



# ANUMUKTI

A Journal Devoted to Non-Nuclear India

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### An Appeal to Conscience

Recently there has been a spate of reports in our media regarding the starting of the Kakrapar Atomic Power Plant. We have cause to suspect that the plant is being started without the authorities taking the minimum precautionary steps needed to ensure the safety of the people living in its neighbourhood. The note written by Shri K. Natarajan, the head of instrumentation and control at Kakrapar power plant which was published in the *Sunday Observer* of 26.7. '92 by Ms Rupa Chinai in her article on safety violations at the Kakrapar plant, proves that the authorities in their hurry to start the plant have disregarded their own safety norms. These violations of safety procedures are a dangerous game with the lives of the people in the vicinity at stake. We pray to God it doesn't, but in case there is an accident at the plant, and the un-

tested safety systems fail to perform their function, the consequences would be disastrous. Keeping the public in the dark regarding its own safety is a step toward unbridled dictatorship. The fact that these dangerous actions are being undertaken due to con-

siderations of personal gain make them akin to treason.

As a concerned citizen living near the Kakrapar plant, this total disregard for the safety and well-being of the nearby public, is intolerable to me. Therefore, I have decided to undertake a five day fast commencing from the 11th of September, 1992. The purpose of the fast is threefold. It is firstly, to express my concern, secondly to demand an enquiry to establish the facts and thirdly to request the authorities to refrain from opening the plant till it satisfies all the safety norms established by the nuclear authorities themselves. This fast is not being undertaken against any particular person but rather in a spirit of humility as a prayer to God to grant wisdom to all and also as a citizen's protest against this blind system which is hurtling us all towards extinction.

I have for long been an opponent of the policy of nuclearisation of

the country and I feel that the entire nuclear programme ought to be stopped. forthwith. However, that aim would be achieved only when the power of the entire population rises against this suicidal system. The purpose of my mat is more limited. It is a cry

against the total abdication of responsible behaviour by public servants.

Unit 1 of the Kakrapar Atomic Power Plant went critical on the 3rd of September, 1992. In the old days, Prime Ministers used to cesne tor these ceremonies and 'dedicate the plant to the nation", but nowadays, Prime Ministers are too busy protecting their throne to have much time for these mundane events. So, the task is performed by the Chairman, Department of Atomic Energy. This worthy is however, considered too small a fry to dedicate anything to anything. Hence he merely declared the plant critical. Also, critical were hundreds of workers in the audience, who wore black armbands as a protest against the fact that their demands had not been granted. Six tonnes of sweets (Pedha) had been specially ordered from Baroda for the occasion. Being a persona-non-grata with the plant authorities, I had not been invited for the grand occasion. Otherwise, I would have certainly advised the local people to have their fill of the pedhas, since this would be the last occasion for the next many millenna that they could enjoy a

milk product without worrying about the threat of radioactive contamination.

Narayan Desai

## Response to the fast

The response to the fast has been overwhelming. People from all over India have responded in their own fashion. Some have fasted for the whole five days while others have gone on a one day sympathetic fast at Udaipur, Ahmedabad, Surat, Vedchhi, Valod, Bedkuvadur, Ghasiamedha and Mangrol. In Vedchhi itself, 250 people fasted for one day. Daily discussions were held at The Sampoorna

Kranti

Vedchhi. Street plays were performed daily in different villages. The villagers in the vicinity of the Kakrapar atomic power plant have decided to organise people's vigilance committees. Involvement of the youth has been overwhelming. They "are conceiving ways to educate the public on this issue. A large procession followed by a meeting was held at Valod on the 15th where a resolution was passed to demand for an independent inquiry.

*Anumukti is late. You now read the announcement of the fast and the opening of RAPP, followed by the report and response to the fast.*

# Editorial

The opening of Kakrapar on September 3, 1992 by the Chairman of Atomic Energy Commission with a fanfare should have been the saddest day in our whole lives. And it was to some extent. But it was also a beginning of the end for the nuclear industry. The hurry in which Unit 1 of KAPP was forced into criticality without even adhering to their own safety norms shows the desperate plight of The Nuclear Power Corporation to attract public funding. An 85% cut in its budgetary requirements by the Centre, and the with the Nuclear Power Corporation's longer than the usual time to finish any project before KAPP, has precipitated severe cost overruns. Flouting basic safety norms at KAPP was an index of a desperate effort for survival.

The financial situation has become so grave that the Chief of the Atomic Energy Establishment, Dr. P.K. Iyengar has been quoted in Nucleonics Week • April 1992 (a nuclear industry journal) asking for foreign funding as well. He says, "In view of DAE's longer term funding needs, India would also consider strengthening its nuclear programme through future capital injections from outside institutions such as the World Bank, other international development agencies and banks. India would have no reservations about using foreign capital to finance nuclear projects built with the assistance of Western Industry."

This is a tacit admission that the Indian nuclear industry's boast of being indigenous and self-sufficient is truly hollow.

With the recent BARC revelations by the media, it is trapped in its own fundamental contradictions. We should soon be fed with a diet of systematic disinformation. We need to be vigilant.

## NOTICE BOARD

### JP Memorial Lectures

**Date:** October 8th. and 9th.

**Venue:** Sampoorna Kranti Vidyalaya, Vedchhi, Dist. Surat 394641

**Speaker:** A. Mohan Kumar, a well known environmentalist from Kerala who had taken part in the Silent Valley movement and was co-ordinator for Save the Western Ghats March in Kerala.

**Subject:** Development-'Kerala model' • Myth and Reality.

The lectures will be accompanied by a slide show and will be conducted in Hindi.

All are invited.

### Workshop on "Environmental Health Surveys"<sup>1</sup>

A workshop will be conducted at Sampoorna Kranti Vidyalaya, Vedchhi on various aspects associated with epidemiological survey in the vicinity of a Nuclear Power Plant. The Rawatbhata health report will be discussed in detail. Problems, requirements and resources available for conducting epidemiological surveys also would be discussed.

**Date:** 26th to 28th of December 1992

All interested people should write to Sanghamitra before the end of October 1992.

### All Gujarat Cycle Yatra

Anumukti and Gujarat Sarvodaya Mandal are organising a cycle yatra covering ten districts of Gujarat. Its purpose is to focus attention on aspects of sustainable development and peoples rights. Special focus will be on the problems of big dams, nuclear power plants, multinational corporations, and suppression of forest rights.

The one month Yatra is scheduled for March end. We need your suggestions and support in organising the details. Contact Anumukti

# BARC Spews Radioactive Poison

- \* Disaster of significant magnitude
- \* Effluents may have leaked into Arabian Sea
- \* Likely contamination of fish

**A** major radioactive leakage from ill-maintained pipelines in the vicinity of the CIRUS and Dhruva reactor complex at the Bhabha Atomic Research Centre, 15 km. from the heart of Bombay, is found to have caused severe soil contamination. Evidence also points to the possibility of the leakage having taken place for a number of years, thereby causing an outflow of contamination towards the sea.

According to independent experts, the incident is a disaster of significant magnitude.

The presence of cesium-137 (Cs-137) in the analysis of soil and water around the leakage site means that a most dangerous radioactive isotope is being released in an open area outside the reactor complex, a situation unacceptable under any internationally accepted norm.

The high readings of Cs-137 in the soil area between the reactor and the sea also points to its uncontrolled outflow towards the sea, where it is likely to have been absorbed by marine life. Cs-137 entering the food chain can have severe repercussions on human beings as it is absorbed by the cells of the body. It remains radioactive for hundreds of years.

The leakage was first detected by reactor workers on December 13, 1991, when a fountain of water shot out onto the lawn between the reactor and the sea. The plant management surmised that the sea-water pipeline must have burst, even though the entire area is criss-crossed with many other lines, carrying radioactive and chemical effluents. The establishment set six contract labourers on the task of digging a pit, to reach the burst pipeline, eight feet below the surface. These workers wore no protective gear or

radiation monitoring badges.

The presence of radioactivity in the area may never have come to light had it not been for an alert official in the office of the Radiation Health Inspectorate at the complex, who got wind of the incident and sent for a water sample from the puddle in the excavated pit. The activity recorded in the water sample was 40 becquerel/ml. (becquerel is a unit of radioactivity).

