



ANUMUKTI

A Journal Devoted to Non-Nuclear India

Volume 8 Number 6

June / July 1995

Food Irradiation: A Foolish Idea

"No, no!" said the Queen. "Sentence first — verdict afterwards."

Lewis Carrol

The decision by Apna Bazaar supermarket chain to store irradiated food items has sparked off a lively debate in Bombay. Suddenly there are meetings with hundreds of participants to whom the wholesomeness of what they eat is an important concern and who are distressed by the uncaring and arrogant attitude shown by a public undertaking working at the behest of the nuclear establishment.

Mr. A. N. Prasad, the director of Bhabha Atomic Research Centre, while inaugurating a two day seminar on food irradiation put one of the reasons for the drive behind food irradiation very clearly. He said, "With the onset of global integration of the Indian economy in the emerging post-GATT era, Indian farmers and traders in food materials are on the threshold of an unprecedented opportunity to reach out to the in-

ternational markets." He also said that "the Centre was likely to clear eight more food products, including fruits, wheat and rice for irradiation."

When Mr. Prasad talks of that collective entity—'Indian farmers', he obviously does not mean Manchhibhai Akhatiyabhai Choudhary and the millions like him all over the country who work day in and day out on their two bighas of land to keep the wolf at bay. The interest that the nucleocrats want to promote are those of agribusiness. The long shelf-life that irradiation produces in food would ensure that they would disappear from local markets. How moral it is to spend public money, most of it gathered in the form of indirect taxes on the Manchhibhais of the country, to subsidise the fat cats, is a question that everybody needs to ponder. As long as food irradiation

was confined to esoteric items like spices, it was merely a foolish idea. A large scale programme of food irradiation in food grains is a prescription for mass hunger a la the man-made Bengal famine of 1943.

The arguments against food irradiation have been very cogently summed up by Dr. Rosalie Bertell in an article starting on page 8 of this issue.

Today the nuclear industry is looking towards food irradiation as a way to 'solve' some of its ever increasing and intractable problem of waste disposal. If caesium could be separated from spent nuclear fuel and 'used' in food irradiation facilities, then the responsibility of looking after it would have been transferred from the nuclear industry to the food processing industry. But think of a nightmarish future in

which the food irradiation tail wags the nuclear industry dog and a large food irradiation programme is put in place requiring more and more caesium as raw material. Well, then the demand for more nuclear plants would become irresistible and the radioactive contamination of the environment would become many times greater than now.

What can an ordinary citizen do to prevent such abuses? It is difficult, if not impossible to fight large corporate entities and their bureaucratic allies through the normal parliamentary and legal channels. They are too well organised and have large sums of money to distribute in the name of 'lobbying'. No citizens' group has that kind of wherewithal to match and more over there are strong moral compunctions against using such methods to gain one's ends.

Food & Water—a voluntary group based in the US was faced with the same problem. Under pressure from the nuclear industry and agribusiness interests, the US Food and Drug Administration approved of food irradiation for some food items such as some fruits, poultry and sea food. A company called Vindicator Inc. built an irradiation facility and began operations. Instead of spending their energies trying to convince members of congress regarding the harmful effects of food irradiation, Food & Water trained hundreds of volunteers all across the nation who would write letters threatening withdrawal of custom, if necessary picket, and generally make their disapproval clear to any food store anywhere in the nation that would keep irradiated foods. The result: while food irradiation is 'allowed' by the government and the law books, after five years of operation, no large food chain in America is willing to touch irradiated food and Vindicator Inc. losses are well over a million dollars

Surendra Gadekar

From the Editor's Desk

AERB must not shirk its responsibility

The leak of radioactive water from the Waste Immobilisation Plant at Tarapur made the first page of national newspapers. This is all to the good. The spotlight of public accountability and indignation at the shoddy practices of the nuclear establishment is the only source of light in this area of darkness.

The response of the authorities to this 'crisis' was predictably inadequate. The leak was detected due to enhanced levels of radioactivity in the environment. When these levels continued to rise for over a month, Atomic Energy Regulatory Board stepped in and halted plant operations. Nobody bothered to take the people living in the vicinity into confidence. The matter came to light because a number of village cattle died suddenly leading to alarm amongst the villagers. Then the authorities pooh-pooed the idea saying that cattle are less radiosensitive than humans, so it is unlikely that humans could have survived a dose which was enough to kill cattle. This argument might well be true. But had the AERB and the plant authorities been sensitive to the need of informing the villagers, they could well have avoided all the adverse publicity.

Nobody, even till now, has actually tried to investigate what killed the animals in the first place. The plant authorities have been speculating that it could be an overdose of poisonous insecticide, but in the absence of any investigation providing convincing proof, these idle speculations are only a means of shifting the blame. Normally, one would expect that scientists at nuclear power plants would take interest in problems of the local environment.

In the din of the controversy regarding the seriousness of the leak, journalists have missed the most important point. The figures released by the Atomic Energy Regulatory Board chief point to a most damaging indictment of nuclear operations at Tarapur. What they reveal is that Tarapur's 'natural' background radiation has risen more than three times from its values recorded 25 years ago. Normally, natural radiation would change on geological time-scales of millions of years. Its extremely rapid increase in the last 25 years points unmistakably towards a human agency. Since atmospheric bomb-testing had already effectively ended before Tarapur started and since any way Tarapur is far away from bomb-testing sites, the most common cause for the rise in the background radiation in the last fifty years is also not likely in this instance. The plain conclusion is that it is the pollution due to the nuclear power plant and its associated facilities like reprocessing and waste management, which has resulted in increased radioactivity in the surrounding region. The radiation dose to surrounding population in absolute terms is much larger than the 100 milli-rem allowed by the AERB's own regulations. The authorities have hidden the pollution by calling it 'natural' background.

The duty of the Atomic Energy Regulatory Board is clear. If it is serious about its often repeated assertions regarding protection of the health of the population, it must not allow any continuation of nuclear activity at the site except those needed to clean up the place, and also ensure that such fraud is not perpetuated at other national sacrifice sites elsewhere in the country.

The Mystery of the Bulging Background

"Oh! Rigorous Re-searcher (RR), here is a mystery for you. The morning paper says that *"Leak of radioactive water at Tarapur goes unnoticed for 45 days."*

"Elementary, my dear Chamcha. That's no mystery at all. Notice the Waste Immobilisation Plant at Tarapur from where the leak occurred is run by the world famous Bhabha Atomic Research Centre. These are great and famous scientists. They have no time to take heed of such mundane everyday things as leaks of radioactive water. I can bet that even now they are busy fulfilling their many international commitments. If they are bothered at all, what they would be investigating is the leak of information about the leak rather than the leak itself."

"No RR, you misunderstand me. Everybody knows the BARC. They are indeed world famous. In 1992, they brought colour to the cheeks of diamond traders by exporting irradiated black diamonds. It was only when the London based Diamond Trading Company and De Beers, the international diamond cartel, lodged a joint formal protest with the Indian government, stating that *the diamonds were found to have "dangerously high levels of radioactivity,"* that the matter ended. Of course BARC disclaimed any knowledge that it was their irradiated diamonds that were being exported."

