



# ANUMUKTI

**A JOURNAL DEVOTED TO NON-NUCLEAR INDIA**

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Some ten years ago, while living in USA, I once planned to go on a sight-seeing trip. Talking to some friends about it, I said that I was off to see the jungles. They all laughed. "There are no jungles in North America," they said, "only forests". I wanted to tell them that jungle is just the Hindi for a forest but I am glad I didn't. It is not. Recently, I was blessed to see the awesome beauty of a real jungle -the Sharavati jungles near Gersappa in the Western Ghats of the Uttara Kannada district of Karnataka.

In today's India, blessings come coupled with curses. To behold this sublime sight one has to at the same time also see the terrible destruction wrought on this jungle in the name of development. The local demon here, is named Sharavati Tail Race Hydroelectric Project. Right now, the jungle has won a temporary breathing spell in the form of a stay granted by the High Court on a writ petition brought by local environmentalists.

But courts however high and enlightened cannot grant life to a jungle. Only the people residing there - the children of the jungle - can do that. The greatest tragedy in India today is that we have blindly adopted a system which makes the people partners in murder of their surroundings and eventual suicide.

I had gone to Uttara Kannada to join in the proposed "Rasta Roko - Rasta Todo" agitation against the Kaiga nuclear power plant. The announcement of elections resulted in the postponement of the agitation. Dr. Shivarama Karanth, the noted Kannada litterateur, and the driving force behind many agitations to protect the environment was persuaded by activist groups to offer himself as an independent candidate to project the environmental agenda.

His defeat holds important lessons for those who wish to form a 'Green Party' in India. Many have felt the need to elect representatives who would articulate the environmental viewpoint in legislatures and the Parliament. Unfortunately, winning elections has very little to do with issues and ideology or with the suitability or otherwise of the candidates for elective office: What matters more are organisational strength and the ability to mobilize resources.

However, legislatures too like the courts are not places where real power resides, appearances to the contrary. Power resides in the people. Given half a chance, even with an imperfect instrument, subject to all manner of abuse, the

people have demonstrated that power again and again. What the environmentalists must do, is to ensure that the chances to demonstrate power do not come just once in five years but are present all the time by right.

The ecology crisis is not an isolated crisis caused by people's ignorance; it is rather a symptom of a much deeper malaise. The real roots of the crisis lie in the fact that centralised systems of governance rob people of their power of decision: the

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power to decide about how to live their own lives ; to control their own local resources; and to decide on forms of future governance. They come to believe in the propaganda of their own helplessness and start looking towards the 'Mai-Baap Sarkar' for help and even for day to day decisions. These paper tigers in their turn look towards their own 'centre' - the kingpins of international finance for guidance and the wherewithall to keep the system going. These greedy overlords have no other answers save more consumerism which is the prime cause of the ecological crisis in the first place.

Green politics is first and foremost about restoring 'People's Power'. To be helpful in this task, environmentalists need to recognise their 'swadharma' The heady and frothy wine of electoral party politics is not for them. Their task is to educate the people to realise and seize the power they possess and to help them use it wisely.

## **Nuclear Loses Power**

November 9th marked the beginning of the end for Britain's nuclear programme. Mr Wakeham, the energy secretary announced that all nuclear power stations were to be withdrawn from the forthcoming sale of Britain's electricity industry.

The nuclear about-turn is the latest embarrassment in a shambolic tale. In July, Mr Parkinson, Mr Wakeham's pre-decessor, pulled Britain's seven elderly magnox nuclear stations from the sale after it was revealed that each could cost up to \$1.5 billion to decommission.

It is a tribute to Mrs Thatcher's blind faith in nuclear power that the remaining nuclear stations stayed in the sale plans until Mr Wakeham's date with reality. The Central Electricity Generating Board's five advanced gas-cooled reactors are among the world's least reliable and most expensive to run. Sizewell-B, under construction and the first of what was to be a family of four pressurised- water reactors (PWR), is already \$250 million over budget. Its electricity will cost up to three times as much as coal-fired power.

The other three planned PWRs will now be scrapped. Nuclear power will now be safely cosseted in the public sector, its spiralling costs hidden rather than displayed in a sales prospectus.

Source: *The Economist* 11-17 November, '89.

## **Punjab : The Land of Milk and Money**

The Pakistani government released for consumption 496 tonnes of Dutch milk which had been contaminated by the Chernobyl accident, then said that it had made a mistake. An analysis of the imported milk samples by the Pakistan Atomic Energy Commission showed that they contained cesium-134 and cesium-137 22% above the 'permissible' limits. The milk had been seized by the customs in December 1988 but released in June 1989 following appeals by importers, who promised to dilute it with uncontaminated milk in a 1-to-10 proportion to comply with European standards for reconstituted products. Punjab state Chief Minister Nawaz Sharif charged that the people associated with Prime Minister Benazir Bhutto's party used political influence to get the milk released. The Punjab government took the lead in a campaign to ban the milk, taking out newspaper ads advising people not to use milk sold under a particular brand name. The milk had been reexported to Pakistan after it was banned in Singapore.

Source: *WISE News Communiqué* 319

# Fly Now Pay Later

Over the years, the nuclear dream merchants have been losing their credibility. After all getting perpetually caught in deception has to take its toll sometime! But their Goebbels-like efforts have not been totally in vain. They have managed to lodge some blatant untruths in the public mind. The most persistent of these are:

(i) Nuclear power offers an inexhaustible source of energy; and (ii) Nuclear power is a cheap or certainly economically competitive source of energy.

We have in an earlier issue (Anumukti Vol.1 No. 3 December '87) presented facts which showed that its promise of being an inexhaustible source of energy was an empty one. Recently I was reminded of the deep rooted nature of these myths when Nation Building Forum - a New Delhi think tank - sent us minutes of a meeting they held on "Economics of Nuclear Power".

Sri G.V.Nadkarny, Director (Environment and Public Awareness), Nuclear Power Corp. of India came to the meeting accompanied by Sri T.Subbaratnam and Sri R.Shrivastava.

Reproduced below are some excerpts: With regard to costs Sri Nadkarny gave the following information:-

- \* Half the fuel charge is capitalised and interest cost is added in burn up costs.
- \* Heavy water is leased by Dept. of Atomic Energy.
- \* Interest during gestation period is calculated @ 7% p.a.
- \* Depreciation is calculated @ 3.6 p.a. on straight line method taking life as 25 years and 10% residual value.
- \* Cost of reprocessing is not added as the fuel is taken on lease.
- \* Rate of income on capital employed is envisaged @ 12%.
- \* For storage of waste a bore hole about 2,000 metres underground is planned to ensure safety.