The contract labourers who had worked for almost eight hours inside the pit on December 13 and 14, 1991, were thereafter hastily pulled out, given a bath, new sets of clothing and packed off home. There is no evidence of the labourers having been subject to radiation monitoring tests.

However, the authorities sought to deduce the dosage the labourers had received. On December 19, department personnel dug a small portion from the bottom of the excavated pit. During a 12-minute period, the whole body dose recorded by the DRD (a radiation monitoring badge) ranged from 10 to 30 millirems (mR). Extrapolating on this observation, the radiation exposure of the contract labourers is held to be in the range of 300 to 1,000 mR. (A normal chest X-ray gives a dose of 70 to 150 mR. This would amount to the labourer receiving 12 X-rays during the course of work.)

Tests done in the excavated pit showed a radiation dosage ranging from 200 to 700 mR/hour, while in one specific spot, described as the "Hot Spot area below the chamber" (inspection chamber along the pipeline), it zoomed to 2,000 mR/hour.

Recording of the "soil specific activity level" revealed the presence of Cs-137. In 50 percent of the samples, Cs-137 activity was

1-10 k Bq/gm, and in another 50 percent of samples it was 10-60 k Bq/gm. Samples of vegetation in the area also revealed contamination, and birds and insects in this area are its carriers into a wider area.

Meanwhile, 325 drums of contaminated soil has already been sent to the Waste Management Department. The department has said that the solid active storage would get exhausted if the entire quantity of contaminated soil is to be excavated, and has stopped further consignments.

On the magnitude of radioactivity present in the soil area at CIRUS, independent, authoritative sources said they were "chilled" by these figures. They compared these to the "acceptable limits" set by the nuclear establishment itself. An advertisement of the Nuclear Power Corporation in The Times of India (July 8, 1990) gives figures of natural background radiation as around 100 mR per year, and compares it to "acceptable" radiation within a 1.6 km. radius of a nuclear plant: 1 to 2 mR per year. The outer limit for dosage to occupational worker is 5,000 mR per year, and for the members of the public it is 100 mR per year.

Taking the lower figure of activity found in the CIRUS pit, 300 mR/hr, it means that persons spending a year in this area are subject to 2.6 million mR during that span, the experts said

According to publications authored by BARC scientists, the "acceptable limit" for Cs-137 is 0.13 Bq/ml. in sea water. In the UK, the permissible limit of Cs-137 in soil is 900 Bq/kg (or 0.9 Bq/gm). Taking the average activity figures found in the CIRUS drums, around 27 k Bq/gm, it means that the activity is 30,000 times higher

than permissible limits in the UK, the experts added.

Circumstantial evidence at CIRUS points to discharge of Cs-137 into the Arabian Sea, where despite the impact of dilution, the chances of it being imbibed by marine life are real.

What was the source of such widespread contamination? The radioactive wastes came from the Rod Cutting Building, where all uranium and plutonium fuel used in the reactor is stored for years in large pools of water, to allow decay and cooling of radioactivity before further treatment. To maintain purity, the storage pool is periodically washed with acid, and the effluents are dangerously radioactive. This discharge is piped to the waste treatment facility in a planned manner, and should never be allowed into the sea, atmosphere or land.

Yet, unbelievably, the pipeline carrying this deadly waste, also at other times, acted as a storm water outlet. The system envisaged that by closing valves, the active discharge would be diverted to waste management, but in reality,

for whatever reason, the untreated wastes flowed towards the sea.

The damage to the Concrete Inspection Chamber along the pipeline, where the highest activity is found, as also the sea water outfall pipe (made of half-inch thick steel and lined by two-inch thick RCC) which crosses the ceramic pipe, is evidence of the slow, corrosive force at work.

Worse still, the plant management was aware of leakage occurring in this same pipe, at the same spot, in 1978, but did nothing. At that time, during the construction of the Dhruva septic tank, several hundred metres away towards the sea, Cs-137 was found in the soil. The sample analysis read 20 Bq/ml. The source of leakage was traced to this same pipeline and inspection chamber. Apart from isolating the pipeline and inspection chamber for a while, no attempt was made to replace the decaying pipeline. The report was filled and forgotten, sources alleged.

On January 13, 1992, the BARC and Radiological Safety Committee clearly stipulated three conditions

before CIRUS received permission from the Safety Review Committee for Operating Plants (SARCOP) to resume operations. These conditions included ensuring repair and integrity of all liquid effluent lines and assessment and plans for disposal of the contamination. Defying this, and without fulfilling these conditions, the plant management resumed operation on February 6, 1992. SARCOP confirms that its permission was given only on April 1, 1992.

When contacted, SARCOP ignored written questions submitted by this correspondent and rejected the request for an interview. It however gave a written response outlining the remedial measures taken in removing the contamination and investigating the incident. It stated that there was no reported leakage on this line previously. It said the contaminated soil has been properly immobilised.

RUPACHINAI  
SUNDAY OBSERVER,  
Sept.6,1992:

## Radioactive Fountain in the Gamma Garden!

This extrapolated 'casual' labourers' dose is a fine example of the nucleocratic callousness. Any leak involving liquids in a place criss-crossed by various pipes carrying radioactive effluents has to be treated with due care. Safety culture would mean that one presumes the worst and goes into the area well protected. Instead, what we have is that the all knowing big shots decide through visual inspection that the leak is that of plain sea-water only and rush in contract labourers with no protective gear or warning to these hapless fellow-humans. And when through luck these big shots do get a warning, their first priority is not towards the health of their fellow-beings who are quickly packed off with a shower and some new clothes but no continued health monitoring. They are more concerned about saving their own necks by showing that the disaster is no disaster at all. Notice the procedure of estimating the dose received by the casual workers. Five days after the event, departmental workers are sent in with full protective gear and measuring devices. Naturally, they go to the least radioactive part of these mess, stay there a few minutes and then come back. The variation in radiation they received in this short time is taken to be the upper and lower bound for the radiation received by the casual workers who, it is assumed worked for six hours while, actually records show that they did work for more than eight hours, This is the only way we get to the figure of a maximum dose of 1,000 mR. (12 minutes gives a dose of 10 to 30 mR, therefore 1 hour gives a dose of 50 to 150 mR and 6 hours work would give a dose from 300 mR to 900 mR.) The extra 100 mR is a small mercy from nucleocrats. But read the next line. "Tests done in the excavation pit showed radiation dose ranging from 200 to 700 mR/hour. " Now the excavation of this very pit was done by the casual workers. Thus, chances are that these fellows received anywhere from 1,600 to 5,600 mR of radiation while earning their 'new' set of clothes. And this assumes that none of the workers went anywhere very close to the 'hot-spot' in which case his dose would 'zoom' towards doom.

Casual workers are members of the 'general' public. The most likely dose received by the unfortunate workers is way beyond internationally accepted radiation safety standards to which our nucleocrats pay ritual obeisance. And hence we find a funny interpretation of the status of the casual workers. According to Mr. Soman, the Chairman of the Atomic Energy Regulatory Board, and supposedly the public's protector in all matters radioactive, "Casual workers cannot be differentiated from the regular workers in the amount of radiation they received." They can and are ofcourse differentiated in the amount of pay, working conditions, facilities, security of tenure, monitoring, etc. *Editor*

# EAST AND WEST ON NUCLEAR POWER

Leaders of two nations - one being the epitome of material well-being while the other literally represents a nation in exile • have commented on nuclear power. One would expect the people of Tibet who are struggling to regain their rights to clamour for nuclear power, while the U.S. having become materially well-off would now strive for spiritual development. This is what their Leaders have to say:

## GEORGE BUSH

On June 18, 1992, President George Bush held a brief press conference outside an oil recycling firm in California. The press conference focussed on energy and environmental issues. At one point, the President was asked, ..if reelected, what incentives would you devise to aid our country in reducing our overconsumption of energy resources?

President Bush's answer, in full:

"We've got an energy bill before the Congress right now that does that. Encourages alternative use of fuels. We have sound environmental practice on off shore. We 've got in this bill—I mean, from lightning..light..kinds of lightbulbs that really save enormous amount of energy, to alternative uses of fuel, we've got a good program. It's hung up in the US Congress right now. But I would press forward on that energy bill and try to move forward.

