



ANUMUKTI

A JOURNAL DEVOTED TO NON-NUCLEAR INDIA

Vol. 1 No. 2

October 1987

Why I Oppose Nuclear Power

Talking to scientists and engineers at Kakrapar and Tarapur, I have often had the feeling that we were either talking two different languages or were engaged in a dialogue of the mutually deaf. In spite of my great admirations for their sincerity and enthusiasm, their efforts to convince me of the desirability of having nuclear power plants in the country have, I must confess, fallen far short of target. Their arguments have not satisfied me, for zeal alone does not persuade and sincerity alone cannot carry conviction.

First of all, I would like to see a position that ought to be common between participants of any dialogue — the position of being seekers of truth. I try to keep my mind open to the best of my ability and appreciate a reciprocal openminded response from the other side.

They talk about progress, development and advancement. Who does not commend these values? But there seem to be two entirely different concepts of these words. Top most nucleocrats have often said that the progress of a people can be measured by the quantum of electricity used by them. Can consumption of electricity really be the measure of progress? As a matter of fact, can the consumption of anything ever be the measure of development? There is a question of values here. Where does the advancement of the individual and the

society lie, in consumerism or in sharing? History is replete with cases of decline in civilisation when people have made increasing wants their ideals and goals. What I would like to emphasize is that increasing wants and progress are not synonymous. Progress of a civilisation to me is based on inner joy rather than on outer accumulation. The joy among individuals and communities depends more on mutual cooperation, willingness to share each others sorrows and happiness, fortunes and misfortunes, rather than on a self centered attitude with each person bent upon competing with the other in a race to accumulate wealth. Progress of a society is based on a healthy balance between change and stability resulting in a steady journey towards higher goals, rather than on ever increasing activity to counteract (real or make-believe) threats to internal security. Progress lies in good neighbourliness which creates a sound basis for mutual security and commercial and cultural exchanges rather than on increasing suspicion and lack of trust in neighbours leading to an arms race. Progress lies in peace, rather than in war. Progress of mankind depends on a science of life, a science which respects, enhances and cherishes life, rather than on a science for death, a science that plans and executes destruction of human beings and environment.

Next comes the question of priorities. For whom are we making these enormous efforts? In

our society the distribution of the dividends of these efforts is appallingly unjust. The immediate risks of nuclear activity are faced by the poor adivasees living in the vicinity of Kakrapar (or at other spots where the nuclear facilities are located) but the benefits of the electricity produced by them are enjoyed by a small minority of bulk consuming industrialists. To help those who have, by putting at risk those who haven't goes against the very foundations of justice. A society which cherishes egalitarian ideals, should begin its development by seeking the good of the lowliest and the lost, rather than begin at the top in the hope of benefits trickling down.

The concern about pollution of the environment is often sought to be met by the argument that coal and other chemical industries create equal if not more pollution. I hold no brief for these other polluting agents. But the existence of other agents does not reduce the undesirability of radio-active pollutants, especially when we consider their millenia lasting effects.

My ecological concerns are rooted in my concept of man's relationship with nature. There is a concept which considers man as the conqueror of nature. I believe that this idea leads to exploitation and ultimately depletion of natural resources. I perceive man as an integral part of nature, who must endeavour to live in harmony with it. Splitting of the atom has broken the harmony of nature. The bomb destroyed two cities and threatens to destroy the rest of mankind. The power plants have the potential to pollute the whole planet.

Science of death is secretive. I am concerned about the atmosphere of secrecy maintained around

nuclear activities. It is strange, that in a free democracy like ours, the Department of Atomic Energy, is not responsible even to the Parliament. The phenomenon of 'classified information' is a violation of a citizen's fundamental right to know. If we are prepared to invite experts from across the borders to visit our nuclear plants, why are some of the reports about nuclear plants concealed from our own public?

The efforts to prove that nuclear generated electricity is cheaper than other sources is far from convincing, because the social costs involved in the production are hardly ever counted, the costs of waste disposal seldom reckoned and those of decommissioning of the plants after a short lifespan of 25 to 35 years are yet to be calculated.

I am not convinced that nuclear power is either cheap, clean or safe. Each one of these claims can and has been challenged. But more than that I am not convinced that the monstrous effort put in to produce this energy is in the right direction. The direction is totally misleading. To me it seems to be leading the poor towards starvation; the less informed towards absolute ignorance; the weak towards complete instability; the already not-so-clean world towards dirty irremedial pollution; the vulnerable planet towards its doom.

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Bombay Peace March

About 1500 enthusiastic college boys and girls along with Sarvodaya and other peace workers took out a peace march from the Gandhi Museum (Mani Bhavan) to Churchgate in Bombay on August 6th. The marchers carried placards, 20 feet long banners and wore peace badges, T-shirts and aprons inscribed with anti nuclear slogans. The march ended with a demonstration followed by a street play outside Churchgate station. An exhibition of about 100 posters on 'Nuclear Disarmament and Peace' was inaugurated at the Government

Law College. An anti-nuclear book, the first of its kind in Marathi was also released on the occasion. Entitled 'Nuclear Power : Curse not Boon', it is written by Shri Gangaprasad Agarwal, a veteran Sarvodaya worker from Marathwada. The march received extensive coverage in the Bombay print media.

Bombay Sarvodaya Mandai plans to continue its programme of educating the people on nuclear issues. It recently organized a poster exhibition and a lecture at the Elphinston College. Similar activities are planned for other colleges in the coming days.