Following questions were raised on costs:-

- \* Is interest rate realistic?
- \* What provision is made for breakdowns?
- \* For what rate of capacity utilisation are the rates worked out?
- \* What costs are included for storage and safety of nuclear waste?

- \* What are other items normally taken in costing, but not considered?

Sri Nadkarny's answers to these questions are not provided in the minutes, but his final statement was: "Even if nuclear power was 50% more costly, it was desirable in the national interest." He quoted Dr H.J.Bhabha

**"No power is costlier than No power."**

On safety of nuclear waste, he reiterated that full provision was being made and provision of 1.25 paise per unit was included for decommissioning. Members, however, remained concerned on safety and costs for storage.

Sri H.C.Sarkar the former chairman of The Bank of India who was chairing the meeting, summed up as follows:-

- \* Nuclear power was an inexhaustible source of energy, if safety could be insured.
- \* Since Japan was having four times more nuclear power than India, we may learn from safety measures adopted there.
- \* Disposal of waste remains a disturbing factor; what would happen in case of volcanic eruption or some other calamity to waste buried 2 kms. underground?
- \* Economics of nuclear power need to be watched in terms of other alternatives.

I have quoted at length from these minutes because they are a typical example of the present disinformation campaign launched by nucleocrats in the wake of rising public questioning by various citizen groups like the Nation Building Forum. The truth is, in Amory Lovins' succinct phrase, "Nuclear power is terminally sick of an attack due to market forces." Wherever businessmen have had to put up their own money rather than bureaucrats putting other people's money into it, nuclear power has already called it a day. The latest country forced to open its eyes to the reality of nuclear costs, is Britain (See following story). Despite Mrs Thatcher's obsession with nuclear power, the government has been forced to remove nuclear power stations from its privatisation plans for electricity generation. There was just no way that the hard-headed businessmen in the 'city' of London could be persuaded, cajoled or bullied to commit financial harakiri by buying shares in companies owning nuclear power stations.

Before commenting on the one firm figure in Sri Nadkarny's presentation, let me put forth a summary

of facts regarding nuclear costs in the U.S. It has been prepared by Public Citizen: Critical Mass Energy Project - a US group monitoring nuclear activities. Though the data presented is that of the U.S., it does reflect a worldwide trend and is not of relevance to US alone.

### **Nuclear Power: Too Costly To Continue**

Nuclear power has become the most expensive of all conventional sources of electricity production.

### **Operating and Repair Costs Have Been Increasing Rapidly**

- \* Since 1970, the cost to operate and maintain nuclear plants has risen four fold in real dollars - an average annual increase of about 11% above inflation.
- \* From 1970 to 1987, annual repair or "capital addition" costs rose from an average of \$1.70 per KW (\$4.84 per KW in 1987 dollars) to \$32.09 per KW - a seven fold increase in real dollars. This equals an average annual increase of about 12% above inflation. In 1986 alone, the cost for major repairs increased by more than 30%.
- \* Major repairs, which can cost hundreds of millions of dollars per reactor, often yield no improvement in plant performance. In 60% of the cases in which nuclear reactors have reopened following long outages for repairs, the reactors had lower capacity factors after the outages than before. Of the 13 reactors that began year long (or longer) outages after operating for 10 or more years, only one improved its capacity factor.
- \* Operating, maintenance, and repair costs increase dramatically as plants age; for those plants which opened before 1970, these costs are double those for plants which opened in 1970 or later

### **Nuclear Waste and Decommissioning Costs**

- \* Managing high-level nuclear waste under the current Department of Energy (DOE) programme will likely cost ratepayers 4 to 12 times more than now projected. The General Accounting Office has projected that the present federal waste programme may produce deficits of \$21 to \$76 billion by the end of the programme.
- \* Since 1982, the DOE's cost estimates for the high-level waste programme have already doubled; from 1985 to 1987 alone, its estimates rose by almost 40%.
- \* The costs to decommission nuclear plants range from \$100 million to well over \$1 billion. For example, the Long Island Lighting Company which owns the Shoreham reactor, estimates decommissioning costs to be about \$440 million even though the plant has only operated at low power for a short time.

- \* Inasmuch as plants become more radioactive the longer they operate, continuing to operate nuclear plants can increase the cost to decommission the facilities by hundreds of millions of dollars.

### **Nuclear Power is Heavily Subsidized**

- \* Nuclear subsidies totalled over \$15 billion in 1984 (the most recent year for which data is available). A 1980 DOE study estimated that if direct and indirect federal subsidies for nuclear power had been borne by private firms, the cost of nuclear electricity would range from one and a half to two times its current cost.
- \* Proposed federal outlays for nuclear fission research and development by DOE in fiscal year 1990 total \$350 million; by comparison, the proposed budget for energy conservation programmes is only \$88 million.
- \* The Price-Anderson Act, which limits the nuclear industry's public liability in case of an accident, artificially lowers the nuclear utility industry's annual insurance costs by \$1-\$5 billion.

### **Total Costs Are Double What the Industry Claims**

- \* The nuclear industry claims that nuclear "production costs" averaged just 2.13 cents per kWh in 1987. However, this figure fails to include several major costs including major repairs and the true costs for waste disposal and decommissioning. When these additional costs are tabulated, the total costs to continue operating a nuclear plant averages between 3.7 and 5.3 cents per kWh, with some reactors costing more than 10 cents per kWh.
- \* Operating the nation's commercial nuclear plants may thus be costing \$7 to \$13 billion more per year than nuclear industry's current estimates of \$8 billion.
- \* These operating costs do not include construction costs which now average between \$2 billion and \$6 billion per reactor.
- \* Even the utility industry implicitly acknowledges the high cost of nuclear power. Over the past two decades, 112 nuclear power plants ordered by nuclear utilities were subsequently cancelled because of projected high construction and operating costs whereas only 110 are presently licensed to operate.

### **Nuclear Power is Unreliable**

- \* U.S. reactors regularly experience long, unexpected outages. Although designed to operate at 70-80% of their capacity, U.S. reactors have operated at an average of only 57% of their capacity over the past sixteen years and never better than 64.7% during any one year.