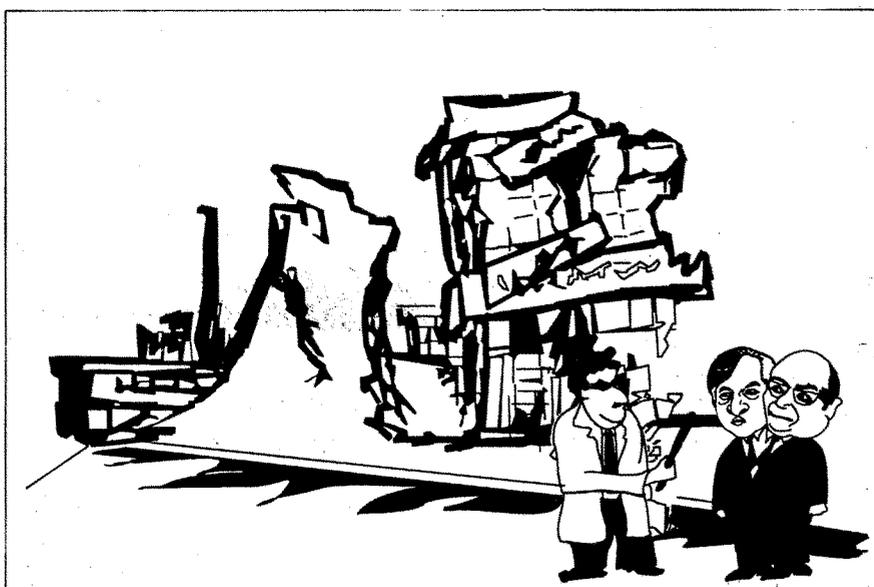
"Yes, diamonds are such small things. Anybody can walk out with a few at a time and who is to know. Why, I heard that in the Kakrapar Atomic Power Plant in Gujarat, 17,000 full grown trees in the 1.6 kilometre exclusion zone around the reactor suddenly disappeared and the plant authorities could do nothing but lodge an FIR with the local police station after three months."

"But RR, aren't these exclusion zones prohibited areas where anyone found loitering is liable for prosecution under the Atomic Energy Act of 1962? Then, how come cattle graze there regularly and people, even small children can walk in and out at will?"

"That is nothing. Go to Kakrapar in the prohibition bound state of Gujarat. Distilleries by the dozen

rity of the plant? If terrorists were to blow it up won't that be a national calamity?"

"That may be so, but as the spokesman from BARC says, "It is difficult to maintain a vigilance squad for this (keeping 'encroachers' out) purpose alone." We need 'z' security for nationally important assets like the precious lives of our leaders and their dear ones and ..."



Yes, there was a leak. But it was well within acceptable limits and we will vouch for that

and yet (legally) not a drop to drink! But seriously as the BARC spokesman said to Times of India on 28th July, *"We have not fenced this zone since villagers are bound to encroach anyway."*

"Of course, since the land originally belonged to these very villagers themselves and the plants have done nothing for the locals, from the people's point of view it is the nuclear-walas who are the encroachers. But as every non-paying profiteer would sanctimoniously tell you, somebody has to pay the price for national development. But what about the secu-

"Let's get back to BARC and the mystery, RR. One surprise is that they did find out about the leak in a mere 45 days! In 1991, they had a leak in their own backyard — the charmingly named "Gamma Garden"— which they later found had been going on for 14 years. Plant management had taken no cognisance of a report, filed in 1978, warning of the danger."

"Come come Chamcha, times are changing. Don't you know that there has been 'glasnost' in the Department of Atomic Energy since 1988 and the new, well, not so new

chair of the Atomic Energy Regulatory Board, Dr. A. Gopalakrishnan himself said, "Safety of the people around the plant is the AERB's responsibility and we will make sure this is done."

"But it wasn't the Atomic Energy Regulatory Board who told the villagers about the leak. It was the villagers who raised a howl when their buffaloes and dogs and even birds started dying."

"Now you have really gone too far. Do you expect these great scientists with so many chores to take time off and talk to illiterate, ignorant, dirty villagers who don't understand English. And, you know, that a little radiation now and then is good for these people. You might even think of it as a much needed family planning measure. If we don't control our exploding population..."

"Yes, yes, I know all that, but you can't deny that there was this leak in an almost brand new plant which had hardly been in use for less than one year."

"It may be a one-year old plant but the equipment was ten years old. The equipment was being naturally weatherised by the BARC all this while. Obviously with the salty sea air all around, some of it might have got rusted. But that is true of all equipment. It has to be ordered years beforehand or else when the time comes it might not be ready and do you realise what a colossal wastage of national resources that would be."

"But RR, do you mean to tell me that all new plants have ten year old rusted equipment?"

"Its not I who is telling you this. You can have it straight from the horse's mouth. Mr. Y. S. R. Prasad, the managing director of the Nuclear Power Corporation while talking about the yet to be sanctioned Tarapur units 3 and 4, said that

"When the orders were placed in 1989, we believed that the plant would be commissioned in five years. This did not happen because the government has not yet given financial clearance." But let me not get into the dilatory ways of Indian bureaucracy."

"That is certainly wise. All I wanted you to do was to solve this mystery regarding Tarapur."

sceped into the soil within the plant area led to radiation fields ranging from 0.05—0.20 milli-Roentgen per hour on instrument contact. Both the nullah and water containment pit site areas affected by the radioactive leakage, are now recording natural background level activity after the clean-up. At the time of contact the radiation field was two to seven times higher than the natural back-



The Nero of Atomic Energy Regulatory Board fiddles with words while background radiation bulges.

"There is no mystery shystery. The director, mind you, of BARC Mr. A. N. Prasad has addressed a press conference on this subject. And he rightly said, *"This was a minor issue which has been blown out of all proportion. Nothing serious would have resulted from a pinhole defect in the evaporator coils."* That should satisfy anyone. But if that is not enough, even R. Ramachandran, the intrepid science editor of *Economic Times* and the author of that much published essay, *"Who is Right About RAPS,"* has put in his usual last word: *"Going by the AERB data — and there is no reason to doubt them — it is clear that there is no danger to villagers in the vicinity of the plant being exposed to radioactivity, newspaper reports to the contrary notwithstanding."* "Now what more can anyone want?"

"The AERB data! That's the mystery. Dr. Gopalakrishnan says that "This contaminated water which

ground levels."

"It is clear as the nullah mud, but what's the mystery?"

"There are 8,760 hours in a year. So if we multiply 0.05—0.20 with this we get an yearly dose of 438—1752 milli-Roentgens per year. Since this is supposed to be *"two to seven times the natural background"* according to Dr. Gopalakrishnan, the natural background around Tarapur is now 219 to 250 milli-Roentgens per year. Now before the reactor started on All Fool's Day in 1969, their own publications say that natural background around Tarapur was just 65 to 85 milli-Roentgens per year. So the mystery is how has the natural background increased by three times in 25 years of reactor operation?"