Sociology of Nuclear Disaster Reporting

The Issues raised in two articles which were published by *Media Monitor* (Nov| Dec 1986) are critically important particularly for India and other Third World societies where science reporting is still in its infancy. There are no specially trained journalists, nor training centres, for science reporting. Only recently, a few newspapers have started periodic science supplements, which primarily aim at popularisation of science, as against critical reporting on high science and nuclear activities and man-made nuclear disasters. For example, to my knowledge, no science supplement has so far carried a story on TMI, Chernobyl and Challenger disasters or on radiation hazards from the Chernobyl fallout

Let us recall how the Chernobyl disaster was reported in India. The explosion took place in the early hours of April 26, 1986, and it was detected over Sweden by the next morning. By the 28th all western media were buzzing with Chernobyl news, comments and criticism, assessments and mostly guesswork as to what might have occurred inside the USSR. On the morning of the 29th first news of Chernobyl reached India over the BBC but no newspaper carried any report that morning. Between the two official media, TV (Doordarshan) placed embargo on the news while AIR managed a brief mention in its late night broadcast. Only on the morning of the 30th—full four days after the accident—our national dailies reported the disaster mainly quoting Reuter, PTI and A.P. TV finally reported the accident in its regular night news bulletin almost six days after, and still without any comments from any Indian or foreign scientists. On May 1, *The Statesman* carried a special report from its Paris correspondent and based on European sources indicating the severity and possible threat to population and environment posed by the accident. It also indicated that full details were still awaited to make an assessment of the disaster. But TOI, in contrast, while reporting the accident on April 30th, came but with a hurriedly written editorial, "A Major Mishap", in which a rather poor attempt

was made to pre-empt criticism of nuclear power and cushion the impact of the worst disaster. Describing it merely as a "mishap", without any scientific basis, the editorial attempted to defend a basically indefensible position by claiming that "the kind of pressure that seems to have caused damage to the reactor at Chernobyl is not created in Indian reactors". Upto that time we did not even know the type of reactor system involved in the Chernobyl accident. Apparently, the inside information came from the Department of Atomic Energy, which was troubled lest public opinion should also turn against the nuclear power programme in India.

Indian Express, in contrast, carried long reports on the 30th morning based on western news agencies but its science correspondent (Somnath Sapru) gathered technical details of the reactor and raised a pertinent question whether the radiation fallout could reach the Indian sub-continent. IE was the sole exception in this regard and it invited my critical comments. Later, I learnt that no Indian scientist was willing to make comments to the press. It was in direct contrast with the western scene where, as David Rubin has reported in MM, the media had collected techno-scientific details, including probable ill effects of radiation fallout from 300 scientists of various institutions within the first few hours.

Indian media in the following days, weeks and months showed little interest in the outcome of the accident. The only exception was when *The Observer* (London) team released their best-seller, "*The worst accident in the world Chernobyl: The end of the nuclear dream*". Almost all national dailies and several weeklies published excerpts from the book and highlighted the seriousness of the accident. But there was still no critical reporting, gathered from independent sources, nor was there any deeper attempt to bring details of the disaster to Indian readers. Of course, the official media(TV)made special programmes to boost the damaged prestige of nuclear

energy in this country. It was repeatedly asserted that our country's nuclear safety records were the best in the world and that there is no possibility of a Chernobyl in India. While many publications gave no credence to the official claims, TOI, and *The Hindu* remained fervently pro-nuclear to the extent that they opposed any weakening of the nuclear energy programme. *The Hindu* even editorially ridiculed those who opposed nuclear power on environmental grounds. IE under the editorship of George Verghese was exceptionally critical of nuclear energy and maintained a critical posture vis-a-vis nuclear technology.

From a journalist's perspective a nuclear power plant accident is not like a natural disaster—hurricane, floods or earthquakes where, as David Rubin described, "disaster information specialists" are ready to assist him with information. But there are not many precedents of a nuclear disaster, there is no-one to brief you on the spot and there is little scope for a courageous reporter to rush to the site of nuclear accident and give an eyewitness account of the scene. All nuclear accidents immediately make the site inaccessible, if it was not already so. In order to avoid public panic, strict secrecy is maintained by the authorities, and the media are totally dependent on official sources for comments and details. A reporter's own knowledge and understanding of nuclear problems is, therefore, critically important in providing the public with a comprehensive picture of the disaster. Only journalists with such understanding and knowledge and good resources at their disposal, good contacts with official and independent scientists, can effectively report on a nuclear disaster.

Nuclear power has come up as a commercial and industrial activity not due to peaceful scientific research but as a direct outcome of war-oriented research activities. Thus it is conducted under total secrecy and only with government funding and patronage. And since governments have vested interest in promoting nuclear programme all official efforts for the last 40 years have been directed to projecting pro-nuclear arguments. This over selling of nuclear energy has made our journalists conditioned to pro-nuclear perspectives. Nuclear power has been propagated as the ultimate in energy sources. Because it has been equated with national progress and technological advancement, without reflecting on the possible consequences for future

generations, our media have shown a general consensus that does not want to upset the country's nuclear boat.

Vilani, while comparing NYT and TOI reporting on the Three Mile Island accident, explained one possible reason for the newspaper's benign attitude towards nuclear power as "national pride and support to one's government". Admittedly such is the case as was vividly demonstrated by the cold war rhetoric of the US media during early reporting on Chernobyl. Nuclear reporting is very much linked with foreign (and defence) policy perspectives of the media. This chauvinism has been a determining factor on nuclear accident reporting, or non-reporting, in this country.

The same reason governs the behaviour of our political parties and parliamentarians which do not insist on discussion of budgetary details of critical ministries—Atomic Energy, Space and Defence. There are hardly any critical books written by Indian scientists and / or social scientists, economists, or even environmentalists of this country on social ramifications of nuclear energy, and space research, as these are inherently linked with the country's defence aspirations. Indian journalists are integral to our social ethos and scientific detachment from one's national bias is too tall a parameter for the Indian media.

TMI and Chernobyl accidents have raised the fundamental question of reassessment of nuclear fission technology as a reliable source of energy for the 21st century. But judging from TOI and *The Hindu* coverage of these accidents and contrasting them with reporting in *The Guardian*, *The Observer*, and *New Scientist* (Weekly) of England and *Indian Express*, *Sunday Mail*, *Sunday Observer*, and *Illustrated Weekly* (under the present editorship of Pritish Nandy), it appears that the pro-or anti-nuclear stance is shaped by attitudes in respect of the Establishment in general. 'Political realism' determines the depth and direction of reporting on a nuclear crisis, even if it glosses over scientific facts. Anthony Tucker, a noted journalist and science editor of *The Guardian*, and several writers in *New Scientist* have published substantial data indicating that nuclear power after Chernobyl has become a 'phasing out' proposition. Indian publications, in this critical group, also appear to have maintained a pro-environmental position and have

reported strong public concern against nuclear radiation Hazards.

