. Durgapa Barki our fisherman from Medleri spoke to the women of the village a day previous to his deciding to burn his rayon clothes. "Why I am doing it is very simple to understand. It is not just giving up use of factory made clothes. We also have to see how we can cooperate to bring better living to our own village craftsmen. We will have to start buying our potters' pots prepared right here in the village and we will have to buy chappals made here by our neighbours!" More and more light started to shine on us as to what had gone wrong. And with each one coining forward to live up to seeking alternatives to evils of industrialization, our spirits soared.

Dr.Kaboor a noted physician gave up his roaring practice to join the folds of the volunteers. Dr.Pawar started as a "fellow traveller" but soon got so involved that he seems to have forgotten .that he has patients to attend. Dr.Pawar's sister had never ventured out of her home. Not only she, but her friend too joined us. Families from cities, households from villages, women from homes and workers from fields came and surrendered themselves to the cause that was finding real roots. They gave up their mundane needs, started constructive work, organising weekend camps and padayatras. Planting useful trees and preparing seedlings provided individuals not only means to earn but also an involvement in the movement for purifying Tungabhadra. These small actions and village meetings brought forth purer and purer blood to the body of the movement.

A daily wage earners' camp 'coolies' as they call themselves - was organised for a weekend. They were chosen by their village. Their village had assured them of three days wages. But at the end of the camp they would not accept the wages. 28 women and men all refused saying, "We had the privilege to represent our village. We have learnt so much here, and we received food without doing any work, slowly the water has changed its colour.

contribute to our fight against the factory." These and many more such sincere actions provided the haemoglobin to our anaemic society.

Journalists and lawyers, scientists and doctors, all started to join our efforts. The stream has now become a rivulet and is moving on to be a river.

Like a river our movement has grown. Something trickling from one corner, some drops from over a rock and so -on. Various sources everywhere contributing to make it a success.

In 1986 the state government of Karnataka joined hands with the factory to overwhelm us by leasing ten thousand hectares of village common lands of over four districts. These lands were given to a Joint Sector company to grow Eucalyptus trees to be used as raw material for the pulp and fibre production by the factory. People's rights on these common lands were taken away almost by a stroke of pen!

They wanted to thwart a river? But the tables 'got turned. It brought more people to join hands to fight the common enemy. Protest marches, "Pluck and Plant" programmes started in all four districts. Yes, the movement spread and got more strength. Instead of being with the people, the government had supported, no promoted, the cause of the factory. "Birds of a feather flock together", they say. But every action of theirs boomerangs!

Our pluck and plant demonstration was to pluck out the factory-planted eucalyptus trees to plant fruit and other more useful trees for the villagers. It provided a unique example of how things change. The assistant commissioner - representing the authorities and the government, - intervened between 2000 villagers and the 40 hoodlums who were engaged by the factory to create violence. He said we will be allowed to plant more useful trees supporting the villagers and replace 100 plants planted by the factory. Yes, the government at the grassroot level understood us better.

Not that we have won. Purifying Tunga is a dream we feel sometimes! But confidence.

The factory now sometimes runs its effluent treatment plant. Small beginnings in their minds are felt by us.

The state High-Court had sent a commission to investigate the state of destruction by pollution. It was more or less an attempt to condone the 'industry. But the truth came out in the commission's report. "There is a nalah from the factory to the river by which the effluent is directly put into the river without treatment." The report also made a request that " since this nalah has existed all these years the Pollution Control Board should permit it as of the day it was made." Thus it is that however much they try all their actions result in exposures of total neglect and callousness of all health and environmental regulations. It seems as if, they fall in the traps they have themselves laid.

The Samaj Parivartan Samudaya has let us find that "people need to and can develop a macro-perspective of a free democratic , secular, egalitarian, non-violent, non-exploitative and just society while working towards it on various issues in a micro-situation and by trying to build links with different sections at various levels." It has helped us find a wider perspective. We know we are not alone. We also know that our efforts are helping many more groups of people all over Karnataka and perhaps in other states too to find out what needs to be done.