Let me say this as a word of caution, though. We are more and more dependent on foreign oil. And it was about a year and half ago, when the Persian Gulf situation got fired up, that it was predicted oil would go to \$80 a barrel overseas. And I don't know if you saw what Saddam Hussein said the other day. He said the biggest mistake he made is, when he first moved into Kuwait, that he didn't move into Saudi Arabia. And you want to project something that would just shoot these gasoline prices right off the scoreboard, try that one on

"So what we've got to do, it seems to me, is to try to become less dependent on foreign oil, for security reasons, and that means alternate sources. I may get into a big fight here, but I believe that safe nuclear power can be used safely. It's clean burning, I believe, clean, and I believe that we ought to facilitate that rather than turn our back on that. But it does concern me that we're becoming more dependent on foreign oil, and yet I think the answer is conservation and alternative sources. And that's in our energy bill."

(We just thought you'd like to know. Perhaps President Bush might benefit from learning that nuclear power cannot possibly contribute to reducing U.S. oil dependency when foreign oil accounts for only about 1% of VS. electricity, and even that oil is residue from other uses. On. the other hand, the President might benefit from a few sessions with an English teacher as well... From Nuclear Monitor)

## THE DALAI LAMA

In this century, civilization has rapidly advanced. However, along with material development and undue emphasis has been made on externa) progress. Without even knowing it, we often neglect to foster the most basic human need for kindness, love, co-operation and caring. Yet, the very development of human society takes place on the basis of this foundation. If we lose our foundation, our essential humanity, what point is there in pursuing material improvement alone?

Everyone desires happiness and no one wants suffering. All of us also have equal rights to avoid suffering and pursue happiness. Therefore, in pursuing any human activity it is of the utmost importance to bear this in mind. The question to ask is: is this activity beneficial to us? Here, it is important to think not only of the temporary benefits but also of the long term consequences. Similarly, in the case of exploitation of uranium we must ask the same question.

In their eagerness to create nuclear weapons and then to exploit the potential resources of nuclear energy, scientists and politicians have underestimated or overlooked the long-term harmful effects both to mankind and to the environment. What is required to counter this is the development of a proper sense of responsibility based on compassion for our fellow human beings.

With regard to the effects of uranium, we are not only concerned with the rights of the many defenseless people living in various parts of the world but also of future generations. I feel strongly that the cause of peace in the world is inseparable from our ability and willingness to protect the rights of others.

From Message sent to the World Uranium Hearing held at Salzburg, Austria on September 13 -18,1992.

## AN APPEAL FROM ANUMUKTI

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# Bomb Tests and Earthquakes

"Nuclear bomb testing **has** doubled the **earthquake rate.**"

Garry Whiteford, Professor of Geography, University of New Brunswick

"Abnormal meteorological phenomena, earthquakes and fluctuations of the earth's axis are related in a direct cause and effect to testing of nuclear devices."

Shigeyoshi Matsumae, President Tokai University Yoshio Kato,  
Department of Aerospace Science.

**O**n June 19, 1992, the United States conducted an underground nuclear bomb test in Nevada. Another test **was** conducted only four days afterwards. Three days later, a series of strong earthquakes one as high as 7.6 on the Richter scale rocked the Mojave desert 176 miles to the south. They were the biggest earthquakes to hit California this century. Only 22 hours later, an "unrelated" earthquake of 5.6 struck less than 20 miles from the Nevada test site itself. It **was** the biggest earthquake ever recorded near the test site and caused one million dollars of damage to buildings in an area designated for permanent disposal of highly radioactive nuclear wastes only fifteen miles from the epicenter of the earthquake. Although the quake provoked renewed calls for a halt to plans for storing radioactive materials in such an unstable area, the larger questions have still not been raised in the United States: Do bomb tests actually cause earthquakes? Do nuclear tests make the planet more prone to geologic disruption?

## Understandable Unease

The latest (and apparently continuing) earthquakes in California and Nevada suggest an inquiry by US scientists may be long overdue, and could lead to an examination of studies over the past twenty years from scientists in Britain, Germany, Japan and Canada, warning that nuclear tests **are** weakening the earth's crust, triggering earthquakes and causing the earth's pole to shift.

In a statement on July 14, 1992, responding to "understandable unease", the Department of Energy in Washington **asserted** the

relationship between nuclear testing and earthquakes is "nonexistent". Yet common sense would suggest the cumulative effect of so many nuclear tests around the world would leave the planet at least somewhat shaken. Indeed in 1956, Estes Kefauver, then Democratic Vice-Presidential candidate, warned, "H.bomb tests could knock the earth 16 degrees off its axis!" He was simply ignored.

However, in a study 20 years later by two Japanese scientists, entitled *Recent Phenomena on Earth and Atomic Power Tests*, Shigeyoshi Matsumae, President of Tokai University, and Yoshio Kato, Head of the University's Department of Aerospace Science concluded: Abnormal meteorological phenomena, earthquakes and fluctuations of the earth's axis are related in a direct cause-and-effect to testing of nuclear devices...Nuclear testing is the cause of abnormal polar motion of the earth. By applying the dates of nuclear tests with a force of more than 150 kilotons, we found it obvious that the position of the pole slid radically at the time of the nuclear explosion... Some of the sudden changes measured up to one meter in distance.

Not quite Kefauver's 16 degrees off the axis; but not entirely reassuring either. Two years later, on 12 October 1978, the British science journal *New Scientist* reported: Geophysicists in Germany and England believe the 1978 earthquake in Tabas, Iran, in which at least 25,000 people were killed, may have been triggered by an underground nuclear explosion.. British seismologists believe the Tabas earthquake implies a nuclear test that has gone awry.

Moreover, a seismic laboratory in Uppsala, Sweden, recorded a Soviet nuclear test of unusual size ten megatons at Semipalitinsk, only thirty-six hours before. One German scientist specifically implicated this test in the origin of Tabas disaster.

More recently, in April, 1989, at the Second Annual Conference on the United Nations and World Peace in Seattle, Washington, Gary T. Whiteford, Professor of Geography at the University of New Brunswick in Canada, presented the most exhaustive study yet of the correlation between nuclear testing and earthquakes. In a paper entitled *Earthquakes and Nuclear Testing: Dangerous Patterns and Trends*, Whiteford presented alarming conclusions which to this day have remained almost completely ignored in the US, although the paper has been widely translated and published abroad.

Whiteford studied all earthquakes this century of more than 5.8 on the Richter scale. "Below that intensity," he explained, "some earthquakes would have passed unrecorded in the earlier part of the century when measuring devices were less sensitive and less ubiquitous. But for bigger quakes the records are detailed and complete for the entire planet." So Whiteford was able to make a simple comparison of the earthquake rate in the first half of the century, before nuclear testing, and the rate for 1950 to 1988. In the 50 years before testing, large earthquakes of more than 5.8 occurred at an average rate of 68 per year. With the advent of testing the rate rose "suddenly and dramatically" to an average of 127 a year. The





earthquake rate has almost doubled. To this day the US military attributes the increase to "coincidence". As Whiteford says, "The geographical patterns in the data, with a clustering of earthquakes in specific regions matched to specific test dates and sites do not support the easy and comforting explanation of 'pure coincidence'. It is a dangerous coincidence."

Within the data he found other suggestive patterns. The one-two nuclear test punch that preceded by only a few days the July earthquakes in California this year may reveal a special danger. The largest earthquake this century took place in Tagshan in North-East China on July 27, 1976. It measured 8.2 and killed 800,000 people. Only five days earlier the French had tested a bomb in the Mururoa atoll in the Pacific. Four days later the United States tested a bomb in Nevada. Twenty-four hours later the earthquake hit China.

