HB

35

TELECOPY COVER SHEET

Kenai Peninsula Legislative Information Office

Phone – (907) 262-9364
Fax – (907) 262-1881

TO: House Hess Secretary

ATTN: Patty Boardman FAX: 465-2864 PHONE:

FROM: PHONE:

INSTRUCTIONS: Please include in testimony on HB 35.
Thank you – HOPE THIS IS BETTER

~~PLEASE NOTE: ALL ODD NUMBERED PAGES WILL BE TRANSMITTED FIRST, THEN THE EVEN NUMBERED.~~

DATE: 5-10-91 TIME: ~~5:05~~ 12:29
DISCARD ORIGINALS___ HOLD FOR PICKUP___

NUMBER OF PAGES (not counting the cover sheet): 2

TRANSMITTED BY: Vesta

MAY 10 '91 12:30 LEG. AFFAIRS - SOLDOTNA

PACE THE PUBLIC AWARENESS COMMITTEE FOR THE ENVIRONMENT
TESTIMONY ON IRRADIATED FOODS hOUSEBILL # 35. MAY 10, 1991

PACE SUPPORTS THE PASSAGE OF HOUSEBILL # 35 FOR THE FOLLOWING REASONS.

1. WE BELIEVE IRRADIATED FOOD IS UNHEALTHY AND UN-SAFE TO CONSUME. IRRADIATED LEVELS RANGE FROM 15,000 RADS TO KILL SPROUTING IN POTATOES, TO 3 MILLION RADS TO KILL BACTERIA IN SPICES. TO PUT THIS IN COMPARISON, A DOSAGE OF IRRADIATION GIVEN TO SPICES EQUALS 30 MILLION X-RAYS.
2. ANIMALS FED IRRADIATED FOODS HAVE DEVELOPED TESTICULAR TUMORS, KIDNEY DISEASE, SHORTENED LIFESPANS, LOSS OF WEIGHT, INCREASED RATE OF INFERTILITY AND DEATH IN OFFSPRING. DO WE WANT THE SAME THING?
3. THERE IS SIGNIFICANT NUTRIENT INJURY AT 100,000 RADS. VITAMINS C,B-1,B-2, AND B-6, A, E, AND K. AMINO AND NUCLEIC ACIDS ARE DAMAGED.
4. THE SOURCES OF GAMMA RADIATION OF FOOD IRRADIATION WILL COME CHIEFLY FROM RADIOACTIVE ISOTOPES CESIUM 137 AND COBALT-60. CESSIUM 137 IS A BY-PRODUCT OF THE DEPARTMENT OF ENERGY NUCLEAR WEAPONS PRODUCTION AND NUCLEAR GENERATION. IT IS THE MOST ABUNDANT ISOTOPE IN THE NATIONS NUCLEAR WASTE AND WILL BE THE MOST IMPORTANT SOURCE IN GAMMA RADIATION. RADIO ACTIVE COBALT-60 IS MADE FROM NON-RADIOACTIVE COBALT-59.
5. MANY IMPORTANT MARKETS FOR ALASKAN SEAFOOD INCLUDING GREAT BRITAIN, WEST GERMANY, NEW ZEALAND, JAPAN, SCANDINAVIAN COUNTRIES, AND AUSTRALIA HAVE EITHER BANNED OR HALTED SALE OF IRRADIATED FOODS.
6. OUT OF 441 TOXICITY STUDIES ON THE EFFECTS OF IRRADIATED FOODS, THE FDA SELECTED ONLY FIVE ANIMAL FEEDING STUDIES AS A BASIS FOR ITS APPROVAL OF IRRADIATION EXPOSED FOODS. WE QUESTION THE VALIDITY OF SUCH A SMALL AMOUNT OF STUDIES FOR THEIR APPROVAL. ARE WE TO BECOME THE GUINEA PIGS?
7. ONE PURPOSE OF GOVERNMENT IS TO PROTECT THE PUBLIC FROM UNSAFE PRODUCTS. IF RESEARCH INDICATES THAT RADIATION EXPOSED FOOD IS HAZARDOUS, LABELING WILL BE AN INADEQUATE WAY TO PROTECT THE PUBLIC INTEREST.
8. IT IS A DOCUMENTED FACT THAT THE PRIMARY ADVOCATES OF RADIATION EXPOSED FOOD ARE THE DOE AND THE INTERNATIONAL NUCLEAR INDUSTRY.
9. THE DOE STATED THAT ITS GOAL IS "TO TRANSFER CESIUM 137 IRRADIATION TECHNOLOGY TO THE COMMERCIAL SECTOR AS RAPIDLY AND SUCCESSFULLY AS POSSIBLE. THE MEASURE OF SUCCESS WILL BE THE DEGREE TO WHICH THIS TECHNOLOGY IS IMPLEMENTED INDUSTRIALLY AND THE SUBSEQUENT DEMAND CREATED FOR CESIUM 137." OUR FOOD CHAIN SHOULD NOT BECOME THE DUMPING GROUND FOR NUCLEAR WASTE.
10. CESIUM 137 COMPRISES OF JUST 3% OF THE VOLUME OF NUCLEAR WASTE, BUT EMITS 50% OF THE HEAT AND 55% OF THE RADIOACTIVITY. DO WE NEED THIS IN OUR BODIES AND FOOD CHAIN?

MAY 10 '91 12:30 LEG. AFFAIRS - SOLDOTNA

11. THE FDA'S REQUIREMENT THAT IRRADIATED WHOLE FOODS CARRY A WRITTEN LABEL EXPIRED ON APRIL 18, 1988. MOST IRRADIATED FOODS WILL REMAIN HIDDEN AS UNLABELED INGREDIENTS.
PACE SENT A VIDEO FROM BBS TO SENATOR FINKELSTEIN FOR VIEWING IF ANYONE IS INTERESTED IN MORE KNOWLEDGE ON THIS VERY IMPORTANT SUBJECT.
12. WE FEEL MUCH MORE UNBIASED RESEARCH MUST BE ACCOMPLISHED BEFORE IRRADIATED FOOD IS PROVEN TO BE SAFE OR UNSAFE FOR HUMAN CONSUMPTION.

PLEASE VOTE YES ON HOUSEBILL # 35 AND HELP PROTECT ALASKA'S CONSUMERS.

Patricia Barnette
President, PACE
100 Trading Bay #4
Kenai, Ak 99611

PHONE: 283-7170

MAY 10 '91 12:31 LEG. AFFAIRS - SOLDOTNA

FROM SIDNEY D. HEIDERSDORF, 789-9958

Health Physics Society Position Statement on Food Irradiation, July 6, 1988

INTRODUCTION

Evidence is mounting that information campaigns on food irradiation are beginning to assume high profiles in the political and public sectors. Certain messages are being communicated that, for the most part, are factually incorrect. The objective of this position statement is to correct this misinformation through statements of fact currently accepted within the scientific community. This statement has been issued by the Health Physics Society.*

HEALTH PHYSICS SOCIETY SYNOPSIS OF THE ISSUE

In April, 1986, the U.S.Food and Drug Administration (FDA) approved regulations permitting the preservation of fruits and vegetables by irradiation. The purpose of this technique is to kill insects, parasites, and some forms of bacteria and yeasts, as well as to inhibit spoilage by retarding the ripening of fruits. This process is an alternative to chemical preservatives and can reduce the use of pesticides and fumigants to control insect infestation of foods. The United States has become the 25th nation in the world to endorse irradiation for a wide variety of foodstuffs. The following countries are among those that have issued unconditional or provisional approval for commercial irradiation of certain foodstuffs: Belgium, Canada, China, France, Holland, Italy, Israel, Japan, and the USSR. This is not the first time that the FDA has approved the use of gamma radiation to preserve food. The process for wheat and potatoes has been approved for more than 20 years; herbs, dried spices, and processed pork were added to the list earlier in the 1980s. Consideration is currently being given to approving irradiation for poultry and fish.

The technique is quite simple. Containers of food are moved by conveyor belt into a thoroughly shielded chamber. Here high-level radioactive sources irradiate the food with a carefully controlled amount of gamma rays. Similarly to microwaves in an oven, the gamma rays pass through the food. The food does *not* become radioactive, in the same way that a chest x ray does not make the body of the patient radioactive. The gamma rays do not heat the food, which can be stored or packaged and shipped immediately. Radioactivity is not added to the food. The same technique has been used for decades to sterilize medical instruments and hospital supplies.

The World Health Organization (WHO) and the UN Food and Agricultural Organization (FAO) have been urging the use of radiation to preserve food to reduce worldwide famine and to eliminate the need for potentially harmful chemical preservatives. Sealed, treated foods can be kept at room temperature for years, like canned foods. The use of radiation to extend the useful life of fresh foods has special potential usefulness for those countries where refrigeration is unaffordable and grain and food losses are particularly severe. As an example, in China 40 percent of all fruits and vegetables spoil before reaching the marketplace. In addition, food irradiation offers more opportunity for tropical countries to export native fruits by retarding the ripening process. In 1980 the IAEA along with the WHO organized a panel of experts to examine the question of the acceptability and potential risks from the use of irradiated food. After examining the most current scientific studies, this panel concluded that ". . . the irradiation of food introduces no special nutritional or microbiological problems . . . and presents no toxicological hazard." They concluded that food pasteurized or sterilized with a prescribed dose of radiation is safe for human consumption. Historically, it is interesting to note that irradiated meals were eaten on the moon by the Apollo astronauts as well as by the crew of the joint American Soviet Apollo-Solyuz space flight in 1975. American astronauts aboard the Space Shuttle have eaten irradiated beef, pork, smoked turkey, and corned beef. In fact, they preferred food sterilized by radiation over all other types of preserved foods.

POLICY STATEMENT

From the examination of the issues relevant to food sterilization by irradiation, the Health Physics Society has drawn the following conclusions:

(1) Food preservation by irradiation offers great potential benefit with little, if any, offsetting hazard.

(2) The technical feasibility of safely preserving certain foods by irradiation is firmly established by experimental evidence and experience.

(3) Federal regulatory bodies responsible for such matters are proceeding cautiously in approving new applications of this technology and are basing their approvals/disapprovals on the best scientific and technical information.

(4) Foods preserved by FDA-recommended irradiation procedures do not become radioactive or toxic as a result of irradiation.

(5) The application of this technology to the betterment of mankind should neither be permitted nor precluded on the basis of misinformation.

■

NOTE

* The Health Physics Society, formed in 1956, is a scientific organization concerned with the protection of people and the environment from radiation. Today its membership numbers more than 6500 and includes professionals representative of all scientific and technical areas related to radiation protection drawn from academia, government, hospitals and health-care institutions, research laboratories, and industry from the 50 states, the District of Columbia, and Puerto Rico. Although the vast majority of the membership is from the United States, the Society has more than 350 members in nearly 50 foreign countries, about half of whom are Canadian. The Society is chartered in the United States as a non-profit, scientific organization, and as such, it is neither affiliated with nor derives direct support from any governmental or industrial source except in an incidental manner.

MY TURN

By SIDNEY D. HEIDERSDORF

A great deal has been said, in letters to the editor and elsewhere, about the health risks associated with irradiated food. Much of this information is misleading and some of it is factually incorrect. Use of this technology should not be permitted or prohibited on the basis of misinformation. I would like to present some information which may help clarify the debate and put into perspective the use of radiation in food processing.

At the outset, it should be understood that the U.S. Food and Drug Administration (FDA) has approved only certain foods for irradiation under specified upper dose limits. Irradiation is approved for the control of insect and microbial infestation and to inhibit spoilage of fresh fruits. The process can extend shelf life and has the potential to reduce food-borne illness associated with chicken, pork and beef. It is an alternative to use of potentially harmful chemical preservatives and can reduce the use of pesticides and fumigants to control insect infestation of foods. Worldwide, the interest in food irradiation is tied to the technology's potential to reduce the incidence of food-borne illness and widespread post-harvest food losses. This is particularly a problem in underdeveloped countries where refrigeration is not available and food loss through spoilage is severe. The primary interest to Alaska is the possible application of radiation in the processing of seafood. Irradiation is not appropriate for all foods, and to date, the FDA has not approved it for seafood.

Irradiation of food is a simple process. The food is moved by a conveyor into a shielded chamber where it is exposed to a controlled level of radiation in the form of X or gamma rays. The food does not become radioactive, just as a chest X-ray does not make the patient radioactive. The process does not heat the food and radioactivity is not added to the food.

All scientific studies purporting to show harmful effects associated with the consumption of irradiated food have been closely examined by the FDA. After review of all the data, including the claims of those opposed to food irradiation, the FDA has concluded there is no scientific evidence meeting FDA standards for toxicological studies that show adverse effects on health from the consumption of irradiated food. Results of studies used to support claims of harmful effects have been rejected for numerous reasons, including lack of adequate scientific design and controls, irradiation of foods not approved by the FDA, use of dose levels far exceeding approved doses and irradiation under conditions not meeting normal food handling requirements. For example, in one case the radiation dose used was 55 times the maximum dose approved by the FDA. This might be compared to cooking a cake at 350 degrees Fahrenheit for 55 hours. In addition, where specific scientific studies seemed to show harmful effects, attempts were made to duplicate the results by repeated experiments which were properly designed to eliminate confounding factors. These follow-up experiments did not show harmful effects.

The FDA has responded to all areas of concern and has explained the reasons for rejecting certain data. The opponents of food irradiation have not presented any evidence which would call into question FDA conclusions and there has not been a response explaining why or where the FDA was in error. Instead, the original claims are simply repeated over again or the public is told that the FDA did not consider all available information.

Space does not permit consideration of all health related claims but it might be instructive to show how one important health issue is presented by opponents of irradiated foods. They argue that such foods are unsafe because of the production of carcinogens. It is true that irradiation of some foods may produce small quantities of carcinogens. However, not mentioned is the fact that conventional cooking is known to produce carcinogens in food. For example, frying an egg or charcoaling a steak produces quantities of carcinogens far exceeding irradiation of food under the FDA guidelines. In addition, a large number of substances that occur naturally in foods have been found to be carcinogenic. It is believed that these natural carcinogens are more numerous, and in some cases, more potent than man-made carcinogens in food. Therefore, food irradiation cannot reasonably be rejected on that basis while continuing to accept cooking or eating of unprocessed natural foods known to possess carcinogens.

In addition to the FDA, numerous other national and international organizations have addressed the safety issues relating to irradiated food. This includes such diverse organizations as the Council for Agricultural Science and Technology, the World Health Organization, the Food and Agricultural Organization of the United Nations, the Health Physics Society, the American Medical Association, and the International Atomic Energy Agency. These organizations have experts qualified by scientific training and experience in broad areas of health, food technology and radiation safety. They have closely examined all claims of harmful effects and, without exception, have determined that food processed by radiation is safe for human consumption.

The type of legislation presently being considered in the Alaska Legislature, which would prohibit the sale of irradiated food in Alaska, has the potential of causing a great deal of mischief.

It will be easy for legislators to vote for this prohibition without looking closely at the issues involved since there is no lobby for food irradiation because irradiated food is not presently on the market. However, the law is a teacher and what this law teaches is opposed to facts currently accepted in the scientific community. In addition, even though the law is probably unconstitutional since it represents restraints of interstate commerce, it could cause trouble for Alaskans who wish to purchase irradiated food when it appears on the market.

The desire to protect Alaskans from consuming food of their choice, which is considered safe by the FDA, is curious. Particularly since irradiated food is required to be labeled. Those who wish to avoid it can do so. Much of the opposition can be understood only in terms of a strong anti-nuclear sentiment in which there is opposition to nuclear technology in

Juneau Empire 3/21/89

Facts on food irradiation

general. For these individuals, there is a strong emotional response against the irradiation of food. As reported in an anti-food irradiation article published in "This Magazine" the authors state, "Some peace activists believe we will never rid the world of nuclear weapons until the so-called peaceful atom is eliminated. Food irradiation seems like a good place to start." Like electricity and fire, there are good uses and bad. Each use should stand or fall on its own merits.

There are frequent expressions of concern about hazards to the environment or from transportation of radioactive materials associated with food irradiation – as if the safety aspect of radiation processing is new, uncharted territory. These concerns ignore 40 years of experience in nuclear technology safely using materials in medical, industrial and educational institutions. Presently there are over 500 large irradiators operating worldwide. Over the past two decades, industrial sources for radiation processing have grown at a rate of 10-15 percent per year. In this country alone, nearly 50 percent of all disposable medical supplies are sterilized by radiation. The economic and health benefits derived from the use of radiation are many.

One of the great ironies of the food irradiation debate is the frequently expressed concern that the food irradiation industry will use waste material (Cesium-137) from nuclear weapons production as a radiation source for food irradiation. The irony is that many of the radiation sources used so beneficially, for decades, in medicine and industry are of the same type and origin as Cesium-137 (byproduct materials). We can be grateful there was no organized effort to prohibit the use of nuclear materials in medicine. There are an estimated 10,000 gamma imaging instruments used in nuclear medicine alone. Those who find the use of byproduct materials resulting from weapon material production unacceptable for irradiation of food apparently are not aware that such materials are also injected into or swallowed by patients undergoing nuclear medicine exams or therapy. In the U.S., nuclear medicine is routine with more than 10 million procedures performed annually. In reality, the concern about Cesium 137 is unnecessary. There are other more suitable sources of radiation for food processing. Of the four food irradiators presently being built in the U.S., none of them will be using CS-137.

