



ANUMUKTI

A Journal Devoted to Non-Nuclear India

Volume 7 Number 4

February / March 1994

Fairy Tales From Anuland

O

The Toddler And The Toy

Once upon a time, the Toddler had a toy. Toddler loved his toy. The toy made Toddler feel big and important. Although you could not taste it or see it or feel it or smell it but it glowed in the dark. You could play with the toy in many different ways. It gave you energy and if you zapped the boy next door with the toy he stayed zapped forever and ever. Yes, the toy was lovely.

Some people said the toy was useless. It was costly. It was dirty. It did not work more than half the time. It

was carcinogenic and caused genetic deformities in children. And God forbid, if the toy was ever to blow up, heaven alone knew what damage it would do. It was no toy for a small boy or for anybody else for that matter. Such toys should be banned these people said.

But Toddler knew that all these people were just jealous of Toddler's

wonderful toy. Any way these old fogies lived in a world of their own far away from Anuland. And they talked nonsense all the time. Like one should love one's neighbour. Ha! Toddler hated his neighbour. Never mind they were brothers once. That was long ago. This upstart kid next door was quarreling with Toddler about the ownership of the swing. Everybody knew that the swing was an inalienable part of the Toddler home and no power on Earth could remove it. But that sneaky creep next door was up to all sorts of tricks. He was secretly making a toy of his own. And he kept shouting that if

Toddler did not give him the swing, he would zap Toddler.

The toy gave you power. Everybody respected you. All the big boys had toys of their own. In fact, unless you had the toy, you were nobody. Even the infants wouldn't look at you with respect. And Toddler wasn't small anymore. He may be poor but he was big. Being poor was terrible. You had

to beg for toffees from Big Brother and the other big boys who lived on the West side. But as far as the toy was concerned, Toddler was self-reliant. Nobody could bully him.

Big Brother had made the first toy And then the second toy And the third. And He had made them bigger and smaller and safer and deadlier. He had built so many of them that now the whole house was full of toys. In fact, the whole of Anu-land was full of toys and there was no place left where you could forget about toys and play in peace. Making toys was not easy It required brains and yellowcake. Yellowcake made everything yellow, and you couldn't clean the stuff. His whole house had 43,300 spots of yellow. But what could he have done? There was that evil red bully (of course they were buddies now and the red bully was not such a bad guy once you knew him especially when he came begging on his knees for a toffee to Big Brother—no, not a bad chap at all).

But in the old days if Big Brother hadn't built all his toys and stayed a stepahead of Red... But all that was old history now.

Big Brother was worried. All these pesky little jerks with toys. They would surely blow up one day. And if the toy were ever to fall in the wrong hands ... Well, they had all made the deal. He had got everybody to agree that only he and the rest of his gang would be allowed to zap with the toy. Everybody else could play with the toy but they had to promise, a real cross your heart and be allowed to die promise mind you, that they would never ever try to use the toy for zapping. If they promised and behaved properly and traded all their toffees for the toy, then Big Brother or somebody else from the gang would make a toy for you and teach you how to play with it and even build one for yourself. But if you ever tried to break the promise, remember the runt. The runt lived in the middle of the street. He had remised but had been double-crossing them and was secretly building a toy for zapping. Well Big Brother had shown him. 'Let that be a lesson to youall. Anybody who falls out of line better watch out. Big Brother is watching you.

The trouble was, that Toddler and the upstart kid next door had not agreed to the deal. They had their toys and kept threatening each other with zapping. Three time during the last ten years, Big Brother had had to step in and break up the fight. The last time it had been quite touch and go. If Toddler wasn't put in his place then what about the others. Nobody would listen to Big Brother any more.

Sleep well, my princess, I will read you the rest of the story tomorrow. You have nothing to worry. Anuland is far away and this is a fairy tale. If only real life were so simple.

Surendra Gadekar

February / March 1994

from the Editor's 'Desk **AERB Chief Visits Vedchhi**

Relations between antinuclear groups and the nuclear establishment in India over the past many years have been cold, even frigid. This is in sharp contrast to colonial times when the intercourse between nationalist groups and the British rulers though hostile and confrontational was also marked at times with mutual personal admiration and even friendship. Nucleocrats in India have thought of antinuclear activists, if they thought at all, either as well meaning but hopelessly deluded and irrelevant Gandhian cranks, or as foreign inspired and funded busybodies who were a hinderance to the task of 'nation building'. Antinuclear activists have reciprocated this contempt and have thought of nucleocrats as self-serving sycophants with no compassion for the people. It is a situation where there can be no dialogue.

The few occasions where the two have come face to face have been public platforms most notably the "National Workshop on Nuclear Energy" in Bangalore in December, 1988. At these events, both sides have tried to put their point of view across to the public but have not tried to build bridges towards each other. The upshot of these debates has been that the nuclear establishment has realised that they are on a very sticky wicket in open public debate and has avoided such fora ever since. They have instead, with some success attempted to influence public opinion by trying to 'buy-off opinion makers around nuclear power plants. Also, they have bombarded TV, radio and large circulation print media with 'documentaries' and paid advertising.

Dr A Gopalakrishnan, the chairman of the Atomic Energy Regulatory Board, has taken initiative in trying to break the ice. He met Professor Dharendra Sharma in January and visited us at Vedchhi in February. Unlike the previous occupants of his chair, who came determined to 'allay our fears', he came alone and spoke with refreshing candour. He wanted to understand the Rawatbhata survey and asked many questions regarding that. He proposed arranging periodic (once every three to four months) meetings with antinuclear activists and 'knowledgeable' journalists, so that "various issues can be discussed across a table and a mutual understanding can be built."

Compared to the sterile stalemate of the past few years, this position does offer some interesting possibilities. It is also fraught with the danger of co-option. Entry to previously inaccessible information and dialogue can if one is not careful lead to 'self-censorship' and a muting of criticism. Also, these across the table discussions cannot be a substitute for open public debate which are the most effective means of educating the public on nuclear issues. Therefore, I would like to hear what you, dear reader, have to say on the issue and invite your opinion regarding the basis on which we should proceed. This would help in another way: I will, for a change, have some letters to publish in the letter-box.

I must humbly apologise for the disaster of the October / November '93 issue where due to an incompatibility between the fonts used in my computer and the printer's, the formatting had gone haywire.

Disposable Citizens

"A new nation conceived in liberty
and dedicated to the ideal that all men are created equal"

The door to a secret chamber of nuclear horrors is slowly being prised open in the United States, revealing government-ordered radiation experiments on retarded children, pregnant women, and convicts and a range of other clandestine atom-age projects which have shocked and frightened the American public.

The steady drip of newly released records from the department of energy, the agency which has overseen America's military and civilian nuclear complex since the dawn of the nuclear era, has suddenly turned into a torrent. Collectively, the records conjure up a nightmarish picture. They show how successive administrations, determined at all costs to keep ahead of the Soviet Union in the nuclear arms race, repeatedly and illegally placed thousands of unsuspecting Americans at serious and lasting physical risk.