#### Killer Quakes & Bomb Tests

In an even more revealing analysis, Whiteford studies so-called "killer earthquakes" in which more than one thousand people have died. He compiled a list of all such 'quakes since 1953 and matched them with nuclear test schedules. Some dates were not available, but in those that were, a pattern was evident: 62.5% of the killer earthquakes occurred only a few days after a nuclear test. Many struck only one day after a detonation. More than a million people have now died in earthquakes that seem to be related to nuclear tests. Again, the governments of nuclear nations claim the results are mere coincidence. Officially the US energy department maintains that even their most powerful nuclear tests have no impact beyond a radius of 15 miles. The claim is challenged by the instruments of modern seismology that can register nuclear tests anywhere in the world by measuring local geological disruptions. Whiteford speculated that although the reverberations may fade within 15 miles of test, they are merely the first ripple of a wave that travels

through the planet's crust and spreads around the globe.

In 1991, the Nuclear Age Peace Foundation published Whiteford's findings in an article called *Is Nuclear Testing Triggering Earthquakes & Volcanic Activity?* In an interview with California State seismologist, Dr. Lalliana Mualchin, the foundation went on to inquire into the long-term effects of testing. Mualchin was asked if the cumulative effect of nuclear testing might trigger earthquakes and volcanoes. He replied, "A single nuclear test may have little *effect* on the earth, like that of an insect biting an elephant. But the cumulative effect might move the earth's tectonic plates in a manner similar to how a swarm of insects might start an elephant running. If an insect bites an elephant in a sensitive spot, such as an eye or ear, then there might be a vast movement out of all proportion to the size of the bite." The article concluded, "Who will the world hold responsible if suddenly an unprecedented series of violent earthquakes and volcanoes shake the earth? Will nuclear testers be able to assure the world they were not responsible?"

#### Ten More Years of Tests?

Recent decisions announced by the Bush administration to "limit" tests in size and number for ten years are meaningless. They represent little or no change from what in fact has been the practice for the last several years. They avoid dealing with the mounting call by Congress and the world-through the UN.- for a halt by all nations to all testing forever. According to UPI, President Bush will actually veto any effort to halt testing. Bush says he wants testing to continue "for at least ten years" to check the safety and reliability of nuclear bombs. The Russians and the French no longer feel the need to conduct such "checks", and have halted testing altogether. Why cannot the USA?

However, as the next presidential election nears, there is an emerging prospect of finally ending 50 years of bomb tests. Governor Bill Clinton's office says

he supports a comprehensive nuclear test ban. His running-mate Al Gore is one of the supporters of the Congressional call for a one-year moratorium on testing.

From The War and Peace Digest

Irradiated strawberries went on the market for the first time in

## Action: Protest Export Of Irradiated US Fruits

Florida, USA. The strawberries had been irradiated with cobalt 60 when the Vindicator, Inc. facility began operation in January. US consumer groups have already been voicing their opposition to food irradiation, with a great deal of success. Now it is generally understood that Vindicator's main commercial target for the near future is outside the US: Japan. (Japan is already a large scale importer of Florida grapefruits and oranges) Consumer Union of Japan is coordinating a campaign against food irradiation. They are asking people to write to Sam Whitney, President of Vindicator Inc., to express opposition to the food irradiation business.

Whitney's address:

Vindicator Inc., 1801  
Thonotosassa Road, Plant City  
FL 33566, USA.

For more information on Food Irradiation, contact:

FoodIrradiationNetwork(FIN),  
International **Organization** of  
Consumers Unions,  
PO Box 104540830 **Penang**,  
Malaysia.

# The Fast Disappearing Fast Breeder

**T**he Indian nuclear program is based on a dream—a dream of unlimited power locked in the uranium atom. Unfortunately, or rather fortunately, we don't have too much uranium.

The only working mines that we have are at Jaduguda in Bihar and the ore there is of poor quality and is anyway almost exhausted. (See Anumukti Vol.5 No.1) What we have in plenty in the monazite sands of Kerala coast is thorium. But the energy locked inside the thorium atom is too securely locked. Thorium does not fission. What thorium does do, under bombardment from neutrons, is to transform itself into a fissionable form of uranium called uranium-233.

The pioneers of the Indian nuclear energy programme were under no illusion regarding the availability of uranium in the country. Prospecting of uranium has been done more thoroughly than that of most other minerals. Thus, the chances of a new unexpected find are somewhat slim.

To bypass the constraints imposed by the poor availability of uranium and still develop a totally self reliant nuclear power programme, the pioneers like Dr Homi Bhabha and Dr Vikram Sarabhai conceived of a three step strategy.

The first step was the construction of ordinary (thermal) nuclear power plants. Normally when an atom fissions, it breaks up into two nearly equal bits and two or three neutrons. The neutrons that are released, move at a tremendous velocity. At least one of these neutrons has to hit another fissile atom and cause it to break up, for the chain reaction to proceed. The chances of these fast moving neutrons hitting the nucleus of another atom and causing fission are quite small. However, if they can be slowed down in some way, then the chances of their causing further

fission are greatly enhanced. This slowing down of neutrons is called 'thermalising' in nuclear jargon and is accomplished by having a 'moderator' in the system. The action of the moderator is akin to that of a crowded bazaar. Neutrons lose their speed through repeated collisions with atoms of the moderator. The CANDU type reactors which are most prevalent in India use heavy water as moderator. Heavy water has an advantage over ordinary (light) water since it absorbs far fewer neutrons. Thus, the chain reaction can proceed even when the amount of fissionable kind of uranium (uranium-235) present in the system is quite small. Other types

('breeds') more fissionable material than it consumes. This is possible because not all atoms of uranium happen to be of the fissionable kind. Most (993 out of 1000 in naturally occurring uranium are of the kind that do not fission (uranium-238), but they can be transformed into a material

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**If the world nuclear industry were to continue and not die a well-deserved death, paucity of uranium, would within the next century, become a world-wide phenomena.**

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of reactors, which use light water in their moderating and cooling systems, need to have a much richer mixture of uranium-235. However, having these thermal nuclear power plants was not a solution to our energy needs since they would soon consume all the scarce available uranium.

Hence the second step in the strategy: this was the construction of fast breeder reactors. A breeder reactor is one which produces

(plutonium) which is fissionable. Hence, the breeder reactors have in their core fissionable material (a mixture of uranium-235 and plutonium) which is surrounded by a blanket of the non-fissionable kind of uranium. The excess neutrons that are produced during fission are absorbed by the atoms of the blanket, and the uranium-238 there becomes converted into plutonium. The 'fast' in fast breeder reactors refers not to the speed of breeding, which is in fact, quite slow, but to the speed of the neutrons which are not moderated like in thermal nuclear reactors. Two questions arise here. Firstly, why use fast neutrons and secondly why go

through this rigmarole of first producing plutonium in a breeder reactor and then using this plutonium in an ordinary reactor with thorium? Why not directly use the abundantly available thorium in the already built thermal reactors in the first place? The answer to the question of the necessity of using fast neutrons is that while 'slow' neutrons are better at causing fission the number of neutrons released per fission on an average is more likely to be two rather than three, whereas in the case of fission caused by fast neutrons, the chances of producing three neutrons per fission are greater. One neutron per fission is needed

for the chain reaction (fissioning of the next atom) and if breeding is desired, at least one neutron would be needed per fission for the purpose of converting non-fissionable material like uranium-238 or thorium into fissile plutonium and uranium-233. Since some neutrons are inevitably 'lost' — absorbed by the moderator, coolant, and structural materials like steel and concrete that make up the reactor, it is difficult to achieve breeding in ordinary nuclear reactors.

Therefore, the pioneers' strategy was: first build ordinary reactors, this would give some amount of

plutonium, though much less than the uranium-235 that would be consumed. Use the plutonium in a fast breeder reactor to have more plutonium. And once, the plutonium supply was thus assured, to convert the abundant thorium into uranium-233 and take the country into an era of unlimited power.

Whereas, the availability of uranium was a specially serious concern to India, it was not the only country faced with this problem. If the world nuclear industry were to continue and not die a well-deserved death, paucity of uranium, would within the next century become a world-wide phenomena. Thus, many countries including U.S., U.S.S.R., U.K., France, Germany, and Japan besides India embarked upon a fast breeder programme. However, like rats deserting a sinking ship, the fast breeder programmes of many countries are being wound up one by one. The U.S. and Germany have already called it a day while U.K. has announced that its prototype fast breeder reactor at Dounray would be shut down in 1994.