Thus this small river of people's strength is slowly gaining involvement of more and more areas and groups. During this growth we have learnt many lessons. The most significant are the following:

1. Not to have a leader, or follow a call of an individual however powerful or imposing he might appear. But try and understand the problem - go to the roots and start correcting by small actions that can be taken by many.

2. Small actions, even writing a letter to officials by entire village people do carry weight. These limited actions also help in building up

6. Keep a relentless effort going

3. Demonstrations have their usefulness as morale boosters but these should be held only after intensive training in non-violence and after having had thoughts and reflections on the action.

4. Ready-made solutions do no help. Seek solutions together. Mob actions appear encouraging at times, but often serve no useful purpose and may result in greater frustration.

5. Real action comes out of determination of a few. Determination comes after well considered reflection by the group. A real training in deciding and owning up responsibility.

on, on all fronts. Legal action as well as local action; constructive work as well as confrontation.

7. Let everyone feel that it is their own movement. City people and salaried people, farmers and coolies, women and old, all of them should contribute whatever they can to create a real people's movement. We will have to collect every drop of devotion and honest sacrifice.

8. This is a very difficult task, we know. But we are determined to see our mother Tunga purified.

The

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Report from Koodankulam

With the entry of farmers from Kanyakumari district, the resistance against the proposed nuke station at Koodankulam is taking a new turn. On 27th August, over 120 organisations representing farmers, fish workers, women, students and environmental groups said "No to Nukes". There were also representatives from various opposition parties barring CPI and CPM.

The meeting was chaired by Thomas Kochery of the National Fishworkers Federation. The delegates were convinced that nuclear power is an evil that has to be resisted with all one's might. Even the farmers, whose main concern is the diversion of waters from the Pechiparai dam - the major source of irrigation in Kanyakumari district - resolved that they would fight even if Pechiparai water is spared.

Till now, the Koodankulam campaign was led by various fishworkers' unions, students and environmentalists. From now on, the movement will be coordinated by the newly formed Anti-Koodankulam Committee with Dr. Kumar Das, Ex-MLA as convenor. The meeting unanimously decided to conduct a signature campaign, continue the mass education and contact programme, hold workshops and seminars in colleges and organise a demonstration at Nagercoil in November this year as a

massive show of people's determination.

The South Indian environmentalists are meeting at Ooty in the Nilgiris on the 22 September to chart out their future action plans. This is bad news for nuclear barons especially in an election year. The Department of Atomic Energy (DAE) still remembers its earlier setback in Kerala where the proposal for the Kothamangalam Atomic Power Plant was withdrawn because the people forced all the candidates to oppose the plant. A similar strategy is likely to evolve for Kaiga, Nagarjunasagar and Koodankulam.

Nuclear establishment has by now realised that its "education" programme has not been well received. From now on it seems that there will be more reliance on police and the other coercive apparatus of the government. For instance, Tom Kochery was asked by the Nagercoil administration to keep his activities confined to Kerala. Anton Gomez, a journalist who has been working among the fish workers of Tamil Nadu also had to face police highhandedness.

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Victory at Wackersdorf

Gorleben is a small village in the north of West Germany. It was chosen as the site of the republic's first large scale nuclear fuel reprocessing plant. However, strong antinuclear protests begun well before the commencement of work on the first phase of the plant forced the planner's to abandon plans and to look for an alternative.

Under the active patronage of the veteran Bavarian conservative Franz Josef Strauss who had been one of the main architects of the West German nuclear programme, Wackersdorf, a site in the south of the country began to be propagated since the early eighties. Here, the construction of a nuclear fuel complex was considered politically feasible. The population, living mainly on agriculture, was promised employment in this "high-tech" industry. Nobody expected any resistance.

A word about Herr Strauss. Known for long as the 'strong man' of W.German politics, his death last year prevented him from seeing the gradual dissolution of his nuclear dreams. Strauss had allowed West German ratification of the Non-Proliferation Treaty only after an amendment was passed which limited the period of the treaty to the year 1995. Precisely the year when both, the reprocessing plant at Wackersdorf. and the commercial scale fast breeder reactor at Kalkar were scheduled for completion. The combination of the two plants being an important step enabling FRG to make its own nuclear weapons!