The government's human experiments, undisclosed atomic weapons tests and deliberate radiation releases over populated areas began in 1945 after the atomic strike on Japan in August of that year. In some cases they have continued almost until the present day. They remained hidden for so long because of what Hazel O'Leary, President Clinton's new energy secretary calls a culture of deception.

"We were shrouded in an atmosphere of secrecy," Ms O'Leary said recently "I would take it a step further. I would call it repression."

Having taken control of the Energy Department early last year Ms O'Leary has been clearly shocked by what she found in its archives. In an unprecedented move, she ordered the review of an estimated 32 million secret documents for possible declassification. Many have already been released. She also ordered a sweeping investigation into the radiation experiments on humans. Then Ms O'Leary took another extraordinary step for a senior government official. She said compensation for victims of the atom age programmes would have to be considered.

"My view is that we must proceed with disclosing these facts and information regardless of the fact of whether it opens the door for a lawsuit against the government. We ought to go forward and explain to the Congress what has happened and let Congress and the American public determine what would be appropriate compensation," Ms O'Leary said. For America's defense establishment, it is as if a whistle blower has suddenly become the boss.

So far, the department of energy records and related research by congressional and journalistic investigators have brought the following US government projects to light:

- At least 19 mentally retarded boys were fed radioactive milk mixed with cereal in experiments conducted by scientists from Harvard and the

"We were shrouded in an atmosphere of secrecy. I would call it a culture of deception. My view is that we must proceed with disclosing these facts regardless of the fact of whether it opens the door for a lawsuit against the government. We ought to go forward and explain to the Congress what has happened and let the American public determine what would be appropriate compensation,"

*Ms. Hazel O'Leary
U.S. Energy Secretary*

Massachusetts Institute of Technology in the 1940s and 1950s. The experiments, funded by the Atomic Energy Commission, were not fully explained to the boy's parents. They were told, in a letter that, we are considering the selection of a group of our brighter patients, including your son, to receive a special diet. The boys were told they were participating in a science club.

- About 800 pregnant women were dosed with radioactive iron in a government-backed experiment at Vanderbilt university in Tennessee in the late 1940s. The objective was to study the effect of radioactivity on fetal development. A follow-up study found a higher than normal cancer rate among the women's children.
- In experiments conducted in jails in Oregon and Washington states, the testicles of more than 130 male inmates were exposed to high levels of radiation from X-ray machines. The prisoners were paid for their trouble, but according to Robert Alvarez, a senior aide to Ms O'Leary, the risks were not fully explained to them. "These prisoner studies were clearly unethical," Mr. Alvarez said. The experiments continued until the early 1970s. There have been no follow-up studies since the prisoners were released.
- Eighteen patients with apparently dangerous illnesses were injected with high concentrations of plutonium at laboratories managed by Chicago and two other universities in experiments between 1945 to 1947. The injections were apparently made without the patients' informed consent. Similar experiments using injections of radioactive calcium were conducted

on terminally ill cancer patients in New York. The purpose was to measure the rate at which radioactive substances are absorbed by human tissue. At the University of Rochester, six people with healthy kidneys were given uranium injections to conduct research on what caused kidney damage.

Greg Herken and James David, both researchers at the Smithsonian's National Air and Space Museum, have recounted the history of two doctors at the University of California Hospital at San Francisco—Joseph G Hamilton, a neurologist and Robert S Stone, a radiologist. One of the aims of their human experiments was to use radioactivity as a weapon. As early as the spring of 1943, they discussed with the Army killing an unspecified number of enemy civilians by poisoning food or water with radioactive strontium. Dr. Hamilton started experimenting on a house painter believed to be suffering from terminal stomach cancer by injecting him with "many times the so-called lethal textbook dose" of plutonium. The patient was never told what he had been injected and the poor man dutifully collected his urine and faeces in glass bottles so that the good doctor could monitor the plutonium excretion from his body. A biopsy later showed that the patient suffered not from stomach cancer but from an ulcer! Dr. Hamilton, however, went on to inject plutonium into a boy with bone cancer and later into a black railroad worker also with bone cancer. Dr. Hamilton sent a secret note to the US Army in which he pro-

II

posed using radioactive smoke as a killing agent. Such a type of preparation would appear well adapted for producing fission product aerosols to subject urban populations to fission product poisoning by inhalation. In October 1949, under his persuasion, the US Army conducted first of six experiments on radioactive aerosol idea in Utah.

Dr. Stone, the radiologist, was giving whole-body X-rays to arthritis patients and even the Atomic Energy Commission was alarmed by what he was doing. Herken and David say that the AEC experts wrote to him that they "do not wish to collaborate in clinical investigations with physicians in whose considered judgment they do not have any confidence." But Dr. Stone apparently continued his experiments, funded by the University of California, at an old-people's home in San Francisco.

Government scientists deliberately exploded atomic bombs in the atmosphere over the US in order to examine the spread and effects of radioactive fallout. The report identified 12 such tests, including one in 1950 in New Mexico after which radiation particle levels were carefully measured in the town of Walrous, 70 Miles away. At the time, scientists said

SPACE AGE RESEARCH

Astronauts in space encounter a great deal of cosmic radiation which can impair their motor ability. To test the effects of high radiation fields on muscular capability, mentally retarded children were made to draw pictures of simple objects like circles and triangles in a room, with a controllable caesium source. The radiation from the source was slowly raised till the children were unable to draw coherent shapes.

there was no risk to people, even though their purpose was to develop a weapon that would kill enemy soldiers through radioactive fallout.

In fact, according to the Los Alamos national laboratory, nerve centre of America's nuclear weapons research, there were about 250 experiments in which radiation was deliberately released into the atmosphere between 1944 and 1961, in New Mexico, Nevada, Utah, Washington state, and perhaps elsewhere,

"Releasing these amounts of radiation on people in an area in secret is a little hard to swallow," said Senator John Glenn, the former astronaut, who is pushing for the release of other government departments' records, including those of the Pentagon.

All of this has come on top of Ms O'Leary's announcement on December 8, 1993 that the government conducted 204 previously undisclosed underground nuclear tests in the US between 1963 and 1990. Among this total are 18 unannounced tests undertaken during the Reagan and Bush administrations. Independent experts said they were at a loss to explain exactly what these later tests were for, or why they were kept secret.

Ms O'Leary said that between 600 and 800 people were subjected to government radiation experiments; she has set up a public telephone inquiry service called the Human Experimentation Hotline. On its first day in operation the hotline was swamped with calls from worried families.

The number of Americans intentionally exposed to radioactive atom test fallout, and its lasting after-effects is unknown. But a study of high fall-out downwind areas in Utah, for example, has found childhood leukaemia rates which are 2.5 times the national average.