Sometime, after the TMI accident in 1979, *Illustrated Weekly* carried an extremely pro-nuclear article. When I approached the *Weekly* for a critical view to be given equal space, the then editor replied that so long as he was in that chair no anti-nuclear view would be published in the *Weekly*. And then he confided, "I have to live in Bombay (the headquarters of the department of Atomic Energy)". There is another, more serious and committed, attitude which also inhibits objective reporting of nuclear accidents. *The Hindu* sincerely believes that nuclear energy offers a powerful means for our national advancement and, therefore, any adverse reporting would harm the national cause. Its proprietor-editor told the writer that he has placed his unquestioned faith in the knowledge and authority of India's nuclear scientists.

All nuclear accidents are caused by human error (technical failure has not yet been established). While in a natural disaster, no-one is humanly responsible, in case of nuclear disaster, fixing the responsibility of blame or error is critically important. The journalist's task is, therefore, very sensitive, as it brings him | her in direct conflict of interest with those who are the sources of information, and in all probability themselves are the epicentre of the disaster. In India, therefore, there has never been a public enquiry into a nuclear accident, and there has never been a case in which responsibility has been fixed for radiation leaks. The gap between the official source of information and the journalist's investigation is too wide for any reliable reporting on nuclear accidents in this country.

Besides, as stated above, there are no independent scientific sources (non-government) or public interest organisations which can help the media persons. There are also few vocal, non-official scientists in our country. Many members of Parliament have told this writer that government must listen to the scientists who are qualified and paid

by the exchequer to advise on the complexities of nuclear policy. But nuclear reporting requires easy access to critical data (official briefing is not sufficient) which, in the prevailing secrecy and non-accountability of our nuclear sub-government, is not possible. A poor Indian or Third World journalist unprovided and unprotected (against the official wrath), cannot prepare an authentic story on nuclear disaster.

In reporting a nuclear accident the most crucial point is then to respect the responsibility of news-media to the public interest, particularly in a closed information system. The Chernobyl nuclear disaster is not the first, nor is it the last, but the worst atomic accident of our times. Indian news-media must be prepared for any future eventuality, especially since government has launched an ambitious programme of producing 10,000 MWe nuclear power from inherently unstable breeder reactors. It is suggested that special training programmes may be worked out for our science writers and reporters in order to update them with necessary information, critical data, and details on earlier accidents and on safety measures and management of atomic crisis systems. Our media must also be familiar with civil defence administration, available to the public in India, in the event of an atomic disaster like TMI and Chernobyl.

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Courtesy : Media Monitor March/April, '87

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Irritation Over Irradiation

An "important milestone in food preservation methodology since the successful development of canning in the 19th century" — this is how the Department of Atomic Energy (DAE) in its PR magazine *Nuclear India* characterises the zapping of food with radiation. The process, which prolongs the shelf-life of fresh food, is called irradiation.

Irradiation seems to be the fashion worldwide. Thus, a Malaysian seminar recently announced that frozen shrimp exported to Japan would soon be treated by this "modern" process. Its pro-ponents are Malaysia's Nuclear Energy Unit, which has a vested interest in this, and Canada, one of the largest producers of Cobalt-60 in the world.

In Japan, the government has announced that irradiated oranges and fish paste products would soon be allowed into the country, in the interest of reducing trade frictions with the United States.

Increasing alarm

But there is also increasing alarm about both the safety of the process and the motives of those who are pushing it. Mainly because of health hazards, the European Parliament has refrained from authorizing irradiation in general and has banned the import of irradiated food from countries other than the members of the European Community. While the process is still under discussion in the United Kingdom, in West Germany selling of irradiated food on the internal market has been banned. For the export of food no such law exists.

In India, which recently cleared the application of radiation for preservation of onions, potatoes, frozen sea foods and spices, critical voices are raised. Kalpana Sharma writes. "The wisdom and appropriateness of the Government's decision allowing irradiation of certain food products for export and for the domestic market can be seriously questioned."

Food irradiation

The technology for irradiation has been available for more than twenty years. However, it has been

applied for conserving food only recently. Beside applying accelerated electrons or X-rays, cobalt-60 or caesium-137 can be used in loading a device which produces beams of ionising radiation. Cobalt-60 and caesium-137 are waste products of nuclear industry.

In relatively low doses of less than 15 kilorads the radiation prevents potatoes and onions from sprouting. Doses up to 50 kilorads delay the ripening of fruits like mangoes or bananas and extend their shelf-life by one or two weeks. It kills insects, bacteria and some fungi and thus disinfects and conserves fruits and vegetables without changing their outer appearance. Higher doses around 200 kilorads "can extend the acceptability, and, in turn, marketability of iced fish by about two weeks". (*Nuclear India*) Spices may be exposed to kill insects and microbes.

It has to be noted that the dosage is not high enough to make irradiated food radioactive. However, the international debate on the health hazards of this process shows that research into this question did not yield uncontradicted conclusions so far.

Debate on health hazards :

The joint Expert Committee on Food Irradiation, which was set up by the Food and Agriculture Organisation, the World Health Organisation and, significantly, the International Atomic Energy Authority, declared irradiated food as safe, if it had been exposed to a dosage below 1 Mrad. This decision was made "on the basis of extensive wholesome new studies with laboratory animals carried out in different countries" claims the DAE. However, the Japanese scientist Dr. Kosei Takahashi found that the joint committee had ignored data which contradicted their findings, including Japanese and Soviet studies which showed mutations and organ changes in mice fed with irradiated diets.

In the US the Food and Drugs Administration has limited the permissible dose of radiation to a

maximum which is smaller than the international!) recommended value by the factor of ten. The contradiction in what has to be regarded as a safe dose must make us suspicious of the validity of the research carried out in both cases.

The supporters of irradiation in the US rely heavily for their safety arguments on a series of 17 studies done by the Industrial Biotech Laboratories for the US Army, which "proved" irradiation to be safe. An investigation by the US General Accounting Office has since revealed deficiencies in their methods and in 1983 three executives of this institution were convicted of falsifying test data material relating to other drugs and chemicals. Such is the reliability of research carried out by institutions which are close to agencies having a vested interest in certain findings.