It is unfortunate that the issue of irradiated food cannot be considered on its own merits. It is not sufficient to say that irradiated foods are unsafe because the process causes chemical changes in food, produces carcinogens or affects nutritional quality. These issues must be considered in light of the effects of other acceptable methods of food processing on food and even food in its natural state. When that is done, the conclusion of health authorities is that irradiated food is safe for human consumption. The process of food irradiation may cause minor changes in foods similar to those caused by cooking or canning and consumers may prefer one taste to another, but these differences do not affect safety. It has also been shown that the nutritional value of the food is not significantly changed when irradiated under the guidelines required by the FDA. Hopefully, decisions made regarding irradiated foods will be based on facts, not emotion.

Sidney D. Heldersdorf is a radiological physicist with the state Division of Public Health.

HB35
TESTIMONY BEFORE HOUSE HEALTH, EDUCATION AND SOCIAL SERVICES COMMITTEE
MAY10, 1991

Madame Chairman, Members of the Committee, I am Dr. Mollie TeVrucht. My Ph.D. is in the field of analytical chemistry, and I urge you to support HB35.

As a scientist, I cannot endorse the irradiation of food as a safe process.

** Unique radiolytic products are created in irradiated foods. These compounds are potentially carcinogenic and mutagenic chemicals.

** Because of the chemical complexity of food, it is virtually impossible to identify and quantitate the unique radiolytic and other products generated upon radiation.

** Irradiation of food produces chemicals that have been defended as "natural." However, many naturally-occurring compounds are carcinogenic, mutagenic, or are otherwise harmful to health.

** Benzene is an example of a carcinogen produced in irradiated food. Just because other processes (e.g. charbroiling) can also produce benzene in food is no defense. We should strive to limit harmful chemicals in our food, not allow the further contamination of food through irradiation.

** Losses in nutritional value may result from irradiation.

** Fradulent food irradiation practices will be difficult to detect, since there are no universal chemical markers of irradiation.

I urge you to support this bill. Thank you for the opportunity to testify.

Official Business

Alaska State Legislature

REPRESENTATIVE RANDY PHILLIPS
HOUSE DISTRICT 15
(907) 465-4949

P.O. Box V
State Capitol
Juneau, Alaska 99811

Memorandum

TO: Representative Pat Carney, Co-Chair
Representative Georgianna Lincoln, Co-Chair
House Health, Education and Social Services Committee

FROM: Representative Randy Phillips R.E.P.

DATE: May 7, 1991

RE: Sponsor Statement in Support of: House Bill 35
"An Act prohibiting under the Alaska Food, Drug, and Cosmetic Act the knowing sale of irradiated food; authorizing embargo and detention remedies in the case of a violation of the prohibition against the sale of irradiated food; and making the commissioner of environmental conservation responsible for enforcing the prohibition."

The above referenced bill is scheduled to be heard by the Health, Education, and Social Services Committee. This bill would ban the sale of irradiated food except for certain spices in Alaska.

The proposed **Committee Substitute** for House Bill 35 would prohibit the sale of irradiated food, **unless irradiated food is required by a physician for medical purposes.**

Food irradiation is a process by which foods are exposed to radiation as a means of killing harmful organisms and thus extending the shelf life of that food. It does not leave the food radioactive, but it does cause chemical changes to the food and leaves potentially harmful substances in the food. Research on the health effects of irradiated food have produced mixed results. Some studies show no harmful effects. **Others indicate that the chemical changes to the food may cause cancer or other health effects.**

CS SPONSOR STATEMENT

I believe that it is responsible to ban the sale of irradiated food until the research shows that this technology is completely safe. Irradiated food has been banned in a number of states, including New Jersey, Maine, and New York. Several companies such as H.J. Heinz, Quaker Oats, Ralston Purina, Borden Foods, Beatrice/Hunt-Wesson and McDonalds, are on record as opposing the use of food irradiation technology. Also, several countries including Great Britain, West Germany, Australia, Denmark, Sweden, New Zealand and Alaska's largest consumer, Japan, have banned the sale of irradiated food.

The marketing position of Alaska's products depends on an image of natural purity. Since the major consuming nation for Alaska seafood products has banned irradiated food. A ban on irradiated food in Alaska would reassure our trading partners about the freshness and quality of our seafood products.

Nothing in the bill would prevent further research on food irradiation from occurring in Alaska. I would encourage further research, and if the technology is proven to be safe, then the ban should be removed by a future Legislature.

Alaska State Legislature

REPRESENTATIVE RANDY PHILLIPS
HOUSE DISTRICT 15
(907) 465-4949

Official Business

P.O. Box V
State Capitol
Juneau, Alaska 99811

Memorandum

TO: Representative David Finkelstein, Chair
House Labor and Commerce Committee

FROM: Representative Randy Phillips REP

DATE: March 13, 1991

RE: Sponsor Statement in Support of: House Bill 35
"An Act prohibiting under the Alaska Food, Drug, and Cosmetic Act the knowing sale of irradiated food; authorizing embargo and detention remedies in the case of a violation of the prohibition against the sale of irradiated food; and making the commissioner of environmental conservation responsible for enforcing the prohibition."

The above referenced bill is scheduled to be heard by the Labor and Commerce Committee. This bill would ban the sale of irradiated food, except for certain spices, in Alaska.

Food irradiation is a process by which foods are exposed to radiation as a means of killing harmful organisms and thus extending the shelf life of that food. It does not leave the food radioactive, but it does cause chemical changes to the food and leaves potentially harmful substances in the food. Research on the health effects of irradiated food have produced mixed results. Some studies show no harmful effects. **Others indicate that the chemical changes to the food may cause cancer or other health effects.**

I believe that it is responsible to ban the sale of irradiated food until the research shows that this technology is completely safe. Irradiated food has been banned in a number of states, including New Jersey, Maine, and New York. Several companies such as H.J. Heinz, Quaker Oats, Ralston Purina, Borden Foods, Beatrice/Hunt-Wesson and McDonalds, are on record as opposing the use of food irradiation technology. Also, several countries including Great Britain, West Germany, Australia, Denmark, Sweden, New Zealand and Alaska's largest consumer, Japan, have banned the sale of irradiated food.

sponsor stmt

The marketing position of Alaska's products depends on an image of natural purity. Since the major consuming nation for Alaska seafood products has banned irradiated food. A ban on irradiated food in Alaska would reassure our trading partners about the freshness and quality of our seafood products.

Nothing in the bill would prevent further research on food irradiation from occurring in Alaska. I would encourage further research, and if the technology is proven to be safe, then the ban should be removed by a future Legislature.

7-LS0269\D
Bannister
3/14/91

CS FOR HOUSE BILL NO. 35 ( )

IN THE LEGISLATURE OF THE STATE OF ALASKA

SEVENTEENTH LEGISLATURE - FIRST SESSION

BY

Offered:
Referred:

Sponsor(s): REPRESENTATIVE R.PHILLIPS

A BILL

FOR AN ACT ENTITLED

"An Act prohibiting under the Alaska Food, Drug, and Cosmetic Act the knowing sale of irradiated food; authorizing embargo and detention remedies in the case of a violation of the prohibition against the sale of irradiated food; and making the commissioner of environmental conservation responsible for enforcing the prohibition."

BE IT ENACTED BY THE LEGISLATURE OF THE STATE OF ALASKA:

*** Section 1.** AS 17.20.230 is amended by adding a new subsection to read:

(c) If the commissioner of environmental conservation finds or has probable cause to believe that a person is violating AS 17.20.290(d), the commissioner may affix to the food that is the subject of the violation a tag or other appropriate marking that gives notice that the food may not be sold and warning all persons not to remove or dispose of the food until permission for removal or disposal is given by the commissioner or a court. A person may not remove or dispose of the detained or embargoed food without this permission.

*** Sec. 2.** AS 17.20.290(b) is amended to read:

(b) The commissioner of environmental conservation or a designee of the commissioner

New Text Underlined [DELETED TEXT BRACKETED]

CS HB 35( )

is responsible for enforcing the provisions of [PARAGRAPHS] (a)(1), (2), (3), (4), (6), (7), (8), (9), and (10) of this section, if the subject of the prohibited act involves food or cosmetics, and the provisions of [PARAGRAPH] (a)(12) and (d) of this section. This subsection does not limit the authority of peace officers.

* **Sec. 3.** AS 17.20.290 is amended by adding a new subsection to read:

(d) The knowing sale of irradiated food is prohibited, unless irradiated food is required by a physician for medical purposes.

* **Sec. 4.** AS 17.20.370 is amended by adding a new paragraph to read:

(15) "irradiated food" means food that has been treated with gamma radiation or other ionizing radiation; "irradiated food" does not include spices that have been irradiated or food that contains spices that have been irradiated unless there are other irradiated ingredients in the food.

UNITED FISHERMEN OF ALASKA

211 4th Street, Suite 106
Juneau, AK 99801
907-586-2820

UNITED FISHERMEN OF ALASKA
Resolution 89-5

WHEREAS food irradiation destroys or depletes amino acids, nucleic acids, and vitamins A, B (thiamin), B2, B3, B6, B12, C, E, K and folic acid, and

WHEREAS food high in polyunsaturated fatty acids (which are increasingly being valued for their contribution to health), when irradiated, form large molecules that cannot be degraded by the body, can partially obstruct blood vessels and increase blood pressure, and

WHEREAS food irradiation is known to produce unstable, chemically reactive free radicals which are highly toxic and increase carcinogenesis, mutogenesis and cardiovascular disease in animals and in man, and,

WHEREAS reviews of the available literature on irradiated food overwhelmingly indicate adverse effects on animals including development of testicular tumors, kidney diseases, shortened life spans, loss of weight, increased rate of infertility and death of offspring, and

WHEREAS the botulism bacterium, Clostridium botulism, is perversely resistant to gamma radiation (irradiation), while most of its natural competitors, including those that alert us to the decay of foods, are destroyed, and

WHEREAS resistant strains of Salmonellae have been developed by repeated irradiation under laboratory conditions, and

WHEREAS acceptable and effective methods of preserving food (freezing, canning, vacuum packing, etc.) already exist and irradiation does not eliminate the need for refrigeration, packaging and good food hygiene, and

WHEREAS several major markets for Alaska seafood, including Japan, Great Britain, the Scandinavian countries, West Germany, New Zealand and some states, have completely banned the sale of irradiated foor for public consumption or halted further exploration of irradiated food due to consumer opposition, and

WHEREAS the price of irradiated food will be 2 to 24 cents per pound higher than non-irradiated food, and

UFA Resolution

WHEREAS the Department of Energy has provided $400,000 to the University of Alaska, Fairbanks, to help Alaska determine the feasibility of irradiating fresh and frozen fish, other seafood and agricultural products, and

WHEREAS the Department of Energy is the primary promoter of food irradiation as a means of inexpensively extracting weapons-grade plutonium from the reprocessing of nuclear waste, and

WHEREAS the specific use of radioactive cesium-137 or other radioactive waste products for food irradiation treatment in Alaska involves another whole range of concerns, including but not limited to worker and public safety (permitted radioactive emissions are 20 times higher than nuclear power plants), transportation of nuclear waste, construction of a radiation facility in a seismically inactive and tsunami-free area, and contamination of groundwater, the food chain and the environment by the highly water-soluble cesium-137,

NOW THEREFORE BE IT RESOLVED that United Fishermen of Alaska strongly opposes the irradiation of seafood in the state of Alaska.

Theo Matthews — Feb 14, 1983

Theo Matthews
President

Date

[redacted]OUSE COMMITTEE REPO[redacted]

(7)

Date Referred: January 21, 1991 FURTHER REFERRALS: Health, Education & Social Services
Finance

Date of Committee Action: 3-14-91

The LABOR AND COMMERCE Committee considered: HB 35

HOUSE BILL NO. 35 BAN SALE OF CERTAIN IRRADIATED FOOD

"An Act prohibiting under the Alaska Food, Drug, and Cosmetic Act the knowing sale of irradiated food; authorizing embargo and detention remedies in the case of a violation of the prohibition against the sale of irradiated food; and making the commissioner of environmental conservation responsible for enforcing the prohibition."

RECOMMENDATIONS: [ ] the same title
be replaced with _____ [ ] a new title

[ ] have attached amendments(s)

[ ] do pass

[ ] do not pass

[X] no recommendations

[ ] individual recommendations

[ ] additional referral to the _____ Committee

ADOPTS: _____ letter of Intent

ATTACHES NEW FISCAL NOTE(s): (Dept) APPROVES PREVIOUS: (Dept/Date)

[ ] fiscal impact _____ [ ] fiscal note(s) _____

[ ] zero fiscal note DEC [ ] zero fiscal note(s) _____

SIGNING DO PASS: SIGNING OTHER RECOMMENDATIONS:

	Check appropriate column:	Do Not Pass	No Rec	Amend
			✓	
			–	
		X		
			✓	
			✓	

Chairman's Signature

L+C Comm. Report

FOOD & WATER
INCORPORATED

OBJECTION AND REQUEST FOR HEARING
TO THE FOOD & DRUG ADMINISTRATION (FDA)
REGARDING:

IRRADIATION IN THE PRODUCTION, PROCESSING, AND HANDLING OF FOOD

Final Rule; 21 CFR Part 179

[Docket Nos. 86F-0507 & 86F-0509]

A final rule to permit the irradiation of poultry

Submitted by:

Richard G. Piccioni, Ph.D.
FOOD & WATER, INC,

JUNE 1, 1990

(Revised Oct.18, 1990)

FOOD & WATER
INCORPORATED

On behalf of Food & Water, Inc., I wish to file an objection and request for a hearing regarding amendment by the Food and Drug Administration (FDA) of 21 CFR Part 179, Irradiation in the Production, Processing and Handling of Food, to provide for the use of sources of ionizing radiation in poultry at 300,000 rad [FDA, 1980].

Food and Water's objection is based upon the conviction that the FDA has failed to demonstrate that there is a "reasonable certainty" that irradiation of poultry at 300 krad is not harmful.

Food and Water's request for a hearing is based upon clear indications, discussed below, that review of the cited studies and other research findings by disinterested members of the scientific community is essential for the protection of the public. Few actions by the FDA have as great a potential impact upon the health of the US population as this approval, affecting the largest sources of animal protein in the US diet.

Additional objections by Food and Water regarding the environmental aspects of FDA rule and based upon the agency's Finding of No Significant Impact, are being submitted separately.

BACKGROUND

Exposure of food to ionizing radiation results in complex, incompletely understood chemical changes and the production of radiolytic residues which remain in the food, ultimately to be ingested by consumers. Since the photon energy in radiations intended for use in food processing (gamma from Cobalt-60 or Cesium-137, high-energy x-rays from machine sources) are tens of thousands of times greater than that required to sever any molecular bond, the number of potential transformations and radiolytic products in a medium as chemically complex as avian muscle, fat, and skin, is vast. This is particularly true when irradiation is carried out in the presence of oxygen [Piccioni, 1988, and references therein].

Because of the enormous number of chemmical transformations potentially brought about by irradiation, the presence of genotoxic substances (i.e., substances which are mutagenic, carcinogenic, and/or teratogenic) in the resulting inventory of radiolytic products is to be expected. Indeed, such genotoxicity has been observed. Numerous reports in the peer-reviewed scientific literature provid evidence of the presence of genotoxic substances in irradiated foods or food components, and a number of specific, known mutagens and carcinogens have been identified amoung radiolytic products. These studies are listed in Tables I and II.

125 Lafayette Street, Suite 612 • New York City, New York 10012 • (212) 941-9340 • Fax (212) 941-5678

Given the evidence that the formation of genotoxic radiolytic products can and does occur, a petitioner seeking approval of irradiation of poultry, a major component of the US diet, logically bears the burden of establishing the magnitude of the expected cancer risk, or of establishing that the risk is below a stated level.

Because of the complexity of both unirradiated and irradiated foods, chemical analysis of irradiated foods, and comparison with its unirradiated counterpart will provide at best only a partial knowledge of the inventory of radiolytic products consumers will ingest and cannot provide a definitive basis for a determination of actual cancer risk. Estimation of the cancer risk inherent in eating irradiated poultry therefore requires exposure of experimental animals (or in vitro systems of equal or greater sensitivity) to the actual mix of radiolytic products which results from irradiation of poultry meats under expected conditions. In accordance with procedures applied to food additives generally, testing must be of such sensitivity that even a "small" incremental risk of cancer will not escape detection. In accordance with other areas regulation of carcinogens in food, this risk is widely taken to be 1 per million for a lifetime of human exposure.

In the case of direct food additives tested for carcinogenicity using chronic feeding studies in animals, the required sensitivity is attained by greatly amplifying the dose administered in the test system over that expected in human consumers. This is necessary because statistical fluctuations in the numbers of tumors observed in control and experimental subjects preclude the detection of increments in the rates of tumor development if the increment is much less than 10%. Clearly, a 10% increment in cancer in a large human population would be unconscionable, representing tens of thousands of excess cancer cases. Dose amplification provides the necessary magnification of any effect, so that, absent a positive observation, the actual risk to humans can be said with some assurance to be much smaller than the minimum detectable risk in the animal experiment.