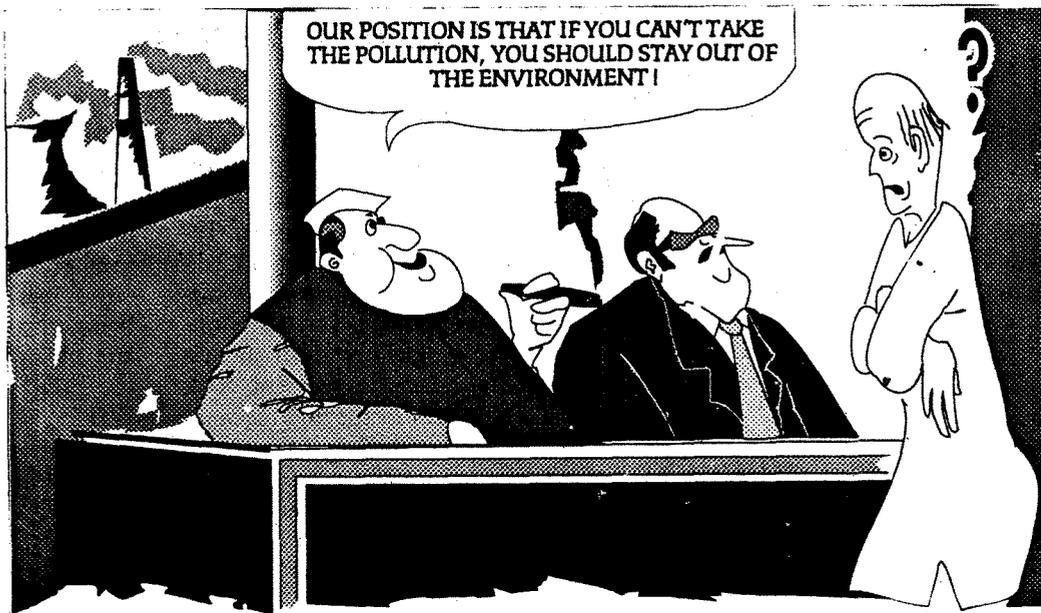
"Chamcha are you the Rigorous Researcher or am I? You should

leave thinking about matters atomic to those authorised to do so under the Atomic Energy Act of 1962. But for once and once only, I will put you out of misery and explain everything:

"See, as this informative booklet brought out by the Nuclear Power Corporation tells us, natural background radiation comes from various sources. Amongst these are

cosmic rays, and radioactive elements in the soil, water, food and air. Nuclear power plants contribute a negligible fraction to the natural background radiation. And in fact, the booklet says this clearly in black and white. "With 20 years of operation we can confidently say that the radiation level around Tarapur nuclear power plant is a small fraction of the natural background radiation."

"As it is people living on the beaches of Kerala near the thorium bearing sands get a much higher dose than anything at Tarapur. Now, what could have happened is that during the last 25 years, these thorium sands of Kerala might have got washed off from there and started depositing near Tarapur.



Since anyway India would soon be going in for thorium based reactors this would be rather convenient, don't you think. Save transportation costs."

"If you don't mind RR, I think this explanation is rather weak. Reminds me of that *"Every tenth person born is deformed"* that Dr. K. Parthasarathy, the secretary of the AERB said sometime ago. And if this were actually the case don't you think the nucleocrats would have let the country know."

"Perhaps you are right. Wait a minute! I have got it. By God, I have got it. It is these anti-national antinukes and their foreign connections. They would stoop to anything

to obstruct our glorious march to peace, progress and prosperity through nuclear energy. If they have foreign contacts, what's to stop them from having extra-terrestrial contacts. They must have asked these contacts to bombard Tarapur with cosmic rays, which mind you form the largest component of the natural background radiation."

"You are the greatest RR. Nobody, not even the one and only Dr. Raja Ramanna could have thought of this."

"It is only a matter of thinking logically and exercising the grey cells."

Surendra Gadekar

An Apology

After almost a year of regular publication, Anumukti has fallen back on its bad old ways of delayed issues. We apologize for the inconvenience caused due to our own inefficiency. Hopefully, as they say in the railways we will make time and will shortly be back on schedule.

Ripley's Corner

On July 12, three teenagers looking for a beach barely escaped with their lives when their four-wheel-drive Ford Explorer was sucked into a discharge pipe at Florida Power & Light's St. Lucie reactor complex.

The kids were seeking a shortcut for a surfing expedition when their car pitched over an embankment into the pipe. The current threatened to sweep them to sea, but all three were accomplished swimmers. One described the water by the pipe "as real warm, like, you know, a hot tub."

Not believing the teenagers had suffered enough, Florida Power & Light announced they would attempt to charge the driver with trespassing.

Tarapur Time Bomb

Radioactivity, contamination, TAPS, stack tower, waste reservoir If these sound like words in the vocabulary of someone familiar with nuclear power generation, think again. They are bandied about effortlessly by the young boys of Ghivali village who have not studied beyond school. The village school is only till class seven—always has been. It has five hundred students today who are taught by seven teachers.

But Ghivali is no ordinary village and its 3,000 militant and knowledgeable residents are not ordinary villagers either. Located 1.23 kilometres from the BARC run Waste Immobilisation Plant (WIP) and 1.8 Kilometres from the reactors of the Tarapur Atomic Power Station, the village is currently in the eye of a storm.

Between the first week of March and April 24, a litre and a half of radioactive waste containing caesium-137 leaked out of a damaged pipe from WIP and due to a major construction gaffe, was poured down a storm water drain which ultimately empties out into a nullah. This nullah meanders over a kilometre before running aground a few metres from one of the wells that the villagers use for drinking water. There is little doubt that this well is fed by water from the nullah.

Another time, another place and this time the name of the village is Tebecheesk. Thousands of miles away from here but close to the Byelorussian capital of Minsk. And, more significantly, only 130 miles from Chernobyl. That power reactor blew up nearly a decade ago on April 26, 1986. "The sky suddenly darkened. It seemed to be overcast but there were no clouds. There was

something like thunder and lightning but we hadn't seen such a flash before. It was much more than thunder." That's how a girl from Tebecheesk, who was on a field trip that day described the worst industrial nuclear disaster ever. (It is unlikely that the girl saw what she has described, since the accident took place in the dead of the night around 2.00 AM when little girls even on field trips are usually asleep, but the vivid description does throw light on

Ghivali is a mere 1.23 km from the nuclear facility and during the period that caesium leaked from the plant into the nullah, a few cattle, some fowl and village dogs died without any apparent reason. the question being debated heatedly in the village and outside is — did they die from the radioactivity that leaked from WIP?

The simple counter logic to the allegations that the deaths were due to



the psychological damage caused—
Editor.)

Many died. Many were left maimed for life. The real cloud, even bigger than the one generated by the blast, was the one that followed — that of secrecy. For several days while radiation spewed by the damaged plant spread rapidly, the residents of Tebecheesk, like residents of many other villages were told nothing of what had happened. They were advised to keep their children indoors as far as possible. When the illnesses began, there were no sympathetic ears to listen to the tales of misery.

radioactivity is that if cattle, which have a much higher radiation resistance than human beings could have died than some villagers too would have fallen prey. Unfortunately, this is the logic that the authorities are using to pull the curtain on the episode. And that has been the tragedy of all the 200 other small and not-so-small nuclear disasters that have hit the country's nuclear power plants in the last 25 years.