The . resistance of the local population together with antinuclear initiatives from all over Germany, developed in a way not anticipated by politicians. Wackersdorf became a symbol of the 'nuclear state'. The government retaliated brutally - "The largest uninterrupted deployment of police and Bundesgrenzschutz (special task force for border protection) against protesters in conditions resembling civil war". Irritant gases and rubber

projectiles were used to crush demonstrators and to end blockades.

For a time it appeared that protests and appeals to reason were fruitless. With the growing resistance against the plant, the government merely increased its propaganda offensive. Only in 1987, did a change in attitude became perceivable. Of all the arguments against the plant - dangers of a nuclear accident; the health problems due to radiation during 'normal' operation; the fact that even after Wackersdorf the waste problem remained as insolvable as ever; the military implications of the programme; the evils of large scale industrialisation; the financial unviability of the programme; - only this last argument was eventually accepted by the authorities.

Slowly, one by one, the big financiers began to drop out of the project. The exodus began in 1985 when one of the largest electricity producers in FRG reduced its shares in the company responsible for operating Wackersdorf. After construction on the first phase of the plant had started, it became obvious that the financial outlay of 3 billion Marks was not realisable. More and more industrialists, declared the project as too expensive and not economically viable. With the death of F.J.Strauss, political commitment to the plant also declined. On the other hand, the British and the French governments offered cheaper fuel reprocessing at Windscale and Le Hague respectively. In an age of decreasing tensions between East and West, nuclear weapons' proponents in W.Germany seem to be losing ground.

Suddenly, no one in FRG is ready anymore to bear the financial risks involved in building new nuclear plants or other large related facilities. Neither the breeder in Kalkar, nor the dream of the German nuclear industry the thorium high-temperature reactor - ever seem likely to be built. Nuclear technology will, however, . remain an

export item.

What will happen to Wackersdorf? Within the half-constituted ruins of the site, a research centre for solar energy is said to be planned. Siemens, the multinational giant wants to invest in this project. Thus, Europe's energy

future is likely to remain firmly in the hands of large industry. Without radical change in the economic system, the soft-energy future will be determined by the masters of the atomic past!

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Report on Cuttack Seminar

One benefit of antinuclear protest in the vicinity of various nuclear power plants has been the great interest it has aroused in the issue of nuclear power in different parts of the country. The eastern region of the country being the coal belt, is not immediately threatened by reactor siting. Even nucleocrats admit that on their own accounting, nuclear generated electricity can compete with coal only 800 Inns from the pit heads. Besides the region is prone to severe cyclones and both these factors have for the present proved a constraint on reactor construction there.

However, in these times, when political considerations take primacy over good sense, natural barriers provide no guarantee of long lasting relief. Nuclear power's central funding proves too much of an attraction for impoverished state governments and their electricity boards to resist. Thus, the governments of both W.Bengal and Orissa despite the variation of ideology, covet nuclear power plants.

Prompt and active opposition by an informed public is the only safeguard against these assaults on the environment and the citizenry. Both W.Bengal and Orissa have been lucky in having public spirited groups which are alive to the nuclear menace and have organised preliminary meetings to debate the issue.

The seminar at Cuttack was a two-day affair on August 5th and 6th organised by The World Union and Utkal Gandhi Smarak Nidhi. Originally it was planned to have a debate between some antinuclear spokespersons and represen-

tatives of the Department of Atomic Energy (DAE). However, the persons invited by the organisers from DAE after accepting the invitations had second thoughts and decided that discretion was the better part of valour and hence did not turn up. Thus, there wasn't much debate though a number of papers were read on different aspects of the nuclear issue. The subjects ranged from nuclear weapons, safety, waste disposal, radiation hazards to biological systems, nuclear politics to the use of nuclear energy in medicine and agriculture. It needs to be pointed out regarding the last mentioned that the radioisotopes needed for such purposes are required in such trace amounts that there is *in* reality no connection between production of radioisotopes and nuclear power generation. Every time there is any discussion on the desirability or otherwise of nuclear power, these "uses" are sure to be mentioned. Thus their 'usefulness' as the 'Shikhandi' of nuclear power technology is undeniable. There were also lively discussions on the role and the responsibility of scientists in bringing about social change.