In standard protocols described by the FDA, the required dose exaggeration, absent knowledge of the chemical structure of the test substance, is a minimum of 2000 [FDA, 1982]. In the case of whole-irradiated food feeding studies, such as those described below, it is roughly 100 times lower. Feeding studies carried out under such low dose exaggeration are of little value in risk determination, unless a positive effect is observed. In such studies, "negative" results, serve only to establish a very high upper bound to risk. This point will be illustrated in the case of the actual studies used by the FDA in supporting their approval of poultry irradiation at 300 krad.

POWER CURVE ANALYSIS OF THE CIVO CHRONIC (2-YEAR) RAT FEEDING STUDY

Memoranda and other materials provided by the FDA on the occasion of its announcement of its approval of poultry irradiation at 300 krad, indicate that the FDA's decision is primarily based upon a series of three studies conducted in the late 1960s and early 1970s by the Dutch Centraal Instituut voor Voedingsonderzoek (CIVO). To the best of my knowledge, none of these studies has been published in peer-reviewed scientific journals. Other studies are mentioned, but their use is heavily qualified by FDA for a variety of reasons. Only the CIVO studies are described as being "of high quality" [FDA, 1990].

The CIVO studies are typical whole-irradiated food feeding studies, in which dose exaggeration is limited to a very modest factor. Chicken, unirradiated or exposed to 300 or 600 krad of gamma radiation, was steamed, lyophilized (freeze-dried), mixed with other components of a stock diet, and fed to rats and beagle dogs at a level which amounted to 35% of the dry weight of the diet. By comparison, chicken currently represents 5.4% of the US diet (see note to Table 3) giving a dose factor of about 6.5 due to the dietary mix. For the 600 krad chicken an additional factor of 2 results from the radiation dose, resulting in a maximum dose exaggeration factor of about 13. As noted above, this is a fraction of the factor (2000 or higher) required of other food additives of unknown chemical structure.

The particular CIVO study which was directed most specifically to the question of cancer risk resulting from lifetime exposure was a chronic (2-year) feeding study in which 120 rats were fed unirradiated chicken, and 120 fed chicken irradiated at each of the two dose levels. Histological examination was carried out after "spontaneous" death, or sacrifice at the end of the two-year period, and the number of tumors or leukemias noted.

I was able to obtain copies of the original CIVO reports of the chronic feeding and other studies, which provide raw data of tumor and leukemia incidence [Til, 1971; de Knecht-van Eekelen et al., 1971; de Knecht-van Eekelen et al., 1972;]. Concerns, described above, regarding the statistical limitations of the "negative" results cited in whole-food feeding studies, were substantiated for the CIVO chronic feeding study by power curve analysis of the data reported by the CIVO group. This analysis was carried out with the assistance of TRUE EPISTAT (Epistat Services, Richardson TX) a statistical software package used widely in the biomedical community. Results of such an analysis of all sites combined, and for leukemia alone, are shown in Figures 1 and 2, respectively, and in Table 3.

The curves in Figure 1 and 2 show the probability of detecting, with statistical significance ($p <= 0.05$) an actual difference in the proportion of rats developing tumors in the experimental and control groups. To give the CIVO study the benefit of the doubt, the 300 krad and 600 krad experimental groups were pooled, and treated as if all had been fed 600 krad chicken. Even with this benefit, the first column of Table 3, taken from points on the curves in Figures 1 and 2, shows that, in the case of all sites, the experiment conducted had only a 1 in 10 chance of detecting an actual 3.7% excess tumor risk in the exposed rats, and only a 1 in 2 chance of detecting an 11% risk. This means that it is highly probable that excess tumor risks as high as 4% would have completely escaped detection. For leukemia, the experiment had only a 1 in 10 chance of detecting an actual excess risk of 1.6%, and a 1 in 2 chance of detecting a 4.5% excess risk.

The second column of Table 3 shows the excess risk expressed as excess cases per million individuals consuming 300 krad poultry as 5.4% of their diet, instead of the 35%, 600 krad poultry consumed by the CIVO rats. Risk is assumed to be proportional to the dietary exposure and radiation dose. Again, the CIVO result is being given the benefit of the doubt in assuming that all experimental rats ate 600 krad chicken, when in fact half ate 300 krad chicken. The third column shows number of excess cases in a population of 230 million. Note that I have not included a possible additional factor of 3 going from rat to human risk [OTA, 1981].

The numbers of excess cases per million individuals, 2,800 and 1,200 for all sites and leukemia, respectively, are not even remotely within the range of "acceptable" risk, one per million individuals. Applied to a population of 230 million, this represents some 655,000 and 283,000 excess cases, the risk of which the CIVO study would have only a 1 in 10 chance of detecting. Thus CIVO study provides no assurance whatsoever that the actual risk of eating irradiated chicken is less than an extremely high upper bound. I submit that this risk is unacceptably high, and indicates unambiguously that the CIVO study cannot provide a basis for approval.

Alternatives exist to improve sensitivity. First, the radiation dose to the chicken could be increased 10 fold, to 6 megarad, with a proportional increase in sensitivity; however, this would not be enough to bring the detectable risk within an acceptable range. Second, as discussed below, concentrated extracts, ideally containing all potential radiolytic carcinogens, could be administered to the experimental animals instead of feeding them whole irradiated chicken. Without such measures, "negative" results, such as those of the CIVO chronic feeding study, are essentially meaningless.

ETHOXYQUIN (EQ) SUPPRESSION OF PEROXIDES

The CIVO studies are also seriously compromised by the addition of ethoxyquin (EQ) to the irradiated chicken. CIVO's own data show that EQ decreased the level of lipid peroxides in the irradiated meat to that of the unirradiated controls. Given the fact that organic peroxides are potential radiolytic carcinogens, this is potentially a serious interference with the very phenomenon one is trying to observe. On this basis alone, it is extraordinary that these experiments are even being considered in a matter as important as the potential carcinogenicity of 3% of the diet of the entire US population.

Indeed, the addition of EQ caused all three of the CIVO studies to be excluded from a previous FDA review of the food irradiation literature, even as regards the safety of irradiation at 100 krad, one third the currently proposed dose level. In a memorandum provided by FDA, the rehabilitation of these studies for this, 300 krad, approval, is based upon an assertion that the amount of EQ added was below that observed in other contexts to suppress the development of tumors [Lorentzen, 1985]. This seems a specious argument indeed, given that the amount of EQ added here was enough to reduce the level of potentially carcinogenic lipid peroxides [Hochstein and Atallah, 1988], found to be higher in the irradiated meat, by close to an order of magnitude, down to roughly the same level found in the unirradiated controls. The authors of the memorandum completely fail to note that the level of lipid peroxides in the absence of EQ was consistently higher in the irradiated meat, both before and after storage, and that this difference was suppressed by EQ. Since the nature of radiolytic carcinogens is not known, the authors' statements that such carcinogens must be insensitive to EQ are highly debatable.

While it may be legitimate to mitigate acutely toxic (as opposed to carcinogenic) effects which are artifacts of dose amplification, it is certainly not legitimate to do so by measures which may in any way reduce the differences in the amounts of potential carcinogens in irradiated and control samples. As described above, these experiments are already suffering from severe insensitivity due to statistical considerations alone; to diminish their sensitivity further by artificially eliminating potentially carcinogenic peroxides is adding insult to injury.

ADDITIONAL ISSUES

There are additional concerns regarding all the CIVO studies (storage of the irradiated chicken for periods far in excess of those anticipated for human consumers; possibly excessive supplementation of diets with vitamins A and E) and for the chronic feeding study in particular as noted in memoranda provided by the FDA [Irausquin, 1986] (incomplete histological

examination of animals; lack of clearly stated conditions of irradiation; inconsistent screening methodology). A detailed examination of these problems by our organization was precluded by the short amount of time available since the announcement by the FDA that it was basing its approval primarily, if not entirely, upon the CIVO studies.

COMPLIANCE WITH RECOMMENDATIONS OF THE BFIFC REPORT

The Bureau of Foods Irradiated Foods Committee (BFIFC) Report, issued in 1980, presented a rationale for the approval of major foods irradiated at 100 krad or less, without the necessity of toxicological testing, based upon theoretical considerations of radiolytic chemistry [Brunetti et al., 1980]. The report was cited as the technical basis of the FDA 1986 approval of a wide range of products up to that dose level [FDA, 1986]. This document was again provided by the FDA on the occasion of its present announcement regarding poultry irradiation at 300 krad.

While I have voiced objection to the reasoning of BFIFC as applied to foods irradiated at up to 100 krad [Piccioni, 1988] even BFIFC itself did not consider the reasoning valid for major foods irradiated at higher dose, primarily because the concentration of radiolytic products was anticipated to be too high to dismiss on the basis of indirect data, and theoretical arguments. Indeed, at 300 krad, the concentration of radiolytic products would, by BFIFC's estimates, reach 90 parts per million (i.e., 3.5 grams per person per year, assuming one radiolytic event per 100 eV and an average molecular weight of 300 daltons, and the chicken consumption values used above) [Brunetti et al., 1980]. For doses above 100 krad, BFIFC set forth a decision-making system involving testing both <u>in vitro</u> and <u>in vivo</u>.

It is noteworthy that BFIFC stipulated that the tests <u>in vitro</u> "must be performed on extracts in which the concentration of <u>radiolytic products is maximized</u>." [Emphasis in the original]. The use of concentrated extracts, ideally containing all potential radiolytic carcinogens, is ultimately the only way to substantially exaggerate the dose of such products above that anticipated in the human diet, and thus increase the level of sensitivity of genotoxicity studies to the point that negative results, if they are obtained, provide some assurance of low actual risk.

It is equally noteworthy, however, that BFIFC drops the requirement of the use of concentrated extracts for the <u>in vivo</u> studies, even though the latter are intended to verify possible positive findings <u>in vitro</u>. The justification given was that use of extracted and concentrated material would be "extremely difficult and expensive to effect in the practical sense."

As has been shown above, without extraction and concentration of extracts, dose exaggeration is limited to

roughly the levels attained in the CIVO study (or, perhaps ten-fold higher if 6 megarad irradiated chicken were to be used) and that the resulting minimum detectable risk is two or three orders of magnitude above the standard of acceptable risk. Thus the implication of BFIFC's position is that increasing the effective dose by administration of concentrated extracts is not worth the difficulty and expense involved, even though relying upon whole-irradiated food studies potentially exposes a substantial fraction of the US public to cancer risks on the order of 100 to 1000 per million (Table 3).

The approach adopted by BFIFC represents and questionable balancing of inconvenience and public risk; it bears review by the larger public health community.

CONCLUSION

The lack of adequate statistical power of the chronic feeding study, potential interference in all three studies by the addition of EQ, and other problems noted above, as well as deficiencies in the underlying technical rationale used by the FDA, require that the FDA's approval of poultry irradiation at 300 krad be stayed, pending a proper public hearing of the scientific issues, in which the members of the larger scientific and medical community can participate in this critical question of public health.

REFERENCES

Ammirato, P.V., Steward, F.P. "Indirect effects of irradiation: morphogenetic effects of irradiated sucrose." Developmental Biology. 1969; 19:87-106.

Berry, R.J., Hills, P.R., Trillwood, W. "Demonstration of a cytotoxic agent in gamma-irradiated carbohydrate solutions." Int. J. Rad. Biol. 1965; 9:559-572.

Bhaskaram, C., Sadasivan, G. "Effects of feeding irradiated wheat to malnourished children." Am. J. Clin. Nutr. 1975; 28:130- 135.

Brooks, B.R., Klamerth, O.L. "Interaction of DNA with bifunctional aldehydes." European J. Biochem. 1968; 5:178-182.

Brunetti, A.P., et al., "Recommendations for evaluating the safety of irradiated foods," Final Report, prepared for the Director, Bureau of Foods, FDA, July, 1990.

Chopra, V.L. "The effects of x-irradiated culture medium on bacteria." Microbial Genet. Bull. 1965; 23:8-9.

Chopra, V.L. "Lethal and mutagenic effects of irradiated medium on Escherichia coli." Mutation Res. 1969: 8:25-33.

Chopra, V.L., Swaminathan, M.S. "Sprout inhibition and radiomimetic properties in irradiated potatoes." Naturwissenschaften. 1963; 50:374-375.

de Knecht-van Eekelen, A., Feron, V.J., Til, H.P., and de Groot, A.P., "Chronic (two-yeazr) feeding study in rats with radiation-pasteurized chicken," Report No. R3773, Centraal Instituut voor Voedingsonderzoek (CIVO), April, 1972.

de Knecht-van Eekelen, A., van der Meulen, H.C., Til, H.P., and de Groot, A.P., "Multi-generation study in rats with radiation-pasteurized chicken," Report No. R3622, Centraal Instituut voor Voedingsonderzoek (CIVO), November, 1971.

El-Zeany, B.A., Abdel-Fattah, L.E., Hassan, I.M. "Stability of fat during irradiation and subsequent storage of irradiated buffalo meat." Z. Lebensm Unters Forsch. 1980; 171:5-8.

FDA, "Toxicological Principles for the safety assessment of direct food additives and color additives used in foods", Bureau of Foods, 1982.

FDA "21 CFR Part 179: Irradiation in the production, processing, and handling of food: final rule," Federal Register, April 18. 1986 51:13376-13399.

FDA "21 CFR Part 179: Irradiation in the production, processing, and handling of food; final rule," Federal Register, May 2, 1990, 55:18538-18544.

Frey, H.E., Pollard, E.C. "Ionizing radiation and bacteria: nature of the effect of irradiated medium." Radiation Res. 1966; 28:668-76.

Gower, J.D., Wills, E.D. "The oxidation of benzo[a]pyrene mediated by lipid peroxidation in irradiated synthetic diets." Int. J. Radiat. Biol. 1986; 49:471-484.

Phillips, G.O., Moody, G.J., and Mattock, J.L. " Radiation chemistry of carbohydrates. Part I. Action of ionising radiation on aqueous solutions of D-glucose." J. Chem. Soc. 1958; 3522-3539.

Piccioni, R.G., "Food Irradiation," The Ecologist, 18 (1988) 48.

Renner, H.W. "Chromosome studies on bone marrow cells of Chinese hamsters fed a radiosterilized diet." Toxicology. 1977; 8:213-222.

Rinehart, R.R., Ratty, F.J. "Mutation in Drosophila melanogaster cultured on irradiated food." Genetics 1965; 52:1119-1126.

Rinehart, R.R., Ratty, F.J. "Mutation in Drosophila melanogaster cultured on irradiated whole food or food components." Int. J. Rad. Biol. 1967; 12:347-354.

Schubert, J., Watson, J.A., White, L.R. "Hydroxyalkyl peroxides and the toxicity of irradiated sucrose," Int. J. Radiat. Biol. 1967; 13: 485-489.

Schubert, J., Sanders, E.B. "Alpha, beta-unsaturated carbonyl sugars as the cytotoxic radiolysis products of irradiated carbohydrates," Nature New Biology. 1971; 233: 199-203.

Steward, F.C., Holsten, R.D., Sugii, M. "Direct and indirect effects of radiation: the radiolysis of sugar," Nature. 1967; 213: 178.

Swaminathan, M.S., Nirula, S., Natarajan, A.T., Sharma, R.P. "Mutations: incidence in Drosophila melanogaster reared on irradiated medium," Science. 1963; 141: 637-638.

Swaminathan, M.S., Chopra, V.L., Bhaskaran, S. "Cytological aberrations observed in barley embryos cultured in irradiated potato mash," Radiat. Res. 1962; 16: 182-188.

Til, H.P., Williams, M.I., Huismans, J.W., and de Groot, A.P., "One-year feeding study with low-dose irradiated chicken in beagle dogs," Report No. R3443, Centraal Instituut voor Voedingsonderzoek (CIVO), May, 1971.

Vijayalaxmi, "Cytogenetic studies in rats fed irradiated wheat," Int. J. Radiat. Biol. 1975; 27: 283-5.

Vijayalaxmi, "Genetic effects of feeding irradiated wheat to mice," Can. J. Genet. Cytol. 1976; 18: 231-238.

Vijayalaxmi, "Immune response in rats given irradiated wheat," Br. J. Nutr. 1978(a); 40: 535-41.

Vijayalaxmi, "Cytogenetic studies in monkeys fed irradiated wheat," Toxicol. 1978(b); 9: 181-4.

Vijayalaxmi, Rao, K.V. "Dominant lethal mutations in rats fed on irradiated wheat," Int. J. Radiat. Biol. 1976; 29:93-8.

Vijayalaxmi, Sadasivan, G. "Chromosomal aberrations in rats fed on irradiated wheat," Int. J. Radiat. Biol. 1975; 27: 135-142, 1975.

Wilmer, J., Leveling, H., Schubert, J. "Mutagenicity of irradiated solutions of 2-deoxy-D-ribose," Mutation Res. 1980; 78: 85-90.

Wilmer, J., Natarajan, A.T. "Induction of sister-chromatid exchanges and chromosome aberrations by gamma-irradiated nucleic acid constituents in CHO cells," Mutation Res. 1981; 88: 99-107.