Much of the macabre 'evidence' of human experimentation has been preserved. About 20,000 irradiated pieces of people are kept at a national human tissue depository in Spokane in Washington state.

Environmentalists and others say that Ms O'Leary and her staff—some of whom were formerly active opponents of the energy department and the nuclear establishment—have opened a Pandora's Box.

The scale of the problem is staggering. A report by the federal environmental protection agency estimated recently that more than 43,300 military and industrial sites in the US are or may be contaminated by radioactivity.

Ms O'Leary says that by opening the files she hopes to set an example for other nuclear powers and to improve the department of energy's public image as it begins its domestic post Soviet nuclear clean-up. But most of all, she said recently, she wants the truth to come out. When she learned of the human experiment* she was "appalled and shocked and it just gave me an ache in my gut and in my heart" Ms O'Leary said.

Chilling too was the publication this week of a 1950 memorandum to senior atomic energy commission officials written by the very same Dr. Joseph Hamilton. It warned that human experimentation was probably unethical, possibly illegal and perhaps a breach of the Nuremberg Code of 1947. If the information became public, Dr. Hamilton said, there would be a lot of criticism "as admittedly this would have a little of the Buchenwald touch."

Based on reports by Simon Tisdall in The Guardian (December 30, 1993) and Bharat Bhushan in The Indian Express (January 30, 1994).

"Subjecting urban populations to radioactive aerosol poisoning by inhalation would appear to be a good killing agent. Human experimentation is probably unethical, possibly illegal and perhaps a breach of the Nuremberg Code of 1947. If the information were to become public, there would be a lot of criticism as admittedly this would have a little of the Buchenwald touch."

*Dr. Joseph G Hamilton
Neurologist, University
of California (1960)*

WE ARE ALL GUINEA PIGS

The Department Of Energy's recent revelations about the testing of plutonium and other radioactive substances on uninformed people are at once chilling and liberating. Chilling because it is nearly impossible to believe that our own government could have acted so cynically and so contrary to any meaningful standard of ethical behavior. Liberating because exposing the truth is the first step toward correcting and redressing the reality

Energy Secretary Hazel O'Leary must be applauded not only for taking 40 years of cold war secrets and splashing them across the front pages of every newspaper in the U.S., but for directly attacking the good old boy network of the Clinton Administration and demanding compensation for radiation victims before the network could move to hush up the government's liability

It was a gutsy move, and we appreciate it. We understand that in Clinton's inner circles, O'Leary and EPA administrator Carol Browner are sometimes dismissively referred to as the "sob sisters." From where we sit—and we disagree with both often—they may be the only Clinton administration appointees with any backbone. Consider that O'Leary virtually single-handedly took on former Defense Secretary Les Aspin, the Joints Chief of Staff, and the rest of the military-industrial complex (yes, it still exists), and successfully fought for an end to nuclear weapons testing, on the simple grounds that the U.S. has no technical or scientific reason to conduct still more weapons tests. And to underscore the point, O'Leary released documentation proving that the U.S. had conducted

at least one-third of its nuclear weapons tests in secret—as recently as 1990. It was a warning to the Pentagon and its supporters that there won't be any more secret weapons tests.

But O'Leary's welcome revelations that the government, and its all-too-willing partners in the medical community, conducted highly unethical radiation tests on civilian subjects only underscores a point that must not be overlooked: we are all guinea pigs.

Simply put, is there any ethical difference between deliberately exposing uninformed Americans to plutonium by injection or by deliberately releasing Iodine from Hanford or by exposing them to a myriad of elements through air and water from radioactive waste dumps? We think not.

The "medical" experiments, conducted with a "touch of Buchenwald" as they were deemed by one scientist, at least were limited. The experiment of "disposing" of radioactive waste in unlined trenches in the California desert, for example, could affect millions of Americans.

Enough scientific evidence has been accumulated to indicate that putting lethal radioactive reactor parts—and that's what "low-level" radioactive waste is—into the proposed Ward Valley dump is tantamount to signing a death warrant to Los Angeles, the most water-starved metropolitan area in the nation. The waste will leak, and it will enter the water supply. And all of southern California will become guinea pigs.

Exposing the truth is just the first step toward correcting and redressing the reality. Even while reaching out to those who were deliberately exposed to bizarre radiation experiments, we must recognize that we have all been exposed to unnecessary radiation from the nuclear experiment. We deserve closed reactors, not leaking waste dumps. We deserve a full re-evaluation of our policies, not a rehash of existing, inadequate laws. The nuclear industry cannot be allowed to generate more waste and radiation.

And so it goes for every other proposed "low—level" radioactive waste dump. In every case, there is a basic conflict between the hazardous lifetime of the waste (tens of thousands of years) and the institutional control periods established by law for the waste (100-500 years). And by the hazard posed by "low-level" reactor internals and the technology which doesn't yet exist to contain the radioactivity The reality and the laws don't mesh, and thus we have a grand experiment, one in which the American people will again be the losers.

A similar argument could, and must, be made for high-level waste, as it could for the routine operation of reactors, which must release radiation into the environment merely to operate.

The fact is, every few years the government and relevant scientific bodies must reduce their "acceptable" levels of radiation exposure as new evidence indicates there is no "safe" level of radiation exposure. And if there is no safe level of exposure, it is incumbent upon the government to eliminate public radiation exposure.

This the government will not do, and thus we are back into experimentation upon an uninformed and unconsenting public. As we learned from Nazi Germany, the Big Lie is always more effective than the small

Count Dracula, it is said, rises from the dead to suck blood from the living. Shutdown nuclear plants can also rise from the dead and are far more dangerous.

According to US Nuclear Regulatory Commission (NRC), cold weather caused breaks in the service water system for Dresden-1 reactor in late January, resulting in a spill of some 55,000 gallons of contaminated

one. It is one thing to consider individual abuses; it is quite another to consider abuses on a mass level.

From Oak Ridge, to Hanford, to Three Mile Island, to Dresden, to Seabrook, to Ward Valley West Valley, and Yucca Mountain, experimentation upon uninformed and unconsenting people is wrong, and the nuclear era is nothing if not one grand experiment.

Even while reaching out to those who were deliberately exposed to bizarre radiation experiments at the height of the Cold War, we must recognize that we have all been exposed to unnecessary radiation from the nuclear experiment.

But how do we move from understanding the immorality of uninformed "medical" experimentation to halting the equally unethical but continuing nuclear age?

Yes, the waste and radioactivity must eventually be somewhere, and yes, the antinukes are willing to play a responsible role in ultimately devising a solution as acceptable as possible. But not under the existing, unethical, and failed laws and schemes, and not—as the debate is driven today—to merely allow the nuclear industry to generate more waste and radiation.