Research on health hazards has not been carried out on just laboratory animals. C. Bhaskaran and G. Sadasiwam from the National Institute of Nutrition in Hyderabad experimented on malnourished children which were fed with wheat which was unirradiated, freshly irradiated and wheat stored for twelve weeks after being exposed to radiation. They observed that the children fed with irradiated wheat produced abnormal cells with more than the usual number of chromosomes. While this study, which was published in 1975 by the *American Journal of Clinical Nutrition*, again raises the fundamental question of the morality of experimenting with children, its validity has been questioned by some scientists because of the use of freshly irradiated wheat. Usually wheat is stored for some time after exposure to radiation. Moreover, critics of this study pointed to the nutritional status of the children used by the scientists. But it seems that the production of abnormal cells, the main result of the study, has not been rejected in general.

Another research report of the same institute warns: "It is clear that irradiation of wheat does not alter the susceptibility of the grain to fungal infection but can bring about changes in the grain composition favouring an increased production of toxin." The toxins referred to are extremely poisonous and carcinogenic even in very small concentrations. In this research project only a few out of hundreds of toxin producing fungi have been studied. Besides, in practice the storing conditions

are more favourable to the growth of fungi than the perfectly dry laboratory conditions in which the experiments were carried out

Spoiled food looks fresh

At doses used for irradiation, a large number of fungi and bacteria will be killed so that the food items, especially fish and sea foods, appear to be fresh. However, some extremely poisonous bacteria and viruses survive, multiply and contaminate the food. There is also a good chance of mutations of these contaminants produced by the radiation which may create new dangerous bacteria and viruses.

Another effect of irradiation is its impact on the fruits and vegetables themselves. It destroys the cells of the products and together with that vitamins A, some Bs, C and E. In wheat 20% to 65% of Vitamin B1 is lost after irradiation and storage for eight weeks. In potatoes there is a loss of 28% to 56% of Vitamin C. In meat, radiation alters amino acids and fat.

The health hazards connected with the handling of radioactive substances like cobalt-60 and caesium-137 in the process of irradiation are a topic left for another article in *Anumukti* appearing later.

Consumers associations in Malaysia, Japan, Western Europe, Australia and the US have urged governments and international organisations that the process should not be inflicted on the unsuspecting consuming public while scientists are still arguing over its effects on health. On the other hand, DAE's praises for irradiation have been quoted earlier. What is behind this attitude?

Political reasons

We find the answer to this from the DAE as well, "one of the beneficial applications of atomic energy". Besides hopes concerning the economic profitability of this technology in the future, there are other political reasons behind its development. International research on food preservation by radiation has been sponsored largely by the Pentagon and the US Department of Energy. It was expected that this way the use of nuclear material would become a common matter of everyday life.

This would help in increasing the acceptability of peaceful as well as military uses of nuclear energy. Showing the benefits drawn from the wastes of the nuclear fuel process, the technically as yet only insufficiently solved question of waste storage is thus expected to be settled on a political level.

Profits are expected from selling this technology to Third World countries which find difficulties in storing and distributing fruits and fish by conventional methods. These countries, on the other hand, want to increase their exports of food products by more effective systems of conservation.

But is this process appropriate for countries like India? Its required capital and its running costs are very high. Therefore, it has been suggested to invest the money needed for its application first into the construction and development of traditional facilities like rat free silos, refrigeration and packing which are cheaper and safer.

Irradiation also means the centralisation of food processing in huge monopolistic complexes dominated by a few industrialists and bureaucrats. The control and regulation of its application itself is a complicated and expensive process posing new legal and administrative questions. Finally, irradiation contributes to a further export orientation of agriculture and food production, the wisdom of which needs to be questioned seriously.

Note : This article is based on material prepared by Ms Hafija Ibrahim from the Consumers Association of Penang, Malaysia, and distributed by Third World Network Features. Other sources are Kalpana Sharma, "Hazards of irradiation", in Indian Express 3-7-'87, and "Atomic Energy and Food Preservation", in Nuclear India. Vol. 25/2 & 3/86, Pp. 8-10.

Alarm Over Safety of Soviet Reactors

The Soviet Union's most popular type of nuclear reactor has come under fire because of their poor record on safety. The Soviet Union builds a large number of pressurised water reactors known as the VVER and exports them to Eastern Europe.

Finland and Cuba. A report leaked from the International Atomic Energy Agency (IAEA), which polices the safety of reactors all over the world, indicates that the VVER reactors have one of the worst records on safety.

The report was published by the German magazine *Der Spiegel*. The magazine had details of 18 accidents in nuclear plants all over the world between 1981 and 1985 out of the over 250 accidents notified to the agency during the same period. The magazine says that 16 out of the 48 incidents occurred in the Russian built VVER reactors. In 1984 alone Czechoslovakia's largest plant at Bohunice, reported four incidents to the agency.

Meanwhile another report on the VVER reactors by a nuclear scientist Dr. Helmut Hirsch and published by the Greenpeace of Vienna is highly critical of their safety. This report looks at a serious accident at Kozloduj in Bulgaria on the 21st of February '83. This accident which was kept secret by the Bulgarian government from its own public is also noted in the IAEA report.

Following an electrical defect two valves were opened in the primary cooling system. As pressure inside the system dropped the reactor was switched off. During the incident, emergency cooling water put into the reactor vessel caused the fracturing of one of the weld seams. According to the report the accident could have resulted in a disaster.

The first generation of VVER reactors — the 440s built in the sixties and the early seventies may be especially vulnerable. Greenpeace has singled out 10 of these because they have no protection against corrosion inside the pressure vessel. After persistent failure of the containment system, two units built in Finland were fitted U.S. built containment: merits. There are 28 VVER-440s already at work in E. Europe and 14 more under construction.

Source : New Scientist, 7 May '87.

WISE News Communique : 277-2370, 257-2347

Editor's Note

Chernobyl has made the whole world aware of the safety of Soviet built reactors. Chernobyl was a RBMK type reactor and not a VVER type reported above. An Indian team has already visited Moscow to negotiate for the supply of two VVER reactors.

Why are we still at it ?