Wilmer, J., Schubert, J. "Mutagenicity of irradiated solutions of nucleic acid bases and nucleosides in Salmonella typhimurium," Mut. Res. 1981; 88: 337-42.

Wilmer, J., Schubert, J., Leveling, H. "Mutagenicity of gamma-irradiated oxygenated and deoxygenated solutions of 2-deoxy-D-ribose and D-ribose in Salmonella typhimurium," Mutation Res. 1981; 90: 385-397.

Table I BIOASSAYS ON IRRADIATED ORGANIC MEDIA AND FOODS SHOWING POSITIVE MUTAGENICITY, CHROMOSOMAL DAMAGE, TERATOGENICITY, OR CYTOTOXICITY (page 1)

author(s)	date	irradiated material	observation	observed in
Kuzin & Kryukova	1961	plant leaves	chromosomal damage	plant embryos
Swaminathan et al.	1962	potato mash	chromosomal damage	barley embryos
Kuzin	1963	plant leaves	mutagenicity of extracts	plant cells
Swaminathan et al.	1963	culture medium	mutagenicity	Drosophila
Chopra & Swaminathan	1963	potato mash	devel. abnormalities	barley embryos
Molin & Ehrenberg	1964	culture medium	cytotoxicity	bacteria
Berry et al.	1965	glucose, fructose	cytotoxicity	human & mouse cells
Chopra	1965	culture medium	probable mutagenicity	bacteria
Holsten et al.	1965	coconut milk, sucrose	chromosomal damage	carrot explants
Parkash	1965	nucleic acids	mutagenicity	Drosophila
Rinehart & Ratty	1965	culture medium	mutagenicity	Drosophila
Frey & Pollard	1966	culture medium	mutagenicity	bacteria
Shaw & Hayes	1966	sucrose	chromosomal damage	human lymphocytes
Hills & Berry	1967	glucose	cytotoxcity	mouse fibroblasts
Hollowell & Littlefield	1967	plasma	chromosomal damage	human lymphocytes
Kesavan et al.	1967	sucrose	germination inhibition	pollen
Makinen et al.	1967	pineapple	chromosomal damage	onion roots
Parkash	1967	nucleic acids	mutagenicity	Drosophila
Rinehart & Ratty	1967	culture medium	mutagenicity	Drosophila
Schubert et al.	1967	sucrose	cytotoxicity	bacteria
Steward et al.	1967	sucrose	cytotoxicity	carrot explants
Hollowell & Littlefield	1968	plasma	chromosomal damage	human leucocytes
Meletti et al.	1968	wheat endosperm	mutagenicity	wheat
Ammirato & Steward	1969	sucrose	devel. abnormalities	plant root cells
Chopra	1969	culture medium	mutagenicity	bacteria
Kesavan et al.	1970	sucrose	chromosomal damage	plant cells
Moutschen-Dahmen et al.	1970	laboratory diet	preimplantation death	mouse
Schubert and Sanders	1971	various sugars	cytotoxicity	bacteria
Kopylov et al.	1972	potatoes	mutagenicity of extracts	mouse (sperm cells)
Bhaskaram & Sadasivan	1975	wheat	polyploidy	malnourished childre
Vijayalaxmi & Sadasivan	1975	wheat	chromosomal damage	rat (bone marrow)
Vijayalaxmi	1975	wheat	polyploidy	rat (bone marrow)
Vijayalaxmi	1976	wheat	mutagenicity	mouse
Vijayalaxmi	1976	wheat	sperm count reduction	mouse
Vijayalaxmi	1976	wheat	polyploidy	mouse (bone marrow)
Vijayalaxmi	1976	wheat	aneuploidy	mouse (sperm cells)

MAY 03 '91 12:35

author(s)	date	irradiated material	observation	observed in
Vijayalaxmi & Rao	1976	wheat	mutagenicity	rat
Vijayalaxmi & Rao	1976	wheat	sperm count reduction	rat
Aiyar & Subba Rao	1977	various sugars	mutagenicity	bacteria
FAO/IAEA/WHO	1977	potatoes	mutagenicity of extracts	mouse
Renner	1977	laboratory diet	polyploidy	hamster
Levina & Ivanov	1978	laboratory diet	autoimmune disease	rat
Vijayalaxmi	1978a	wheat	low antibody levels	rat
Vijayalaxmi	1978b	wheat	polyploidy, other effects	monkey
Wilmer et al.	1980	nucleic acids	mutagenicity	bacteria
Ivanov & Levina	1981	laboratory diet	testicular abnormalities	rat
Wilmer et al.	1981	deoxyribose, ribose	mutagenicity	bacteria
Wilmer & Natarajan	1981	deoxyribose	chromosomal damage	hamster cells
Wilmer & Schubert	1981	nucleosides	mutagenicity	bacteria

Accord Research and Educational Associates
New York, NY (212)580-3889

3/15/89

MAY 03 '91 17:36 P.04

Table II IDENTIFICATION OF GENOTOXIC RADIOLYTIC PRODUCTS IN IRRADIATED ORGANIC MEDIA OR FOOD
Accord Research and Educational Associates, NYC, 212/580-3889 (1/19/89).

author(s)	date	irradiated material	radiolytic product	genotoxicity
Phillips et al.	1958	dextrose, fructose	glyoxal formaldehyde	mutagenic mutagenic
Kuzin	1963	plant tissues	organic peroxides orthoquinones	mutagenic carcinogenic
Kuzin	1966	plants, rat thymus, tyrosine	orthoquinones orthophenols	carcinogenic carcinogenic
Schubert et al.	1967	sucrose	hydroxyalkyl peroxides glyoxal	mutagenic mutagenic
Steward et al.	1967	sucrose	formic acid	mutagenic
Brooks & Klamerth	1968	glucose	glyoxal malonyldialdehyde	mutagenic, binds to DNA mutagenic, binds to DNA
Chopra	1969	glucose	organic peroxides	mutagenic
Berger & Saint-Lebe	1970	starch	formaldehyde	mutagenic
Riov	1971	grapefruit	6,7-dimethoxycoumarin	teratogenic
Schubert & Sanders	1971	D-glucose, D-fructose, D-mannose, D-rhamnose, D-galactose, D-fucose	alpha, beta-unsaturated carbonyl sugars	cytotoxic (toxicity increased upon heating irradiated solution)
El Zeany	1980	buffalo meat	peroxides carbonyl compounds	mutagenic cytotoxic
Wilmer et al.	1981	deoxy-D-ribose, D-ribose	hydrogen peroxide malonaldehyde carbonyl compounds	mutagenic mutagenic cytotoxic
Gower & Wills	1986	benzo[a]pyrene, starch & oil mixtures	benzo[a]pyrene (oxidized) quinones malonaldehyde lipid peroxides	carcinogenic carcinogenic mutagenic mutagenic
Fiddler et al.	1987	bacon	N-nitrosopyrrolidine	mutagenic

MAY 03 '91 17:37 P.05

Table 3

Risks which would escape detection in nine out of ten runs of the CIVO chronic feeding study in rats

	Difference of proportions	Excess cases per million	Excess cases per 230 million
All sites	0.037	2,800	655,000
Leukemia only	0.016	1,200	283,000

Difference in proportion is taken from Figures 1 and 2 for all sites combined and leukemias only, respectively. For each, the difference in proportions corresponding to a power of 0.10 is converted to risk to indivduals consuming the average amount of chicken in the US diet, irradiated at 300 krad. This conversion entials correction for the relative percentage of chicken in the US and study diets, as well as an assumed two-fold difference in the dose.

The percent of poultry in the US diet is obtained by updating the USDA value [Brunetti et al., 1980] using a 1989 industry figures on per capital chicken consumption value of 85.6 lbs per year [National Broiler Council, 1989].

The two-fold radiation dose correction is generous to the CIVO study, since in fact only half of the experimental rats were fed chicken irradiated at 600, as opposed to 300, krad.

Figure 1

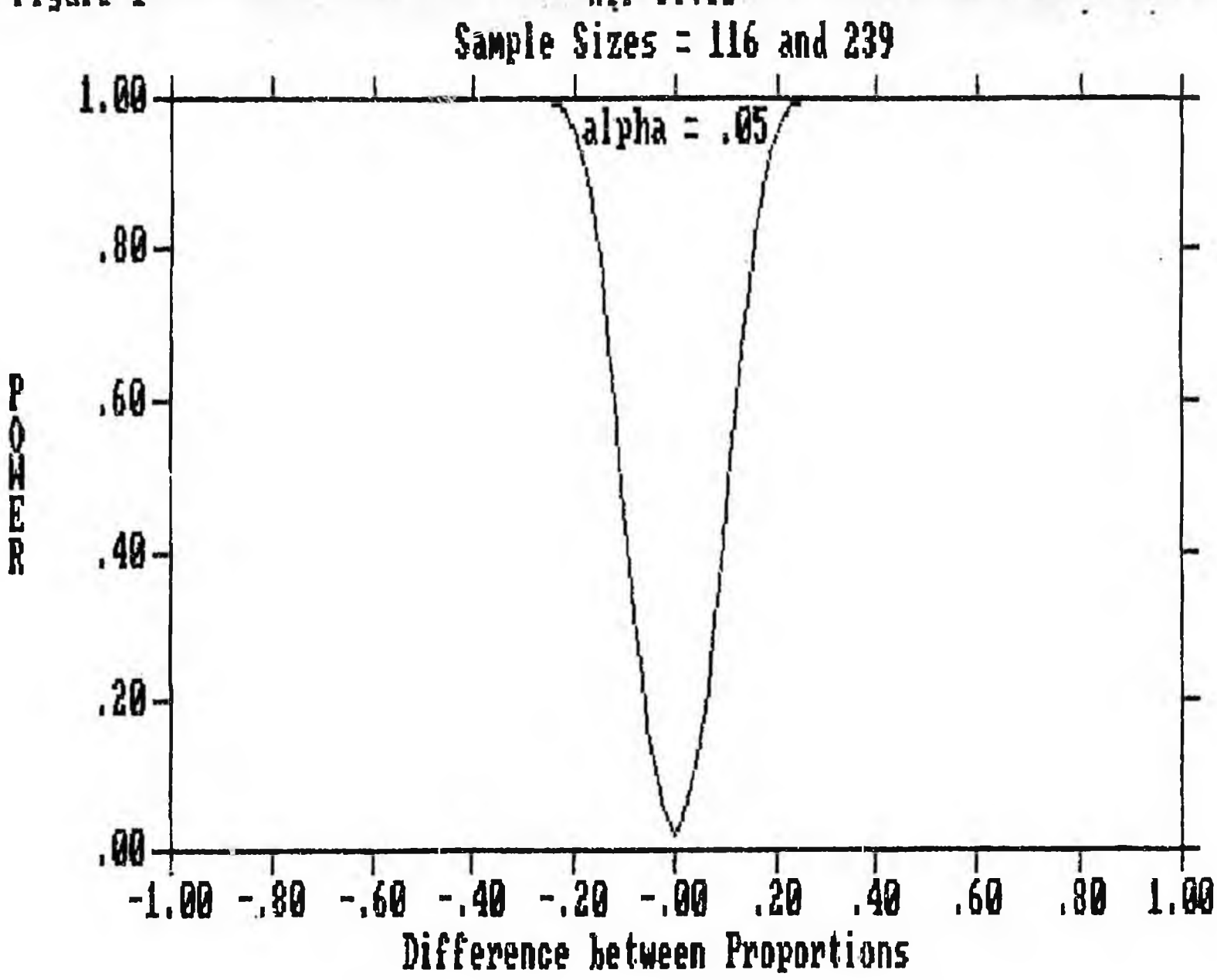
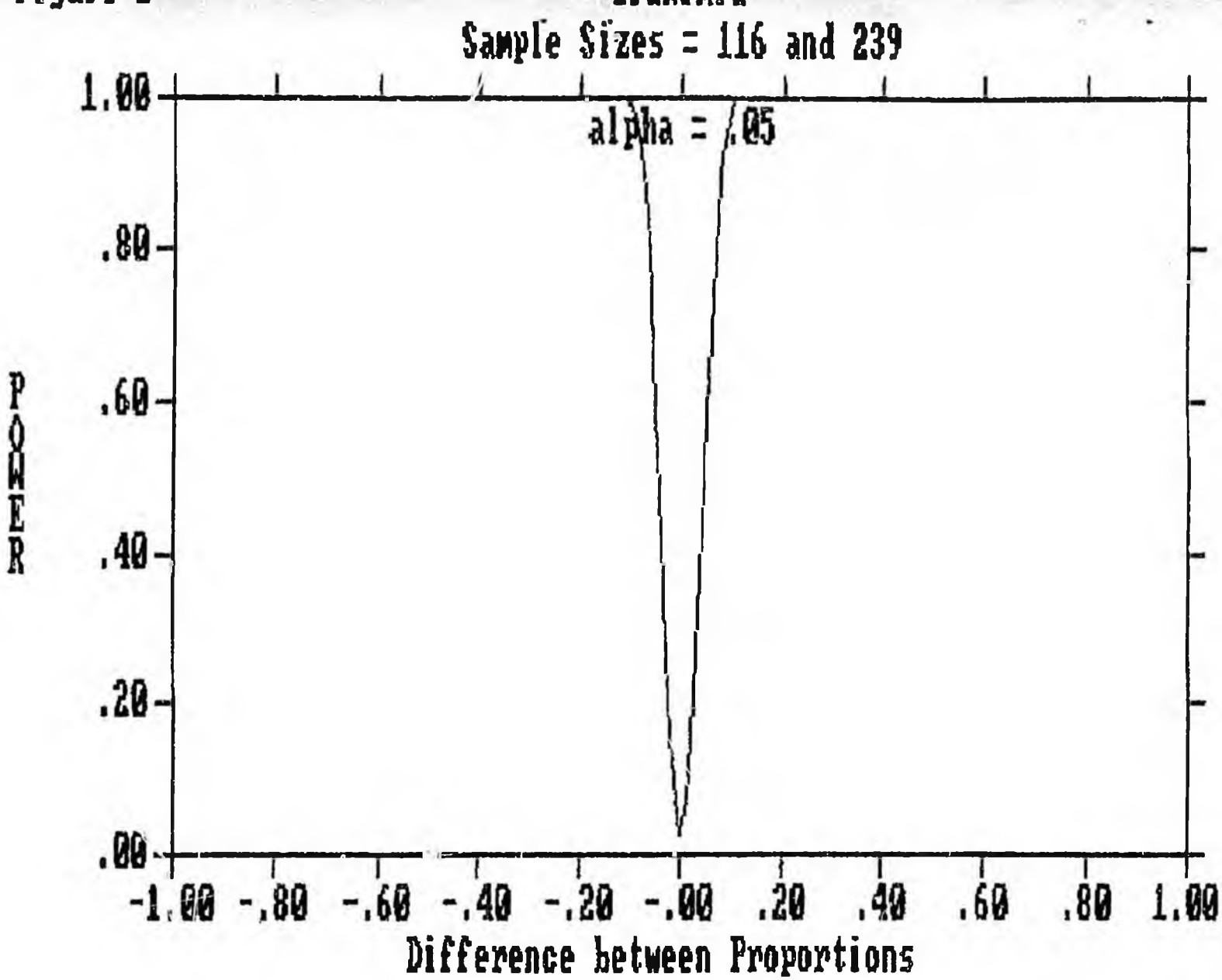

All Sites
Sample Sizes = 116 and 239
alpha = .05
1.00
.80
.60
.40
.20
.00
POWER
-1.00 -.80 -.60 -.40 -.20 -.00 .20 .40 .60 .80 1.00
Difference between Proportions

Figure 2



P.08
MAY 03 '91 17:38

Alaska State Legislature

Legislative Research Agency

P.O. Box Y
Juneau, AK 99811-3100
Phone: (907) 465-3991
Fax: (907) 463-3351

April 17, 1990

MEMORANDUM

TO: Senator Fred Zharoff

ATTN: Michael Thill

FROM: Leola Weimer LMW
Legislative Analyst

RE: Irradiated Products In Alaska
Research Request 90.295

You asked us to provide information about irradiated food and commercial products sold in Alaska. Specifically, you wanted to know if retailers in Alaska sold irradiated food items (e.g., wheat flour, produce or poultry) or commercial products (e.g., cosmetics and feminine hygiene products). You also asked if hospitals in Alaska provide irradiated food to patients on restricted diets.

SUMMARY

Irradiated food is not commercially available in Alaska. It is estimated that three to ten percent of industrial spices (large quantities of spices sold to manufacturers of processed foods, not including restaurants or retail stores) are irradiated in the United States. In the United States, foods approved for the irradiation process (e.g., pork, fruits, vegetables, wheat and wheat flour) are treated by other means.

Irradiated nonfood products are commercially available in Alaska. Attachment A is a list of commonly irradiated products. Data was not available to determine the market share of these irradiated items.

Thirty to forty percent of all medical products, and over fifty percent of disposable medical products are irradiated. This percentage is expected to increase as the use of ethylene oxide gas decreases.

Alaska hospitals have not prescribed irradiated food for patients on restricted diets. The Fred Hutchen Cancer Center in Seattle, Washington is the only American hospital to have received FDA approval for this practice. The food irradiation program was voluntarily discontinued two years ago.