The French were the frontrunners in fast breeder technology. They had not only built prototype fast breeders, but also a commercial scale fast breeder. Superphoenix was the largest and so far the only example of a large commercial scale operating breeder reactor anywhere in the world. This helps explain why the French state power company, Electricite de France (EDF), is defending Superphoenix despite its dismal history—a record number of breakdowns, the fact that it has operated at full power for less than six months of its six year existence—and its enormous costs.

DSIN (Direction de la Surete des Installations Nucleaires: the French nuclear regulatory agency somewhat akin to the Indian Atomic Energy Regulatory Board, except for the fact that it seems to have more teeth) has stated that, before authorizing a startup for Superphoenix, it wants to understand the mysterious and potentially dangerous variations in reactivity that for two years have

been plaguing the Phoenix, the prototype of Superphoenix. DSIN in their report have highlighted the most serious failures suffered at Superphoenix: the discovery of tubing leaks in 1987, the entry of air into the reactor in 1990, and the collapse of the machine room roof in 1990 due to snow load. All of these according to DSIN "have statistical significance for the future." They are due, say DSIN, "too difficult technical problems that have been insufficiently mastered, or failures in designing must be considered that the probability of new failures appearing is significant." And despite heavy pressure from the nuclear establishment, the government is hesitant to override safety considerations for an increasingly controversial project. Concern with environmental issues and nuclear energy is

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**like rats deserting a sinking ship, the fast breeder programmes of many countries are being wound up one by one.**

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rapidly

rising in France, as illustrated by March regional elections where green parties won nearly 15 percent of the vote.

Now, Superphoenix will have to go through a long relicensing process for restarting. This would include public hearings, and that, say French activists, would probably finish it off. Didier Anger, national spokesperson for the French Green Party, says that unofficial ministry sources estimate that there are three chances out of four that the French government will abandon the project.

The French nuclear programme is the most extreme example of the quasi-military style of centralised administration that characterizes the French state. There is no place for separation of powers, democratic process or independent watchdogs in the French system. Thus, its nuclear program (civil and military) was developed by an elite government bureaucracy, the

Atomic Energy Commission (CEA), acting on executive orders issued without any parliamentary oversight or involvement. The state owned electricity board EDF maintains a monopoly over all electric and gas power. Plant safety is controlled by the Ministry of Industry, but it relies on experts from the CEA. Until the Chernobyl accident, monitoring of radioactivity was the responsibility of another bureaucracy which is so pronuclear that it denied the presence of the Chernobyl cloud over France. The CEA, rather than the universities, provides training in nuclear engineering, which helps minimise the number of nuclear engineers who might be critical of the industry. *{Editor's Annotation: Replace the word India for France in this paragraph and see if you can observe any difference. }*

The French government began its dramatic expansion of the country's civil nuclear program after the 1973 oil shock, provoking widespread opposition. But the government crushed the grassroots movement. In 1977, police brutally dispersed a march of 60,000 protesters at the Superphoenix site, killing one person and wounding 100 others. In 1981, when the Socialist Party came to power, promises to close Superphoenix and open a debate on nuclear power were quickly betrayed. The extra parliamentary opposition was co-opted or disheartened and the nuclear question was moved out of the political arena.

This began to change after Chernobyl. Until the 1986 Chernobyl disaster, most newspapers refused to publish any critical commentary on nuclear power. Immediately following the accident many journalists broadcast assurances (there was no significant increase in radioactivity over France and no reason to take preventative measures), only to discover that all neighbouring countries were destroying large stocks of vegetable and dairy products and refusing to buy French products. The scandal led to the creation of France's first independent



monitoring lab, the CRIIRAD, which besides monitoring Chernobyl radiation, has since discovered several significant hazards from France's own facilities. The spell was broken. And despite the media blackout, the grassroots opposition began to grow.

The nuclear industry suffered further blows in the late 1980s, as it searched for somewhere to dump its waste. It met with formidable opposition from farmers, environmentalists and local governments at three of the four potential sites it chose. As many as 15,000 protesters occupied sites and seized equipment. When attacked with tear gas, farmers fought back with tractors spraying pig manure. In 1990, then Prime Minister Michel Rocard was forced to announce a one year moratorium on new waste dumps and to organize, in June 1991, the country's first parliamentary debate on a nuclear issue. By then, environmentalists had leaked an alarming secret report on safety written by EDF safety chief Pierre Tanguy, further eroding public confidence. Among other things, the report discussed serious aging problems in reactors, important design defects in Pressurized Water Reactors, and most seriously, a re-evaluation of accident probabilities which now showed the risk of a serious accident to be at least 20,000 times higher than had been previously estimated.

The political fallout and the description in the report of the risk of accident as an important financial issue was something EDF was more concerned about than any health hazards involved. EDF claims to produce very cheap nuclear electricity, and often sells it below cost, thereby running up a debt equal to Poland's entire foreign debt. In fact, were it not for a guarantee from the French government which also holds down interest rates, EDF would be bankrupt.

The Superphoenix itself has already proved to be a major economic disaster. US\$9 billion has so far been spent (six times the initial costs estimate) for a site

that is still not finished or in working condition. Fuel reprocessing costs would push the bill even higher. EDF claims that the reactor will eventually produce electricity for only about twice the cost of standard PWRs, but it admits now that commercial models won't be viable until the middle of the next century.

That price estimate is misleading, since it does not take into account the costs of the whole fuel cycle, the reprocessing costs in particular. According to

started. With its record of actual operating experience - which includes an incredible series of impossible accidents (two of which had officially been estimated to have a probability of occurring not more than once in 10,000 to 100,000 years) - the DSIN safety authorities have understandably become publicly critical.

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**The dangers of fast breeders are so great that even many otherwise pronuclear physicists oppose them. They are believed to be the only reactors in which there can actually be an atomic explosion.**

independent analysis of the plutonium fuel cycle by economist Dominique Finon of the university of Grenoble, the reprocessing costs are so high that it would probably cost less to extract uranium from sea water.

The superphoenix houses more than six tons of plutonium (and CRIIRAD has already detected traces of it in the Rhone River). The dangers of fast breeders are so great that even many otherwise pronuclear physicists oppose them. They are believed to be the only reactors in which there can actually be an atomic explosion.

These dangers are inherent in Superphoenix's design, and were known well before the reactor

## Growing Opposition

Despite the media blackout in France, opposition to the Superphoenix, long based in Switzerland (Geneva is only 45 miles away), has gradually grown. A recent poll in the Isere (the area where Superphoenix is located) indicated the 69 percent of the population believed that building Superphoenix had been a mistaken decision and that 78 percent thought the Superphoenix might become a second Chernobyl.

### The Effect on Japan

Now that the French are not proving the ideal role-models for India, our nucleocrats are liable to shift their admiration towards the Japanese. Future pronuclear

cheerleading is bound to have glowing references to the still expanding Japanese nuclear programme along with lot of blah-blah regarding the fact that Japanese are the only people ever to have suffered the effects of atomic explosions. However, the French government's decision not to restart the Superphoenix should also have a large impact on the Japanese nuclear industry.

The story regarding the French decision got little coverage from the Japanese news media, while the government and nuclear industry officials feigned indifference. PNC (Power Reactor and Nuclear Fuel Development Corp.) officials commented that their own Fast Breeder Reactor

(FBR) Project Monju, which is scheduled to start next spring, would not be affected by the French decision because the difficulties with Superphoenix are mainly due to intrinsic maintenance problems and also because the loop type Monju is structurally different from the pool type Superphoenix. *{Now where have we heard that one before? Editor}*

Actually PNC was nervously waiting for the French decision, hoping that Superphoenix could be restarted. The decision came about one week later than generally expected. During this period, officials were desperately trying to get hold of all the information they could, so as to be prepared at any



time to comment that their programme would not be affected even if the decision was unfavourable. In spite of their comments, however, the French decision has a direct bearing on Monju, and they know this all too well.

For one thing, the decision not to restart Superphoenix was based on the safety report prepared by M. Laverie, chief of DSIN and the report raises serious doubts as to the safety of FBRs in general. The weaknesses and uncertainties that Laverie points out concerning Superphoenix are mainly related to the following three points:

The difficulty of controlling core reactivity. The potential danger of a sodium fire, particularly in the secondary sodium circuit.