\* U.S. reactors were designed to operate for at least 30 years. However only five U.S. plants have operated beyond 20 years while 13 have been closed before their 20th anniversary.

It is a pity that one needs to bring in facts regarding costs in U.S. reactors in a discussion on Indian nuclear costs. But despite repeated promises of openness, getting hard figures from Indian nucleocrats remains a herculean task.

Nuclear advocacy arguments keep changing continually. Though, there remain some old favourites. Thus, "Nuclear power even if 50% more costly..." is far removed from the "Too cheap to meter" days but raising unfounded fears about a dark and powerless non-nuclear future is typical. So is the almost ritualistic invocation of "National Interest." Truly has it been said that "Patriotism is the last refuge of scoundrels."

As an example of the kind of fraud being done let us consider the 1.25 paise per unit being accounted for in the cost of nuclear electricity to create a decommissioning fund. The six reactors we have presently in commercial operation, (Narora has yet to do so) together produce, according to Nuclear

Power Corpn. own publications, around 5,000 million units every year. Thus, the fund accumulates around 62 million Rupees a year or about one crore Rupees for each reactor. Over an expected life-span of 25 years each reactor would after taking 7% compound interest into account, create a fund of Rs.70 crores. Presently, even the most optimistic estimates of decommissioning costs put a figure three to four times this amount. But estimates of decommissioning costs have been rising all the time and the real amount may well be twenty times this figure or more.

Continued operation of old plants would increase the decommissioning bill by hundreds of crores of Rupees. However, that bill is going to come safely after the glorious retirement of the present leaders of the nuclear establishment. Whereas, shutting down of these plants as sound economic sense requires, would just bring the true costs of nuclear power out into the open. So much for national interest!

Surendra Gadekar  
Sampoorna Kranti Vdyalaya  
Vedchhi 394 64

## **ANUMUKTI LIVES BUT STILL NEEDS YOUR HELP**

The response to reports of *Anumukti's* (the journal not the idea) demise has been overwhelming. The number of subscribers has already crossed 650. The highest ever.

### **THANK YOU**

Last issue's printing was an eyesore. Our fault not the printer's. The printing process we were using involved a dot-matrix printer. From this issue onwards we plan on using a better printer. How do you like the new looks? Please let us know.

The present issue has too much of WISE in it. We need individuals and local groups to write reports (even short ones) on what they are doing, so that *Anumukti* becomes a 'Window to the World' not only for those inside India but for those outside looking in as well.

The country has a new Parliament which needs to be educated about the nuclear issue. As an experiment, we are willing to send three issues free to any MP whose name is recommended by a subscriber. We expect that the person making the recommendation will make some effort to make the MP read the journal. Please send us your suggestions. Please send us your suggestions to help *Anumukti* fulfill its educational role.

# Childhood Leukemia Increase Around Nuclear Facilities

Last May, the Atomic Energy Control Board (AECB) of Canada released a study on childhood leukemia in the vicinity of nuclear facilities in Ontario, Canada. Despite methodological problems which have probably diluted its findings, the study found higher than expected levels of cancer in the Elliot lake area (where uranium mining and milling is conducted), in the Port Hope area (where uranium refining is conducted), and in the areas around the Bruce and Pickering nuclear power stations. The study found lower than average levels around the Chalk River Nuclear Laboratories and the nearby Rolphoton reactor which was shut down in 1965.

Leukemia is a form of cancer which attacks the white blood corpuscles. Only two agents are known to cause leukemia in humans - ionizing radiation and benzene. Exposure to radiation in the first trimester of pregnancy is the most probable factor in the leukemia increase which involves a diagnosis before the child is five years of age. Radiation damages both bone marrow and lymph tissue, which generate the blood cells.

The study, entitled Childhood Leukemia Around Canadian Nuclear Facilities - Phase I was commissioned by the AECB, and was produced under contract by Dr. Aileen Clarke and Mr. J. McLaughlin of the Ontario Cancer Treatment and Research Foundation with the assistance of Dr. T. W. Anderson of the University of British Columbia. It is based on a similar study carried out in Great Britain.

In 1983, a television programme reported high levels of leukemia in children living in Seascale, a town on the Cumbria coast of the United Kingdom. The village is located beside a fuel reprocessing plant called Sellafield used to manufacture plutonium for the British nuclear weapons programme. In 1957, an accident occurred there. In those days the plant was known as Windscale. Eleven tonnes of uranium caught fire and radioactive contaminants were spread around the countryside. For public relations reasons the name of the plant was changed to Sellafield. The controversy from the 1983 programme generated a public inquiry, and a study subsequently confirmed a level of childhood leukemia more

than nine times higher than what would normally be expected. Other studies have also found elevated levels of leukemia around UK's other reprocessing plant at Dounreay on the Scottish coast and the nuclear weapons and research facilities at Aldermaston and Burghfield, but not around civilian nuclear power stations.

Dr. Rosalie Bertell has identified a number of shortcomings of the AECB study. She argues that the most significant fact is that the accepted "normal" levels of leukemia are already too high, since they are based upon the already elevated levels caused by the atmospheric nuclear weapons tests of the 1950s. "Using these high cancer/leukemia rates as normal tends to obscure and underestimate localized effects due to nuclear and uranium activities."

Other factors identified by Dr. Bertell as influencing the results include:

- \* The mixing of urban and rural rates of leukemia to determine expected rates may have biased the results, since the power plants are mostly in rural areas and there is some evidence to show that there is increased risk of leukemia in urban areas. Ontario has no legal requirement to register cases of cancer, thus indirect sources of information need to be used, increasing the risk of missing cases.

- \* The study did not try to quantify the risk of childhood leukemia in relation to radiation doses and exposure to chemicals in the environment in the vicinity of nuclear facilities.

- \* The study simply ignored some Quebec data that should have been included in the Chalk River portion of the study just because it was outside Ontario.

Source: The Anti-Nuclear Review summer/fall 1989.

# Vandellos Lost

Chanting "Stop Nuclear Power Plants," 15,000 people blockaded the Vandellos nuclear power station in Tarragona, Spain on 5th November. The blockade, which was carried out from both the land and the sea, lasted 3 hours and was part of the ongoing series of protests against the plant following the fire in the plant on 19th October.