BACKGROUND

The irradiation of food is a physical process like canning, freezing, drying and pasteurizing. Food is irradiated to destroy bacteria, yeast and molds; to kill or sterilize insects; or to retard further ripening of fruits and vegetables. Nonfood products may be irradiated for sterilization (e.g., cosmetics, medical supplies and disposable containers) or for strengthening (e.g., car bumpers, rubber tires, wire and cable). The energy source used to irradiate is either from radioactive isotopes such as cesium-137 or cobalt-60, or from machine generators that produce beams of high-energy electrons or X-rays.[1]

Irradiated Food

In the United States, the Food and Drug Administration (FDA) is the agency responsible for premarket safety review and regulation of irradiated foods. Food products must receive approval on a case-by-case basis. The FDA has approved irradiation for the food products in Table 1.

TABLE 1
FOODS APPROVED BY FDA FOR IRRADIATION TREATMENT

Food	Purpose	Dose Limit	Date Approved
Fruits and vegetables	To slow growth and ripening and to control insects	Up to 1 kilogray (kGy)	April 18, 1986
Dry or dehydrated herbs, spices, seeds teas, vegetable seasonings	To kill insects and control microorganisms	Up to 30 kGy	April 18, 1986
Pork	To control *Trichinella spiralis* (the parasite that causes trichinosis)	Minimum 0.3 kGy to Maximum of 1 kGy	July 22, 1985
White potatoes	To inhibit sprout development	50 to 150 gray	August 8, 1964
Wheat, wheat flour	To control insects	200 to 500 gray	August 21, 1963

SOURCE: *FDA Consumer*, July-August 1986, p. 13.

---

[1]"Fact Sheet: Irradiated Foods," University of Alaska, Fairbanks (n.d.); and telephone conversation with Jean Swinwood, director of Marketing Development, Nordion International Inc. (Canada), April 12, 1990, Tel: (613) 592-2790.

Currently, the FDA is concentrating its efforts on the approval of irradiated poultry to control *Salmonellae* because there is no known alternative to prevent the spread of this disease.[2] An approval notice is expected to appear in the *Federal Register* before the end of this month.[3]

Since there is no known test to detect foods that have been irradiated, the FDA requires that irradiated foods be labeled with the Radura symbol accompanied with the statement "treated with radiation," or "treated by irradiation."[4] Processed foods with irradiated ingredients (e.g., irradiated spices) are exempted from this labeling requirement because "small quantities are involved, and it is considered obvious that the product has been processed in some way."[5]

The Radura logo is the international symbol adopted by the Codex Alimetarius Commission (the United Nations body that sets international standards to protect consumers, facilitate international trade, and aid developing countries[6]). First used in the Netherlands, this stylized tulip is surrounded by a circle with five breaks depicting rays from the energy source. The predominant color of the logo is green.

---

[2]Approvals for the irradiation of poultry to control *Salmonellae* have been granted in Canada (1973), the Netherlands (1971 & 1976) and the Soviet Union (1966), ("Food Irradiation Approaches to Commercialization," *Info Fish Marketing Digest*, no. 1, 1985, p. 33).

[3]Takeguchi, Clyde, Dr., FDA irradiation specialist, telephone conversation, March 13, 1990, Tel: (202) 472-5740.

[4]*Federal Register*, Vol. 51, No. 75, April 18, 1986, Rules and Regulations, P. 13399.

[5]Swanson, Ruthann B., *et al.*, *The Role of Irradiation In Food Processing: Can It Benefit Alaska?* University of Alaska, Fairbanks (UAF), Circular 64, March 1988, p. 4.

[6]Swanson, *Ibid.*, p. 9.

Irradiated Nonfood Products

Commercial nonfood products do not require premarket safety review or labeling. The FDA, Division of Colors and Cosmetics, regulates cosmetic ingredients but does not have any regulations restricting the type of sterilization procedure used in treating cosmetic ingredients. Commercial irradiators must be licensed by the Nuclear Regulatory Commission (NRC) or a state agency authorized to monitor radioactive materials. The Occupational Safety and Health Administration (OSHA) monitors radiation exposure and worker safety. The Department of Transportation (DOT) regulates the transportation of radioactive materials.[7] A list of products commonly irradiated is Attachment A. A comparison of sterilization methods are shown in Attachment B.

OBSTACLES TO FOOD IRRADIATION IN ALASKA

When the FDA approved the irradiation of fruits and vegetables in April 1986, they emphasized that "the marketplace should determine which alternative method is used when safety is not an issue."[8] Confident that food irradiation would soon be a multibillion-dollar industry, the U.S. Department of Health and Human Services (HHS) officials predicted that 10 to 40 percent of our diet would be exposed to irradiation in the near future.[9]

Despite FDA approvals and initial enthusiasm, there are still no commercially irradiated food products available to consumers in Alaska or the rest of the United States.[10] Lack of manufacture application, opposition to food irradiation and consumer ignorance have kept irradiated foods from the market place.

Lack of Manufacturer Application

There are an estimated 37 irradiators in 20 states (not including hospitals and universities) that presently sterilize medical products, cosmetics, pharmaceutical and other devices. Although existing plant facilities are capable of irradiating spices, only a few of the irradiators do so.[11] It is estimated

---

[7]Porter, Donna V., Dr., "Preservation of Food By Irradiation," *Congressional Research Service Report For Congress*, 89-491 SPR, Updated August 18, 1989, p. 8-9.

[8]Lecos, Chris W., "The Growing Use of Irradiation to Preserve Food," *FDA Consumer*, July-August 1986, p. 15.

[9]Gibbs, Gary, "Zap, Crackle, Pop, Irradiated Foods Aren't Coming; They're Here," *The Progressive*, September 1987, p. 22.

[10]Porter, *op cit.*, p. 1.

[11]Johnston, Lucy, "Heavens Preserve Us!" *Environmental Action*, May-June, 1987, p. 18.

that three to ten percent of industrial spices (large quantities of spices sold to manufacturers of processed foods, not including restaurants or retail stores) or less than one percent of all spices are irradiated.[12]

Manufacturers have been reluctant to irradiate approved foods because chemical and other alternatives are less expensive.[13] The need to irradiate pork to control *Trichinella spiralis* (the parasite that causes trichinosis) has been replaced by a simple and inexpensive diagnostic test that can be conducted within existing packing plant facilities.[14] The irradiation of spices was approved to help control insects. However, manufacturers commonly use the fumigant ethylene oxide which costs three to four cents per pound instead of irradiation which costs five to six cents per pound.[15] (Ethylene oxide is a known carcinogen capable of causing mutations, damage to developing fetuses and irritation.[16] The EPA is conducting a special review of ethylene oxide to determine its safety and effectiveness.[17]) Fruits and vegetables were approved for irradiation to control insects and slow growth and ripening. Attachment C provides a list of potential applications for fresh fruits and vegetables and the alternatives to irradiation that are currently used. Not all fruits and vegetables, however, are suitable for irradiation. Attachment C also provides a list of common fruits and vegetables and their relative tolerances to irradiation.

---

[12]*Ibid.*, p. 17; and telephone conversations with the American Spice Trade Association, Dr. George Giddings of Isomedix, Inc., and Barry Fairand of Radiation Sterilizers, Inc., March 1990.

[13]This is true for all foods currently approved by the FDA for irradiation. FDA approval for the irradiation of poultry to control *Salmonellae* is expected to be announced in the *Federal Register* within the next few weeks (conversations with Hank Kocol, Region Ten, FDA; Dr. Clyde Takeguchi, irradiation specialist FDA; and Dr. George Giddings, Isomedix, Inc.). At present, there is no known alternative for the control of *Salmonellae*.

[14]Giddings, George Dr., radiation processing consultant for Isomedix, Inc., telephone conversation, March 29, 1990, Tel: (201) 887-4700.

[15]Slavin, Joseph, "Food irradiation approaches commercialization," *Info Fish Marketing Digest*, No. 1, 1985, p. 35.

[16]Webb, Tony, Tim Lang and Kathleen Tucker, *Food Irradiation, Who wants it?* 1987, p. 81.

[17]Previously, the fumigant ethylene dibromide was used to control insects. In 1984, the EPA banned the use of ethylene dibromide. A special exception was made for the importation of products treated with ethylene dibromide from certain South Pacific locations where the United States funded the construction of ethylene dibromide facilities prior to the 1984 ban. (Carl Arney, EPA specialist, telephone conversation, April 6, 1990, Tel: (206) 442-2576.)

Another factor contributing to the high cost of irradiation processing is the need to construct additional facilities. Existing irradiators lack the proper storage and processing facilities to irradiate fresh meats, fruits or vegetables.

Opposition to Food Irradiation

The most outspoken opponents to food irradiation in Alaska have been SANE Alaska, Food & Water, Inc. and the Food Irradiation Network (FIN) of Japan. The most common concerns from consumer groups opposed to irradiation are as follows:

1. Safety is not proven because feeding studies are inconclusive, potentially hazardous free radicals are formed, and hazardous microorganisms may have a selective advantage as they are more resistant to irradiation than microorganisms which generate obvious signs of spoilage;

2. Nutrient losses may lower food quality;

3. The Department of Energy is using food irradiation as a way to dispose of cesium-137 waste from nuclear weapons manufacture;

4. Worker safety is not adequately assured;

5. Safeguards for the transport of material to plants is inadequate;

6. People may be unknowingly exposed to irradiated foods since labelling of ingredients in processed foods is not required; and

7. Irradiation will increase the cost of food to the consumer.[18]

Consumer groups opposing food irradiation have had an impact on consumer perceptions towards irradiated foods and manufacturers willingness to use the process of irradiation. Citizens Against Irradiated Food (CAIR) conducted a survey of 44 American food processors in 1986. They found that "the majority of manufacturers do not yet use irradiated foods, and most have taken no position regarding the process."[19] The "crucial issue" in determining whether to use the process of food irradiation was consumer willingness to purchase irradiated foods. A summary of CAIR's findings is Attachment D.

In response to anti-irradiation campaigns, many manufacturers have pledged not to use or process irradiated foods. Quaker Oats, H.J. Heinz, McDonalds, Ralston-Purina, Borden Foods and Beatrice have stated their intention not to use

---

[18]Bruhn, C.M. and H.G. Schutz, "Consumer Awareness and Outlook for Acceptance of Food Irradiation," *Food Technology*, July 1989, p. 93.

[19]Webb, *et al.*, *op. cit.*, 1987, p. 122.

irradiated foods. A number of other food processors, retailers and wholesalers have taken similar positions.[20]

Consumer Reaction To Irradiated Food

Studies of consumer reaction to irradiated foods have revealed that consumers are generally unaware of the facts about food irradiation and therefore education programs must be initiated prior to the sale of irradiated foods. M. Young, a consultant for the joint FAO/IAEA marketing committee, found that "a consumer education program is essential." Due to consumer ignorance and association of the word "radiation" with the nuclear industry, consumers' first reaction to irradiated foods is typically "one of horror, revulsion, and disbelief that we could seriously anticipate such a thing."[21] Young recommended careful preparation and consumer education before marketing irradiated foods.

A similar study conducted by Weise Research Associates, Inc., in 1984, found that "in general, consumers fear the unknown, whether the unknown is a 'new' process or what happens during any commercial handling process."[22] Consumer surveys revealed that "a large percentage of the public has not heard of food irradiation and, even if they have heard of the process, they know very little about it."[23]

The findings of these studies is consistent with those of the UAF Institute of Northern Engineering study on food irradiation. In their final report entitled *Alaskan Commodities Irradiation Project*, UAF researchers found that "data from test markets on products of interest in Alaska are essentially nonexistent."

Until manufactures construct new facilities, opposition to irradiation is overcome and/or consumers are educated about the effects of the process, irradiated food will not be commercially available in Alaska.

PRESENCE OF IRRADIATED NONFOOD PRODUCTS IN ALASKA

Commercial and medical products are irradiated for sterilization or strengthening purposes. Because there are no labeling requirements for

---

[20]Colby, Michael and Christina Rossler, directors of Food & Water, Inc., letter to Mr. Horgan and Mr. Castner, United Fisherman of Alaska, March 13, 1990, p. 2.

[21]Young, M., Anticipated Consumer Reaction to Irradiated Foods, presentation to FAO/IAEA Consulting Meeting, Vienna, Austria, September 27 - October 1, 1982.

[22]Weise Research Associates, Inc., *Consumer reaction to the irradiation concept--A summary report*, prepared for the DOE and National Pork Producers Council, 1984.

[23]*Ibid.*

irradiated nonfood products, it is difficult to determine which products have been irradiated. Attachment A is a list of nonfood products that are typically irradiated.

Commercial Products

We were unable to determine what percentage of commercial products were actually irradiated. The Department of Commerce does not keep track of such figures, and irradiation facilities and individual manufacturers proved reluctant to disclose such information.

According to Jean Swinwood, marketing director of Nordion International Inc., talc, bentonite[24] and gelatine are the three most common cosmetic ingredients that are irradiated for sterilization. Car bumpers, rubber tires, plastic bags, electrical wires and cable are often irradiated to add strength.

According to Barry Fairand, of Radiation Sterilizers, Inc., feminine hygiene products and other absorbent disposables are often sterilized with irradiation because the alternative, ethylene oxide gas, leaves a toxic residue.[25] Dr. George Giddings of Isomedix, Inc., also explained that many plastic containers and packaged products are irradiated because, unlike the methods of steam or gas, irradiation allows the contents to be sterilized after packaging.[26]

Medical Products

It is estimated that 30 to 40 percent of all medical products, and over 50 percent of disposable medical products are irradiated.[27] The most common alternative to irradiation is ethylene oxide gas. Some reusable medical products (e.g., bed pans and sheets) may be sterilized with heat or steam. The amount of products sterilized by irradiation is expected to increase as more manufacturers seek alternatives to ethylene oxide gas.

---

[24]Bentonite is a natural white clay used at a filler in cosmetic products such as eye shadows. Irradiation is the most effective means to sterilize bentonite because its high density makes it impenetrable to steam or ethylene oxide sterilization procedures. (Jean F. Swinwood, marketing director, Nordion International Inc., telephone conversation April 12, 1990, Tel: (613) 592-2790.)

[25]Barry Fairand, Radiation Sterilizers, Inc., telephone conversation, March 30, 1990, Tel: (415) 770-9000.

[26]Giddings, *op cit.*, telephone conversation March 13, 1990.

[27]Telephone conversations with Dr. Fairand, Dr. Giddings, *op cit.*; and Don Price of Sherwood Medical Co., March 29, 1990, TEL: (314) 241-5700.

Irradiated Hospital Food

The prescription of irradiated food for hospital patients with compromised immune systems has been widely used in the United Kingdom since its approval in 1969.[28] In the United States, however, only one hospital has been given a special permit for this purpose. The Fred Hutchen Cancer Center located in Seattle, Washington received FDA approval to supply a diet of irradiated food to cancer patients recovering from bone marrow transplants.[29]

Dr. Sandra Acker, director of the food irradiation program, explained that after receiving a bone marrow transplant, patients must be placed in a completely sterile environment for 30 to 60 days while their body adopts a new immune system. All things, including air, must be filtered or sterilized to prevent infection. Food for these patients must either be canned, steamed or cooked for long periods of time.

During the fifteen years that Dr. Acker administered the food irradiation program, approximately 2,000 patients received irradiated food to supplement their diet. Nearly 25 percent of their diet consisted of pancakes, breads, pastas, dried powders, candy, gum and other food items that had been irradiated at sterilization doses (considerably higher than FDA approvals for commercial food items).

The program was voluntarily discontinued two years ago when the irradiation facility that Dr. Acker was using at the University of Washington was no longer able to irradiate the foods in a timely manner (e.g., one week to sterilize a slice of bread). University and hospital officials determined that it would not be cost effective to rejuvenate the radiation source (cost estimated to be over $250,000). No other hospital has been granted or has applied for FDA approval to irradiate food for patients with low immune systems.

*** ** ***

I hope you find this information useful. If you have further questions, please contact this agency.

Attachments

---

[28]Slavin, Joseph W., "Food Irradiation Approaches Commercialization," *Info Fish Marketing Digest*, No. 1, 1985, p. 33.

[29]Acker, Sandra, Dr., Fred Hutchen Cancer Center, telephone conversation April 11, 1990, Tel: (206) 467-5000.

NORDION INTERNATIONAL INC.

447 March Road
P.O. Box 13500
Kanata, Ontario
Canada K2K 1X8
Tel: (613) 592-2790
Telex. (053) 4162
Fax: (613) 592-0440

447 chemin March
C.P. 13500
Kanata (Ontario)
Canada K2K 1X8
Tel: (613) 592-2790
Télex: (053) 4162
Fax: (613) 592-0440

TELEFAX

TO/A: Leola Weimer
COUNTRY/PAYS: ~~Canada~~ USA
COMPANY/SOCIETE: Legislative Research
FAX: 907-463-3351
CITY/VILLE: Agency - Juno, Alaska
DATE: 17 April /90

Dear Leola;

As discussed, attached is a list of some of the products that are routinely irradiation-sterilized.

Package is on its way. Best regards!