India was the first third world country to embark upon a fullscale nuclear programme. In early 1940's even before the horrors perpetuated on Hiroshima and Nagasaki made the power of the atom a tangible reality to everyone, Bhabha had envisaged nuclear power as the vehicle to launch a newly emergent India into the 'modern age'. Bhabha's dream was shared by Jawaharlal Nehru. Clothed in eloquent prose by him, it captured the imagination of many. The country bid goodbye to Gandhi and marched down the nuclear path.

In the last forty years much has changed. The world today is a very different sort of place from what it was then. People's expectations and aspirations have changed. The path marked 'development' no longer looks as rosy as it did then. The jargon too has changed from 'modern age' to '21st century'. During the same time there has been a revolutionary change in science. Splitting of the atom no longer seems the Mt. Everest of scientific achievement as it did then.

In this changed context, when the whole concept of 'development' is being challenged by many, it might be worthwhile to reexamine the nuclear energy programme. However, it would be futile to engage in this exercise without first understanding the historical and politico-economic framework within which the nuclear enterprise was undertaken.

It was decades of exploitation of the agricultural, mineral and forest wealth of this country that had been the driving force which had sustained the industrial revolution in England. This exploitation had conditioned the thinking of many who were soon to become leaders in independent India. They were determined to prevent exploitation by foreigners and for this the country had to become 'strong' and take its 'rightful place' in the comity of nations. However, to become strong, the only way known to them — the prevalent development paradigm — (Gandhi then as now was good only for lip service) was the very same exploitation and industrialisation.

Hence the great stress laid on self reliance and on the core sector of basic heavy industry and the great effort spent in trying to acquire mastery of various modern technologies. In the nuclear field this meant gaining control over all the phases of the entire fuel cycle. The objective was to develop indigenous capability to locate minerals useful for nuclear power and to exploit them in a planner in conformity with the national interest.

What was true of materials was even more true of knowhow. Modern science was the base for Western technological advancement and the consequent Western domination. Therefore, mastery over technical sophistication was considered essential if we were not to be subjected to manipulation by the 'big brothers'. As Nehru said, "The future belongs to those who make friends with science"⁵. Another facet of this reluctance to be pushed around was to acquire the capability of building a nuclear arsenal if desired — "Keeping the nuclear option open".

There were other secondary factors too in our decision to trudge the nuclear path. Cheap reliable and abundant electricity was seen as a vital element for development. Nuclear power was perceived as one of the answers to meet this massive expected electricity demand. There was also the expectation of 'spin off effects.(e.g. food irradiation technology, advances in metallurgy of rare earths etc.) The thinking went that if we could 'deliver the goods' in such a complex enterprise, it would increase confidence in indigenous capability and allow us to do less sophisticated tasks with ease.

A climate of distrust and mutual suspicion between us and the nuclear 'haves' has prevailed during the post independence era. The policies pursued by all the nuclear haves throughout this time have only served to reinforce this distrust. These policies have swung from total denial of access to nuclear technology in the supersecret early days, to the commercial hustle of the 'Atoms for

Peace' era and back to denial as signified by the Nuclear Nonproliferation Treaty (NPT) and the 'Club of London'. Nuclear suppliers have abrogated existing commercial contracts with impunity, (e.g. U. S. enriched uranium for Tarapur) Their behaviour can be characterised as trying to impose a new set of rules midway during the game.

With this perspective let us see where does the Indian nuclear programme stand in today's world context. The primary original objectives of self reliance have already been met and have become non-issues. The country has control over nuclear raw material and an indigenous capability is now present able to deal with them. Similarly a large scientific and technical base is already in existence some of it quite capable of carrying out 'frontline' research. So much so, that the country's continuing poverty and backwardness can no longer be explained away by reference to its scientific unsophistication. Today, when a graduate student can make a plausible bomb design as part of a self study project, becoming a nuclear weapons state too, is no longer a technical but rather a political problem.

Thus today's nuclear objectives are far removed from those which motivated us four decades ago. Today nuclear power is just another way of boiling water to run the turbines. After twenty years of doing just this, nuclear technology can no longer claim indulgence due to a new technology. Failures can no longer be airily dismissed as 'teething troubles'. However it is precisely in the field of electricity generation that the nuclear Napoleon has met its Waterloo. Bhabha in 1962 had projected a figure of 20000 M\A to 50000 M\A for 1987 nuclear electricity production. Well, it is 1987 now and we fall short of producing even a 1000 MW. Which other industry can get away with such unrealistically massive overprojection and such an abysmally poor performance? Now a days the DAE is all set on the figure of 10000 MW by the dawn of the 21st century. Each passing day pushes this pie a little further in the sky. In despair the high priests of the nuclear order have performed an astonishing summersault. They have given the go bye to self reliance and the country is again out, begging bowl in hand, asking our good 'friends' the Russians for VVER plants. These VVER type reactors have an appalling safety record (see news item) and besides they

use enriched uranium as fuel. As yet, India has no fuel enrichment facility. We would thus be supplicants of enriched uranium suppliers for the lifetime of the plants. We seem all set for a reenactment of the Tarapur drama of the seventies, when the U. S. kept us on a tight 'leash' by releasing small dribbles of fuel every few months in an effort to force us to sign the Nuclear Nonproliferation Treaty.

India's nuclear programme has thus come full circle. We started with the objective of being independent, masters of ourselves, free of domination and manipulation by foreigners. It is strange to see us willing to fritter away these hard won gains today just to achieve a target. Of course, all this is one of a piece with the rest of the '21st century' thinking.

The current of science in the last forty years too has been somewhat unkind to the nuclear enterprise which has been consigned to the backwaters. Giant nuclear plants, with all their attendant risks, inflexibilities, capital intensities, vulnerabilities, environmental hazards and other ills are beginning to look like dinosaurs at the dawn of the age of mammals. Today's 'breakthrough' areas from high temperature superconductors to genetic engineering, from high speed computation to designer drugs all involve manipulation at the molecular level requiring very little energy.

The time is thus ripe even within the Nehruvian developmental framework to ponder over the title question. Why are we still at it? Isn't it time we placed the national interest above the vested interest of the nuclear mandarins and their political masters?

Acknowledgements; This paper has borrowed extensively from a paper by J. A. Sabato and Jairam Ramesh which appeared in the March 1980 issue of Bulletin of Atomic Scientists.