The conference ended in a well attended public meeting which resolved that no nuclear plant construction should be started in Orissa without a public debate which would help the formation of a consensus on the issue. To facilitate such a debate, it is imperative that there be free flow of information from the DAE.

Ten Years of Fallout

In March 1979, the Shah had just left Iran, Jimmy Carter was the President of the United States, and the world suffered its first major nuclear plant disaster at Three Mile Island in Pennsylvania. Much has changed in the past decade, including the state of the nuclear industry. But one thing endures -the highly radioactive remains of the TMI reactor.

core

Disaster Strikes

When the first alarms sounded in the chilly predawn hours of March 28th, the operators at the almost new TMI-2 plant thought they were facing another routine malfunction. Indeed the series of small mistakes made before and during the TMI accident were surprisingly mundane.

A minor problem in the plant's plumbing caused the turbine of the TMI reactor to trip early in the accident, disconnecting it from the steam being produced by the hot reactor. The unconnected steam jetted into the night sky with a roar. Only mildly concerned, the shift supervisor's first call was to his counterpart at TMI-1 reactor, which was down for repairs, telling him that he would have to do without TMI-2's power.

It was at this point that the accident became serious. Critical water valves were mistakenly closed. Another was inadvertently stuck open. Operators shut down the emergency core cooling system at a time when it was badly needed, and then an hour into the accident mistakenly turned off the main coolant pumps. The water surrounding the core of the reactor slowly leaked out over a two hour period.

Bedeviled by flawed equipment, a shortage of key data about critical water levels and temperatures, and hundreds of warning lights and alarms, the TMI operators made a bad situation worse, and soon had the plant on the verge of catastrophe. Within minutes of closing the coolant pumps, the

began to overheat.

Meanwhile, a hole developed in the primary cooling system, allowing hundreds of thousands of gallons of radioactive water to fill the basement of the reactor's containment building to a depth of eight feet. Some of this water was automatically pumped into an auxiliary building, where small amounts of radioactive gases were released without warning into the sky.

As the temperature of the reactor core exceeded 5000 degrees Fahrenheit, the rods containing the uranium fuel ruptured. At least 70% of the core was damaged, and more than one third of it melted, flowing downwards like "hot olive oil," according to one expert's description. The molten remnants of the core then coagulated at the bottom of the reactor building.

Most of the details of what happened at Three Mile Island were not known until days after the most critical period had passed. The operators themselves and the nuclear experts from

around the country were puzzled by the event, misled by inaccurate gauge readings and reluctant to believe correct measurements because they were so far outside the norm. The plant's owners repeatedly misinformed the public in their haste to downplay the seriousness of the accident.

In the months and years since the accident, it has become clear that this was a most serious accident, one that could have caused immediate loss of human life. A grave tragedy was avoided at Three Mile Island in part because the core- was uncovered for only a brief period. In addition, because the plant had been in operation for just three months, the core contained only small amounts of radioactive fission products that are most dangerous to life. There is a controversy about whether deaths can be directly attributed to the accident. Even if it did not kill people, TMI revealed technical and human flaws in the safety systems essential to

the safe operation of nuclear plants. In the years since Three Mile Island, U.S. nuclear plants have experienced nearly 30,000 mishaps, some with the potential to have caused disasters more serious than that at Three Mile Island.

Picking up the Pieces

After several months of study, the presidential commission on the TMI accident estimated that the plant could be returned to service by 1984 at a cost of \$466 million - a challenging but feasible task. Ten years and nearly \$1 billion later, the project is still not finished. Not only is returning the plant to "operation no longer being considered, the reactor's owners are attempting to get permission from officials to leave some radioactive material sealed inside for decades.

Like the construction and operation of nuclear plants, the cleanup of a destroyed reactor can be a minefield of optimistic projections, trial and error procedures and unpleasant surprises. Many of the techniques used to dismantle TMI had to be invented and in some cases reinvented during the course of the project.