Sincerely,

Jean Swinwood

P.S. Our Food Irradiation expert is Michelle Marcotte, phone # 613-592-2790, fax # 613-592-0440.

FROM/DE: Jean Swinwood
PAGE 1 OF 1
DEPARTMENT: Mkt. Dev.
MY FAX NO: (613) 592-0440

This is not a complete inventory of products, but a reasonably comprehensive list of ex

INFORMATION BULLETIN

ISOMEDIX

ITEMS BEING STERILIZED OR PROCESSED WITH COBALT-60 RADIATION

(some are also being sterilized with electron accelerator machine which are also used for many additional industrial applications

OPERATING ROOM DISPOSABLES

Alcohol Wipes
Arterial Prosthesis
Bandages
Bone Wax
Catheters
Colostomy Pads
Dressing Packs
ECG Electrodes
Fetal Probes
Grounding Pads
Heart Catheters
Hypodermic Needles
Hypodermic Syringes
IV Tubing Sets
Laparodemy Pads
Marking Pens
Orthopedic Implants
(hips, knees, fingers, etc.)
Ostomy Rings
Procedure Packs
Scalpel Blades
Sponges
Stockinettes
Stop Corks
Surgeon Glove Powder
(talc or cornstarch)
Surgeons Gloves
Surgeons Scrub Brushes
(plain and impregnated)
Surgical Drapes
Surgical Gowns
Sutures
Swabs
Towels
Vascular Prosthesis
Water-Filled Syringes

OTHER DISPOSABLES

Bioassay Dishes & Tubes
Bleeder Bags
Blood Bankers
Blood Collection Tubes
Blood Lancets
Body Bags
Bulk Glue
Burn Blankets
Burn Ointments
Burn Pads
Cell Culture Flasks
Centrifuge Tubes
Clean Room Garments
Cornstarch
Cotton Balls
Culture Flasks, Tubes & Trays
Dental Anchors
Dental Burs
Dental Sponges
Drum Liners
Entero Feeding Devices
Eye Droppers
Eye Ointment
Nursing Pads
Petrie Dishes
Pipettes
Polyethylene Bottles
Rawhide Dog Toys
Roller Bottles
Saline Solution
Specimen Containers
Talc
Tampons
Teething Rings
Test Tubes
Thermometer Covers
Thermometers
Tongue Depressors

ISOMEDIX INC.
CORPORATE OFFICES • 11 APOLLO DRIVE WHIPPANY, NEW JERSEY 07981 • (201) 887-4700

NORDION INTERNATIONAL INC.

447 March Road
P.O. Box 13500
Kanata, Ontario
Canada K2K 1X8
Tel: (613) 592-2790
Telex. (053) 4162
Fax: (613) 592-0440

447 chemin March
C.P. 13500
Kanata (Ontario)
Canada K2K 1X8
Tel: (613) 592-2790
Telex: (053) 4162
Fax: (613) 592-0440

TELEFAX

TO/A: Leola Weimer
COMPANY/SOCIETE: Legislative Research Agency
CITY/VILLE: Juno, Alaska
COUNTRY/PAYS: USA
FAX: 907-463-3351
DATE: 12 April /90

Dear Leola;

As discussed, attached is a list of some of the products that are routinely irradiation-sterilized.

Package is on its way. Best regards!

Sincerely,

Jean Swinwood

P.S. Our Food Irradiation expert is Michelle Marcotte, phone # 613-592-2790, fax # 613-592-0440.

FROM/DE: Jean Swinwood
DEPARTMENT: Mkt. Dev.
PAGE 1 OF 1
MY FAX NO.: (613) 592-0440

CONSUMER PRODUCTS

- Aluminum Hydroxide (antacid)
- Baby Bottle Nipples
- Chlorox Pre-wash
- Cosmetics
  - Bentonite Clay
  - Brushes
  - Cornstarch
  - Emery Boards
  - Eye Lashes
  - Eye Shadow
  - Hair Cream
  - Hair Pieces
  - Karaya Gum
  - Lotions
  - Nut Shells
  - Shampoo
  - Talc
- Cotton Balls
- Cotton-tipped Swabs
- Disposable Nurser Bottles
- Dry Bandages
- Eye Droppers
- Glass Bottles
- Impregnated Bandages
- Infant Wear
- Insect Spray
- Liquid Pre-Wash and Dishwashing Detergents
- Milk Blanks (milk, cream, half & half, egg nog, etc.)
- Moist Wipes
- Pacifiers
- Packaging
  - Bulk Food Containers
  - Butter Pat Containers
  - Creamer Cups & Lids
  - Food/Medical Roll Stock
  - Heat Shrinkable Film
  - Lidding
- Silicone Spray
- Tampons
- Tongue Depressors
- Wine Corks

MISCELLANEOUS

- Bee Hives
- Blood Serum
- Fetal Calf Serum
- Human Bones
- Human Eyes
- Lab Animal Feed and Bedding
- Mastitis Test Kits

NORDION INTERNATIONAL INC.

PRODUCT INFORMATION

Gamma Sterilized Disposable Medical Products and Related Health Care Items

Acupuncture and electrolysis needles

Baby pacifiers, Baby bottles
Baby bottle nipples, Baby powder
Bandages
Beakers, transport containers
Bioassay dishes
Bladder irrigation sets, Blankets
Blood agar (processed in frozen state)
Blood collection tubes
Blood lancets, Blood plasma
Bone joints, hip joints
Bone wax
Bottles and cups
Brushes
Burn ointments, Burn pads

Cataract removal instruments
Catheter collars, Catheters
Centrifuge tubes, Clamps
Connectors eg. T & Y
Contact lens (saline) solution
Culture flasks, tubes
Custom packs and cosmetics

Diagnostic strips
Dialysis units, Dialyzers
Disposable thermometers
Donor sets, Drainage systems
Dressings, Dressing packs

Electrodes, Enzymes
Eye droppers, Eye pads

Filter clamps, Filters
First aid packs, Forceps

Gloving cream
Glove Powder

Hypodermic syringes

Implants, Infusion sets
Inoculating loops and needles
Intravenous bags
Intravenous sets
Iron oxide pigment
IV valves/connectors

Kidney transplantation kits

Laboratory animal bedding
Laboratory animal feed
Laboratory diagnostic kits
Lubricating jelly

Mastitis test kits

Needle counting systems
Neonatal diapers

Oxygenators

Packing film
Petri dishes
Pharmaceuticals
Pipettes

Saline solution
Sanitary napkins
Scalpel blades, Serum tubes
Shampoo, Specimen collection kits
Specimen containers, Stopcocks
Surgeons' gloves
Surgical drapes
Surgical gowns
Surgical kits
Surgical needles, Surgical pens
Surgical scrub brushes, Surgical sets
Surgical marking pens
Surgical staplers
Suture removal tray, Sutures
Swabs, Swab specimen kits
Syringe needles, Syringes

Talc, Tampons
Teflon (to improve properties)
Test tubes, Towels
Tracheal suction kits
Transfusion sets
Transplant carrying containers
Tray kits
Tube connectors, Tubing

Urine bags
Urine sample collection kits

Valves
Vascular grafts

Water

NORDION INTERNATIONAL INC.
447 March Rd. P.O. Box 13500, Kanata, Ontario, Canada, K2K 1X8
Tel: (613) 592-2790, Telex (053) 4162, Telefax (613) 592-6937

ATTACHMENT B

Comparison of Sterilization Methods

ISOMEDIX

INFORMATION BULLETIN

COMPARISON OF STERILIZATION METHODS

Consideration	Steam	Ethylene Oxide (toxic and explosive)	Gamma Radiation
1. Product Design	[illegible]aled Cavity	No Sealed Cavity	No Restrictions
2. Materials of Construction	Most Materials Satisfactory except for those which are Heat or Moisture Sensitive	Most Materials Satisfactory	Most Materials Satisfactory
3. Product Packaging	Permeable Material or Second Sealing Process	Permeable Material or Second Sealing Process	No Restrictions
	Provision for Expansion of Packaging during Vacuum	Provision for Expansion of Packaging during Vacuum	No Restrictions
	Seals must withstand Vacuum Stress	Seals must withstand Vacuum Stress	No Restrictions
4. Parameters to be Controlled during Sterilization	Vacuum Pressure Temperature Relative Humidity Time	ETO Concentration Vacuum Pressure Temperature Relative Humidity Time	Time
5. Reliability of Sterilizing Process	Good	Good	Excellent
6. Post Sterilization Microbioloigical Testing	Desirable	Required	Can be Eliminated
7. Quarantine Period	7 – 14 Days	7 – 14 Days	Can be Eliminated
8. Post Sterilization Treatment	Dry Product	Aerate to Remove Toxic Residues	None
9. Quantitative Process Monitoring Possible	No	No	Yes
10. Economics	Good on Low and High Volumes	Good on Low and High Volumes	Good On High Volumes

ATTACHMENT C

Potential Applications for and Alternatives to Irradiation of Fresh Fruit and Vegetables

Common Fruits and Vegetables and Their Relative Tolerances to Irradiation

TABLE 6. A Summary of Potential Applications and Limitations of Ionizing Radiation for Fresh Vegetables, and Fruits,

Commodities	Treatment objective	Estimated minimum dose required (KGy) (1 KGy = 100 Krad)	Estimated maximum dose tolerated (KGy)	Detrimental effects above maximum dose tolerated	Alternative treatment is available
Potato, onion, garlic, carrot, table beet, radish, turnip, Jerusalem artichoke, sweet potato, yam, cassava, taro, ginger	Inhibition of growth (sprouting and rooting)	0.05–0.10	0.15	Decreased wound healing ability Tissue discoloration Increased susceptibility to decay	Use of sprout inhibitors (e.g. maleic hydrazide and chloroisopropyl carbamate) Maintenance of optimum temperature and relative humidity
Asparagus	Inhibition of growth (elongation and curvature)	0.05–0.10	0.15	Tissue breakdown Increased susceptibility to decay	Vertical packing and maintenance of optimum temperature (2°C = 36°F) and relative humidity (95–98%) Use of elevated carbon dioxide atmospheres
Mushrooms	Inhibition of growth (cap opening and stalk elongation)	0.06–0.5	0.50	Development of off-flavors	Prompt cooling and maintenance of optimum temperature (0°C = 32°F) and relative humidity (95–98%)
Artichoke, asparagus, broccoli, brussel sprouts, cabbage, cauliflower, lettuce, spinach, other leafy vegetables	Insect disinfestation (prevention of adult emergence)	0.15–0.30	0.25	Loss of green color Stem pitting of artichoke Tissue discoloration	Fumigation with hydrogen cyanide (can be detrimental to quality of most commodities in this group)
Snap beans, sweet corn cucumber, eggplant, okra, green peas, bell peppers, summer squash	Insect disinfestation	0.15–0.50	0.50	Loss of green color Increased denting of sweet corn Tissue discoloration	Fumigation with methyl bromide (can be detrimental to quality)
Cantaloupe, honeydew melons, persian melons, casaba melons, tomatoes	Insect disinfestation	0.15–0.30	1.00	Accelerated softening Abnormal ripening	Fumigation with methyl bromide (can be detrimental) Short vapor heat treatment
Apple, apricot, blueberry, cherry, fig, loquat, nectarine, peach, pear, persimmon, plum, pomegranate, raspberry, strawberry, tamarillo	Insect disinfestation	0.15–0.30 depending on the commodity	0.50–1.75	Accelerated softening Abnormal ripening	Fumigation with methyl bromide (can be detrimental) Cold treatments
	Control of postharvest diseases	1.50–2.00			Use of postharvest fungicides
Avocado, grapefruit, grade kiwifruit, kumquat, lemon, lime, olive, orange tangelo, tangerine	Insect disinfestation	0.15–0.30	0.25–0.75 depending on the commodity	Accelerated softening Tissue discoloration Surface pitting	Cold treatments (can be detrimental)
Banana, mango, papaya, pineapple, plantain, guava, lychee, longan, rambutan, cherimoya, carambola, passion fruit, sapodilla	Insect disinfestation	0.15–0.30	0.50–1.50 depending on the commodity	Accelerated softening Uneven ripening Tissue discoloration	Hot water or vapor heat treatments Fumigation with methyl bromide (can be detrimental)
	Retardation of ripening	0.25–0.50			Temperature management Ethylene removal Controlled atmospheres

Source: Food Irradiation for the Produce Industry, United Fresh Fruit and Vegetable Association, 1986.

TABLE 5. Relative Tolerance of Fresh Fruits and Fruit-Vegetables to Irradiation Stress at Doses Below 1 kGy (100 krad)

Group A	Group B	Group C	Group D
Apple	Apricot	Avocado	Kiwifruit
Cherry	Banana	Cucumber	Persimmon
Date	Cherimoya	Grape	Pomegranate
Guava	Fig	Green bean	
Mango	Grapefruit	Lemon	
Muskmelons	Kumquat	Lime	
Cantaloupe	Litchi	Olive	
Honeydew	Loquat	Pepper, bell	
Nectarine	Orange	Pepper, chili	
Papaya	Pear	Summer Squash	
Peach	Pineapple	Tree nuts	
Prune and other	Plum	Almond	
dried fruits	Tangelo	Filbert	
Raspberry	Tangerine	Pecan	
Strawberry		Pistachio	
Tomato		Walnut	

Group A. Commodities with minimum documented detrimental responses to irradiation.

Group B. Commodities with inconsistent documented detrimental responses to irradiation.

Group C. Commodities exhibiting significant, documented irradiation injury.

Group D. Commodities for which no documentation of radiation tolerance is available.

Source: U.S. Dept. of Energy, Agriculture, and the American Institute of Biological Sciences. Low-Dose Radiation Treatment of Agricultural Commodities. Working Report of Workshop, Arlington, VA., Apr. 19-21, 1982.

ATTACHMENT D

Citizens Against Irradiated Food (CAIR)
1986 Survey Response

89-491 SPR

CRS Report for Congress

Preservation of Food By Irradiation

Donna V. Porter
Specialist in Life Sciences
Science Policy Research Division

Updated August 18, 1989

CRS

Congressional Research Service • The Library of Congress

APPENDIX 3

RESPONSE TO U.S. SURVEY

Manufacturer	Irradiating	Irradiated Ingredients	Conducts Research	Concept
Armour-Dial Corp.	No	No	No	No
Beatrice-Hunt/ Wesson	No	Yes-Spices	Interested in	technology
Best Foods (Hellman's, Mazola Skippy)	No	No	No	DNA
Bordens	No	No	No	No
Campbell's Soup Company	No	DNA	DNA	Yes-Coalition
Carnation	No	No	Yes	believes promising
Celestial Seasonings	DNA	No	DNA	DNA
Chelsea Milling Co. (Jiffy Mixes)	No	No	No	No
Compass Foods (8 o'clock bean coffee)		No	No	No
Dannon Company, Inc.	DNA	No	DNA	DNA
Fearn Natural Foods	No	No	No	No
R.T. French Co. (French's)	DNA	No	Irradiation has potential	
Gorton's Fish	No	No	No plans to irr. in future	
Hartville Kitchen (salad dressings)	DNA	No	DNA	DNA
Heinz	No	DNA	Yes	DNA
Hollywood Foods	No	No	DNA	DNA
Holsum Foods	No	DNA	No	thinks safe
Hormel	No	No	DNA	DNA
I&K Dist., Inc.	No	No	No	No
Lawsons Company (dairy products)	No	No	DNA	DNA
The Larsen Company (Freshlike Veg.)	No	No	Evaluating concept	
Thomas J. Lipton, Inc.	No	DNA	No	Yes-Coalition
Miami Margarine Co.	No	No	No	DNA

Manufacturer	Irradiating	Irradiated Ingredients	Conducts Research	Concept
Miss Molly Foods (TV dinners)	No	No	DNA	DNA
Nature's Plus (vitamins)	No	No	No	No
Nature's Way (herbal powders)	No	No	DNA	DNA
Nestle Foods	No	No	No position	No position
Ocean Spray Cranberries, Inc.	No	No	No	No position
Oscar-Mayer	No	No	DNA	DNA
Ralston-Purina (human and pet foods)	No	No	No	Believes safe
J.H. Routh Packaging (pork products)	No	No	DNA	DNA
Swift-Eckrich	DNA	DNA	Are evaluating concept	
Starkist Foods, Inc. (human and pet foods)	No	No	DNA	DNA
Sunny Delight Juices	No	No	No	DNA
Weaver Foods	No	No	No	DNA
SPICES:				
Durkee Famous Foods	No	-	-	-
Kroger	No	-	-	-
McCormick	not retail	-	Yes	-
Mrs. Dash (Alberto-Culver)	No	DNA	DNA	DNA
Topco (Food Club Spices)	No	-	-	-
Ragu products do not contain irradiated herbs or spices.				
BABY FOOD:				
Beech-Nut	No	No	No	No
Gerber	No	No	Yes	-
Heinz	No	-	-	-

DNA, did not answer.
From C.A.I.R. Newsletter, December 1986.