S. N. Gadekar

LETTERBOX

In this column we present excerpts from some of the letters we received in the last two months. We are very grateful for any comments, queries and criticisms. All suggestions are carefully discussed and we want to encourage our readers to write to us so that Anumukti really becomes a forum for a wide network of anti-nuclear activists.

Long live Anumukti What a good idea!

L. C. Jain.
Milap Vatica
19 C|UA Jawahar Nagar,
Delhi 110007.

Reads well and easily and the statement of objectives is clear and concise. It fills a much felt need for information on an issue about which open debate has been prevented by a modern fatalism.

Kishore Saint. The
Ashoka Foundation, II-A,
Fatehpura, Udaipur 313
001.

It had only 20 pages Quite disappointing. Hope it will pick up. An appeal for funds may be made in the 2nd issue.

S. K. De
Friends Rural Centre Rasulia,
Hoshangabad-461 001.

Congratulations on the attractive *Anumukti*. I do have very many queries and comments.... The quality of printing is excellent, so the errors are 'original', i.e., in the MSS

Whenever you have free space left, you can provide concise information regarding nuclear plants in existence in the country, in neighbouring countries, elsewhere; planned plants; information about individual accidents and their consequences; list of interesting readings in the subject or related readings (e.g., the last issue of *National Geographic* which has an article on Chernobyl; Richard Jeffe-ries' novel from the end of the 19th century. *After London*, Oxford Classics which provides a powerful pre-view of a world ruined by man's 'progress'; of Huxley's *Ape and Essence* (1948), a horrifying dystopian prophecy, written right after World War II, projecting forward to a world after World War III; etc.)

Sudhakar Marathe Dept of
English University of
Hyderabad Golden
Threshold Hyderabad.

It is encouraging to see such a journal in India, where there has been such a surprising lack of debate and controversy about nuclear power and (even rather little attention to nuclear explosives.)

Jim Forest
International Fellowship of
Reconciliation,
38 Spoorstraat, 1815 BK

Alkamar, Holland

Regarding the *Anumukti* format It is good that at last a linkage has been established among Indian anti-nuke activists. But I feel that the magazine's format has to be changed. Long articles like the one written by me should not be published. At best, a short half page condensation should have been sufficient with a note at the end to contact the author for a detailed article. Contact addresses of all should be given without fail. The purpose of the magazine is to strengthen the link..... I feel there should be a separate editor for every issue and he should write an editorial. It could be cyclic.

Nagesh Hegde CANE,
138, 5th Cross, 1st
Phase J. P. Nagar,
Bangalore 560 078.

How one wishes that nuclear energy was never discovered! But pursuit of science is relentless and it is basically amoral. Once man discovered fire, it was up to him or her to use it for cooking or heating or for burning down the whole of a Khandava Vana as was done under the supervision of Arjun and Krishna of the Geeta fame! Now with the discovery of atomic energy, we might have come a long way but the basic dilemma of science persists. Unfortunately for us, all sources of energy, fire, wind, coal, oil, steam and electricity have political implications. History is replete with instances to prove a general statement that those communities and countries which were negligent in mastering energy were either wiped out or had to become subservient to those who had learnt to master it. India's history is in no way different. We lost to the British not because we lacked in bravery, but because we had not the fire-power the British troops had nor the organisational and technical discipline that the Western scientific knowledge had generated in those days.

As the strategic implications of having and not having nuclear power at our disposal are too obvious, I need not dwell on them at length, If and only if. China, Russia, Pakistan and India sign a nuclear free zone agreement, would T be willing to insist together with you on our government to stop

developing nuclear weaponry. But for any suggestion of this kind from India to be taken serious note of, India will have to develop its own nuclear capability. Moreover would it not be just criminal on the part of any government to order its army to march against an enemy who can destroy not their lines of supply alone but their supply basis within a few seconds? Personally speaking I would prefer India prepared to get destroyed together with the enemy to India living in slavery for another thousand years.

Your objection is, if I have guessed correctly, basic, that is you are against the splitting of the atom. I think it is too late in the day to take that position. It is like trying to unscramble an egg. I live in the hope that scientists will find some way to separate nuclear energy from its attendant destructive elements; that they will know how to control the BRAMHASTRA, they have invoked.

Today you and your friends are striving for a "non-nuclear" India. Tomorrow there, might dawn the age of the super conductor, heralding a new epoch of technology with its own package of side effects. USA, USSR and Japan have already reached the threshold. It will again have tremendous political implications. Should we then insist on a non-super conductor India? Science, especially modern science, will not allow any country to put the sign of "no entry" on its portals.

However, let me congratulate you on your bold effort to demystify the nuclear issue. That will show the pitfalls and prevent the government from taking the whole nation for a ride.

N. G. Goray
5511, Aylesboro Avenue
Pittsburgh, PA 15217
USA.

GLOWING ON THE JOB

Records obtained by the Public Citizen from the United States Nuclear Regulatory Commission (NRC) reveal that over 93000 workers at 83 nuclear plants were exposed to measurable amount of radiation in 1985. (The most recent year for which NRC has compiled data). A report from the Public Citizen's Critical Mass Energy Project finds a dramatic increase in the number of exposed workers as plants age. For example, the oldest plants—those which began operating in the 1960's — exposed their workers to four times as much radiation as the newest plants.

Other findings include

* Worker exposure levels have continued to worsen : the figures represent a fourfold increase over the number of workers exposed in 1975 while the number of operating reactors increased by a factor of two.

During the same time, the average of nuclear workers exposed to radiation at each reactor nearly doubled : from 579 workers per reactor in 1975 to 1132 workers per reactor in 1985.

* Temporary workers run the highest risk : while they represent one half of the nuclear workforce, in 1984 they received about two thirds of the total radiation exposure. Temporary workers can receive their maximum allowable dose at one nuclear power plant and then be employed at another plant thus receiving two or three times the allowed amount. The number of temporary workers has doubled in the last eight years.

* The problem of worker exposure to radiation is most acute at the 28 Boiling Water Reactors (BWR) in the US. On average workers at BWR's received 30% more radiation than those at other reactors. One BWR, the Susquehanna reactor in Pennsylvania, exposed 3669 people to radiation, more than three times the national average.