The issue is not whether the animals of Ghivali died of radioactivity, but of what the plant—that has been a part of the village for almost 30 years now—has done to the environ-

ment and, given the blatant flouting of international safety norms, what it has the potential to do. The village and the metropolis of Bombay about 100 km from Tarapur, are sitting on a powder keg.

The village, comprising chiefly of fishermen, had about 30 fishing vessels bringing in a big catch till a few years ago. Today there are only two left. And even these two have to go deep into the sea before they can catch any fish. "The discharges from the nuclear power plant have chased the fish away from our shores. And whatever fish we get close to the shore tastes awful," complain the villagers.

Only divine intervention can save the village in case of a disaster at the nuclear power plant. Although the International Atomic Energy Agency and our own Atomic Energy Regulatory Board safety norms specify that there be no human habitation within a distance of 1.6 km from the plant, this village has not been relocated despite the fact that it is only 1.23 km from the Waste Immobilisation Plant. The authorities' argument is that though the village is close to WIP, it is 1.8 km from the nuclear power plant and therefore their safety norms are not violated. What they fail to mention is the fact that there is no fencing nor any security men between the village and the inner boundary of the plant. Village cattle old men and

children spend around eight of their waking hours within this 1.6 km exclusion zone. In fact, one of the wells that the villagers use for water lies within the exclusion zone.

WIP handles radioactive nuclear waste both low level and high level.

that the nuclear power plant has been operational.

The state government, which has no say in the matter, rushed two teams from the Pollution Control Board within hours of the expose. They are not a radiation monitoring agency and have no expertise in the field and thus have to accept whatever the plant authorities tell them. The Chairman of the Atomic Energy Regulatory Board, Dr. A. Gopalakrishnan spent three days at Tarapur to conduct an independent investigation. He has already said that the radioactivity release from the accident was minimal and "well within permissible limits". Just another usual "unusual occurrence" at a nuclear power plant, the explanation has been given. The chapter is now closed.

Does anyone ever question the permissible limits. Permissible for whom? Man has inherited the earth and the rest be damned seems to be the all-pervasive attitude.

What about Tarapur's animal and plant life? Is that to be left to fend for itself while a mismanaged plant hides its shortcomings and waits to fall apart?

Nitin Padte Indian Express July 17, 1995

Is it any wonder that the background radiation has risen threefold?

Till 1977, a research paper claimed that thousands of litres of 'dirty' radioactive waste were being discharged directly into the sea every day. Cross-contamination between clean and dirty waste liquids was a common occurrence, Cloth bags being used for filtration of solid wastes from their liquid content, whenever the only centrifuge happened to breakdown.

Another 1977 paper claimed that the waste disposal facilities in the original design were adequate only for the first two years of operation. The reasons: rising number of fuel leaks, frequent emergency shutdowns, operational snags in the liquid waste concentrator and mixing of dirty radioactive waste with chemical waste.

At no time did TAPS facilities have sufficient storage space to hold waste being generated at the rate of 1 lakh litres per day. In fact, when there was a surge of 1 million litres of liquid waste in 1972, they were transferred to the delay tanks using ordinary tanker lorries with virtually no protection.

Thereafter these effluents were given an ion-exchange treatment to remove caesium in "throw-away" type columns. What this really means is that numerous columns filled with used up chemical resins were dumped on the fields inside the 1.6 km exclusion zone.

Another technical paper reported in 1982 that corrective measures were extremely slow, because of inherent defects in the layout of the plant.

S. Ghoshal in Indian Express July 17, 1995

The walls of the chamber that handle the waste are nearly a metre thick. Within the complex the employees have to observe very strict safety rules. But not a single villager has ever been examined for the effects of radioactivity during the past 25 years

Food Irradiation—A Massive Experiment on Humans

Dr. Rosalie Bertell, the author of this article is an antimuclear activist of world renown and the winner of the Right Livelihood Award. She wrote the article in 1988 during an intervention to decide Canadian involvement in food irradiation. In response to our request for information on the subject, she sent the paper along with the following letter

Food irradiation was first introduced for the space flights. It was to provide long shelf-life on flights. The space programme was military in its beginnings, and is still highly militarised. Currently, food irradiation provides a convenient excuse to reprocess spent nuclear fuel. The reprocessing would be done to extract caesium 137 to use in irradiators. This breaks down the strong opposition in the US, and some other countries, to reprocessing. Opposition is based on fear of plutonium diversion. Of course, plutonium could also be extracted along with the caesium and this would be hard to monitor. The citizen watchdog function would be undermined and the diversion of spent nuclear fuel from civilian to military purposes would be facilitated. Food Irradiation has little to recommend it even if one discounts the connection with the military.

Basic to the question of food irradiation is an understanding of wellness or health. Food is not just another form of "pills" or an inert pile of chemicals. One doesn't choose a "sickly" chicken or mouldy looking egg plant for the evening dinner. A healthy plant or animal is able to balance harmful and healthful bacteria so that it maintains its normal size, shape, texture and colour. Even a child can distinguish between a rotten apple and a red juicy wholesome apple freshly picked.

Conventional human wisdom has identified freshly caught fish and game, freshly picked fruits and vege-

tables, and healthy domestic animal meat as the best nourishment for humans. Once the fruit is picked or the animal killed it can no longer perform its balancing task and the forces of death and decay begin to take over. The decay process can be slowed through various means such



as dehydration, cooking or heat processing, freezing or the newly proposed irradiation process. None of these has the ability to differentiate between desirable and undesirable bacteria. None has the ability to remove pesticide or herbicide residue, toxic non-living material, or even all the bacteria, yeast and moulds. Completely dead food loses its taste, colour, texture and attractiveness. It also loses vitamins and other nourishment.

With this in mind, the comparative benefits and disadvantages of food irradiation can be briefly sketched, including an assessment of the need for new food processing methods, the scientific studies on the wholesomeness of irradiated foods, and the political and economic climate under which the technology is being promoted.

History

Patents for food irradiation were taken out as early as 1921 in the USA and 1930 in France, but the technology was not implemented. In 1957 irradiation of spices was permitted in W. Germany under the assumption that spices make up only a small percentage of any food. This permission was withdrawn in 1958 and all food irradiation was banned. Canada permitted irradiation of potatoes in 1960 to prevent sprouting, i.e. to make the potato sterile, and in 1963 USA granted permits for irradiation of wheat, potatoes and bacon for export. The US Food and Drug Administration withdrew the permit for bacon in 1968.

The impetus for food irradiation has not come from farmers, the developing world, retail grocers or consumers. In the early 1970's the International Atomic Energy Agency (IAEA), whose mandate is to promote nuclear technology, began to hold seminars on food irradiation and established a joint committee of experts from the IAEA, the World Health Organisation (WHO) and Food and Agriculture Organisation (FAO). This group, the Joint Expert Committee on Food Irradiation (J.E.C.F.I.) decided in 1976 that the new chemicals called radiolytic products which are produced in irradiated foods do not need to pass tests of toxicity as do other food additives. They declared irradiation a process not an additive, although free radicals (highly reactive molecules) and new chemicals are produced in the food. Some of these radiolytic products are the same as those produced in cooking

or thermal processes, for example hydrogen peroxide and formaldehyde, but they occur in larger proportions in irradiated foods. Others are unique to the irradiation process.

The question of classification of food irradiation as a process or an additive is not trivial. Food additives must be tested for toxicity. Food processes do not require such testing.