The difficulty of inspecting the inside of the reactor vessel and steam generators.

These are problems common to all types of FBR and thus weaknesses of Monju as well.

It should be noted that the French decision seems also to be related to the prospect of a world plutonium surplus problem. In an age of surplus plutonium, it does not make sense to breed plutonium in a FBR. NERSA, the owner of SpX, decided three years ago to

remodel the reactor from a breeder to a non breeding fast reactor. It can be said that the recent French decision on SpX has accelerated this policy shift from breeding to non breeding in France. Germany's decision last year to abandon the almost completed SNR 300 FBR also came years after remodeling it to a non breeder. In this context it is interesting to note that talks on the future remodeling of Monju to a non breeding fast reactor have just begun in Japan.

Ten days after the French decision, the *Mainichi Shimbun*, one of the national daily newspapers, reported that PNC had decided to convert the ATR(advanced thermal reactor) Fugen, a heavy water moderated light water cooled converter reactor of Japanese design which partly uses MOX as fuel, into a dedicated plutonium burner. This may be regarded as further evidence that the Japanese government now admits Japan is going to have a large plutonium surplus, as we have repeatedly pointed out. But the decision sounds very strange in the light of the fact that the government and PNC have always claimed until very recently that we need to breed plutonium for Japan's energy self sufficiency and we

must also have plutonium from Europe because without it we face a shortfall for fueling Japan's R & D plutonium projects. The decision to use Fugen as a plutonium burner probably reflects the change of perception which is slowly taking place inside the Japanese nuclear industry about the plutonium surplus, but the decision has apparently been expedited by the French decision on SpX. Hence the death of SpX is already affecting Japan's plutonium policy.

Anyway, Japan is obviously going to face a large surplus of plutonium as the government itself now admits, and we would like here again to stress that there is no need for plutonium to be shipped back from Europe, even if the dangers of shipments can be minimized.

Surendra Gadekar

Sources:

WISE 371

Nuke-Info Tokyo

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CRII RAD, Lo Cime, 471  
Avenue Victor Hugo, 26000  
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## 33 Power Projects Facing Cost Overruns

**A** review of the power sector, has revealed that of the total 39 mega and major projects, 33 are behind schedule and 31 face cost escalations of 77.6 percent.

The cost of the 39 projects has jumped from the original estimated Rs 17368.1 crore to Rs 3,11,736 crore, registering an increase of 77.6 percent.

Due to project slippages, less than 50 percent additional capacity was added during 1991-92; against a target of 1,880 MW, only 908 MW was added during the period. Top officials are highly skeptical that the current year's target of commissioning 2,890 MW would be met

According to official sources, the cost of 31 projects has shot up from the original estimate of Rs 15,845.1 crore to Rs 29,715.1 crore—an increase of 87.5 per cent. The time overrun in the case of 33 projects ranges between *one* month and 128 months. The cost of these projects has risen from Rs 14,510 crore to Rs 27,046 crore.

The reasons for delay in project completion are:

Delay in environment clearance, notably for major projects including Farraka Super Thermal Power Project (STPP), Kalgoan 'STPP, Kalgoan transmission line and Doyang which are stuck with the Department of Environment.

Controversy between Uttar Pradesh, Madhya Pradesh, and Bihar over the reallocation of water from the Renusagar reservoir, delaying the Vindhyachal STPP, which the meeting felt should be resolved immediately.

Land acquisition problem is holding up Kalgoan, Farraka STPP 11, Talcher, Bokaro B 11 Majijia, Ranganadi Doyang and Koel Karo; serious funding problems for Farraka STPP 111 and Vindhyachal Transmission system.

Law and order problems in Jammu and Kashmir are delaying the Ori and Dulhasti, and the Kalgoan and Farraka due to the Jharkhand Mukti Morcha.



# Nuke Project That Failed To Take Off

**U**nlike the agreement between India and the Soviet Union regarding the Koodangulam nuclear centre, which has now been scrapped, was the culmination of eight years of negotiation on the technical and economic aspects of the Soviet offer first made in 1979 when then Prime Minister Morarji Desai visited Moscow.

Under the agreement, two 1000 MW units would be set up, the first by the end of 1998 and the second exactly one year later, according to the chairman of the Atomic Energy Commission, Dr. M.R.Srinivasan, in October 1988. The project was taken up by Atomenergoexport, a Soviet foreign company.

Practically all technological systems of the project were to be made available by Soviet Union. The USSR was also to provide the fuel, but India was free to get the enriched uranium from wherever it could. The spent fuel was to go back to the USSR, both because it had better storage facilities and less population and because India wanted to avoid complications regarding the weapons grade plutonium that can be derived from reprocessed fuel.

Koodangulam was chosen as the site for the reactor as it was seismic activity free, a sparsely populated area but with availability of water and proximity to the sea.

The Koodangulam project was opposed by quite a lot of people, starting with the villagers of the coastal areas. They were apprehensive that the radioactivity would harm them. Fishermen were against it because they feared destruction of marine life. But villagers in the interior were enthusiastic, trying to get the maximum possible for their lands.

Part of those opposing the scheme, the Committee for Sane Nuclear Policy (Cosnup) even decided to ask the Centre to scrap the project to set up two VVER 1,000 MW nuclear reactors, saying that they were obsolete and

flawed. Cosnup convener Prof. Dhirendra Sharma said that the Soviet Union itself had suspended installation of 20 VVER reactors after the Chernobyl accident, and anyway its technology had been developed 20 years ago.

Justice V.R. Krishna Iyer, national chairman of Cosnup, also supported the demand.

The reasons for their opposition

were: 1) The friends of Nature Society said there were no water sources in the arid area to supply the water necessary for a nuclear plant, and it would also be a Herculean task to link the power generated from there to the national or state grids; 2) The plant was of no use to the displaced villagers as most of them were far too poor to benefit from it, having only thatched houses; 3) Fishermen were afraid that marine life would be affected; 4) Radiation was already high in Kanyakumari district because of natural radioactivity from the monazite deposits along the coast; and 5) Villagers and environment conscious organisations were absolutely against giving water from the Pechiparai reservoir as the area was already starved of water.

President of Atomenergoexport said that a Chernobyl type disaster was not possible in Koodangulam because the reactors were the VVER 1000 type, not the RBMK as in Chernobyl. And only one percent of pechiparai reservoir's capacity would be required for the plant.

VVER 1000 is a water cooled and water moderated reactor, with the core in a thick metal shell with

a sphered lid, preventing radiation leaks and breakdown of the reactor. It is also earthquake resistant, able to withstand a 8 point quake on a 12 pt scale. It also allows for use of sea water for cooling ancillary equipment.

The reactor has three barriers to prevent radioactivity -sealed around fuel elements, heat transfer circuit and localisation of

fission products in limited space.

Project director V.S.Gopinatha Rao also reassured the fishermen, saying that coolant water would not pose any danger to marine life. He said the condensers were so designed that the water that was let into the sea would not raise its temperature by more than 5 degrees C.

All the same, objections were periodically raised, like those by Dr. Dharendra Sharma, who insisted that VVER reactors were not safe either, as they no longer were to be built in the Soviet Union which scrapped five which had already been built.

Between the objections and the

denials, the project did not really take off. In early January 1990, the then Union Minister for Science and Technology, Mr.M.G.KMenon, said that the Government of India had not taken a final decision on the plant. The Government would look into the project in its totality, including cost, economics, etc. No agreement had been entered into on a final basis with the Soviet Union, he stressed, adding that it would only be after the Detailed Project Report.

The quick changes in the Soviet Union in mid 1991, once again stalled the Koodangulam project.

As recently as December 1991,

AEC chairman P.K.Iyengar said it would take two months at least to know if the reactor would be set up with Soviet help or without, due to the rapid changes there. And project director C.R.Prabhakaran said infrastructure work under the Rs.7 crore first phase was being carried out.

On December 4, 1991, Dr Iyengar asserted that the Atomic Energy Department would go ahead with putting up the four pressurised heavy water reactors (PHWR) of 600 MW each with Indian knowhow, even if the Soviet agreement fell through.