The fire, which is even officially admitted to be "the worst ever accident at a Spanish nuclear plant," occurred when one turbine stopped suddenly. The weight of the machine (five tons) then proceeded to heat up the lubrication oil which decomposed and lost hydrogen. The hydrogen exploded and then the turbine itself caught fire. The fire continued to burn for nearly four and a half hours and seriously affected two of the four connections from the turbine to the plants cooling system.

Because the plant did not have the required fire fighting equipment, firefighters from neighbouring communities had to be called in. Some came from as far away as Bella Terra, 100 kms from the facility. None of the fire departments were covered by Spain's nuclear emergency plan. As a result, they did not have appropriate equipment or training. Because of this, they piled one calamity on top of another. For instance, they used water to fight the fire, whereas they ought to have used foam to prevent electrical short circuits. The basement ended up flooded and the plant's director explained that the big smoke column coming from the plant was due to the burning of electrical insulators - one step closer to a really big catastrophe.

The Spanish Commission for Nuclear Safety,(el Consejo de Seguridad Nuclear -CSN) and the government first said that no radiation escaped, but later ammended this statement to no 'significant' radiation releases and said that there was no danger to the surrounding population. Though as usual they did not publish the measurements taken around the plant by the local government.

Vandellos-1 has a history full of overheating as well as corrosion problems. After the Chernobyl disaster, CSN had ordered five modifications, but only two were made. One of the modifications not made related directly to the fire. CSN had asked

for a modifi- cation that would make the four connec- tions to the cooling system more independent of each other. The plant's director recently said that it was impossible to put in a fifth connection because of the cost. If the four connections had caught fire, then the 3,000 tons of graphite inside the reactor would have also ignited.

Because of the seriousness of the incident, it is necessary that the public be informed into the causes and consequences. However, there has been no publicity given to the incident by the authorities. According to WISE- Tarragona, the fire could have been avoided because the same kind of accident had occurred at one of the Asco nuclear plant reactors. Vandellos' opera-tors should have learnt from it, but had obviously hadn't. Also, they claimed that the firefighting equipment at Vandellos would not be able to pass inspection by the IAEA. Meanwhile, CSN stated that it was premature to specu- late about the future of the reactor.

The blockade on 5th November was organized by "Committe Anti-Nuclear de Amettla" and began with a march going around surrounding villages. While people walked to the plant site to set up the blockade, at the same time, ships and boats set out from the nearby village of Amettla de Mar to complete the blockade on the seaward side.

On 12th of November, an unofficial referendum was held in Amettla de Mar on the question of closing down of the nuclear plant. More than 80% of the villagers eligible turned out to vote and 99.99% voted to shut down the plant.

Source: *WISE News Communique* : 320.2207  
and

321.3216

# Proper Approach to Pollution

*For want of a Nail ... Ben Franklin*

*For want of a nail, the shoe was lost ...*

*For want of a shoe, the horse was lost ...*

*For want of a horse, the rider was lost.*

**Let us not make our descendents say : For want of principle, human health was lost**

As the environmental movement worldwide gains strength, it is appropriate to consider certain lessons -- of great importance to the entire movement -- which can be uniquely illuminated by the nuclear energy controversy.

## **The Burden of Proof**

Industrialization and the introduction of popular consumer items, like cars and radios, has proceeded apace. It has been a long time before it became evident that serious thought should be given to the injection into the environment of legions of physical, chemical and agricultural pollutants -- like radiation, asbestos, lead, mercury, pesticides, dioxin, CFCs and more ...

As concern about pollution ("dumping") began to grow, the response with respect to each type of pollutant was: "Show us the harm before you ask us to restrict anything." For instance lead from leaded gasoline was spread everywhere before there was irrefutable evidence of its damage to the central nervous system, the kidneys, etc. Recently, long term effects are increasingly being observed even with lead levels much lower than previously believed to be harmful.

## **Back to the Caves**

Strongly resisting the environmental awareness in the public today is a very influential crowd representing the 'Special Interests' who say that there is no need to waste resources preventing environmental pollution by any agent whose harm is not yet proven. They insist that the burden of proof is on those who claim such measures are necessary. Citing "scientific uncertainties" they come close to denying that pollution hurts anything at all especially HUMAN HEALTH.

At the same time they also warn that if the so-called environmental extremists were to prevail, the result would be DISASTER for everyone. There would be lower standards of living, unemployment, an end to progress, and perpetual poverty for the Third World. And while saying all this they try to pin the label "alarmist" on to the environmentalists. These accusations are often accompanied by a non-sequitur: "Life expectancy is longer than in the past."

Well, certainly life expectancy SHOULD be longer. After decades of progress in sanitation and in controlling infectious diseases, if life expectancy were still the same, it would mean that these advances in health were just barely able to balance new forces which were tending to shorten life expectancy. Moreover, it is a mistake to regard good health and longer life expectancy as one and the same thing.

So, the central question is: What is the proper approach to pollution in the absence of solid health data on toxicity and possible safe doses, for each of the 10,000 or more different pollutants and their interactions.

## **No Dumping Principle**

No one has any right whatever to dump any industrial or personal waste products into any part of the commons or into any kind of personal property. The principle does not require demonstration of potential harm from such dumping.

Where might we be now, if the no-dumping principle had been in full force 100 years ago?

Industry's development would have occurred along totally different lines. Industrial processes would have been designed to produce as little waste as possible, and with respect to unwelcome

by-products which were unavoidable, the expected operating status would have been full containment. An ethic would have developed by now in the public, where severe disdain would prevail toward those who have treated others with contempt by dumping on them. Motorists would not be claiming the pseudo-right to choose fuel-inefficient, high-polluting automobiles. Smokers would never have claimed the pseudo-right to make others tolerate their smoke. The shame of using other humans as experimental guinea-pigs would be well understood. Behaviour would be kinder in many ways.

### **The Reign of the "Prove Harm" Rule**

In the absence of the no-dumping principle, the "prove harm" rule dominates worldwide. Therefore, it is important to consider the consequences for human health of continuing under that rule. Nuclear energy history illustrates in a classic fashion what actually happens.

Inevitably, every polluter will suggest that (1) his pollutant is harmless, below some "threshold" dose, and (2) a small amount of substance which is harmful at high doses (e.g. aspirin, trace minerals) may be good for people at low doses... so each pollutant must be examined for possible beneficial effects on the public at large. (The technical jargon indicating possible benefits is "hormesis".) Every industry must hope that some "pioneer" polluter will make a plausible case for a threshold or for hormesis. And the idea is attractive to the public too. We all WANT to believe that harm is absent or doubtful from each additional thing that is dumped on us.