When the cleanup operation began, experts were confident that they would find the fuel assemblies intact. However, in 1982, when a remote camera was first lowered into the reactor vessel, workers found a large empty space where part of the core should have been. When they finally got access to the pressure vessel six years later, the cleanup crew found rest of the core - 20 tonnes of it buried in radioactive rubble at the bottom of the vessel.

These discoveries showed for the first time that part of the core had melted and the cleanup would be a vastly more complicated operation. The rubble, too radioactive to be approached by workers would have to be 'chopped into pieces and removed from the vessel by remotely controlled devices. Numerous pipes, pumps, walls and other equipment that had been contaminated by the slumping core would have to be extracted and stored as radioactive waste.

The centrepiece of the cleanup

effort is a huge steel and lead platform built over the reactor to give workers safe access to the core. Workers lower shovels, pliers, buckets, cutting torches and other devices through an 18 inch hole in the platform on 40 foot poles. These extend to the bottom of the reactor vessel, which is filled with water left over from earlier cleanup efforts. Debris from the damaged core is leaded into protective canisters before being raised out of the water. Complicating the handling of this material is the fact that it is dangerously radioactive, even after a decade.

The cleanup is further hindered by the constant need to develop new types of remotely controlled equipment. All of these devices must be directed using special television cameras that are also lowered into the vessel. Early in the cleanup, bacteria and algae began flourishing in the warm water, limiting visibility to only a few inches. It was not uncommon for expensive equipment to be lost in the murky bowels of the pressure vessel, requiring costly recovery attempts.

Atop the platform the life of a cleanup worker is not easy. Even the thick layer of lead and steel is not enough to stop 10 millirems of radiation per hour from seeping out, roughly equivalent to getting a chest X-ray every 60 minutes. When large pieces of radioactive debris are pulled out of the water, radiation levels go far higher. For this reason workers are clothed in cumbersome decontamination suits and plastic smocks, layers of special gloves are peeled off and discarded every 15 minutes. Shifts are less than 4 hours and workers are permitted on the platform only one week in six.

The most difficult part of the operation is the removal of the solid layer of radioactive debris that coagulated at the bottom of the vessel, a process that is still going on. The cleanup crew uses a specially designed diamond tipped drill to break up the material, then winches the fragments some of which weigh half a ton, out of the reactor.

The projected completion date for

the cleanup operation has been postponed on almost an annual basis. The latest date is at the end of 1990, but there is simple room for more delay. Whereas company executives first said that the reactor would be restarted or at least fully decontaminated, they now plan to simplify their task by leaving some radioactive debris in the plant until at least 2020 - "post defuelling monitored storage," - in nuclear jargon.

The Aftermath

Three Mile Island has become a symbol of the nuclear industry's problems. Public concern has intensified and knowledgeable scientists and local officials have joined the chorus of opponents. California has passed a law forbidding more nuclear plants in the state until a solution to the waste problem has been found.

Safety devices and regulations in the pre-TMI era were clearly inadequate. Everything from control room layouts and the training of operators to the standards for particular welds had to be altered. This resulted in a great burden on the builders of many plants then still under construction. Components had to be replaced or rebuilt. Cost overruns already out of control, became astronomical.

The average construction cost of a nuclear plant built during the eighties in the U.S. has been \$3,700/kilowatt. During the haydays of the sixties the expectation was that nuclear plants would cost \$150/kilowatt to build.

Adding construction and operating costs today, nuclear -power is twice as expensive as competing energy sources such as gas fired cogeneration or fluidized bed coal plants. At the time the nuclear costs have, gone up, technological improvements have allowed a reduction in the costs of these and other electricity sources. During the past five years, for example, the cost of installing solar photovoltaic cells has fallen from \$10,000 per kilowatt to \$5,000 per kilowatt, while the cost of wind power has fallen from \$2,000 to \$800 per kilowatt. It is cheaper still to generate electricity by saving

electricity through more efficient light bulbs, appliances and other devices.

Hereditary Problems

Nuclear proponents are now trying to light a new flame - a generation of "inherently safe" reactors intended to be impervious to meltdowns. Lawmakers under pressure to come up with alternatives to fossil fuel plants that cause air pollution and global warming are being lobbied to fund a rebirth of nuclear industry.