# Letter Box

At you know, there it a nuclear plant of high accident rate not far off St Petersburg. We are interested in genetic effects of the wastages from the plant. Our lab tracks Down's syndrome and congenital malformations rates in Leningrad-St Petersburg since 1982. It is very interesting to compare the dates of nuclear accidents with dynamics of Down's syndrome rate in the city as a whole and in the districts of the city. However, despite 'Glasnost' information on accidents is still not available. We are making efforts to discover this information and hope to achieve success.

We have obtained information on a big accident in 1975 (See following). This accident affords the possibility of monitoring immediate genetic effects and as well the possibility of learning about late genetic effects.

In 1994, young women conceived at the time of accident in 1975 will be giving birth to their children. Marital age in Russia is 18 years, and we are waiting the start of Down's syndrome rate elevation (if the conception of irradiation influence on meiotic chromosome pairing is correct).

Unfortunately, under unlucky situation in our country such fundamental explorations usually fail to receive financial support. Moreover, we are afraid we shall have to stop our investigations in the nearest future.

Taking into consideration the significance of the problem, we hope to attract the attention of foreign scientists, with the purpose of founding international collaboration in this topic.

## **SUBSTANTIATION OF THE PROJECT OF EXPLORING GENETIC EFFECTS OF THE ACCIDENT ON THE LENINGRAD NUCLEAR POWER STATION IN 1975**

The problem of the effects of low dose radiation on human germ cells is one of the most important in radiobiology. It is of great significance to medical genetics.

To date, there are a lot of

indirect contradictory data that cannot elucidate the problem. That's why scientists pay special attention to accidents that could result in genetic effects in big population: Hiroshima explosion, accident in Kystym and Chernobyl, etc

But for the number of reasons, correct experiments on distant effects of these events cannot be carried out. One of them is that humans can regulate childbearing taking into consideration possible consequences of irradiation. Thus, after Chernobyl accident, for instance, birth rate in old age groups of Byelorussian women, presumably most radiosensitive, considerably decreased. Hence, the most correct experiments can be carried out only in population that underwent irradiation being unaware of it (In Kyshtym, both physicians and administration knew the truth and deliberately distorted statistics.)

Such a situation occurs in Leningrad on November 30th, 1975 as a result of partial core melt down. The reactor was stopped and blown off with nitrogen through a 150 meter high chimney. All in all 1500000 Curies of radioactive waste was released into the atmosphere.

The accident was first mentioned on a closed meeting of the cabinet of ministers in March 1976 by Prime Minister Kosygin. He reported about a request of Finnish and Swedish Government of the increased level of radioactivity above their countries.

Visual analysis of synoptical maps on barometrical altitude 850 milibars and 200 milibars showed that in the period under study the S-SW air mass movement took place, and radioactivity could have passed throughout the city. More precise analysis after estimation of radioactive particles trajectory. Resulting from this scoring the regions of most pollution would be determined.

In Leningrad owing to established practice, all live births with congenital malformations are subjected to genetic examination including cytogenetic

investigations. The part of affected children died soon after birth remain unexamined. Thus the significant part of children suffering chromosome diseases is registered in annals of both municipal medical genetics survey and science laboratory on medical genetics (Academic Group on Medical Genetic of Associated Member of the Russian Medicine Academy, Prof. EF Davidenkova.)

The laboratory serves 8 maternity hospitals (out of 20 such institutions of the city) since 1970. Observing the chromosome analysis records from 1974 to 1980 we revealed the elevation of the number of chromosome anomalies in 1976, next year after accident.

Analysis of the data of 1965 to 1979 published by Finnish scientists revealed the elevation of Down's syndrome rate in new borns in Finland since 1976 (Leisti et al Clin. Genet.; 1985:27,3.252 to 257.)

We are far from the proved conclusion that this was result of action of radiation of germ human cells. But we believe that the data mentioned above is the serious substantiation for careful retrospective investigation in this field.

We suppose:

1. Processing the archives (not computerised) of all maternity hospitals of the city since 1970 in purpose to determine the birth rate, the levels of child death, Still births, congenital malformations and Down's syndrome.

2. Study of anamnestic parental data (age, place of birth, nationality, occupational hazards, obstetrical, gynecological anamnesis) in comparison with the selected control.

3. Detailisation of obstetrical-gynaecological data (in the cases of incomplete birth certificates) in maternity consultations (not computerised)

4. Study of the records of pathological archives (not computerised) for recognition of syndromes.

5. Multiparameter statistical analysis for determination of leading factors causing the



hereditary and congenital defects and estimating the role of irradiation.

It is obvious such exploration to be actual and not of common to all biology. Nevertheless in Russia we are not able to find institution interested in this problem. To our knowledge there are several international programs concerned with the effects of Chernobyl's accident on human health. We hope the outcome of the study suggested would be useful for prognosing genetic effects of such tragedies.

We appeal to you with a request to include our project in appropriate monitoring program.

The study would be completed in one year provided the financial support is \$10,000.

The prospect for financing of the work and we would grateful for aid in searching possible sponsors.

Reproduced in toto from a letter written by a Russian Scientist

Contact V.T. Padmanabhan,  
CISEC, Kottamuku, Quelion.

I have taken serious note of your fast from September eleven to fifteen. I agree with you completely that integrated testing of the ECCS (Emergency Core Cooling System), a safety system should be done and not in piecemeal in the public interest. I am writing to the Center to look into this matter.

Chimanbhai Patel  
Chief Minister of **Gujarat**

I have decided to undergo a five day's sympathetic fast with Narayanbhai. Work here prevents me from going to Vedchhi. We had a meeting of friends from the Manaviya Technology Forum. They have decided to observe a one day sympathetic fast on 11th September.

It would be interesting to know the reaction of the authorities. Please make diagrams and explain in simple Gujarati what an Emergency Core Cooling System is and what are the implications to safety of such callousness. Please

send us some copies of leaflets.

Rajani Dave

Prayas, Mangrol, Bharuch Dist.

*Editor's Comment\*: The AERB chief, Mr. Soman came to Vedchhi to discuss the matter with Narayanbhai but did not come to the point till they were leaving. Most of their time was spent in explaining their independence from DAE. Mr. Soman gave an unsigned document which shows that they had tried to perform some ECCS tests in February 1992, and found results not upto the designed specification. New standards were set and the repaired portions were tested in June and August 1992. Obviously, the AERB gave permission for fuel and heavy water loading before being sure that the ECCS would work in toto. The ECCS should have been tested before allowing the fuel or heavy water loading. An integrated test would mean rushing in of tons of simple water into the expensive heavy water.*

Rupa Chinai's article 'BARC Spews Radioactive Poison' (Sunday Observer. Sept.7) and 'Chernobyl in the Making' (Sept. 13) has stirred people in Bombay. As of today the BARC has not challenged a single incident or fact of the several enumerated by Ms. Chinai. A demand for the right to know and for accountability on the part of BARC is the outcome.

The Anumukti Bombay Group met at the Bombay Sarvodaya Mandal to work out an appropriate action plan. Suggestions made then and in the follow-up discussions were:

- Rupa Chinai to be supported and commended for the\* service she has rendered by enlightening the public on matters pertaining to health and safety of the environment. It is a service not only to this generation but also to future ones, since radioactivity damages our genetic pool.
- Encourage Doctors to independently investigate health effects of the accidents.
- BARC disasters and its

implications with emphasis on:

- Remedial **measures**
- **Queries (esp. about the contaminated soil)**
- Health/Ecological Angle
- Human Rights (esp. of the BARC casual contract labourers)
- SARCOPs (Safety Review Committee for Operating Plants) responses to this issue.
- Dissemination of information to the common man about the happenings at BARC in particular and the hazards of nuclear power production.
- Dismantling the 'Holy Cow' attitude towards nuclear issues.
- Dissemination of information to villagers around nuclear power plants of the hazards they face.
- Letters/articles to be written in Hindi/Marathi etc. to press and periodicals on the happenings at Trombay.
- Demand for an open debate on safety of nuclear power plants with an emphasis on the right to information.
- Decision to network with NGOs in Bombay, and anti-nuclear groups in India regarding BARC's fall out.'
- Inviting individuals for: suggestions & support (Letters, signature campaigns, information)

All mail may be addressed to the Anumukti Bombay Group at the Bombay Sarvodaya Mandal, 299 Tardeo Rd., Nana Chowk, Bombay.