Secondly, a small group of vested interests, working for a benefit which is concentrated upon themselves, can almost always prevail over the vastly larger number of people who will pay the diffused costs. The general public puts up with paying for subsidies, tariffs, organised crime... and pollution... because each individual regards his direct cost of submission to be lower than his direct cost of resistance, on each of the thousands of separate issues -- especially when it is likely that the system is biased in favour of the special interests.

The "prove harm" rule is inherently unfair to the victims of pollution. It forces them to pay once as taxpayers for information they distrust from government funded research and pay again for information they distrust (in the form of tax write-offs)

for polluter funded research and pay yet a third time directly for information they CAN trust.

No matter what the public can show scientifically - even millions of DEATHS -the denial syndrome is powerful. When it comes to cancer from radiation, for instance, the model for some of the responses seems to be the Flat Earth Society. And lastly, it turns out, that the proof of harm is not good enough ANYWAY. Then the argument begins over how much is too much. It is true that the million extra cancers from Chernobyl will occur gradually over 75 years or so and will NOT be detectable in the Vital Statistics. But not being detectable does not mean that they would be absent. Under the "prove harm" ethic, any health effect which conclusively fails to show up in the Vital Statistics is considered as "inconsequential." I can not regard giving cancer to a million people a negligible crime, but that is where the "prove harm" rule leads one to.

A brief review of events will make it self-evident how the radiation issue provides a giant warning with respect to handling other additional pollutants.

### **Lessons from 1969-1979**

While nuclear power was still in its infancy, its promoters said that, in the absence of hard evidence, they were going to act "prudently" and assume that ionizing radiation is harmful in proportion to the dose, right down to the lowest possible dose. This is the "no-threshold" and "linear model of dose vs. response," and it was still the official position with respect to radiation in 1972. Indeed, thanks to citizen pressure in those years, the government drastically reduced "permissible levels" of dumping by the nuclear industry and those reductions may have saved millions of people from radiation-induced cancer.

But all this happened before the nuclear industry realized how costly and difficult it would be to contain its radioactive by-products. Ever since the mid-1970s, a campaign has been conducted to convince the public that radioactive pollution is not worth bothering about.

For instance, every time a leak or spill occurred into the environment, there were claims that the release was below the level where any injury to public health would occur. The fact that these claims are unsupported by any evidence and are also in direct conflict with the "no-threshold" position

and are thus irresponsible, is not the point. The point is that the claims are made again and again, nonetheless.

Soon we heard nuclear polluters saying at every occasion, "It is doubtful that anyone at all has been injured by the nuclear power industry. Show me ONE member of the public whose cancer was proved to be due to radiation." Since no cancer carries an identity tag telling us its cause, no particular case can ever be proven beyond reasonable doubt to be the radiation caused cancer. Similarly, no particular case of lung cancer can ever be proven beyond reasonable doubt to have been caused by smoking. Yet, in both cases definite proof exists for cancer induction, and it comes from careful study of groups. The lesson: Introduction of confusion is inevitable under the "prove harm" rule.

#### **Lessons from 1979-1989**

After the Three Mile Island accident in 1979, despite public denials the nuclear promoters realized that major releases of radioactivity were a real possibility in future accidents. It seemed obvious to me at the time that a full reversal of the no threshold linear dose response theory was needed for the health of this industry. And lo and behold, two of the leading radiation committees published reports in 1980 in which they discarded linear dose-response and claimed that cancer risk per unit dose is much LESS at low doses than at high doses. As for a threshold, the idea was revived by the statement, that there was "uncertainty as to whether a dose of say 1 rad would have any effect at all." (BEIR-3 report p.193) This 1980 reversal occurred IN SPITE OF the strong human evidence accumulated since 1972 that the cancer-hazard was probably WORSE per unit of dose at low doses than at high doses. Records show that the radiation committees were fully aware of the fact that the human data did not support their action in claiming the opposite.

The important lesson is the same in any case: Those who plan to defeat pollution under the "prove harm" rule are going to find that proof makes no difference. Because stronger the evidence supporting toxicity in humans, more attention and support will be concentrated on the idea of some safe dose and some speculative low-dose benefits. For instance by 1985, a campaign was underway to present "possible beneficial effects" from low-dose ionizing radiation as a reputable hypothesis. A

conference on "radiation hormesis" was organized. No benefits showed up ... which was all the more reason for INTENSIFYING the search.

#### **Lessons from 1986-1989**

The Chernobyl accident was the Waterloo of the nuclear power industry. The resulting fallout will give cancer to about a million people if one uses my estimates of risk per rad and no threshold. Using the same dose estimates, but using the underestimates of risk per rad prepared in 1980, the radiation community produced much smaller estimates of cancers than mine. But the accident was so enormous that even the underestimates produced figures like 14,000 to 75,000 extra cancer fatalities. The response? Referring to its own 1987 estimate of 28,000 cancer fatalities, the U.S. Department of Energy stated that the number is "negligible" compared with spontaneous cancer deaths (DOE 1987, p.xiii).

Even my own estimate of a MILLION extra cancers (half of them fatal) is a small number compared with the number which will occur anyway, but of what relevance is the comparison? If "perspective" is the issue, why not remind people that all mayhem and murder and wars are just trivial killers compared with the NATURAL death rate (which is 100 percent).

This repeated statement that extra deaths constitute a very small increment over the natural background constitute the other big warning from the radiation controversy to the environmental movement in general. If you prove harm, you will end up arguing over how MUCH killing can be inflicted with impunity. Once premeditated random murder by polluters receives legal approval, and is also accepted as an ethical norm by the environmental movement, more than the PHYSICAL health of humans is in peril.

By the time the 1987 DOE report was abbreviated in the journal Science (Dec.16,1988), the number of fatal cancers had been reduced from 28,000 to 17,400. Prominently displayed next to the number 17,400 was the number 513,000,000 - the number of spontaneous cancer fatalities expected in the entire Northern Hemisphere during the same decades. Now even 17,400 deaths from a single accident is not a pretty picture. So, seven times in just six pages the report claims that exposure from the accident may cause NO extra deaths at

all. The President of the Health Physics Society has gone even further in promoting the safe-dose idea, by suggesting that very low-doses should not even be CONSIDERED in estimating risks from radiation. Meanwhile, the Nuclear Regulatory Commission BEHAVES as if there were a safe dose by proposing that some nuclear waste is "below regulatory concern" and can go directly into dumps.