Today's light water plants have obvious inadequacies that the new plants would supposedly rectify. Three major alternatives, each intended to avoid the possibility of a TMI-type accident, are gaining attention. One is a modified light water reactor that differs from the current design mainly in having a larger and cooler core. This design still relies on elaborate redundant safety systems. The "PIUS" reactor being promoted by Swedish scientists is a sharp departure from present day designs. The core is to be housed in a pool of water containing boric acid that would automatically flood the core and cool it in case of an accident.

The third design is the high temperature gas cooled reactor. This has a very different type of core, with the uranium encased in billions of tiny ceramic spheres that limit the potential heat buildup. Fission automatically stops of its own accord if the core overheats. Such a system would work only if the reactor were restricted to about 100 megawatts - one tenth the size of today's plants.

While each of these designs has its advantages, none is free from potential problems. Meltdowns are not the only kinds of nuclear accidents. Reactors can also be subject to hydrogen explosions (one " of the fears at TMI) or a runaway reaction, as at Chernobyl.

The misfortunes of the entire nuclear industry show that engineers' best intentions and detailed calculations do not ensure reliability. Indeed, the concept of "inherent safety" may be an engineering mirage, implying a degree of certainty and flawlessness

that is beyond the scope of foreseeable nuclear technologies.

More Nuclear Boondoggles?

The current hope of the nuclear advocates is to have the government fund the construction of a demonstration reactor, perhaps under the auspices of the nuclear weapons programme. However, the government has an abysmal record in managing large nuclear projects, including the decaying U.S. nuclear weapons complex, which will cost upward of \$100 billion to clean up during the next 20 years. Another is the Clinch River Breeder Reactor, which was a managerial disaster that cost \$1.5 billion before being stopped by the Congress in 1974. A uranium enrichment plant in Ohio begun in 1977 was abandoned in 1985 after \$3.5 billion went down the drain. That blunder alone wasted more money than the U.S. government has spent on all renewable energy R&D during the past decade.

Safer Alternatives

A nuclear revival would at best be a slow endeavour. A demonstration plant would take a decade to build and to prove itself reliable. It would take another decade before commercial reactors begin to come on line, and a third before there was enough nuclear power to supply significant energy. Energy efficiency by contrast, could make large contributions in a matter of months and renewable energy sources in a few years.

Today in the U.S., nuclear R&D spending is nearly five times that of spending on energy efficiency and nearly six times that on renewable energy - both of which are not only indisputably safe but far more likely to stop global warming before it seriously affects the planet.

Alternatives such as energy efficiency and some renewables are already cheaper than current nuclear plants, and, most likely, any "new generation". Non-nuclear energy sources are the only ones that can be honestly termed "inherently safe". Moreover they will not take 30 years to come on line,

and will never create a symbol as powerfully negative as the cooling towers looming over Three Mile Island. Source: Christopher Flavin, World.Watch

Hotspots Galore

A recent United States General Accounting Office (GAO) - (an office similar in purpose to our CAG) - report has found severe radioactive contamination at nine nuclear sites, all of which had supposedly been decommissioned. Three of the sites had been released for unrestricted use. At five sites, radioactive waste had been buried, but nobody knew the type or the amount of waste buried. Records were incomplete or non-existent.

According to GAO, ..."all five sites have groundwater contamination levels higher than federal drinking water standards allow." One site, Kerr-HcGee's Cimarron uranium enrichment facility - most famous as the plant where Karen Silkwood worked - had groundwater contamination 400 times the standards. Another site in Erwin, Tennessee has contamination 730 times the federal drinking water standards.

In all, the GAO looked at nine sites. All had various levels of contamination. The problems at the U.S. Department of Energy's 17 nuclear weapon's plants are now well known. Although, no single civilian site may be as contaminated as the weapon's sites, there are far more civilian radiation users, including 112 reactors plus several already shut down, 22 fuel cycle facilities, 54 research reactors, and 23,000 other licensed users of radioactive materials.