We work every day to make our elected officials, and the public as

well, understand what the nuclear era really means, and why it needs to be dismantled as soon as possible. We try to help people understand the unique hazards posed by both the power and the longevity of radiation and radioactive waste. Maybe we don't work hard enough, that's certainly possible. But we also need your help. If the continued experimentation upon the American people distresses you as much as it does us, then contact your elected officials and demand an end to the nuclear age. We deserve closed reactors, not leaking waste dump*. We deserve a full re-evaluation of our policies, not a rehash of existing, inadequate laws.

And we deserve an ethical underpinning that says: no more nuclear experimentation on our citizens. We've had enough!

The nuclear era is nearly over. What we are seeing is the last twitch from the dinosaurs tail. Hut it* a large, powerful dinosaur that can be quite destructive unless tamed. We must all act, as directly and aggressively and joyously as possible, to ensure that the horrors so recently revealed are not simply prelude to far greater horrors to come. Our children will have other battles to fight; let this one be ours.

Michdel Mariottc, The Nuclear Monitor January 12, 1994

Deadly, even while dead

water to the containment. The reactor has been shut down since October 1978. But according to an NRC report, it appears that only sheer luck averted a far greater catastrophe: an inspection found that the plant's irradiated fuel pool was vulnerable to the same type of weather-induced cracking. Within 40 minutes of such a crack, the fuel pool could have been uncovered. Consequences, says the NRC, would have

been phenomenal dose rates at the pool of 2,700 rems an hour (a dose of 400 rems kills half the people who are unlucky enough to receive it immediately) and 19 rems/hour within 100 yards of the pool (which, the report dryly notes, is where the NRC resident inspector situ).

*The Nuclear Monitor
February 28, 1994*

Guinea Pigs, Guinea Pigs Everywhere

It is natural for Americans to be shocked at the revelations that grievous harm and injury was deliberately caused to many ordinary American citizens by their own government. All of us tend to look upon 'our own' government as protector and guarantor of citizen's rights and to find instead that the protector himself is the violator, is a blow. The blow is greater because the government has been preaching 'concern for human rights and dignity' to all and sundry.

While I fully endorse the sentiments expressed in the "We are all guinea pigs" editorial of The Nuclear Monitor, and that is why we have republished it, there is something in the tone that I don't like. There is too much emphasis on "Americans". Experimentation without consent on uninformed beings is wrong whether they be Americans or Polynesians or Japanese, or any other racial or ethnic group. The US government during the war and later during the cold war did willfully cause radiation harm and injury to peaceful citizens of other countries as well as its own citizens.

The dropping of the A-bomb on Hiroshima and Nagasaki, was actually more in the nature of an 'experiment'. But there have been many other subsequent assays as well. The whole sorry saga of bomb testing has involved experimentation on a vast scale. This has been mainly done on populations in the Pacific and in the Nevada desert.

But American government is not alone in indulging in this criminal activity. All nuclear powers have been equally unmindful of human rights of weak and voiceless citizens. The Soviets in Kazhakhstan or in the Arctic, the French in Algeria and in the Pacific Islands, the British in Australia or the Chinese in Mongolia and in Tibet have not hesitated in

sacrificing the health of innocent populations in the pursuit of nuclear 'power'. Even the one and only 'peaceful' nuclear power exploded its 'device' in the deserts of Rajasthan. There have been studies by doctors at the university of Jaipur showing increased incidence of cancers in the local population.

The revelations are shocking for another reason as well. They show the widespread involvement of 'respected' researches in prestigious universities and research institutions. Even those who are not dismayed by the dark deeds of governments, are apt to be aghast at this involvement, since it goes against much cherished notions about scientific humanism and integrity

The widespread involvement of scientists at many different universities, makes it all the more astonishing that it took more than 40 years for the facts to come out in a society which prides itself on being free and where the press is known to be so active and outspoken. This conspiracy of silence has involved many, perhaps thousands. The 'experiments' could not have been conducted without the willing cooperation of research assistants and lab technicians and office administrators and the whole paraphernalia that constitutes 'modern' research. That none of these tried (or succeeded if they tried) to penetrate the dark veil of secrecy, is a telling illustration of enormous dead weight the 'System' has. All of us, you and I, are afraid of making a 'scene' and it is this apathy which allows the gross-crimes.

It is in this context, that these revelations of American misdeeds are of importance to us in India today. For one thing, Indian nucleocrats have learnt not only nuclear technology in American nuclear establishments but they have also imbibed the pre-

vailing 'culture'. The practice of hiring large numbers of poor, untrained 'casual' workers at nuclear power plants so that the individual doses of the regular staff are reduced, is an old American custom which has been fervently followed in Indian nuclear establishments. No monitoring of the health of these workers is being done. This is worse than experimentation, since although the authorities are damaging the health of these poor people, they do not bother to even record the 'experiment'. The conspiracy of silence is no less deafening in India. Reports regarding deformities and ill-health at Rawatbhata and Jaduguda have come many times in the press and yet the victims have still not received government attention.

"Internationally accepted norms" form a powerful shield to cover wrongdoing everywhere. This magic mantra is invoked by Indian nucleocrats as the last word to stifle any protest. (For example, see the article "AERB Chief admits nuclear workers exposed to high radiation levels" in this issue.) Although individual exposures in India may (and it is a big may), be within internationally accepted limits, these limits themselves are certainly not safe and have been revised downwards frequently in the past. It is also ironical that a number of experts in the field of radiation have obtained their expertise through precisely such ethically dubious experimentation. It is the opinions of such 'experts' which has been accepted by the judges in a large number of radiation injury cases.

We are all guinea pigs but even guinea pigs should have rights and it is only when we are ready to stand up for guinea pigs that we have a moral claim to stand up for our rights.

Surendra Gadekar

Nuclear Inspector Sues Industry

Says Leukaemia Caused By Radiation At Work

A former US Nuclear Regulatory Commission resident inspector at Southern California Edison's San Onofre nuclear complex is suing the utility, its partner—San Diego Gas & Electric, Westinghouse, Combustion Engineering and Bechtel Corporation on the grounds that her work at the plant resulted in radiation exposures that caused her to contract acute myelogenous leukaemia.

44-year old Ruth Tang, who has been told by her doctors that she has about six months to live, is at the center of a lawsuit that could shake the nuclear power industry to its foundations.

Tang alleges that her cancer was caused by radiation exposure from her work at San Onofre. Especially during 1985-87, the plant was plagued by defective fuel rods and radioactive "fleas," highly radioactive but microscopic particles which cling to workers' clothes and skin. Her suit charges that standard dosimeters used in the nuclear industry do not accurately measure such exposures, and thus there is no way of knowing how much radiation she actually received while working at the plant.

And the suit brings up even larger issues. For example, if radioactive "fleas" cannot be detected by the industry, then how many have been set loose in communities across the nation and the world? And the suit also challenges the notion that there is any safe radiation dose.

Said Tang's attorney, Don Howarth, "If we're successful, we will crack open for the first time the liability of these nuclear power

plants for what they've been doing to their workers and the communities outside."