All this is happening concurrently with new evidence from the atomic-bomb survivors which confirms that (A) the risk-per-rad is much higher than estimates used by the radiation community and (B) the risk-per-rad is NOT lower when the total dose is low - the risk is probably higher. In 1987 and 1988, not one but TWO groups of analysts within the radiation community have confirmed such findings.

In the face of mounting evidence to the contrary it is wondrous to behold how some people can maintain their faith that the waste they produce will be a BOON to humanity. This faith is strongest when needed most: After Chernobyl and after revelations of radioactive messes around DOE facilities. The power of faith is a marvel, for suddenly speculation about possible benefits from nuclear pollution has started to show up everywhere, as needed. If you don't believe this is happening, check the journals - *Science* (August 11, 1989), *Health Physics* (May 1987), *Lancet* (August 26, 1989 p.518) or *National Geographic* (April 1989, p.411). The Dept. of Energy and the Electric Power Research Institute are major sponsors of research and conferences on possible benefits.

### The Original Question

Our original question was: What is the proper approach to pollution in the ABSENCE of solid health data on toxicity and possible safe doses for each of the 10,000 pollutants?

Yet the events described here are occurring in a field where solid health data are PRESENT, both on the magnitude of cancer risk and on the absence of threshold. Indeed, it is unlikely that there will ever be comparably definitive human evidence for any other pollutant on such questions. The reason is that ionizing radiation is unique in several ways. For instance, in this field we do not need to rely on possibly irrelevant, and therefore eternally inconclusive, data from other species or cell studies. Extensive human data already exist for

radiation because it is widely used in medicine. In addition, as a result of the atomic bombings in Japan, genuinely comparable groups of humans exist who were exposed to very different dose levels. This situation is important for proving causality beyond a reasonable doubt. This is unlikely to occur for other pollutants. Thus, relative to ionizing radiation, "proof of harm" in humans from each of the other 10,000 pollutants is going to be even harder to obtain and far easier to challenge.

I do not deny that, under the "prove harm" rule, we have had some successes in reducing the dumping of certain pollutants, including radioactive ones, thanks to the dedicated efforts of citizens. But the lesson remains nevertheless, that the "prove harm" rule puts human health at peril.

In the absence of the no-dumping principle, each and every victory is subject to REVERSAL. Research will be generously sponsored in the search for that silver lining, and no matter how inconclusive, a succession of new studies will then become the occasion for debate on RELAXING restrictions on a particular pollutant. Nothing will ever be settled. While "debate" is conducted on 10,000 separate pollutants separately in different countries, the bulk of dumping will continue. Worldwide pollution will increase. Even if the unknown (and unknowable) risks from each of pollutants were very small, the AGGREGATE injury to health - from letting each of them build up in the biosphere - could be unpredictable and huge.

It follows that the "prove harm" rule is a totally irresponsible way to approach the pollution issue. The only realistic approach to reducing and preventing pollution is the no-dumping principle. In the absence of this principle, it is essential that we and others keep providing independent research, but we must work vigorously at the same time for adopting the no-dumping principle on behalf of the future generations who rely on us.

*Dr. John W Goffman*  
Committee for Nuclear Responsibility  
P.O.Box 11207, San Francisco,  
California 94101 U.S.A.

Dr.Goffman is Professor Emeritus of Medical Physics at the University of California, Berkeley and was the Director of Biomedical Division of the Livermore National Laboratory 1963-69.

## Going "Dutch"

An illegal trade in seafood which is irradiated to kill traces of Salmonella before being imported into Britain has been exposed by the British newspaper, The Sunday Times. The trade was brought to light by reporters who posing as buyers were offered a 16 ton consignment of Indian prawns which had been seized and condemned by US health officials because of salmonella contamination. The offer came from Landauer, a London firm of commodity brokers.

Landauer sent out a telex in early August soliciting bids from would be British clients. One of Landauer's dealers offered to send the prawns "on a holiday to Holland," a trade expression for diverting them to an irradiation plant in The Netherlands. Another trade term for this is "Dutching." British port health officials testing for salmonella would be unable to find any traces as well as would not be able to detect that the prawns had been irradiated.

Landauer, which has an annual turn-over of more than 26 million pounds sterling, told the Times reporters that they could save British duty on the shipment by pretending that the prawns had been directly imported from Holland. Seafood imported from US carries a 12% duty but the duty is only 4% if it is brought in directly from India via Holland. Even accounting for the costs of irradiation, the shipment could have made a profit of around 100,000 pounds.

Such offers are commonplace according to importers. Landauer itself admitted that it regularly tried to sell rejected US seafood. Rinus Verwijs, a Landauer director, is quoted as saying, "We tell our customers that it has been rejected. What they do with it then is entirely up to them."

Opponents to food irradiation are actively responding to situations such as this. The International Food Irradiation Network, a coalition of groups opposed to food irradiation from around the world which has its clearinghouse in Penang, Malaysia, has circulated a memo giving details of its campaign. The main objective of the campaign is to encourage companies in the trade to declare that they will not sell irradiated foods - thereby signalling that they are dealing in a clean product that did not need irradiation

to cover up bad hygienic practices. Groups in Australasia, North America, Japan and Europe are being asked to write letters to each of the major importers in their region asking them to (a) give an assurance that they would not be importing irradiated sea- foods; and (b) highlighting the problem the importing companies will have in making sure that the product they buy is not irradiated and asking for a statement that they have or will seek written guarantees from their suppliers that they are not irradiating seafoods.

The organisers of this campaign expect that it will serve to let the major importers know that there is concern over this practice and this message will filter down the seafood supply chain to the exporters in South East Asian countries who are being told that they need irradiation to get their products accepted in the markets of the developed world. This will lay the foundations of the second phase of the campaign where they will organize a similar letter writing campaign to exporting companies.