If only one percent of these sites turn out to have contamination problems, the clean up cost will dwarf the tens of billions of dollars estimated to be necessary for the cleanup of the weapon's plants. With the GAO finding severe contamination problems at all nine of the sites it examined, the outlook is not promising.

The Nuclear Monitor 21.3.'89

Daring the last two years we have made special efforts to link with other kindred groups through exchanges of information and literature. As a result we nowadays got a large number of papers and journals not normally easily available in India. Beginning with this issue we intend to have a regular column to introduce/review different magazines, books etc. so that you too can have access' to this world of information.



On September 1st, 1939 as German tanks started rumbling towards Poland, heralding the beginning of the most destructive war yet in human history, the first issue of Peace News hit the stands. Ever since 2,316 more have come out with the objective of bringing about non-violent revolution. In their own words:

"The nuclear arms race must be opposed. But it is only an extreme form of violence which is inherent in our society. Its other manifestations include sexism, racism, war, brutality, hunger, inequality and the exploitation of people animals and the environment.

Peace News seeks to oppose all forms of violence, and to create positive change based on co-operation and responsibility. ' To create a non-violent world, we must avoid violence in our struggle for change, since aims and means cannot be separated. The concept of non-violent revolution draws on the traditions of pacifism, anarchism, feminism, human rights, animal liberation, socialism and green politics.

We believe in breaking down hierarchies and demystifying skills. Peace News is produced by an editorial

collective independent of any organisation. It is non-profit making and depends on its survival on the generous support of its readers."

EXTRACT

If everything goes according to plan a small group of American businessmen will become millionaires by collecting rubbish. And a group of Pacific Islanders will, for the second time in the last forty years become guinea-pigs for American poisons.

It's in the best tradition of Western free enterprise. Having polluted their own environment to the point where an outraged American public has forced health and safety standards on waste dumps, American industrialists and local governments are glad to find an alternative. The newly formed Admiralty Pacific company (AP) hopes to make \$23 million profit in 1991 and \$77 million profit per year from 1994 on.

With 7,000,000 tons arriving annually from 1994 on, the Marshalls will get \$56 million per year - more than the annual budget of this Micronesian archipelago, where 43,000 people live on only 73 square miles of land.

Although it sounds innocuous, "household garbage" is laced with toxic wastes. Just the five years worth includes more than 125 million pounds of hazardous material, much of which will leach into the surrounding environment - the scarce fresh water aquifer and the Pacific Ocean. Even AP's President Dan Fleming admits that "there is no such thing as non-toxic, non-hazardous garbage."

Although there is significant Marshallese opposition to the plan, many local people support it. Senator Tony DeBrum who has led the Marshallese opposition says, "We have had to suffer the brunt of nuclear testing. We have had enough of American garbage out here. It is one thing to do something out of ignorance and fear, but to do it again for money would be inexcusable."

Peace News: 1.9.'39.

LETTER BOX

It was good to receive the last two issues of Anumukti after the prolonged gap. The attempts of the DAE to steam-roller all opposition to nuclear projects by repeatedly asserting the same semi-truths and falsehoods are by now a familiar experience. With Doordarshan in the hands of the government, it sometimes seems a hopelessly uphill task to make heard the voice of concerned dissent. I am referring to an edition of the Doordarshan's "FOCUS", aired of July 30th (I think !) where the so-called discussion on nuclear power was merely an opportunity for Dr.M.R. Srinivasan and others who are already deeply committed to nuclear energy to put forward the establishment's views. Shashi Kumar as moderator, questioned the wisdom of establishing nuclear plants very diffidently and apologetically - more as a matter of form than as any genuine argument against these plants. However, since Doordarshan's bias is by now fairly obvious and its credibility low; such exercises are not unduly worrisome on their own.

What saddened me, was the conviction with which some youngsters towed the DAE line at an inter-collegiate debate on the subject. This debate was held to mark Hiroshima day, by the "Young Hen's Christian Association". Those who spoke for the establishment seemed entirely convinced of the truthfulness, wisdom and sensibility of the pronuclear energy strategy. The danger according to me lies not so much in believing unquestioningly what the nuclear barons say, but in considering dissenters as a bunch of irresponsible, frightened dreamers whose patriotism is questionable. In fact as you rightly pointed out in an earlier issue of Anumukti there seems to be no communication of ideas between the two groups. That every one of the arguments in favour of nuclear energy is at least questionable seems to be outside the perception of the nuclear energy lobbyists.