Potential Problems

In thermal food processing there is a rather homogenous reduction of all bacteria, both the relatively harmless and those which are pathogenic or toxin producing. In irradiation bacteria are killed in a proportion relative to their sensitivity and resistance to radiation. Some of the bacteria which produce the natural indicators of unwholesomeness in food: staleness, disagreeable smell, or unpleasant taste would be killed off while some of the most pathogenic bacteria would be left alive. For example Clostridium Botulinum resists irradiation below the 10 kilogray upper limit for food processing. The toxin produced by Clostridium Botulinum can cause botulism. It flourishes in anaerobic (oxygen free) conditions. This deadly pathogen would not be destroyed by irradiation and in fact could even thrive. Irradiated food requires some protection against recontamination but the anaerobic growth enhancing environment for Clostridium Botulinum rules out the use of vacuum seal cans for this purpose. The "old fashioned" canning of food done in the proper manner effectively eliminates botulism food poisoning.

Salmonella Poisoning

Irradiation can kill some bacteria, those most sensitive to it, but it can never remove toxins already deposited in the food. For this reason, the cleanliness and health of food chosen for preservation can never be neglected. Moreover, food irradiation

should not be allowed to replace sanitary handling of food.

The nuclear industry is promoting food irradiation primarily as a preventive action against Salmonella in poultry. From 1983—1985 there were 28 deaths in Canada attributed to Salmonella poisoning. Present statistics are unknown at this time. The report of the standing committee on food irradiation from 1983 - 1985 notes that:

"relatively rough extrapolations have indicated that Salmonella may have contributed to approximately 750 deaths in Canada in 1985, but actual statistics attributed only 28 deaths to Salmonella from 1983 to 1985. Which figures may be more accurate is unknown at this time, but Salmonella contamination is a major source of food poisoning and a significant public health concern in Canada and elsewhere."

Salmonella contamination is due to improper handling techniques by processors, handlers, consumers and restaurants. Mechanical cleaning of chickens (which bursts the gut) is the single greatest cause of the problem.

Aflatoxins

The JECFI declared that there would be no toxicological problems with irradiated food not exceeding an average dose of 10 kilograys. It gave no specified minimum to ensure the killing of radiation sensitive bacteria; nor is there a specified maximum which would avoid the production of radiolytic by-products or stimulation of production of known harmful pathogens. It is well known that irradiation can increase the production of some extremely toxic aflatoxins by certain fungi, especially in nuts and grains. These aflatoxins are known to be extremely potent carcinogens and their ability to continue production following irradiation has not been addressed by the Joint Committee. Proposing an average exposure only leaves this

technology open to widespread misuse.

Pesticides and Other Chemical Hazards in Food

Irradiation fails to eliminate pesticide residues and other chemical hazards in food. It has been proposed as an alternative to pesticides and preservatives. However pre-harvest pesticides will still be used, and their chemical interaction with irradiation is unknown. Irradiated food will still require preservatives, cooking, freezing, and other means to avoid recontamination.

Loss of Nutrients

Some key vitamins, especially E, C, and thiamine are lost through irradiation. The production of hydroperoxides apparently reduces the concentrations of fatty acids and fat soluble vitamins. This may in turn influence absorption and utilisation of the food.

Assessment of US Food Irradiation Research

There have been about 2000 research papers on food irradiation published internationally, of which about 400 were selected by the US Food & Drug Administration for serious review. They chose six as "considered by the agency to reviewers to be properly conducted, fully adequate by 1980 toxicological standards, and able to stand alone in support of safety." Two of the studies were in English, three in French and one in German. On investigation in one of the English language papers, published in 1964, the authors state about their own research that "consequently in many cases statistical comparisons were not possible. However, examination of data intuitively suggest that differences of no real significance." There were differences between the control rats and the rats fed irradiated wheat, with a statistically significant increase in stillbirth rate among those fed irradi-

ated wheat. Other findings failed to reach significance because of the small number of animals. This hardly constitutes strong proof of the safety of food irradiation.

The second English language paper reported unexplained deaths and abnormalities in animals given irradiated food, not reaching statistical significance because of the small number of animals in the study. One of the studies indicated negative effects in older animals, but the finding was not pursued. The food used in the English language studies had been irradiated at 20 kilorad (0.2 kilogray) well below the proposed level of irradiation of human food—1,000 kilorads (10 kilogray).

In two of the three French studies, the dose to food was less than 50 kilorad (0.5 kilogray). No adverse effects were reported. In the German study animals fed irradiated food weighed significantly less than controls and had reproductive abnormalities. Both these effects were mitigated with vitamins.

Thus, the 'scientific' evidence in support of food irradiation consists of studies with low irradiation dose, small number of animals, short follow-up times, and negative results. No real scientist would accept these studies as establishing the safety of irradiated foods.

The Most Convincing Study

Drs. C. Bhaskaram and G. Sadasivan of the National Institute of Nutrition, Hyderabad, carried out a study on children which was published in American Journal of Clinical Nutrition in February 1975. This is one of the very few human studies with irradiated food. Five children were fed freshly irradiated wheat (75 kilorads or 0.75 kilograys) and four out of the five children developed a chromosomal abnormality called polyploidy. Polyploidy is a good indication of possible future cancer. However, after the feeding was stopped, the polyploidy disappeared.

The same results were obtained in monkeys.

It was this study which fortified Mrs. Indira Gandhi to overrule Department of Atomic Energy's strong advocacy of food irradiation in the 1970s. However, the US Food and Drug Administration rejected this study based on a review.—Editor

For most, food irradiation offers no economic gain and means higher priced food, less nourishment and probable harmful side effects.

"A committee of Indian scientists critically examined the techniques, the appropriateness of experimental design, the data collection and the interpretation of the NIN scientists. This committee concluded that the bulk of the data are not only mutually contradictory, but are also at variance with well-established facts of biology."

Now, as it happens "the committee of scientists" which reviewed the study consisted of two persons: Dr. P. C. Kesavan and Dr. P. V. Sukhatme. NIN had immediately terminated their use of irradiated wheat when polyploidy was noticed, and tested their findings on lab animals. Sukhatme and Kesavan, refused to look at the NIN animal studies as "outside their frame of reference."

Ionising Radiation Breaks Chemical Bonds

One of the ways by which proponents of food irradiation try to minimise concern is by quoting a study from Ames, Iowa saying that each kilogray of ionising radiation breaks only six chemical bonds out of ten million in food. This makes the magnitude, nature and biological impact of the breaks seem small. However, in 100 millilitres of water there are 5 gram moles, that is 1025 molecules. At the low dose of one kilogray, 1018 bonds are broken creating the hydroxyl radical, one of the most re-

active entities known in biochemistry. Water makes up some 80 % of most foods. Food irradiation will be permitted to an average dose of 10 kilograys.

Labelling

Labelling requirements for irradiated foods offer no assurance to the consumer that food has not been irradiated because there is no test to detect irradiation.

The flower like radura symbol is misleading and should be accompanied with the words irradiated. The wording should appear on all food that has irradiated ingredients. The proposed labelling exemption for irradiated ingredients that comprise less than 10 % is not acceptable. A food could contain six ingredients each one less than 10 % of the whole, together comprising 45 % of the product. All irradiated ingredients at any percentage in the food product should be listed.