The utilities attempted to have the case dismissed before trial, but a federal judge ruled that the case involves complex matters of federal and state law, and would be heard. The trial began in early January.

Tang is supported by Dr. Edward Radford of the University of Pittsburgh, Dr. Harry Demopoulos of New York University, and by F. Morgan Cox, a health physicist. All ar-

Mistrial Declared

A mistrial was declared February 9 in the case of Ruth Tang. According to CNN, the jury was deadlocked at 7-2 in tang's favour. A retrial has been set to begin March 1, 1994 although CNN reported that Southern California Edison and the other defendants in the case might now offer Tang an out of court settlement.

gue that industry dosimeters are inaccurate. In an affidavit, for example, Cox said, "these devices register external dose only and do not take into account any internal radiation dose. Second, these dosimeters do not detect or record alpha radiation, except in rare instances of actual contact with the radiation source. Third, they will detect and record beta radiation to a limited extent, and only if such radiation is in close proximity to the dosimeter **and is** not shielded. In addition, TLD's do not detect or record low energy gamma radiation or gamma radiation from sources too far from the device."

According to Tang's dosimeters, she received a total of 34 millirems during the period June 1985 to December 1986. But contradictory readings, and internal utility documents which revealed both the presence of the radioactive "fleas," and utility concern over the inadequacy of the dosimeters, persuaded the scientists that her actual dose may have been far higher.

And if her dose were higher, there is little reason to believe other workers' doses were not higher as well. Further, because the "fleas" cannot be easily detected, they may have spread throughout local communities on workers' clothes and skin.

The utilities also argued that they should not have to face liability because their releases were within regulatory limits and because the Price Anderson Act limits their liability. But the court rejected both arguments. Normally, civil suits such as this take years to resolve. But Federal Judge Gordon Thompson Jr. accelerated the trial when he learned of Tang's limited life expectancy.

Tang, who has a master's degree in nuclear engineering from MIT, told the *Los Angeles Times* that she is filing suit to provide money for her daughter, who is also studying at MIT. Originally, her daughter wanted to study nuclear engineering, but Tang talked her out of it. "I didn't want to do it," Tang told the *Times*, but I didn't think it was safe."

The Nuclear Monitor
January 17 and February 14, 1994

The Answer, My Friend, is Blowing in the Wind

Portland General Electric (PGE), which closed its Trojan reactor early last year, has decided that wind power will play a major role in its future. The utility announced December 28, 1993 that it has selected a bid for a 100 M W wind plant, which is scheduled to be operational by 1996. PGE also selected 21.1 MW of geothermal energy proposals, 32 MW of biomass, and 16 MW of hydro. According to a PGE spokesman, the utility intends to quadruple its wind commitment by 2002, and could quadruple it again by 2012.

The answer also lies in White Paint

Ask energy—efficiency expert Art Rosenfield what Los Angeles needs to keep cool in those long hot summers and he'd most likely say a can of white paint.

In a recent study he conducted at the Centre for Building Sciences at Lawrence Berkeley Laboratory in California, he and his researchers whitewashed the roof of a house in Sacramento and found the house used 40 percent less cooling energy in summer. If this is were applied to the whole of the United States, which uses 10 percent of its electricity on summer air conditioning, the potential energy savings would be enormous.

Art says he was inspired by Mediterranean countries where not only roofs, but walls and roads are whitewashed. Indeed, in Israel, urban residents are required by law to annually paint their roofs white.

He believes whitewashing would significantly curb the solar radiation absorbed by dark rooftops and asphalt in cities like Los Angeles. Raising that city's albedo (the percentage of solar radiation reflected rather

than absorbed) from 0.15 to 0.25, would reduce the "heat island" effect and lower the city's summer temperature by 5-8 degrees Fahrenheit, and save about two giga watts of energy during peak air conditioning use. In financial terms, this would save the Angelenos a cool \$700 million a year.

And also in hog shit at the farm

After American pig farmer Roy Sharp built a lagoon to treat the wastes from his 16,000 hogs and covered it with a tent to control odours, he wondered if he could burn the trapped methane gases to produce electricity. Engineers told him it would never be cost-effective, because such a system couldn't produce more than 26 kilowatts (kW) of electricity an hour. Roy went ahead and built his lagoon anyway. "We're now getting 140kW an hour during the summer," he says. "What we're doing here is confounding the experts." The pig gas power plant produces enough energy to cover the farm's monthly \$3900 electricity bill. Meanwhile, Roy receives \$400-900 a month from the local power company for the excess electricity he's pumping into the local grid. And the lagoon system is now being considered by Russia, China and eastern Europe.

But the answer certainly does not lie in accepting Dutch Bull-Shit

India, the land of phoren goods, from mineral water, aerated drinks, chewing gum, Kentucky Fried Chicken, ... is about to become the world repository of cowdung and hog droppings. Dutch farmers along

with other European farmers have been stuffing their farm animals with all kinds of chemicals and drugs. Thus, the dung is full of these poisons and poses a serious danger to people. Chemicals from cattledung are one of the major cause of groundwater pollution in Holland. European environmental regulations do not allow the dumping into the seas. Till now the 'solution' had been to dump these wastes in Africa, but now environmental protest there has persuaded the Dutch government to view Manmohan Singh's new India with 'favour.'

Seaswan B.V., a company based in Wassenaar and EID Parry of Madras have formed a joint venture. The project envisages importing seven to ten million tons of dung every year. Prior to transportation to India, biogas will be extracted from the manure. Then it would be loaded into large tankers and set sail for Kandla. After drying in various locations in Gujarat, the material would be sold as 'Envirodung' in Indian markets. The investment in India to import this shit is estimated to be US \$150 million. It will create 150 jobs for the natives.

The project document states, "India has a fertiliser market of 26 million tons a year. India is in the process of decontrolling its fertiliser prices. As a consequence, older and inefficient fertiliser units will shut down. The market will for sometime stabilise at a lower volume and with higher prices. This situation opens up a strategic advantage for the Indian Envirodung joint venture." Holy Cow!

Based on reports in The Nuclear Monitor (US), Third Opinion (Australia) and an Action Alert issued by Public Interest Research Group Delhi.

The Foreign Connection

"The truth is, more people are making a living by talking about radiation induced diseases than dying of them. It has become fashionable to talk of radiation as the inducer of cancer and genetic abnormalities although research and studies conducted worldwide have proved otherwise."

A N. Prasad
Director,
Bhabha Atomic Research Centre

had said
funny if the
truth were not so sad.
Anybody who is a victim
of an environmental polluting
agent
has a horrid existence. First, there is
the suffering induced by the disease
itself. On top of that you have to
constantly fight an uncaring system
which tries to blame the victim for
the disability.