For ways in which you can participate in this campaign, contact:

*Martin Abraham*  
IOCU,  
P.O.Box 1045,  
10830, Penang Malaysia

## Chernobylia

The Byelorussian parliament has asked Moscow on 25 October to approve a massive programme to clear up after the 1986 Chernobyl accident. Faced with public discontent over failure to deal with the accident's aftereffects, the deputies voted for a 17 billion roubles cleanup programme. This sum is well over one and a half times the Republic's normal annual budget. If implemented the plan would include building 40,000 new homes to house 100,000 people still living in the contaminated zone. Local environmentalists say that the number is actually closer to half a million. Several thousand people demonstrated in Minsk in September to demand that authorities do more to deal with the effects of the accident

# HANFORD RADIOACTIVE FALLOUT

It is well known that the atomic bomb which destroyed Nagasaki on August 9th, 1945 killed thousands on the spot and continues to take its toll even today. Not so well known is the fact, that the same bomb also claimed victims thousands of miles away, "downwind" from Hanford, Washington, U.S.A.

The plutonium for the Nagasaki bomb was extracted at Hanford. During the emergency of war, there was no time to wait for the three months it would have required to let the radioactive material 'cool' through natural decay. So, large quantities of radioactive iodine were released to the atmosphere. Even after the war was over, the practice was continued probably due to bureaucratic inertia and insensitivity.

Today, a mind-boggling amount of information is being generated which remains unintelligible to all except a miniscule minority of initiates. This book by Dr. Allen B. Benson, is the result of an 18 month survey through thousands of pages of medical and scientific literature on radioactive iodine and the thyroid gland. It brings coherence to this vast body of data by correlating it and marshalling it in a lucid manner. It would be of special interest to doctors and also to antinuclear groups as a superb reference on the subject. Its price at \$12.95 is steep for most Indian purses but maybe not for libraries.

## **Hanford Radioactive Fallout Are there observable health effects?**

Allen B. Benson, Ph.D

High Impact Press, P.O. Box 262, Cheney,  
Washington 99004 U.S.A.

### **A Summary of Results**

Between 1944 and 1956, Hanford plutonium production facilities released about 530,000 curies of radioactive iodine-131 to the atmosphere. These emissions - which came to light two years ago when the U.S. Department of Energy finally agreed to release hundreds of once-secret Hanford historical documents - are the largest releases ever recorded from a U.S. nuclear facility. Yet, despite the attention these documents received from the news media, government officials, the scientific community and the public, little has been done to determine how Hanford's emissions

may have affected the health of the people in the region.

In 1986 radiation experts at Washington's Department of Social and Health Services (DSHS) were able to make preliminary calculations based on environmental measurements recorded in the Hanford historical records. The DSHS calculations clearly suggest that some of the nearest "downwinders" received sizeable radiation doses to the thyroid gland. For example they show that in the year 1945 children living in Pasco (about 30 miles from the source of the radioactive releases) and consuming locally produced milk and vegetables may have received 1,175 rems to the thyroid. (A rem is a measure of the biological effect of radiation.) By contrast, children living just over 3 miles from Chernobyl are estimated to have received only 120 rems to the thyroid. The National Committee for Radiation Protection labels 1,500 rems to the thyroid as a "high dose."

The larger doses from Hanford seem perplexing at first, because Chernobyl's iodine leak - 7.3 million curies - dwarfs Hanford's release. In other words, Chernobyl discharged more than 10 times more radioiodine than Hanford, but people living near Hanford received about ten times more radiation than Chernobyl's next door neighbours. Why? For one thing the meteorological conditions at Chernobyl were different. For another, the intense fire in Chernobyl's graphite core drove the radioactive materials high into the air where they could be dispersed more broadly by the winds. But the major reason for Hanford's higher doses is that at Chernobyl steps were taken to substantially reduce public exposure: contaminated milk and food were confiscated, and populations were evacuated from the most affected areas. At Hanford the public was allowed to take the dose.

By now, a large body of evidence has accumulated on the effects of radioactive iodine on the thyroid gland. General physicians see more thyroid disorders than any other endocrine disease. Since the late 1940s radioactive iodine (primarily iodine-131) has been used so extensively in the diagnosis and treatment of thyroid illness that researchers regard it as the most thoroughly investigated organ through the use of radioisotopes. This wealth of data sheds considerable light on the risks associated with Hanford's iodine fallout.

While cancer, birth defects and genetic damage form the classic triad of radiation health effects, the most common health problem arising from Hanford's iodine was probably the induction of hypothyroidism in adults, children, infants and fetuses. This is not to say that other injuries - perhaps including embryo deaths and stillbirths - were not present. But in medical literature one conclusion towers above all the rest: radioactive iodine in "low" doses can cause hypothyroidism. The consequences can range from the disastrous to manageable.

The business of the thyroid is to regulate metabolism; it governs the myriad chemical and physical processes which provide energy for the growth and maintenance of the body.

The thyroid performs the task by secreting thyroid hormones to the blood through a finely regulated system involving the hypothalamus, pituitary and thyroid glands. The "fuel" of the thyroid gland is iodine.

So hungry is the thyroid for iodine that it packs it into its lining (epithelial cells) in concentrations 30 times above its presence in the plasma. Iodine is so vital to life of the thyroid that the normal gland maintains a reserve sufficient to last 100 days.

Because the thyroid has a huge appetite for iodine and cannot distinguish between radioactive and non-radioactive forms of iodine, radioiodine is an effective agent for measuring thyroid function and treating some dysfunctions. Diagnostically iodine-131 is used in very small doses - millionths of a curie - to trace the turnover of iodine, thereby measuring the activity of the gland. An improperly functioning thyroid gland can secrete too much hormone (hyperthyroidism) or too little (hypothyroidism). The former speeds the body up, the latter slows it down. Therapeutically, iodine-131 is used to destroy cells in a "hyperfunctioning" thyroid and sometimes to destroy malignant cells in a cancerous thyroid.

In children, hyperthyroidism may accelerate growth and development. In victims of all ages it can cause simultaneous weight loss and ravenous appetite. It is associated with many eye problems, goiter, hyperkinetic behaviour and psychological instability, quickened reflexes with some muscular weakness and poor endurance, pulse rates over 120, smooth, warm and moist skin, heat intolerance, blood problems such as too much plasma, and such gastrointestinal symptoms as excessive defecation.

Hypothyroidism, on the other hand, is characterized by, among other things, physical and mental torpor, pulse rates below 60, puffy face and dry scaly skin, cold intolerance, such blood problems as anemia

and too little plasma, and constipation. Some hypothyroidism occurs naturally at birth (affecting about one in every 7,000 infants) and some occurs spontaneously, usually in middle age. But most hypothyroidism is iatrogenic - that is, caused by medical procedures such as surgery and radioiodine therapy. Studies show that a high percentage of patients treated with iodine-131 become hypothyroid. In the opinion of some doctors, virtually all patients so treated eventually become hypothyroid.