Conclusions

There is little gain in food irradiation other than economic gain for nuclear industry. It allows a fig-leaf cover to the nuclear weapons industry to continue reprocessing in the name of recovering caesium for the irradiation plants. For the farmer, consumer and the poor in the developing world, it means higher priced food, less nourishment, in the food and probable harmful side effects in terms of pregnancy outcomes, cancers and chronic diseases. More scientific testing of the effects of food irradiation needs to be done and done by those who have no pecuniary interest in the technology. Without this assurance, food irradiation becomes a massive experiment on human guinea-pigs.

Not covered in this note are question of worker exposure, accident potential and waste disposal from irradiation plants.

Rosalie Bertell

Another Warning on the CANDU Front

"There is nothing more frightful than ignorance in action"

Goethe

Except for the Tarapur reactors all the rest of our reactors are CANDUs. Nucleocrats say that these are safer than other reactor types and have frequently pointed towards Canada as an example of what could be achieved if only enough funds were made available. Unfortunately, as CANDUs age, they seem to be more and more prone to problems.

Investigations following the "loss of coolant accident" (LOCA) at Pickering unit-2 in Canada on December 10, 1994 (reported earlier in Anumukti) have revealed that the written instructions followed by reactor operators actually contributed to the accident. The same design flaws that caused the Pickering accident exist at other CANDU reactors. (All Indian power reactors with the exception of Tarapur are CANDU type.) A similar, though less severe accident took place a few months later at another Canadian reactor (Bruce unit-5). This latter accident took place despite the detailed analysis done by Ontario Hydro (the owners of both the plants) following the Pickering accident. In both accidents, super-heated, radioactive coolant (heavy water) leaked from the reactor core due to faulty valves. LOCAs can be extremely dangerous in CANDUs since if for some reason the automatic reactor shutdown system fails following a LOCA, there are very good chances that the resultant overheat

ing will melt

the fuel bundles and result in a huge explosion that would destroy the reactor a la Chernobyl. However, in both these accidents as well as a third similar accident at Wol-

ung-1 CANDU in South Korea, there was no damage to fuel bundles.

The Pickering accident

Initially, a liquid relief valve in the reactor core cooling system stuck open, allowing the coolant to enter the bleed condenser (an overflow tank for the cooling system). This resulted in an automatic shutdown of the reactor. However, following the shutdown, pressure increased in the cooling system, causing the bleed condenser pressure relief valves to open. The piping to one of these valves cracked because of severe vibration, spilling the coolant into the reactor building. 185 tonnes of heavy water were spilled. (Just to get things in monetary perspective one tonne of heavy water costs more than Rs 1 crore.)

The emergency core cooling system then pumped about 140 tonnes of water into the core for several hours to prevent overheating and melting of the fuel. Workers stopped the leak after one and a half hours by manually closing all liquid relief valves on the core cooling system. About 200 workers were involved in the clean-up effort. It is estimated that the reactor will be out of service till October 1995. The costs for repairs and retrofitting are estimated to be \$ 10.5 million.

The AECB Investigation

The Atomic Energy Control Board (AECB) of Canada established an investigation to review the accident circumstances. The investigating team found that some of the actions taken the reactor operators actually contributed to the accident. The operations manual (Power Reduction

Action Guide) had recommended these very actions. Also, stopping the leak by closing all the pressure relief valves meant there was no overpressure protection for the entire primary cooling system, and this was done without regulatory approval. According to the team, Ontario Hydro's root cause analysis is incomplete. The team made a number of recommendations to Ontario Hydro including revision of reactor operating procedures; audit of human performance evaluation system; and review of nuclear emergency procedures.

Significance for other CANDU stations

The root cause of these recent accidents has been traced to a failure of a diaphragm in a liquid relief valve of the reactor core cooling system. The secondary accident stage involved damage to the bleed condenser relief valves, and in the case of Pickering the piping as well. The team felt that the design of the bleed condenser pressure relief system is inherently flawed in CANDU reactors. AECB have recommended design changes for all the other CANDU stations in Canada. The investigating team also noted the fact that an earlier analysis carried out by Ontario Hydro engineers at Bruce prior to the May 1995 accident there had failed to identify the possibility of the very situation that did arise.

Bruce-5 Accident May 14, 1995

This accident was a replay of the Pickering accident. The liquid relief valve leading from the reactor cooling system to the bleed condenser stuck open while the reactor was

running at 88 per cent of its full power. The reactor shut down automatically, despite efforts by the operators to reduce the reactor power level slowly. After shutdown, the cooling system pressure increased, causing two bleed condenser relief valves to open, dumping heavy water into the reactor building sump. 87 tonnes of heavy water were spilled

and 68 tonnes were automatically recycled back into the cooling system during the accident. Most of the remaining 19 tonnes were recovered later by clean-up crews. About 20 staff were involved in the clean-up. Ontario Hydro downplayed the seriousness of the accident by noting the amount of heavy water that had to be manually cleaned up as if it were

the total amount spilled, and by stating publicly that there had been no radiation release from the accident. However, 180 billion becquerels of tritium were released to the air during May 14, 15 and 16.

WISE News Communiqué 436 21
July 1995

A Question of Informed Consent

The Punjabi community in the city of Coventry, about 100 miles north of London, has demanded a public inquiry into recent allegations that 21 Punjabi women were secretly fed radioactively contaminated chapatis under a nutrition experiment conducted more than two decades ago.

The allegations, made in a documentary shown on Channel Four television, titled *Deadly Experiments* has pitted Coventry's Asian community—one of the oldest settled in Britain—against the British Government's Medical Research Council (MRC), whose scientists devised and conducted the experiments in the late 1960s and early 1970s.

According to at least two surviving women who have been identified as having been among those experimented upon, the MRC did not seek the women's consent before launching tests on them.

The experiments were conducted after concern among medical circles that Asian women in Britain suffered from widespread iron deficiency. The MRC suspected problems with the Asian diet and decided to track the iron content in chapatis by mixing in the flour a solution of mild radioactive iron salts.

After being fed the chapatis the MRC's version of the duration of

the experiment is being disputed by Asians the women were taken to the British government's main atomic research centre in Harwell, for tests.

The 21 women, it appears were selected carefully for the experiment after they went to their family general practitioner Dr. Shah (who has now died) seeking cures for ordinary ailments like arthritis and migraine. According to the women and their families, Dr Shah told them a special diet would cure them, but never informed them about the experiment.

At least one family member of one of the women (who is now dead) has said that her mother died prematurely because of the radiation.

The question of whether there is anything like a "safe dose" of radiation has been debated the world over ever since the first atom bomb fifty years ago. The question is still unresolved with some scientist claiming that even background radiation causes cancer amongst children and others claiming that low levels of radiation are not harmful.

The nuclear chapatis scandal was unearthed by makers of *Deadly Experiments* while researching alleged excesses by British scientists, taking a cue from the Pulitzer-award winning newspaper story in the US.