* Thirty reactors exposed their workers to levels of radiation higher than the NRC's "allowable" level for the general public. Three reactors — the two at Peach Bottom in Pennsylvania and the Mill-stone-2 reactor in Connecticut — each exposed their employees to three times as much radiation as the average plant did in 1985.

Rather than take measures to reduce this hazard, the NRC is considering rule changes that would actually increase exposure levels. For example, it is proposing to increase the amount of radiation allowed for each worker, even though the limits are already 10 times higher than government recommendations and 680 times higher than the standards set by the Environmental Protection Agency for the general public.

Source : WISE News Communique : 275,2350
Editor's Note : Susquehanna BWR figures, (the worst US case), are old hat for Workers at Tarapur. The Tarapur plant has been regularly exposing between 3000 to 4000 workers year after year to radiation dosages from twice to thrice the average dosage to radiation workers at US plants.

Protest in Gujarat

It was raining as 6th August dawned. But that is usual; this part of south Gujarat gets a great deal of rains (75"/year) most of it during the monsoons.

Last year a rally was held at Bedkuadoor, about 3 Km from the site of the up coming nuclear plant at Kakrapar. This rally organised by Anu Urja Jagriti and Sampurna Kranti Vidyalaya Vedchhi was to commemorate the Hiroshima vic-tims and to protest against the building of nuclear reactor in their midst. The police had resorted to lathi charge, tear gas and firing in an effort to crush people's opposition.

With memories of last year still fresh in mind, most activists were reluctant to organise another confrontation this year. Throughout last year many attempts had been made to increase mass contact with the local villagers so that a disciplined nonviolent force could be raised. But most activists still felt unsure about the discipline and peaceful-ness of the people at large. Consequently it was decided to hold a large number of prayer meetings in different villages around the plant. It was felt that this decentralised form of protest would help in maintainance of peace and at the same time allow larger numbers to participate in the protest.

The police had other ideas. Their 'bandobust' was on a scale larger than last year's. A comple-ment of 8 trucksfull of police; some brought from as far away as Bhavnagar and Valsad, with 6 horses and the usual number of officers descended on Kakrapar. They promulgated sec. 144 in the area and stopped all vehicular traffic. All this show of force was assembled, not at the site of the plant, but at the side of last year's rally.

The authorities at the nuclear plant contributed their bit by conducting a survey of a 10 Km radius area in July. This was presumably done as part of an exercise in emergency preparedness. But as is the usual practice, people were not taken into confidence regarding the purpose of the exercise, the authorities fearing that information shall lead

to panic. Rumours of all kinds were thus rife and people were tense.

It was in this state of tension that 6th August dawned, raining as usual. People in villages near Kakrapar who had been contacted by the activists went about their daily tasks undeterred by the massive police contingent in their midst. They held prayer meetings, passed a resolution demanding closure of the nuclear reactor and sent letters to the same effect to the prime minister and the chief minister of Gujarat. But for the people from the far off villages, whom the activists had not contacted, the police conglomeration itself acted as a magnet. They felt that the police would not have gathered in such numbers unless a demonstration was hnm-i-nant. About four thousand people walked 15 to 20 Kms in the night and gathered near the spot where the police were encamped.

The prescence of the police acted as a provocation. They were encamped near a cycle shop. Last year too they had campad near the same place. The villagers considered the shop keeper to be a betrayer. Some of them picked up some cycle tyres from the shop and set fire to them. This was enough excuse for the police to launch tear gas shells. The crowd resorted to stone throwing. The police replied with bullets.

There were 16 arrests. Those arrested were kept in the Vyara police lock-up for four days, as presumably investigations continued. They were initially charged under the newly enacted terrorist act but the magistrate refused to entertain these charges due to lack of evidence.

The news released by the Surat rural police for the newspapers and the radio tried to involve Narayan Desai with the stone throwing incident. There were also rumours to the effect that the police made efforts to implicate Narayan Desai with the violance and to arrest him as a terrorist but the idea was later dropped.

Surendra Gadekar

Nuclear News From Karnataka

The Karnataka government is finally making arrangements to send study teams to various nuclear installations in the country, in order to fulfill its long standing promise to convince its people about the feasibility and the safety of nuclear technology. Four teams of five members each will visit Tarapur, Jaduguda mines, Kota, and Kalpakkam by mid October. People selected for this tour are from the North Kannara district in which the Kaiga nuclear plant is proposed to be set up.

The chief minister had proposed such a study tour two years ago, after a public demonstration against the Kaiga project. However the Hegde government had not taken any steps towards fulfilling its promise till the question was raised during a crowded press conference where the chief minister had to renew his promise.

All the 20 members of the study teams have been contacted by the government. Each team consists of one MLA, one learned person (like principal of a local college), a journalist and two other local people. The leading anti-nuke group CANE (Citizens Against Nuclear Energy) is preparing background materials for the teams.

Protests Galore

Karnataka is the only state in India which harbours all the different segments of the nuclear 'fuel cycle', from uranium mining in Arebail in a fuel processing and uranium enrichment plant under construction at Ratnahalli, from the construction of a nuclear reactor at Kaiga to the investigation into feasibility of a high level waste depository at the Kolar gold field; Karnataka has them all. Thanks, are probably due to an excess of local feeling in Dr. Raja Ramanna and Dr. M. R. Srinivasan both of whom hail from Bangalore. This uncalled for intrusion into their lives has caused resentment in many and has resulted in the springing up of many groups ready to protest the activities of the nuclear empire.

The Rare Earths Materials Plant (REMP) at Ratnahalli near Mysore city needs to be watched by every anti-nuclear group in the country. Six years ago the Indian Rare Earths began its secret activities here by building a 20' high wall on the shore of the Kannambadi reservoir along the river Kaveri. Huge pipelines and massive electricity cables were laid without any questions being asked. Local newspapers began sporadic reporting last year about the possibility of a uranium enrichment facility coming up at this complex. But for Tarapur, all Indian reactors operate on natural uranium. Tarapur is in any case destined for closure by 1992. Enrichment would hence be a step essentially in the direction of nuclear weapons production. The enrichment process requires huge amounts of energy. Thus, the facility would besides posing a grave threat to the people and the environment would be a drain of high energy reserve and it would be internationally controversial. The DAE has, however, casually brushed aside the bomb production rumour without giving any other plausible explanation for the sudden spurt of secret activity at Ratnahally. People of Mysore — the mayor, university professors, PUCL activists and students have seriously questioned these secret operations. However, till now no question has been raised in the state assembly. So much for the democratic set up.