However, there is one point on
which I agree with Dr. Prasad. I
dearly wish the situation he de-
scribes actually becomes reality. It
is only when many more people than
just those 'affected' would talk
about radiation induced diseases
and take up the struggle, that we
would be able to put an end to this
madness.

Dr. Prasad is the head of the only
institution allowed to do research on
nuclear energy in the country and I
cannot believe he could be as igno-
rant as his words imply. If he were
just to read the first page of any
standard textbook on radiation biol-
ogy, he would know that radiation
has been well established as a causa-
tive agent in many different types of
cancers in both human and animal

studies conducted in all parts of the
world since many decades.

The BARC chief made this asser-
tion while denouncing a TV pro-
gramme on CBS network. On Sun-
day, February 13, 1994, a
programme entitled '60 minutes'
had carried a feature on the Indian
nuclear programme. Since I have not
seen the show, I cannot comment on
the contents. However, I wonder if
the heads of atomic research centres
like the one at Harwell in England
or Argonne near Chicago in the US
ever feel constrained to make com-
ments about a TV programme broad-
cast on the Doordarshan? The guys
at BARC obviously do, though not
about programmes on Doordarshan
(their pocket network) but on
'phoren' TV networks and whenever
they do open their mouths they in-
variably remind one how appropri-
ate is the acronym of their institu-
tion.

The following is the report which
The Times of India had carried on
the feature.

Indian N-plants most unsafe, says CBS

Washington, Feb 14.

CBS 60 minutes, which has a very
large nation-wide audience, today
charged that India is operating the
most unsafe nuclear plants in the
world without inspection by the In-
ternational Atomic Energy Agency
(IAEA), reports PTI.

The programme dovetails with the
U.S. government policy of demand-
ing full scope safeguards in India and
depriving the Indian armed forces, if
they can, of any modern missile tech-
nology on the pretext that what In-
dia does is destabilising vis-a-vis
Pakistan.

The programme is expected to be
used both by officials and members
of Congress to put further pressure
on India.

The programme did carry an inter-
view with an Indian official but in a
context that cast doubt on the truth
of what he was saying about India's
ability to run nuclear plants without
the IAEA holding its hand.

The programme also charged that
no care is taken for the safety of
either the workers or the people near
the plants with the result that work-
ers are severely injured (pictures of
burn marks were shown).

With confirmation by an Ameri-
can-trained Indian doctor, CBS TV
also said that due largely to the ra-
dioactive contamination, children
are born in areas nearby without
ears, with two thumbs and so on.

An English analyst, Mr. Steven
Thomas, who said that he had been
closely tracking the Indian nuclear
programme for 15 years, said that
India's nuclear plants had far more
emergency shutdowns than in any
country in the world and that this
was a sure sign of trouble. Things
were going wrong all the time, he
said.

Almost as an afterthought, the net-
work said the rest of the world is
denying India not only nuclear
equipment and fuel but also safety
equipment in order to curb India's
programme (unless it agrees to the
M.S. demand for fullscope safe-
guards.)

The network also said that the U.S.
nuclear regulatory commission said
in a report that the fire in the reactor
at Narora "was a close call. Just how
close may never be known "

The network did not explain why western governments, if they are so concerned about the safety of India's nuclear plants, are banning the export of nuclear safety systems for India.

But it complained that while attention is being paid to unsafe reactors in Russia and to the nuclear programmes of countries like Iran, "one country that has largely escaped scrutiny is India where nothing seems as important as its membership in the nuclear club. Over the years it has steadfastly kept international safety inspectors out of its facilities while pursuing one of the most dangerous and essentially secret nuclear programmes in the world."

Just last year, said the network, there had been 136 nuclear incidents and five of them ended up killing people. It noted a Bombay newspaper as calling the U.S.-built and internationally inspected Tarapur power plant one of the most contaminated power stations of its kind in the world.

"Vilification Campaign"

The BARC chief denounced this programme as "a vilification campaign aimed at discrediting the country's nuclear energy programme and raising doubts about its technological capability." Commenting on the charge that India proposed to become a member of the nuclear club, Prasad said "this is a dead give-away of the real intentions of such a vilification campaign." Prasad "urged all members of the scientific community to counter such propaganda in the interests of the country."

I am struck by two related questions. First, why are these foreigners suddenly so interested in our nuclear programme. The problems that beset the Indian nuclear muddle are of long standing. The fact that

"things are going wrong all the time" has been known for ages. We at *Anumukti* have been saying the same thing for the last seven years without fail six times a year. Then why is it that all of a sudden US TV programmes with a viewership of millions have suddenly found this newsworthy?

The other question is what I posed at the beginning of the article regarding the protest by senior Indian nucleocrats. Don't they have anything better to do than 'answering' all and sundry charges leveled in TV shows? I am inclined to believe that may be the nuclear programme is not in such dire straits after all, seeing the amount of time these high officials have for the press media.

Recently, Dr. M. R. Srinivasan, the ex-chairman of the Department of Atomic Energy, wrote a series of three articles on nuclear power. The following is an extract from the third article in the series which was published in *The Hindu* on 13th January, 1994.

Dismal State of Nuclear Finances

"We are at present producing only about two per cent of our electricity from nuclear sources. If we had implemented the programme of 10,000 MW of nuclear power by 2000 AD, some 10 to 15 per cent of the electricity would have come from nuclear energy. After 1990, funding of the nuclear power programme has dropped drastically and the target has slipped to some 3,000 to 4,000 MW by 2000 AD.

"An important component of the long term plan was induction of 500 MW reactors of heavy water type, based on indigenous technology. Unfortunately, no funds have been made available for starting construction, although the design work has been completed. In the new economic environment prevailing, the

Government is allergic to funding power projects and would like the capital market to be tapped. This may be in order for thermal power plants burning coal, oil, or gas but will not help in the growth of nuclear power.

France to the Rescue?

"France which has an enviable nuclear power programme has built it up largely through public funding and bonds issued by the Electricite du France. In addition to pursuing the heavy water reactor line based on indigenous technology the country should explore the possibility of building some light water reactors also, as the 1,000 MW PWR has become the equivalent of Boeing 747. In 1988, India and the former Soviet Union agreed to cooperate on building two 1000 MW plants at a site in the southern tip of India. However, with the collapse of the Soviet Union, this project is a nonstarter.

"At that time, the French industry, in cooperation with Germany, was keen to build in India some PWRs. France had then not signed the NPT and India could have got these reactors without acceding to the NPT or accepting full scope safeguards. The situation has changed after France joined the NPT in 1992. However, India may still explore a way out if a joint French-German-Indian ownership of the reactors were feasible, through a tripartite investment.

"Since the nuclear industries of France and Germany are starved of orders, they may welcome such an option. India may be able to have some PWRs, without having to sign NPT or accepting fullscope safeguards. Enriched uranium for these stations will have to come from France. In this way, the country will be able to speed up nuclear power development, without giving up India's reactor line based on heavy water and natural uranium, or the basic position on NPT or safeguards.