The researchers of *Deadly Experiments* found that similar secret experiments had been carried out in Britain as well, where bones had been removed from bodies of dead children without their parents being told, hundreds of pregnant women in Liverpool injected with radioactive isotopes and cancer patients experimented upon. Some of the experiments were said to have defence implications. Britain and the Soviet Union were conducting increasing numbers of nuclear tests. However, an MRC spokesman said the experiment carried out on Punjabi women of Coventry had no such military link.

Since the screening of the film, the case of the Punjabi women has received wide publicity in the British press. The women were seen as particularly vulnerable on account of the fact that they did not speak English.

At an angry meeting held in the Asian dominated area of Coventry many called for a public enquiry into the affair. They took particular exception to a press statement by MRC scientists Peter Elwood that there was no need for a public enquiry. Professor Elwood was quoted as saying that he would do the experiments again if he had to. "You have to accept my word that each woman did give her consent," he is quoted as saying.

Car(e)free Athens

Athens is a city that has long been plagued by the exhaust gases and noise from motor vehicles. Then suddenly on April 10 the noise had subsided, traffic lights had been switched off, and the streets were practically empty of traffic. The ban on cars and motorcycles in the 2.5 square kilometres of the city centre has cost some 5 million drachmas. Streets have been made into pedestrian areas, traffic redirected, and no-fare buses started. The only other vehicles that are allowed in are delivery vans and residents' cars. After a three month trial, the effects of this innovation will be evaluated, but almost

everything points to it being made permanent, and eventually extended.

To Parisians, the Greek move seems like a model. Their city is notorious for its traffic problems, and during windless periods of high pressure, the concentration of air pollutants can rise to very high levels.

A special problem for France is the large proportion of diesel vehicles, which emit much greater amounts of particulate matter than petrol-driven types. The particles which are a result of incomplete burning of the fuel, measure less than 2.5 micrometers across and can penetrate deep into the lungs. They are in fact

linked to an increase in mortality from respiratory and heart diseases. Moreover, they carry carcinogens such as benzopyrene and other hydrocarbons, and according to the International Agency for Research on Cancer, exhaust from diesel engines is one probable cause of cancer.

A main reason for the popularity of diesels in France is the price of the fuel which is 3.8 francs per litre compared to 5.8 francs for petrol due to a lower tax rate. A car maker with a special interest in this state of affairs is Peugeot, the leading world manufacturer of diesel driven cars.

Acid News 3 June, 1995

Airborne Particles: Smallest are the Worst

Research is leading more and more to the conclusion that small airborne particles constitute a serious risk to health. An American epidemiological study has recently traced a link between particulate coming from the burning of fuel and an increased incidence of premature deaths from heart and lung diseases. This study, which is the largest so far to see such a link, can only strengthen the case for air-quality standards and the monitoring of fine particles.

More than half a million persons aged forty-five and over were studied

in 151 towns and cities in the United States. Attention focused particularly on the concentrations of so-called PM2.5 – particles with a diameter of less than 2.5 micrometers – which are considered to be especially dangerous to health since they can force their way deep down into the lungs.

The study noted the known cause of all deaths among adults between 1982 and 1989 and linked this to national data on PM2.5 levels. Statistical analysis after correction for various life-style factors showed that the relative risk of dying was dis-

tinctly greater in places with high levels of airborne particles.

The risk for adults in cities with the highest levels of fine particulates was found to be 17 per cent higher than in the least polluted areas. There was an evident association between deaths from cardio-pulmonary disease and lung cancer and particulate air pollution, but not from any other diseases.

Acid News 3 June, 1995

Rise and Fall of the Carbon Sink

Avast amount of carbon is locked up in the world's forest. While the atmosphere contains about 750 billion tons of carbon, in the form of carbon-dioxide, there are about 2000 billion tons contained in the world's forests. Roughly 500 billion tons are stored in trees and shrubs and 1500

billion tons in forest litter, soil and peat bogs.

Each year, about 5 per cent of this latter amount, or 100 billion tons, is cycled through the atmosphere. The cycle is in rough balance, with about 100 billion tons being absorbed through photosynthesis, while 60

billion tons is released by decomposition, and 40 billion by respiration.

Human activity has profoundly disturbed this natural carbon balance. Since 1850, about 320 billion tons of carbon have been dumped into the atmosphere – about 200 billion tons coming from burning of fossil fuels and 120 billion tons from

deforestation. About 130 billion tons of carbon have remained in the atmosphere. The most recent research suggests that 90 billion tons was absorbed by the oceans and 100 billion tons by the forests.

Almost all the carbon released by deforestation has been reabsorbed elsewhere. How has this happened and will it continue to happen in the future?

There are three major possible reasons for this forest carbon "sink":

Carbon dioxide fertilisation

Carbon dioxide can act as a natural fertiliser, speeding up plant growth. However, this process only works if trees have an adequate supply of other nutrients, including nitrogen. Hence, carbon dioxide fertilisation, if it is happening at all, is only affecting tropical and temperate forests, not nitrogen deficient boreal forests.

Nitrogen fertilisation

Some scientists have concluded that nitrogen from acid rain, although giving rise to many negative effects on trees, may be having a temporary fertilising effect, especially in boreal forests.

Logging and other forest management practices

Monoculture tree plantations have replaced the natural temperate forests that were extensively logged in the early decades of the twentieth century. These plantations have absorbed billions of tons of carbon – including much, but not all, of the carbon released when these forests were first logged.

In addition, large scale suppression of fire and insect damage has created forests and plantations that are artificially old and contain more carbon than natural forests.

Despite a common misconception, forests are not natural carbon sinks. Under normal conditions forests are neither sinks nor sources, but are in rough balance with the atmosphere. The forest carbon sink created during the 20th century is an artificial human creation – as artificial as the huge carbon emissions from the burning of fossil fuels.

Moreover, there are growing signs that the forest sink is shrinking rapidly. Direct measurements show that less of the carbon released after the mid-1970s is being reabsorbed. In fact, a recent detailed analysis of the

carbon budget of the Canadian forest, described during last fall's conference of the International Boreal Forest Research Association, concluded that the forest is now a carbon source, rather than a carbon sink. Allan Auclair, a Washington based forest scientist, has drawn the same conclusion for all boreal forests.

Ironically, the same forces responsible for the creation of the forest carbon sink now appear to be responsible for its demise. Increased levels of carbon dioxide now appear to be causing significant climate change, thus increasing the frequency of fires, storms and insect outbreaks and releasing still more carbon dioxide from dying forests. Increased levels of acid rain will cause forest die-back rather than fertilisation through nitrogen.

It is as though human beings have been stockpiling gunpowder in a forest 'warehouse' and then struck a match. The carbon bomb is about to explode.

Kevin Jardine

Greenpeace Canada

Acid News 3 June 1995

Interview

Dr. Walter Burnstein is a practising family physician and the President of Food & Water — an activist organisation in US. Known as Wally to one and all, his has been an important voice against food irradiation in the US.

Why was Food & Water established?