Young people, especially students are taking up the REMP and Kaiga issues very seriously. Wall writings have appeared in major cities like Bidar, Gulbarga, Raichur, Chitradurga, Mysore and Bangalore. A rally was organized in Chitradurga on July 17th in which about 600 people participated. A state level seminar was held in Bangalore on August 2nd. Four days later a rally was held in Bidar. Chitradurga witnessed a bandh on 14th of August during which 400 students submitted a memorandum to the district commissioner demanding a halt to all atomic activities in Karnataka. The students under the common banner of 'Progressive Youth Centre' then went to

Mysore and mobilized a large number of students there with the help of slide shows, street plays and video films. There has thus been a mobilization of a large number of people in and around Ratnahally.

Professor Vistimised

Meanwhile, Professor Ramalingam of the department of Botany at the university of Mysore has been transferred to the Karnataka university at Dharwar. He had been the most vocal among the academicians on the question of the location of the REMP complex. Undeterred by this 'punish-ment' he has continued to address other student rallies.

"Stop Kaiga Memorandum"

The signature campaign launched by CANE appealing the Prime minister of India to stop the Kaiga reactor, is gaining momentum. Many prominent writers, poets, artists and senior citizens have signed the statement. It may be recalled here that some 135 environmentalists from 32 countries who had attended the 'Global Development and Environment' conference at Penang in April, had signed a similar memorandum. Besides, some 75000 local residents of the North Kannara district have already signed the memorandum.

Nagesh Hegde CANE

Shri Nagesh Hegde is a journalist and a social activist Contact Address : C/o. CANE, 138, 5th Cross, 1st phase J P Nagar, Bangalore 560078

KAIGA MEMORANDUM

TO The Prime Minister of India

We oppose the Government's decision to site a nuclear power plant at Kaiga in the heart of a precious patch of rainforest. The small hit of this unique biosphere remaining should not be exposed to the hazards of radiation and other developmental projects.

- * Nuclear wastes and dead nuclear plants in this river belt exposes future generations to radiation hazards by contaminating the land, water and air.
- * Concentration of large dams, a naval base and the nuclear plant turns this area into a high security risk.
- * Scientific energy management and tapping of safe and renewable alternative sources will meet all our energy needs.

ON BEHALF OF THE COMING GENERATIONS WE OPPOSE NUCLEAR POWER PLANT AT KAIGA.

| Name | Designation & Address | Signature |
|------|---|--|
| | Please Send this signed memorandum to : | Citizens Against Nuclear Energy (CANE). 138, 5th Cross, 1st Phase, J P Nagar, Bangalore-560 078. |

CAN 136 INTREPID SOULS KEEP THE NUCLEAR WOLF AT BAY?

May be for an issue or two *ANUMUKTI*
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Editor ANUMUKTI Sampurna
Kranti Vidyalaya Vedchhi, Dist.
Surat-394 641

Any donations over and above the subscription amount will strengthen our joint effort towards a non-nuclear India and would be greatly appreciated.

Notice Board

Antrukti needs to become an effective medium through which anti-nuclear activists can communicate with each other. As part of this effort we are starting this section, giving information of forth-coming events, appeals for help,-etc.

Please send us names and addresses of any contact person at Tarapur, Jaduguda, Rawat-bhata and Kalpakkam who could supply us with relevant and correct information during our visit. We shall be visiting these places in mid | late October.

Nagesh Hegde CANE

BARCOA (BARC Officer's Association) is arranging a panel discussion on "Issues in Nuclear Technology" within the BARC campus, Anushakti Nagar, Bombay on the 10th of October '87. The panelists shall include Dr. P. K. Iyengar, Mr. S. L. Kati, Dr. A. K. De, Mr. Prafula Bidwai.

Mr. Dharendra Sharma, and Mr. Ivan Fera among others. Anumukti welcomes this initiative of BARCOA.

Contact Person : Dr. Gautam Chattopadhyay
1, 2-346-s Modular Labs BARC, Trombay, Bombay-400 085. A 3 day workshop of antinuclear activists and students is scheduled for November '87 in Delhi.

Contact Person : Tripta Batra

C/o. Prafula Bidwai, Times of India, 7, Bahadur Shah Zafar Marg New Delhi 110 002.

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Subscriptions, donations, enquiries regarding circulation etc. should be addressed to :

Editor Anumukti,
Sampoorna Kranti Vidyalaya,
Vedchhi, Via Valod,
District : Surat 394 641.

Editor : Surendra Gadekar

Printed at : *Topstyle Press*, Old Danapith,
Shahpur. Opp. Rajaji's Pole. Ahmedabad-1.

An International Meeting of Concerned Scientists and Citizens for 'Nuclear Free World-Order' will be held in India during 8-15. January, 1988. Participants will include parliamentarians, public policy analysts, social scientists, nuclear scientists, anti-nuclear activists, and mediemen from many continents. The deliberations will be divided in 3 Sections:

A. *PUBLIC POLICY ISSUES*

B. *TECHNOLOGICAL PROBLEMS*

C. *DEFENCE & INTERNATIONAL*

SYSTEMS OBJECTIVE : International

Meeting aims to provide a critical assessment of nuclear systems and suggest parameters of nuclear free world strategy.

LANGUAGE : English and Hindi will be the medium of the conference.

PROGRAMME : The programme will be finalised by the end of October. Tentatively the organisers plan to hold conferences at two major cities in India :

NEW DELHI : January 8-10,

BANGALORE : January 12-14,

COST : The organiser (COSNUP) will arrange and pay local expenses — conference facilities, accommodation (in-family residence), and meals of participant. Due to banking restrictions travel costs will have to be arranged by each participant. A small registration fee will be charged at the time of the Meeting. Those who would like to stay in hotels/guest houses can be assisted in finding suitable accommodations.

THE COMMITTEE FOR SANE
NUCLEAR POLICY (COSNUP)
M-120, Greater Kailash, New
Delhi-110 048,