"What the country needs is a continuing political commitment to nuclear power. For its part the scientific and technical community must take on an activist posture to convince the public of the relevance of nuclear power and seek its full support. If these initiatives are not taken, the country will miss the benefits that nuclear technology promised. The dedicated work done by the large band of pioneers in mastering a difficult technology will then have been in vain."

I have quoted Dr. Srinivasan at length, because I think he does shed valuable light on the questions I had raised earlier. The Indian nuclear programme, this monstrous undertaking involving an outlay of billions and the lives of many, is actually just a pawn in the game of power politics. Foreign networks have suddenly become interested for two reasons. Firstly because it is time to renew signatures on the NPT and this time

the big boys do not want bit players like India to get away without signing on the dotted line. After getting that signature these commercial interests would be extremely keen to sell India their technology and ⁴knowhow\ Like what has happened in Eastern Europe and the former Soviet Union, they are not interested in a safer, cleaner non-nuclear world but only in selling their much touted 'safe' nuclear technology. The Indian nuclear establishment is equally keen to establish links with foreign nuclear industry. The belligerent "determination to forge ahead in frontline areas of science and technology is all a sham. If these links can be forged without having to sign on NPT, so much the better. But if worst comes to worst, and they have to find a fig leaf to cover themselves, well 'liberalisation' and globalisation are the key words today and a high sounding justification would be found. Western nuclear industry, starved of orders at home (*how*

come? Drs. Sritivasan and Prasad, if nuclear energy is such a panacea?) would pressure Western governments to look the other way as they have been doing till now. It is a question of who blinks first on NPT but on the wider issue of nuclear power Indian and Western governments and the nuclear industry are on the same side and against the better interests of the people.

I am also amused at the call to the scientific community to take up pro-nuke activism made by both Dr. Srinivasan and by Dr. Prasad. The wellspring of activism is deep conviction born out of truth and compassion. A system which breeds lies and deception and an arrogant contempt for people as nuclear power does, cannot give rise to activism. It is not the vocation of people out to "make a living".

Surendra Gadehar

AERB Admits Nuclear Workers Exposed to High Radiation Levels

The Atomic Energy Regulatory Board (AERB) admits workers in Indian nuclear plants are exposed to "very high" levels of radiation, but opposes workers' demands for financial compensation on the ground this would lead to "undesirable practices and laxity in providing the necessary protection."

According to AERB Chairman Dr. Gopalakrishnan, radiation workers' demands for compensation in the form of radiation leave or radiation work allowance are inappropriate and unjustifiable. While the board is aware that the collective dose to workers in Indian nuclear plants is very high—individual doses appear to be kept within "acceptable levels".

Dr. Gopalakrishnan told a recent meeting here of the Indian Association for Radiation Protection that reducing the individual doses alone without bringing down the overall

man-rem consumption is not an acceptable strategy, and said the AERB has directed management's to give top priority to reduction of the collective dose.

Qualified persons from outside the Department of Atomic Energy should be inducted on to various committees which are looking into the causes of overexposure and the decisions of the committees should be conveyed to the workers in writing Dr. Gopalakrishnan said. The public at large would feel more comfortable if evaluation of radiation doses received by workers in Department of Atomic Energy (DAE) installations were done by an outside agency rather than by scientists at BARC. The AERB would lay down standards and monitor the independent non-Governmental agency which could initially be given the task of evaluating workers' TLD badges.

"Under a new set of guidelines issued by the AERB in January, India has become one of the few nations to fully meet the dose limit for radiation workers stipulated by the International Commission on Radiological Protection (ICRP)." It was imperative to impose a cumulative dose limit of 100 mSv over a five-year block starting with January, while keeping in place the currently stipulated upper limit of 30 mSv for annual exposure, Dr. Gopalakrishnan said. "These limits are well within the ICRP recommendations."

Employers would have to seriously analyse the activities of overexposed workers. Dr. Gopalakrishnan said, emphasising the need for increased automation and robotics, proper radiation shielding, decontamination of areas and equipment and consistently good housekeeping.

News report in The Pioneer 3.2.94.

Nuclear Power Corporation Brings Out the Begging Bowl

The first estimate of financial damage to the Nuclear Power Corporation due to the devastating fire last year at the Narora nuclear plant's reactor unit-1 had spoken of a figure in the neighbourhood of Rs 150 crores. Later revised reports had put the figure more conservatively at Rs 40 crores. Dr Chidambaram, the chairman of the Department of Atomic Energy had claimed then that the crippled reactor would be back in operation in just four months. "The fire will cause an extra delay of just two months in the resumption of operation of the unit, since anyway it was scheduled for a two months annual shutdown for maintenance purposes." The unit has still not resumed production although nearly an year has passed. An year's interest on the huge investment, has already made the first 'hurried' guess of the monetary loss closer to the truth.

Following the fire, the Atomic Energy Regulatory Board (AERB) directed the Nuclear Power Corporation (NPC) to shut down its plants one after another for inspection. The inspection was intended to avoid a repeat of the Narora incident. Thereafter, it was proposed that during the 6-8 week annual shutdown of the plants, modified turbine blading would be installed in these plants. This step has been necessiated due to the fact that the turbine blades which were manufactured by BHEL

have shown a tendency to shear. The original design of the blades was supplied by GE and there have been a large number of instances of similar problems reported in GE blades as well in the past.

The shutdowns are only one of the multitude of problems that plague NPC. As a result, even the reduced target of 5,000 MW of installed capacity by the end of the century

Meanwhile, the corporation's market borrowings have been rising steadily and now stand at Rs. 1,884 crores. This translates to an annual interest burden of Rs. 257 crores payable from 1995 onwards. Further, the corporation owes about Rs. 800 crores to the department of atomic energy (DAE) as fuel and heavy water charges and this amount is reported to be increasing at the rate of Rs. 400 crores per year.

Run For Cover

An interesting aspect of nuclear power plant safety in India is that the NPC and the government-owned General Insurance Corp. (GIC) have not been able to come to any agreement regarding insurance of the plants. The insurance company, though government-owned, usually takes a reinsurance cover from one of the London "clubs" and is not willing to cover the entire risk of an accident by itself. The NPC is not willing to involve "any foreigner" in examining its plants in case there is an accident and claims have to be settled. GIC is not able to guarantee complete secrecy of the plant operations and so far has not insured the nuclear power plants.

Nucleonics Week June 17, 1993

A proposal for converting NPC's dues to DAE into equity is pending before the government, says Mr. C.K. Koshy, the corporation's executive director for personnel and finance. However, the move can be justified only if a definite turn-around is envisaged in NPC's fortunes, since it amounts to increasing the government's stake in the corporation.