Wally: Specifically, I founded Food & Water in 1986 to work on the issue of food irradiation. I learnt that the government had approved use of a technology which exposed food to radioactive material. I was so angry that I had to do something about it. But I also had a larger purpose in mind. I had been looking for a key

issue that was so compelling that people couldn't help but want to get involved. I wanted to use the specific issue to introduce people to other environmental issues and the urgent need for grassroots activism. I found my key issue in food irradiation because everyone eats, so everyone is concerned that what they put into their bodies is safe. With food irradiation I knew that I had an issue

that would build a broad coalition. Just about everyone's response to the idea of eating radiation exposed food is extremely negative. At first, everyone, even my closest friends, thought I was crazy to tackle an issue that looked impossible to win. The Food and Drug Administration had already approved food irradiation and it was being promoted by the richest and most powerful de-

partment in the country - the Department of Energy. Even to me our success has been miraculous; so far, we have prevented food irradiation from talking hold in the US.

Why is food irradiation so bad?

Wally: We aren't getting food irradiation because we need it. In every case there are cheaper, more effective methods for doing what irradiation does, which is to kill bugs and bacteria and extend shelf life. The real rationale for exposing food to radiation is to re-use radioactive waste - both from the military and commercial nuclear power plants. The question to ask, regarding introduction of a new technology is, whether it ought to be subject to rules of moral responsibility. I think new technologies should be useful, have a purpose, and should be truly harmless—not only to the human species, but to the planet as a whole. With food irradiation, we know the process is hazardous, not only to human health but to the environment as well.

What led to your involvement in environmental issues?

Wally: A real turning point for me was in 1977 and '78 when my wife, who is a medical anthropologist, and I went to live and work with the Hopi Indians for two summers. Before that I had always loved hiking and bird watching, and liked to think of myself as a naturalist, but I realise now I was really a spectator. Nature was something I went out and observed in my spare time, but I wasn't really a part of it. Then I lived with the Hopis and they taught me a whole different way of looking at things. They believe that everything on earth has a common mother and that mother is the Mother Earth. All species are related, and we're even related to the wind, rain, mountains, streams and seas. Their concept that as long as we respect protect our sisters and brothers, the Mother Earth will be healthy and will give us everything we need—food, water, air etc. But if we destroy the Earth, we

will make ourselves sick as well. This made so much sense to me because of what I was seeing in my office. Despite all the advances in medicine, the number of people with cancer has gone up tremendously since I started practising medicine. When I first started linking the rise in the cancer rate with environmental factors in the early 80's, many people thought I was being far-fetched. Now, everyone agrees that environmental factors have a tremendous impact on health; and even the American Cancer Society says that 70-80% of cancers are environmentally induced.

If there is so much evidence linking the state of the environment with health, why isn't more being done to clean up the environment? Despite the fitness craze, you seem to be saying no matter how fit you are, you're not protected against illness.

Wally: That's exactly right. You can take care of yourself physically by eating all the right foods and you can exercise like crazy, but unless you also work to stop the pollution of the earth, it isn't going to do you any good. The problem is we've been in an unsurpassed period of growth since 1950's and people have become accustomed to a lifestyle which includes lots of material goods. We all want our cars, our TV's and VCR's, our computers, etc. We haven't figured out a way to manufacture all this "stuff" without rapidly depleting our natural resources and at the same time polluting ourselves out of existence.

Our present way of life is simply not sustainable. In order for us to have this seemingly endless selection of goods that we have now, something had to give, and that something was the health of the planet and our own health. Corporate representatives, government regulators and scientists are always talking about "acceptable risk." They talk about acceptable risk in terms of numbers and graphs. Unfortunately, I see the people in my office every

day who are the ones who have the "acceptable risk" cancers. To them the risk isn't acceptable any more. As a doctor, I can treat their symptoms sometimes, but I realise now that often I'm giving Band-Aid type treatment, because until we get to the root environmental causes of these diseases our collective health is going to deteriorate.

What do you recommend that we do in order to change this destructive course - can we repair the damage that we have caused?

Wally: I can't emphasise strongly enough how important it is to get involved and really work to help clean up the environment. This involves making changes in your personal lifestyle and leaving time in your schedule for environmental activism - whether at the local, state or national level. Every community now is dealing with some environmental problem, whether that be a toxic waste dump, garbage incinerator, pesticide spraying - the list is endless. If everyone reading this newsletter started working on one or more of these issues, the impact would be tremendous. What I would like to see is a huge public outcry demanding clean air, clean water, clean food. There are plenty of people who make enormous profits from ignoring the pollution they are causing. But if rest of us said "NO! pollution is intolerable and we won't allow it any more," the polluters will have to stop. We are playing right into the hands of polluters when we meekly accept the fact that "progress" means pollution and increased disease.

Food & Water has been referred to by adversaries as a bunch of terrorists. What is your answer to that?

Wally: Far from being terrorists we always work well within the democratic system. But often, those of us who won't tolerate degradation of the environment are often called undemocratic. In fact, we are the ones who are democratic in demanding

that the rights of the majority be protected and the earth be preserved for future generations.

What do you recommend to people who want to start working on environmental issues?

Wally: Probably the easiest place to start is right in your own community. Virtually every community has some environmental problem that needs attention. Find out what groups are already working in your area and how you can work with them. Or, if no group exists or they're not working on an issue you find compelling, form your own group. That sounds hard but is in fact very easy. Just as an example, one of the nurses I work with, Milly, called me up last year because there had been some aerial insecticide spraying in her neighbourhood, and her daughter and husband got very sick from it. I urged her to look into it, and it turned out that a group of her neighbours had hired someone to spray, and of course they sprayed the whole neighbourhood without letting anyone know in advance that they planned to do this. They sprayed in the middle of the day when kids were outside playing, people were mowing the lawn, etc.; they sprayed on people's organic gardens. It was a tremendous infringement of people's rights and was totally illegal. Anyway, none of the neighbours

said anything until Milly started calling them up to ask how they felt about the spraying. It turned out that people were really upset, but didn't know what to do. Milly started investigating and found that the chemical used in the spray was quite toxic. She organised the neighbours to protest, went on radio, was interviewed both by the local paper and the big paper in the area. The result was there was no more spraying. She really had an impact and she had not done anything like that before.

I gave that example to show that all of us can become environmental activists. If you have questions on what to do, how to organise, or need suggestions on strategies, contact us at Food & Water. (*Anumukti in India.*) We have to hold fast to the principle that there can be no compromise where our health and the health of the planet is concerned. We are paying a tremendous price for our compromises of the past, and those compromises have led us to the brink of environmental disaster. Now it's time to insist that science,

technology, industry, and government safeguard our health and start making decisions with the long view in mind. I feel terrible about the earth legacy I'm leaving to my children, but I'm hopeful that we can work to turn it around so that with each succeeding generation the planet becomes cleaner. I want to see a return of the birds, the butterflies, the trees, clean air, clean water, clean food. I want to see a return of a world that nourishes us and all species. To achieve that vision, all must help.

From Safe Food News

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. 10/-
Subscriptions, donations and enquiries regarding circulation should be addressed to:

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Published by S. Gadgil for Sampoorna Kranti Vidyalaya.

PRINTED MATTER

Letter Box

Friends have sent me the recent issue of Anumukti carrying some of my writings. Thank you very much for this attention and for connecting our work here with the teachings of Gandhi. He is indeed a source of much inspiration to us as he is to you.

When I return home on August 18, I will look back upon my six months in prison as a small price to pay for the privilege of challenging nuclear secrecy in this country. I send you best wishes for the success of your own similar work in India.

Sam Day 05121-045
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