**MONAPATRAO  
BOMBAY**

Narayanbai's 5 days fast in response to KAPP going critical without adhering to safety norms is appropriate.

Perhaps this nonviolent **protest** in the land of Ahimsa may catalyse the authorities not to **take such a** callous attitude with regards to the public's safety.

**KANTIBAISHAH  
EDITOR: BHOOMIPUTRA  
VADODARA.**



# Asian Rare Earths Ordered to close

A Malaysian court on July 11 ordered Mitsubishi's joint venture Asian Rare Earth immediately to close its plant in Bukit Merah and remove all radioactive waste and toxic chemicals from the factory.

The ruling ends a seven year suit brought by eight Bukit Merah villagers against the firm, which was 35% owned by Mitsubishi Kasei. Asian Rare Earth processes monazite to produce yttrium and other rare earth chlorides used in color television screens and other electronic parts. In the process, radioactive thorium is produced as waste, and this waste was virtually dumped in the backyard without any signs or fences to protect the residents. Local residents have suffered cancers, leukaemias, and birth defects, caused by high levels of radioactivity. The ARE case had been dubbed a Japanese pollution export by environmentalists.

This ruling was the first of its kind in which a multinational giant has been ordered to close down because of environmental damage and adverse effects on the local residents. The ruling has been a great shock to the Japanese government as well as the industry. The Ministry of International Trade & Industry immediately announced that they feel deeply regretful over the issue

and summoned Mitsubishi Kasei to explain the situation. The Director General of the Environmental Agency also called in the directors of the company for a briefing. The industry has likewise shown regret, saying, when a firm wants to go abroad, it should not only satisfy the local law but also get the acceptance of the local people.

Two residents of Bukit Merah, Mr. Lau Fong Fatt and Mr. Hew Yoon Tat, came to Tokyo and visited government agencies and Mitsubishi Kasei, in an attempt to persuade the firm not to appeal and to close the plant for good. During their visit, the ARE, contrary to their wishes, filed an appeal in July 23 and applied the next day for a stay of execution of the injunction to stop operation. Mitsubishi Kasei claimed the decision had been made on the Malaysian side alone without the consent of the Tokyo office and made statement saying that we cannot help expressing our regret towards these measures taken by the Malaysian side, but will continue insisting on our basic position, which is that the plant should not continue operation unless it harmonizes with the local people.

We have yet to see the outcome of the case.

(Nuke Info Tokyo July/Aug. 1992)

## Prisoner Of Conscience

Moroccan born Mordechai Vanunu, immigrated to Israel at the age of 11, along with his parents and their ten other children. After an adolescence of poverty followed by three years of service on the Golan Heights in the Israel Defense Forces, Vanunu was trained as a nuclear technician. From 1977 to 1985 he worked at Dimona at the underground Machon II lab, Israel's top-secret plutonium separation plant.

He began to question his own work on a secret nuclear weapons programme. Like Daniel Ellsberg and Robert Aldridge in the US, he finally decided to make public his Government's secret Policy for the sake of truth and democracy.

In October 1985, The London Times persuaded him to visit London where a series of British scientists became convinced that his detailed story and photographs were genuine evidence that Israel's nuclear weapons programme was far more extensive than believed, making it the world's sixth most destructive nation with as many as 200 nuclear bombs.

Before Vanunu's story hit the press on October 5, 1986, its source had been kidnapped by Israeli agents. Vanunu had been tricked by a female Mossad agent into flying to Rome. There he had been overpowered, drugged, chained, and shipped to Israel on a cargo ship.

After a trial held in total secrecy, Mordechai Vanunu was sentenced to 18 years in Prison for treason, espionage and revealing state secrets. He is now at Ashkelon Prison, where he is about to begin his seventh consecutive year in solitary confinement. Amnesty International has described his conditions in a six by ten-foot cell as "cruel, inhuman, and degrading."

Israel executed Eichmann because he obeyed the directions of his superiors, and not the dictates of his conscience, when he killed thousands of Jews. Now Israel is punishing Vanunu for doing what Eichmann did not do.

### APPEAL FOR INTERNATIONAL ACTION

#### Free Vanunu for a Nuclear Free Middle East

Send the following message supported by as many signatures

[possible to: 6 Endsleigh Street, London WC1H 0DX, UK.

**" We the undersigned, call upon the people of Israel and their Government to release Mordechai Vanunu from prison.**

# I Am Your Spy

by Mordechai Vanunu

translated from Hebrew by Maxine Kaufman Nunn

I am the clerk, the technician, the mechanic, the driver,  
whom they told, do this or do that Don't look  
to the right, to the left, don't eye the page. Don't look  
at the whole machine. You are responsible for one bolt  
only. You are responsible for just one rubber-stamp.  
Concern yourself with one matter only. Don't bother  
with things that are above you. Don't think  
for us. Drive. Keep driving. On. On.

The great, the wise, those who understand our future,  
thought:

There's nothing to worry about. No fear. Everything works,  
clicks.

Our little clerk is a diligent worker. He's a simple technician.

He's the little guy.

Like all the low-ranking clerks, ears have they, but they hear  
not,

eyes have they but they see not. We have a head;  
not the little guys.

Answer them, he thought to himself

-just between him and himself-

the little citizen. But the man with the head  
is not little. Who is the boss here, who knows  
where the train is headed?

Where is our head. I too have a head.

Why do I see the abyss

Does this train have an engineer?

The clerk-driver-technician-mechanic raised

his head. Retreated a bit, saw a monster

Unbelieving, returned, rubbed his eyes and indeed -

they're fine. I'm just fine. I really do

see a monster. I am part of the system I  
signed this form. And only now I am reading

the text. This bolt is part of a bomb.

This bolt is me. How did I not see  
and how do others go on bolt-tightening.

Who else knows. Who saw, who heard

The emperor is indeed naked. I see him.

Why me. This is not for me. It's too big for me.

Rise up and cry out. Rise up and proclaim to this nation.

You can. I the bolt, the mechanic,  
the technician. Yes you. You are the secret agent

of this nation You are the eyes of the state.

Spy-agent, reveal what you've seen. Reveal

to us what those who understand, the wise, hide from us.

If you are not with us, the void awaits us.

A holocaust awaits us. You and only you sit  
at the wheel and see the void.

I have no choice. I am a little guy, an ordinary citizen,  
one of the common folk,

but I will fulfill my commitment. I have heard

the voice of my conscience. And there's nowhere to run.

The world is small. Small compared to

big brother. Here I am, on your mission Here I am

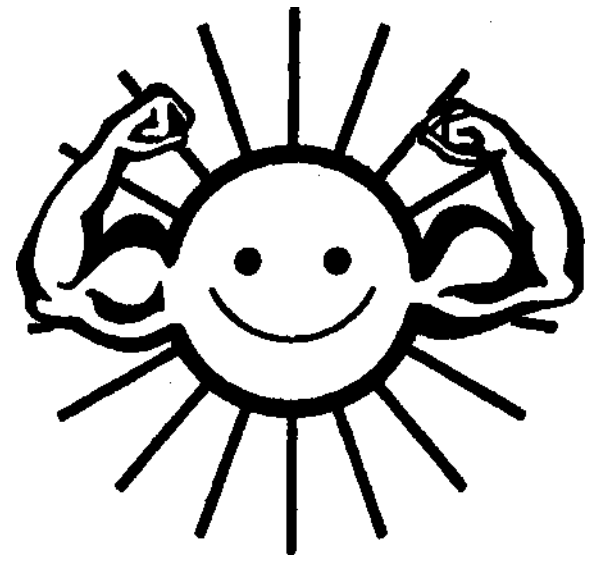
fulfilling my role. Take this

from me. Come and judge. Lighten my

load. Carry it along with me. Carry

on my messenger-mission. Stop the train. Get off

the train. The next stop is nuclear holocaust



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**The next book, the next machine, no. There is no  
such thing.**