NPC needs about Rs. 4,000 crores to complete its ongoing projects over the next seven years. Opinion is divided over continuing with advance procurement for projects which are yet to take any tangible shape. It is felt that all the resources should be directed towards completing the ongoing projects on schedule. This will considerably improve the funds situation as about 35 per cent of the available funds are currently used for advance procurement.

seems too ambitious, and the likely achievable target is only 2820 MW. This is because of a major resource crunch in the face of the government's progressively decreasing budgetary support. The government's contribution has come down from 63 per cent of the approved outlay in 1988-89 to a low of 15 per cent year before last and just 17 per cent last year. I do not know the figure for the current year.

However, Mr. Koshy says that since the raising of funds is an annual exercise, the corporation's target should be revised in the context of the availability of funds. He adds that advance procurement has already been reduced in the same proportion as the scaling down of the corporation's target, except in cases where contractual agreements existed.

In their defence, NPC officials say that the government has backed out of its earlier commitment of meeting half the project cost as well as the interest burden while NPC was expected to raise the rest. They also say that the earlier target of 10,000 MW of installed capacity by the year 2000 was something that the government had projected on non-economic assumptions, and that they themselves would not have taken a decision to increase capacity ten-fold. It may be recalled that installed

capacity was 840 MW in 1984 when the decision was taken to increase it to 10,000 MW.

If NPC's finances are in trouble, so are various aspects of its operations and management. To begin with the corporation's average capacity utilisation for 1992 was a poor 53 per cent while the availability factor was only slightly higher at 64 per cent. The corporation's project completion in some cases has taken as much as 12 years in comparison to seven years in developed countries. Also worrisome is the fact that over the past years NPC's profits have shown no increase despite separate accounting for projects and generation. In addition, the employee strength has gone up from 1,300 six years ago to 2,300 today. NPC employees' association put the blame for the poor financial state on mismanagement by officials.

On its part NPC has been investigating alternate means of finance. Some state governments are reported to have shown an interest for their respective electricity boards entering into equity participation with NPC. However, certain quarters within NPC are hesitant to enter into any such alliance since NPC is still to recover Rs. 480 crores (including penal interest) from various state electricity boards to which it has supplied power.

But there does seem to be one thing over which most people in NPC are agreed. They agree that a macro-level decision questioning the very relevance of nuclear power in the Indian context needs to be taken. And if the verdict is to continue with it, then it must be backed up with sufficient funds.

Based on newsreports in Times of India, Jansatta and Indian EXPRESS

Uranium Tipped Ammunition

During the uranium enrichment process required to make nuclear weapons or fuel for reactors, the concentration of the 'fissile' U-235 isotope has to be increased. What is left, is called depleted uranium (DU). It is about half as radioactive as natural uranium, but very dense and extremely hard. In a powdery form it burns easily and is hence a very good material for armour piercing shells. Because it is a waste product of the nuclear industry, it is probably supplied free to weapons' manufacturers.

A 1979 British defence ministry memorandum states that tungsten alloys were then in use but: "The effectiveness of armour-piercing tank gun ammunition depends

largely on the density of the metal from which it is made. DU has proved the most effective anti-armour penetrator and is also considerably cheaper than tungsten.

External radiation levels from depleted uranium are low. Standing near a DU contaminated vehicle shouldn't be any more harmful than background radiation, as far as external radiation is concerned. However, DU is about as toxic as lead and could be harmful to the kidneys if eaten or inhaled. When DU burns in a fire, it converts into a form which can be readily absorbed by the body. If ingested or inhaled, the toxic effects of DU dust could damage the kidneys, and the short range alpha

radiation emitted would increase the risk of contracting cancer

Reasons for Concern

British Atomic Energy Authority estimates that the tens of thousands of rounds of penetrator DU bullets fired during the war left behind 41 tonnes of radioactive debris scattered over Kuwait and Iraq.

Just loading a DU bullet exposes tank crews to the equivalent of one chest x-ray every 20-30 hours. British troops have complained of memory loss, fatigue, skin disorders, headaches, eye and ear infections, bleeding gums, hair and weight loss, facial paralysis, damaged lungs and general collapse of the immune sys-

Protesters Beware!

Incongruously, the nuclear industry is promoting a non-lethal weapon. Sandia National Laboratories— a nuclear weapon's establishment in New Mexico specialising in nuclear safeguards— designed a sticky foam which could flood nuclear stores, preventing theft by terrorist or freelance bomb maker.

Now, with an idea stolen from 2000 AD's comic-book star Judge Dredd, the company is developing a method of firing the foam at people for use in riot control. There is still one major problem to overcome, a familiar one for the nuclear industry, how to clean up the mess afterwards.

Perhaps they could just entomb the sticky rioters in concrete for 100 years while they figure out how to decommission them.

Safe Energy February / March 1994

tern. According to the UK Atomic Energy Authority, there is enough DU in Kuwait and southern Iraq to cause 500,000 potential deaths. But documents released under the US Freedom of Information Act indicate there could be as much as 300 tonnes of DU out there — with a potential death toll of 3.75 million!

The US Defense Department admitted in a memorandum in May '91 that the use of depleted uranium "results in remnants that are subject to atmospheric oxidation and/or aqueous corrosion. Either process can lead to environmental contamination that has the potential to cause adverse impacts on human health, primarily through the water pathway ... "Surface oxidation of fragments of depleted uranium penetrators is a significant process because oxidised forms of uranium are more soluble in water, and thus potentially more available for ingestion by humans and animals."

Although the US has spent a lot of money recovering contaminated US military vehicles from the battlefield and returning them home for disposal as nuclear waste, nothing has been done in Iraq and little in Kuwait to recover these remaining DU rounds. Cleanup workers in Kuwait

have been unprepared to deal with the hundreds of contaminated Iraqi vehicles.

The province of Saskatchewan in Canada is investigating whether Canadian uranium was illegally diverted to make depleted uranium penetrator bullets, which were subsequently used by US during the Gulf War.

Moreover, Iraqi and Kuwaiti children have been found playing with the bullets. Saskatchewan's Inter-Church Uranium Committee, which claims at least a 450,000 kilos of Canadian uranium were covertly turned into DU bullets for the US military, is alarmed at the rising incidence of cancer and leukaemia among Kuwaiti children.

*Safe Energy
Oct—Nov. 1993*

Subscription Information

*Rs. 30/- per year (6 issues) within India
U.S. \$ 15/- per year or equivalent in other currencies for airmail overseas.*

Rs. 500/- for life (only within India)

*Demand drafts should be drawn on the State Bank of India, Valod (Code: 0531) For cheques and drafts drawn on other banks, please add Rs 6/-
Subscriptions, donations and enquiries regarding circulation should be addressed to:*

**Editor Anumukti
Sampoorna Kranti Vidyalaya
Vedchhi, 394 641 India
Tel: 02626-2074**

Please do not send personal cheques or drafts addressed to Surendra Gadekar

Anumukti Team:

Banaprava Naik, Sanghamitra and Surendra Gadekar

PRINTED MATTER

BOOK POST