Then there was this
most

frightening aspect of the debate: youngsters calmly arguing that India needs to keep up its nuclear programmes in order to develop a nuclear weapons capability. If anyone doubted the hypocrisy of the government's statement that our nuclear energy programmes are purely peaceful, they should have heard these students. Obviously they have read between the lines very well and then merely stated the 'unacknowledged but very real corollary to our allegedly peaceful plans.

Let me quote from a report on the "Agni" missile published in the June 15th issue of India Today, to show that it does not take very much to put two and two together - ". . . with the Pokharan explosion, of 1974 India had demonstrated its ability to make a nuclear bomb. In 1980, the SLV-3 rocket launched the country into the space age. All that was missing was the vital third leg of the strategic triangle - a potent medium range ballistic missile capable of carrying a warhead over long distances." Of course "Agni" has been; successfully launched and the gap covered. To quote further, "Agni can also act as delivery system for a nuclear warhead with its destructive potential, with plutonium production in India's nuclear reactors and a number of Agni missiles deployed at strategic sites, India's deterrence factor is multiplied enormously."

Glory, glory, hallelujah, India is a superpower at last! Brothers in Pakistan beware, we could annihilate you and ourselves too in the bargain.

I am truly ashamed to find our nation being called a superpower. The connotations are entirely negative. Does it matter nothing if another million babies die miserable deaths from poverty and poor sanitation, or if a thriving people are reduced to beggary, as long as our missile bases are established and our scientists can boast of their ability to create weapons of mass destruction? Truly has Gandhi been murdered in the land of his birth !

Indira Vijaysimha
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A few points that emerged during and after a meeting with Dr. Dharendra Sharma on August.14th here in Bangalore.

1. Dr. Sharma asked that we all support Anumukti and request you for the price of bulk mailing. It was found that many of us speak to different audiences all the time and when we leave we just hand out a folder or two and there is very little follow-up. The decision was that some of us could receive Anumukti in bulk and distribute it.

2. We all seemed to be in agreement that there should be a regular column of news from Kaiga in Anumukti.

3. Some of us felt that Anumukti should be based on the WISE format and should not carry lengthy articles or reviews - which some of us may already be aware of or have access to.

Hemachandra Bassappa
for CANE group
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Nehru Nagar, Bangalore

Your effort is praiseworthy, though it involves a lot of pains. In my view Anumukti should be strengthened at the national level. CANE as well as friends from Bombay should pitch in and help you with this work. But at the same time you should be prepared to "row the lonely furrow"

I believe that long articles are read by very few people. Thousand words should be the upper limit for an article. Calcutta Convention (Anumukti Vol.2 No.G June '09) deserved a bigger coverage.

Recently India Today's Newstrack (10.6.'89) has a very good video clip on Narora. It is of 20 minutes duration and is the result of the efforts of Shri Shanturn Seth.

Dhirendra Sharma
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My name is Keiko Dekai. Rev.K.Yoda is a friend of my husband. I heard about your anti-nuclear movements in India from Rev. Yoda. He told us, you want some contact to Japanese who studying nuclear power plants. We've got shock when Rev.Yoda told us India starts to

built nuclear power plant in 'Orissa. Orissa is one of a most holy place, because Ashoka stopped violence, because Gandhi Jee walked to Puri. Why nuclear power plant in Orissa !! I really expect you are getting more and more power.

Anyway, my English is not good, so I can't give you information exactly, what Japanese movements going on, I send you "Nuke Info Tokyo". I think you better contact to this paper.

I also send you "Is It Too Late?" Many Japanese read this book, then they change them mind, and stand up to stop the nuclear power plants.

Nukes, No!! Why people can 'be stupid. People must be stady. I wish your beautifful future.

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Apologising again and again for not sticking to the scheduled date of publication is disgraceful. Why can't you publish on time? Others do.

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