Hypothyroidism is most serious in the fetus, infant and pregnant woman, because an inadequate supply of thyroid hormone compromises normal development. Threatened are injuries ranging from undiscovered embryonic deaths to stillbirths, from mental retardation of all degrees to a host of skeletal and central nervous system defects. Hypothyroidism has ominous implications for pregnancy outcome. The stillbirth rate is doubled and there is a high incidence of prematurity and congenital deformities.

The good news is that if neonatal (new infant) hypothyroidism is detected at birth, even severe cases have been shown to respond to thyroid hormone replacement therapy; normal physical and mental development has been reported by adolescence. The bad news is that if neonatal hypothyroidism isn't treated during the first two years of life, permanent disability is inevitable.

Medical consensus now holds that fetuses are so vulnerable to radioiodine that no exposure at any level is considered acceptable. Radioactive iodine is the only known circulating substance capable of crossing the placenta and selectively destroying the fetal thyroid. Research suggests that this can result from maternal exposures as little as 25-50 microcuries. A large body of research has found that in both animals and humans, the fetal thyroid is far more sensitive to radioiodine than mother's thyroid. One study concluded that a radioactive iodine dose to the thyroid of a pregnant mother at the end of her first trimester of pregnancy resulted in a radioiodine dose magnified by about 25 times to the thyroid of her fetus.

Based on standard measurement procedures, it would appear that in 1945 Pasco fetuses could have received enough iodine-131 from Hanford emissions to induce hypothyroidism by destroying portions of the developing glands.

Source : *The Hanford Journal*

# LETTER BOX

Thank you very much for your letter of protest against the Katun River dam project. The decision on the construction of the dam has been postponed by the government till next spring due to the requests put forth by the public and the Altay Salvation Committee. So, we expect one more 'battle' for the protection of Altay. The support of foreign scientific and green community is very important for us just now. May be you know that the Altay mountains are connected with the name of Nicolai Roerich, the Russian-Indian philosopher and painter. A little museum of his paintings exists in Upper Ujmon (the Katun river valley-the upper part). So, if any Indian organisation whose activity is connected with the name of Roerich, protests against the Katun dam, it would be very useful.

Maria Ananicheva  
Institute of Geography  
Academy of Sciences  
Staromonetny Str. 29,  
109017 Moscow, USSR

Narora Nuclear Power Station was dedicated to the nation on 15th October, 1989 with much fanfare. A pigeon showed the state of the security arrangements by entering the control room.

The biggest problem that nuclear power poses is the disposal of radioactive waste. The solution offered by the nuclear industry at present, is to just stuff it somewhere and hope that it will never leak out. In view of this should we continue with the expansion of the nuclear industry?

Laxmi Narain Modi  
Nation Building Forum  
C-38, Pamposh Enclave  
New Delhi 110048

Since last one year, the first ever "School of Environment" has been functioning in Pondy. Yesterday two of the students saw Anumukti and faught

for the issue, noted the address and were glad to learn about the journal.

There is a rumour that the Russian reactors which are being dismantled are the ones which would be set up in India.

I recently read "Nuclear Plants: The Silent Killers" by Prof. T.Shivaji Rao. It is a good readable book.

S.Sharma-Hablik  
32, Rue Suffren  
Pondicherry 605001

*Anumukti* certainly does not deserve death. It is perhaps the voice of millions of Indians who are against 'Nuclear India.' We may not be able to stop India going nuclear, because of the ignorance, stupidity and stubbornness of the people at the 'top', but perhaps we would have sown a seed of doubt in the hearts of some 'thinking people' and it may yet be effective.

D. Shrinivasan  
MIG 1104,  
Vivekananda Nagar,  
Mysore 570023  
Karnataka.

The focus of the forthcoming annual meeting of Medico Friend Circle will be: Radiation and Heath. The two day meeting will be held from the evening of 26th January till the evening of 28th January, 1990. The venue is not yet finally fixed but it shall most likely be Gandhigram Rural University in Tamil Nadu. We are trying to collect relevant papers and reading material for this meet, as well as invite non-members who might be interested in the subject.

Contact : Dr.Narendra Gupta  
MFC, Deolia via Partabgarh  
Chittorgarh,  
Rajasthan 312621

## Polish Protest

On 17 November a Yugoslavian ship entered the harbor of Gdynia, Poland with parts from the Czechoslovakian "Skoda" reactors for the nuclear power plant in Zarnowiec, Poland. The local Solidarity committee of Gdynia immediately made an appeal to the dock-workers not to unload the ship. As a result, the committee, together with the dock-workers, are urging the government to hold a national referendum on nuclear energy.

The next day, between six and seven in the evening, the wharf (with facilities for loading and unloading ships) was blocked with tractors and bulldozers. Joining in the blockade were members of the organizations Wole Byc, Wolnosc i Pokoj and representatives of the Federation of Greens. Citizens supported the blockade as slogans were yelled and soup and tea were served. The result was - no unloading could be done.

In the 1970's, Zarnowiec was to be the pride of government plans to introduce Poland to the exclusive group of countries using nuclear energy. Public discussions were interrupted by the introduction of Martial Law in 1981. This interruption has continued to the present day. Meanwhile, construction of Zarnowiec began.

Soon after the catastrophe at Chernobyl in 1986, members of the Freedom and Peace Movement (WiP) from Gdansk organized the first street demonstration against Zarnowiec. Since then, WiP has continued to fight. At the beginning of 1989, WiP initiated a series of anti-Zarnowiec demonstrations which took place each Friday in the Old Town of Gdansk. Then, at the end of April 1989, the Antiatom Federation was founded by people of different political views, but with a common interest in halting nuclear development.

The Franciscanian Ecological Movement in Gdansk has been and still is also active in opposing the plant, which is close to the mass of inhabitants of Gdansk-Sopot-Gdynia, numbering over one million. As if that is not bad enough, the plant is situated directly on fault lines active over the last 70 years. An agreement, reached on 16 August, gave Siemens (a West German company) the building contract for the Zarnowiec nuclear power plant. The managers of the plant decided to sell the energy produced for less than five phening per KWh for a period of five years.

It is clear to all groups involved in the fight against Zarnowiec that an increase in nuclear power until the year 2010, such as the government plans, can only result in more economic and environmental problems. They are appealing for international help.

Source : *Wise New Communique* : 322.3226

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