FOOD IRRADIATION

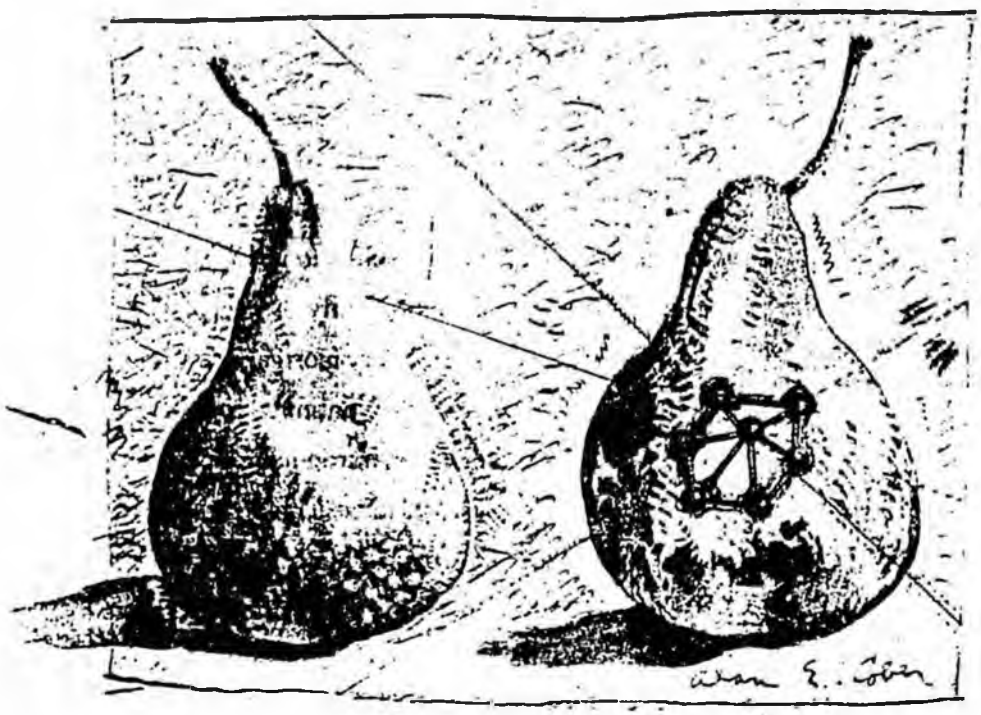
WHO WANTS IT?

Tony Webb, Tim Lang, and Kathleen Tucker

With a forward by Michael Jacobson, Director
Center for Science in the Public Interest

© 1987

Thorsons Publishers, Inc.
Rochester, Vermont
Wellingborough, Northamptonshire



PUBLIC HEALTH

Food Irradiation

Emotional opposition persists in the face of scientific evidence that the process is harmless

When the Food and Drug Administration announced, last May, its approval of irradiation to kill salmonella and other harmful bacteria in poultry, the only uncertainty about the poultry industry's response lay in what reason it would provide for declining the FDA's invitation to use the process. The rationale that industry spokesmen gave—citing food irradiation's poor public image rather than concerns about its safety—accurately reflects the degree of public confusion about the process. In declining to impugn food irradiation's wholesomeness, the spokesmen concurred with the widespread assumption among scientists that the process is safe. They were also correct in acknowledging that most laymen would rather depend on proper cooking to kill salmonella than eat irradiated poultry. "The issue," said Roger Coleman, of the National Food Processors Association, "is consumer acceptance."

Food irradiation works by exposing food to beams or isotopes of ionizing energy, which split molecules of organisms within the food that cause disease, spoilage, or other forms of deterioration. If enough molecules are split, the organisms die. Meanwhile, the energy passes through the food, leaving it otherwise relatively unchanged. Food-irradiation advocates cite substantial evidence that low doses of radiation can destroy the salmonella bacteria that infest up to half the poultry now marketed in the United States, kill trichina in pork, wipe out harmful insects and microorganisms that infest some fruits and vegetables, kill parasites in fish, inhibit sprouting in potatoes and onions, and delay spoilage in a variety of foods, all while affecting taste and nutritional content only slightly. The advocates say that at higher radiation exposures—above the level currently approved by the FDA—food can be sterilized (for consumption, say, by hospital patients whose immune systems have been seriously damaged) and it can be given a nearly indefinite shelf life without refrigeration. In some instances irradiation could replace toxic pesticides. For example, the Hawaiian papaya industry, which slumped after the Environmental Protection Agency banned a chemical defumigant called ethylene dibromide, used in fruit-fly disinfestation, actively backed irradiation as an alternative. Irradiation's most ardent supporters even maintain that the process could combat hunger in Third World countries, by reducing food losses due to spoilage. While that may be claiming too much, thirty-seven nations, including such poor countries as China and Bangladesh, have approved the process, and of those, twenty-four are using it.

Most opposition to food irradiation is visceral. It starts from the assumption that radiation, frequently a lethal agent, cannot possibly affect food in safe ways. Considering that radiation is linked to such symbolic and literal disasters as Hiroshima, Three Mile Island, and Chernobyl, the power of that assumption is undeniable, even if food irradiation has nothing but radioactivity in common with atomic bombs and nuclear reactors. Fear of radiation has provoked a segment of the public to resist the process, and the dispute thus chiefly pits experts who support food irradiation against laymen who oppose it. Instead of grappling with the details of scientific inquiry, the coalition of anti-nuclear activists, organic-food advocates, and holistic-health practitioners who compose the organized opposition to food irradiation habitually make startling but invariably hollow claims of conspiracy. For instance, Denis Mosgofian, the former director of the San Francisco-based National Coalition to Stop Food Irradiation, charged in 1987 that during her two-and-a-half-year tenure as Secretary of Health and Human Services, Margaret Heckler, a longtime food-irradiation advocate, "headed up the entire process of getting food irradiation through FDA." That unsubstantiated allegation, with its implication that Heckler influenced the FDA's decision-making process, overlooks the facts that the report establishing the FDA's pro-irradiation policy was written nearly three years before Heckler became Secretary, and that the FDA's final rule on fruits and vegetables—the agency's most significant food-irradiation rule of the 1980s—was announced after her departure.

Opponents have also resorted to colorful antics to draw attention to their cause. In 1987, when a Canadian parliamentary committee was considering the future of food irradiation, a man wearing a chicken suit strolled through downtown Toronto handing out anti-irradiation leaflets. In October of that year, when a proponent tried to display

ILLUSTRATION BY ALAN E. COBER

canned irradiated chicken to television cameras during a food-irradiation debate in Washington, D.C., an opponent slipped a drawing of a skull and crossbones onto the table. But while such ploys reflect the opponents' flair for public relations, they shed little light on a process that may possess considerable benefit for mankind.

OF THE HUNDREDS of scientists in this country who have done extensive research on the wholesomeness of food irradiation, only a few have publicly expressed opposition to it, and the several other scientists who are actively against food irradiation are not experienced in the field. This consensus almost certainly exists because the preponderance of evidence refutes the opposition's claims. Not even the most ardent food-irradiation opponent argues that the process makes food radioactive, but, as radiation chemistry has shown, irradiation does create tiny numbers of molecules known as radiolytic products—formed when the ionizing energy from a radioactive isotope or a linear accelerator splits food molecules, creating new ones. The argument over food irradiation's wholesomeness essentially turns on whether these radiolytic products, or RPs, are hazardous when eaten.

In defending food irradiation's safety, an FDA committee in 1980 cited data showing that a low radiation dose would generate RPs in a ratio of no more than thirty parts per million. Of those thirty parts, about 90 percent have been identified as identical to natural food components and therefore presumably safe. Of the remaining 10 percent of the RPs—or three parts per million—most have been found to be chemically similar to natural food components. Their understanding of the composition of equivalent natural food led the researchers to conclude that if the remaining RPs harbored any significantly toxic substances, these existed in quantities so small—a few parts per billion—as to be harmless. Such levels, they said, were undetectable in state-of-the-art toxicological tests. In addition, FDA officials now maintain, they are comparable to the quantity of significantly toxic substances known to exist, harmlessly, in some nonirradiated foods. The FDA officials assert that only one significantly toxic RP, benzene, has ever been identified, and that was in meat irradiated at a dose more than fifteen times as great as that now approved by the FDA. According to George H. Pauli, an FDA consumer-safety officer who has supervised the agency's food-irradiation deliberations, the amount of benzene in the irradiated meat was 100 times less than that found in nonirradiated eggs.

Both sides cite various toxicological tests to support their conclusions, but all such tests have limited usefulness when applied to food irradiation. A standard toxicological evaluation of a food additive entails supplementing test animals' diets with the additive in quantities far greater than those to be used in practice, to find the maximum quantity that produces no ill effects; that quantity is then divided by a safety factor, usually 100, to determine the amount of the additive allowable in human diets. But with food irradiation the "additive" is the food itself, and no animal would be able to eat the quantity of irradiated food required to find the no-effect level. Or, if the animal were fed one kind of irradiated food out of proportion to its normal intake of that food, the study might produce ill effects caused not by irradiation but by the test diet's nutritional imbalance. Scientists have tried to get around these limitations by defining the additive as RPs, which are, after all, what distinguishes irradiated food, but this approach also has drawbacks: RPs exist in such low concentrations that the needed excess cannot be supplied, and in any event many RPs have not even been identified. For all these reasons toxicological testing can do no more than provide rough indicators of irradiated food's safety.

Even so, opponents claim to have found a smoking gun in a set of studies conducted by the National Institute of Nutrition in Hyderabad, India, in the early 1970s. Referring to evidence that malnutrition could increase one's vulnerability to the toxicity of drugs, scientists at NIN devised a study to test the effect of irradiated food on severely underfed children. Three groups of five children, all two- to five-year-olds suffering from a disease of malnutrition called kwashiorkor, were hospitalized and rehabilitated. One group was fed freshly irradiated wheat, one received wheat irradiated and then stored for twelve weeks, and one got nonirradiated wheat. The study's authors stated that four of the five children in the first group developed polyploidy, a chromosomal abnormality that may cause cancer, while children in the second group displayed far fewer polyploid cells, and children in the third group showed none. The authors concluded, "These observations clearly indicate that the appearance of polyploid cells is due to the feeding of irradiated wheat." They recommended storage of irradiated wheat "for periods beyond twelve weeks, before it can be considered safe for human consumption." Other NIN studies showed polyploidy or lethal mutations in animals fed irradiated wheat.

However, the studies' conclusions conflicted with the findings of similar experiments on rats and mice conducted at the Bhabha Atomic Research Center, in Bombay, and so the Indian Ministry of Health asked two independent scientists to identify reasons for the discrepancy. After examining the two sets of studies, the scientists harshly criticized the NIN studies. The number of polyploid cells found in the children fed freshly irradiated wheat "is well within the normal range of occurrence in healthy human beings," they said, whereas the number of polyploid cells found before the studies began—none—contradicted the conventional understanding that all human beings have some polyploid cells. The scientists also questioned the studies' claim that in the two children who were examined after they had stopped eating the irradiated wheat, all abnormal cells disappeared within twenty-four weeks. Such cells, the scientists said, should continue to exist for years. These and other problems led the scientists to conclude that "the bulk of the NIN data are not only mutually contradictory but also are at variance with the well established facts of biology."

The scientists' critique led the Indian government unconditionally to accept irradiated-wheat products. And other food-policy-making agencies around the world, including the FDA, dismissed the NIN studies as a product of bad science. Michael G. Simic, a research chemist at the National Institute of Standards and Technology's Center for Radiation Research and a professed independent in the food-irradiation controversy, speaks for most scientists who have worked in the field when he calls the NIN studies "discredited."

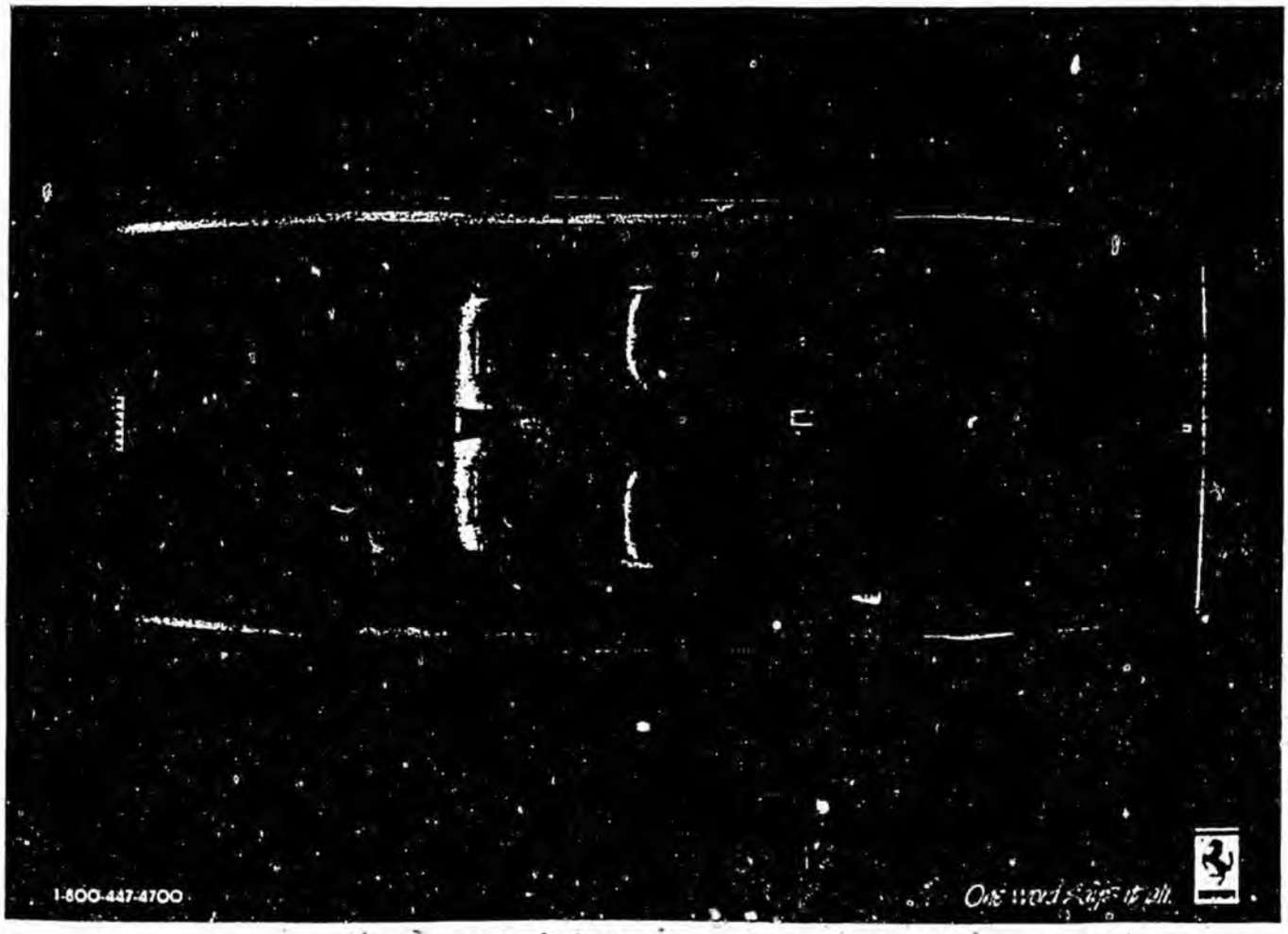
Opponents of irradiation usually respond that those who disparage the NIN studies have an overriding interest in promoting food irradiation.

Opponents also charge that processing plants using isotopes as radiation sources pose unacceptable health risks to nearby residents. Exposure to the isotopes used in irradiation can indeed be lethal. For that reason each plant's isotopes, customarily sheathed in stainless-steel capsules, are stored in a cell surrounded by cement walls five or six feet thick, which absorb radioactive energy. Products needing exposure are rolled into the cell on a conveyer belt. Workers enter the cell only when the plant is not in operation and the isotopes have been mechanically lowered into a pool of water inside the cell.

Food-irradiation opponents say that the safety record of the roughly forty American irradiation plants makes a "hall of shame," and an information manual published by the National Coalition to Stop Food Irradiation (NCSFI) cites six accidents as evidence. However, none of the accidents is known to have caused harm to anyone outside the plant. In addition, although four of the incidents involved leaks of isotopes into the shielding pools, in each case the leaking capsules had been built using a technology no longer in use (although some of the old-style capsules are still in use). The leading current supplier of capsules, Nordion International, formerly a subsidiary of Atomic Energy of Canada, has built 25,000 capsules and delivered them around the world without experiencing a single leak.

Furthermore, if the fondest dreams of some proponents are realized, the dangers posed by isotopes will be eliminated. These proponents envision a time when linear accelerators will replace isotopes as energy sources for food irradiation; indeed, accelerators have already supplanted isotopes as sources for medical therapy units, and are used commercially in many other kinds of radiation processing. Instead of emitting radiation in all directions, accelerators generate high-intensity beams of radiation that can be as narrow as half an inch in diameter. Moreover, a flip of a switch starts or stops generation of the beam. That means that so long as accelerators are not running, they present no danger; the difficulties of transporting, storing, and using isotopes are obviated. Cost is the biggest obstacle to expanding the use of accelerators, but recent technological advances may eventually make accelerators as cost-effective as isotopes.

THE MOST SPECTACULAR charge by critics of irradiation, recently weakened by the improvement in Soviet-American relations, is that the U.S. Department of Energy has promoted food irradiation as part of a convoluted strategy to increase the production of plutonium, thereby furthering weapons production. Mosgofian, the NCSFI's former director, went so far as to call food irradiation "the engine to drive a crucial component of the arms race." Opponents cite the DOE's role as administrator of a program, launched in 1985, to build six demonstration irradiation plants, at a



cost of about $32 million. Whereas most irradiation plants around the world use cobalt-60, supplied by Nordion International, as their isotope source, government planners originally hoped to use cesium-137 in the demonstration plants. Unlike cobalt-60, cesium-137 is an incidental by-product of nuclear-weapons manufacture; it is also more dangerous and less suitable for irradiation than cobalt-60.

One reason the planners were in favor of cesium is that they wished to put to use the relatively small amount that had been kept in underwater cooling tanks at Washington State's Hanford Nuclear Reservation while awaiting storage in a permanent geological repository. But opponents suspected an ulterior motive: if the demonstration plants showed that cesium was useful in food irradiation, private plant operators might demand access to another, much larger source of cesium—the spent fuel from commercial nuclear reactors. Spent fuel also contains an abundant amount of plutonium; reprocessing of the fuel, which would be necessary to extract the cesium, would be the first step toward recovering the plutonium for military use. A 1986 NCSFI publication states, "The separation processing of cesium will allow for the reprocessing of plutonium for the new generation of 17,000 warheads the Reagan Administration has requested within the next 6-7 years."

Advocates point out that the 1982 Hart-Simpson amendment to the Nuclear Regulatory Commission's budget authorization bars using spent commercial fuel for military purposes, and that the DOE has shown no interest in repealing the amendment. The requisite reprocessing plants do not even exist in this country, and are not likely to for many years, if ever. In addition, the impetus for the six demonstration irradiation plants came not from the DOE, which was lukewarm toward the idea, but from Congress, where irradiation advocates regularly wrote money for the program into administration budgets. Finally, none of the planned demonstration plants specified any intention to use cesium as an energy source, and after funding constraints caused the program to be cut back, the two plants that survived chose a source other than cesium. This seems a peculiar way to operate a program intended to create a demand for cesium. Although the cesium argument is without merit, it has nonetheless complicated the proponents' public-relations chore. George Giddings, an irradiation-technology consultant, correctly calls the argument "the single most inflammatory aspect of the food irradiation debate." He says, "It has fueled the controversy far beyond its significance."

The two sides are now at an impasse. On the one hand, advocates have held sway at the federal level, as the FDA's poultry rule indicates. Legislation introduced in Congress three years ago to roll back FDA food-irradiation permits and ban the import and export of irradiated food for two years never reached the floor, and enactment in the future is extremely unlikely. On the other hand, opponents have had some triumphs at the state and local levels. They have won two-year moratoriums on sales and processing of irradiated foods in New York and New Jersey, and they have obtained a permanent ban in Maine. Before the DOE's food-irradiation program was cut from six to two plants, they also blocked construction of two of the proposed facilities, first in California and later in Alaska, and they have prevented private irradiation companies from building plants in several cities. Most important, the opponents' success in depicting food irradiation as dangerous is likely to deter food companies for at least the next several years from the risk of alienating consumers by embracing the process.

Even without the pressure from opponents, food irradiation's development would probably be slow, because of uncertainties about the efficiency of the process. DOE planners hope that their demonstration plants, both of which will use accelerators as energy sources, will resolve some of those questions. In the meantime, food-company executives seem prepared to wait. Merle Eiss, the technical-systems manager at McCormick & Company, the only food manufacturer in the country that has acknowledged using food irradiation even sparingly, says, "Consumers react very slowly to any technological change [related to food]. People thought canned food was poison, and fifty years passed before anybody would eat it. Some people around the country still don't like to drink pasteurized milk."

—Jacques Leslie

"The Packaging of A Fragrance"

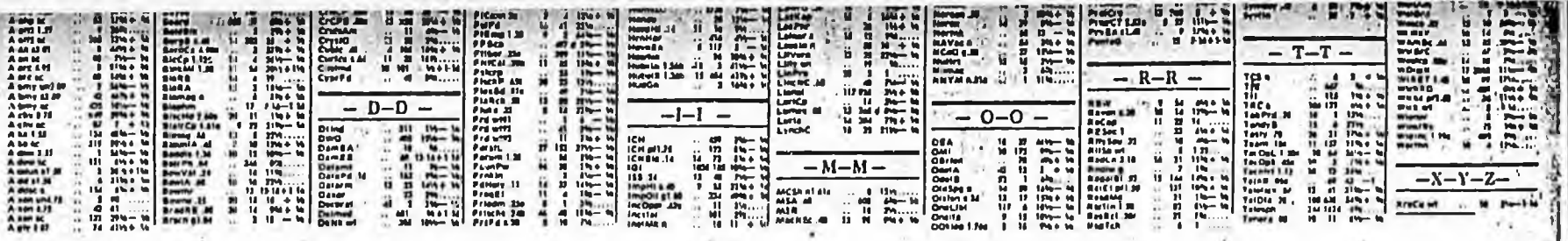
To create a truly successful fragrance for today's sophisticated woman, it is essential to her sense of style to both stimulate her emotions and create a distinct image in her mind. Just as the scent of an individual fragrance is a highly personal sensory experience, so too is the packaging that enhances it.

Throughout history the creators of perfume bottles have been inspired by the materials and designs of the times in which they lived. Ancient Egyptians fashioned the very first fragrance bottles out of terra-cotta, often in sphinx-like shapes. The 13th century Venetians crafted glass flacons for their scents. And in the 18th century, called by many "the great age of perfumery," French artists designed precious bottles of porcelain, gold and enamel.

When I sat down to create the bottle for my new "Cassini" fragrance, I was inspired by these masters of the art–as well as by my Russian heritage. When you look at the highly individualistic bottle that houses "Cassini" you see an original glass sculpture with an Asiatic feeling that is tempered by my Western background. Very sensual, but also very subtle.

It is a bottle that promises to become a classic: heavy, crystal-like glass, crowned by an amethyst stopper set on a 22-karat gold collar. A bottle that perfectly complements the fragrance it holds. Something that any man would want to give the woman in his life; that any woman would want to grace her dressing table. Remember, a woman without a perfume is a woman without a past.

Oleg Cassini



White House would not fight resignation of S&L bailout boss

By DAVE SKIDMORE
The Associated Press

WASHINGTON — The White House said Tuesday it would not resist the resignation of savings and loan bailout boss L. William Seidman, raising strong protests from the regulator's supporters in Congress.

Seidman, 69, is chairman of the Federal Deposit Insurance Corp., which guarantees bank and S&L deposits, and of the Resolution Trust Corp., the agency charged with disposing of failed thrifts.

He was appointed by President Reagan in 1985. His term expires in October 1991.

Presidential spokesman Marlin Fitzwater said, "Bill has indicated he's not going to stay the whole term, and we are interested in getting new leadership there that would carry on an aggressive program when the time comes."

However, Fitzwater denied a report in The Washington Post that Bush suggested in a meeting with the regulator two weeks ago that this would be a good time for Seidman to leave. The newspaper quoted two unidentified administration sources.

"The president has not asked him to leave or suggested a specific departure," the spokesman said.

Seidman has made no secret of his desire to leave before the end of his term. Despite periodic feuding with White House Chief of Staff John Sununu and Deputy Treasury Secretary John Robson, however, he had given no indication his departure was imminent.

Although he has riled administrations with his willingness to hold an independent line, Seidman gets high marks on Capitol Hill for steering the FDIC through the unprecedented failure of more than 800 banks during his term and for his candor about the thrift industry's problems.

In a letter circulated by Rep. Charles Schumer, D-N.Y. and a member of the Banking Committee, House Democrats called on Bush to urge Seidman to stay and warned that his departure would paralyze the administration's bailout effort.

"It is intolerable that Chairman Seidman's early departure may be the result of his frustration with the internal bickering, bureaucratic interference, and turf battles that have marked the first nine months of the thrift bailout effort," the letter read.

Sen. Donald W. Riegle Jr., chairman of the Senate Banking Committee, said, "It's my hope that Bill Seidman will remain at the FDIC and finish his term. It's a crucial assignment and Bill has the experience and independence the country needs at this time."

Seidman, reached by telephone from his hometown of Grand Rapids, Mich., where he was accepting a business award, declined to comment on the story.


L. William Seidman

ADN
5/2/90

Government approves use of radiation to control bacteria on poultry

May 1, 1990

By DEBORAH MESCE
The Associated Press

WASHINGTON — The Food and Drug Administration on Tuesday approved irradiation of poultry to control salmonella and other bacteria that cause food-borne illnesses. But the industry said it had no plans to use the procedure.

The FDA said irradiation is safe and effective in eliminating most bacteria in chicken, turkey and other fresh and frozen birds, making poultry safe for longer periods under refrigeration.

Poultry companies, however, said they do not plan to use the technology because of consumer opposition and because "the consumer can achieve the same thing by cooking the chicken," said Stephen Pretanik, science director at the National Broiler Council, which represents the commercial broiler chicken industry.

"There does not appear to be wide consumer acceptance for any food irradiation," he said.

Although cooking chicken thoroughly kills illness-causing bacteria, "a lot of the sickness coming from chicken is coming from cross-contamination" when raw poultry comes in contact with other food, said George Pauli, consumer safety officer at FDA.

Irradiation of food was first approved in 1963, when the FDA allowed its use to control insects in wheat and wheat flour. Later, the FDA approved its use to control insects, spoilage and parasites in other grains, fruits, vegetables, spices and pork.

Irradiation of poultry is the first approved use aimed at controlling bacteria in food that cause illness in humans.

So far, the process has been used infrequently because of consumer opposition, food industry officials said. When foods are irradiated, they must be labeled that have been treated that way.

The FDA on Tuesday emphasized that "the process does not make the food radioactive and, as a result, does not expose consumers to radiation."

But Michael Colby, director of Food and Water Inc., a grou that researches food safety and environmental issues, said the FDA's action was "an outrage to consumers and to anyone who cares about safe food products."

AK Marine Resources Quarterly
Fall, 1988

WHOLESOMENESS OF IRRADIATED FOODS

by

Ruthann B. Swanson
Assistant Professor
of Food Science
University of Alaska Fairbanks

Irradiated foods. Are they safe or not? Some Alaskans have expressed concern about the possibility of induced radioactivity, toxicological effects, and changes in nutritional quality.

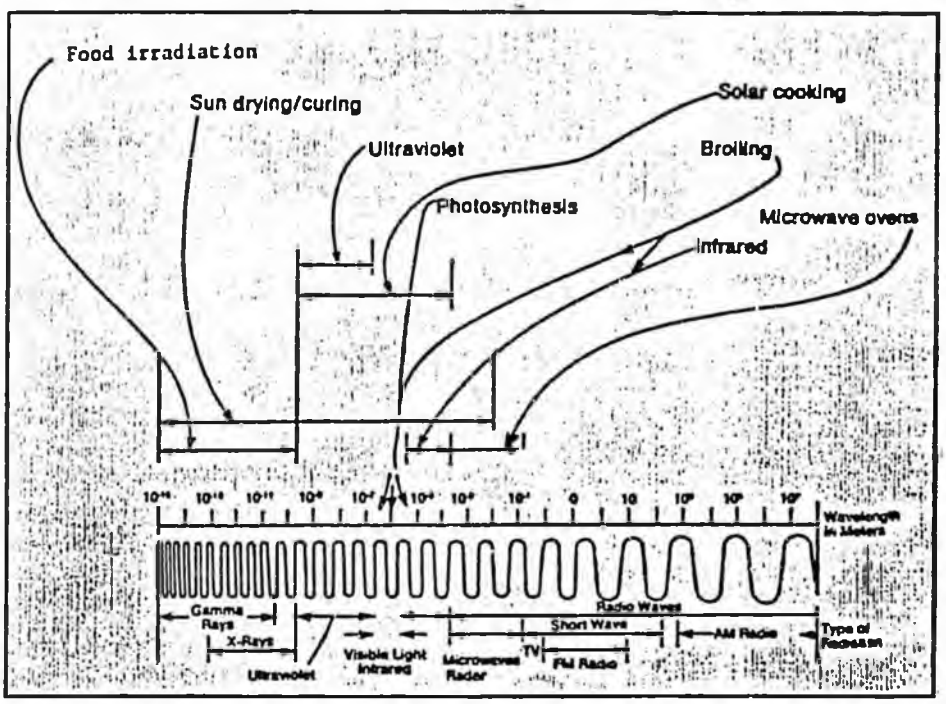
Irradiated foods are considered safe if no significant toxic effects or radioactivity are produced by processing, nutritional quality is not significantly decreased when the food is compared to fresh product or the same product processed using traditional methods, and harmful microorganisms and microbial toxins are not present.

Electromagnetic Energy and the Irradiation Process

Irradiated food products are exposed to an ionizing radiation source for a short time. Ionizing radiation (gamma rays, X-rays, and high-energy electrons) is just one form of electromagnetic energy. Other common forms of energy, such as infrared, microwave, and ultraviolet radiations, are also part of the electromagnetic spectrum (see figure).

If you have consumed an apple or some other food that has passed through an airport security station, you have consumed a food exposed to ionizing radiation. Sun-dried foods also have been exposed to ionizing as well as infrared and microwave irradiation (see figure). Just as these foods are not radioactive, neither are irradiated foods.

Irradiation extends the refrigerated shelf life of fishery products by reducing levels of spoilage microorganisms present. Irradiation also reduces pathogenic microorganisms that may cause illness. Because the temperature of the product is increased only a few degrees, the appearance, flavor, and texture of the fresh unprocessed product are retained. At the low-dose levels suggested for commercial application, the foods are not sterilized. Irradiation at suggested commercial levels reduces the initial microbial load, but it does not totally eliminate it (Giddings, 1984).



Food processing and cooking using electromagnetic energy.

Microbiological Safety

A major concern regarding the use of irradiation on seafood products is the selective killing of spoilage bacteria while dangerous toxin-producing bacteria survive. *Pseudomonas*, the most common spoilage bacterium, is easily killed by irradiation. However, *Clostridium botulinum*, the bacterium responsible for botulism, is not. Because botulinum bacteria do not produce putrid odors in foods, consumers must rely on spoilage bacteria to indicate the fishery product is unsafe. This potential risk is of particular importance in Alaska. Handling and processing techniques used for fish harvested in Alaskan waters must assume contamination because botulinum type E is widely distributed in our waters.

Although spoilage bacteria, e.g., *Achromobacter*, *Micrococus*, and *Pseudomonas*, are reduced during irradiation, spoilage does occur prior to production of the deadly botulinum toxin. Botulinum spores are injured at the low temperatures suggested for irradiation processing and these are less likely to germinate and produce toxin than are uninjured spores (Rowley *et al.*, 1983).

Radiolytic Products and Toxicological Safety

Fewer chemical changes occur during the irradiation process than during more traditional processing or simply during cooking. No more than a few chemical bonds per million may be broken. This breakage causes free radicals to form just as they are formed during the baking of bread. The free radicals quickly combine with themselves or with other food components to form stable compounds in the presence of moisture. The compounds formed during the irradiation process are called radiolytic products. Despite

the special name, almost all have been identified in the same or other foods that have not been irradiated.

Opponents of food irradiation contend that there is the possibility that radiolytic products are mutagenic (alter the genes or chromosomes) or carcinogenic (cause cancer) and that only "one single carcinogenic insult is needed to produce a malignant tumor" (NCSFI, n.d.). Advocates dispute this view, listing mutagens and carcinogens already consumed by Americans, including those in fresh, nonprocessed foods.

In a classic study (Hall, 1977), natural ingredients of foods served at a multicourse luncheon were tested for toxicity using the same criteria used for man-made substances. From a menu including carrots, radishes, onions, olives, ham, shrimp Newburg, potatoes, broccoli, watercress, parsley, rolls, avocado, cheese, bananas, milk, wine, tea, coffee, and water, only a hearts of palm salad was without adverse health effects! Although potential mutagens and carcinogens occur naturally in common foods such as potatoes and in less traditional foods such as herbal teas (Ames, 1983), many others are formed when the food is cooked. Carcinogens are formed simply by broiling or frying red meats or seafoods (Wishnok, 1984).

Nutritional Quality

Fish is an excellent source of protein and unsaturated fat, and a relatively good source of some vitamins and minerals. Under today's processing conditions, low-dose ionizing energy has little effect on the overall nutritive value of the food. Even at irradiation doses up to 10 times higher than those suggested for use with fish, the biological value of the proteins is not impaired. Fats are relatively stable and the nutritional quality of potassium, calcium, iron, and zinc is not affected. Vitamins such as riboflavin, niacin, folacin, and biotin are very stable. Levels of others may be reduced but not any more so than by other commercial processing techniques.

Adverse Findings

An Indian study in which malnourished children were fed freshly irradiated wheat is frequently cited by opponents as "the only study done on humans" (NCSFI, n.d.). In fact, numerous human feeding studies have been conducted, including several in the United States (Brynjolfsson, 1978). In recent human studies, 439 Chinese volunteers consumed irradiated foods. No evidence of adverse effects was found (Brynjolfsson, 1987).

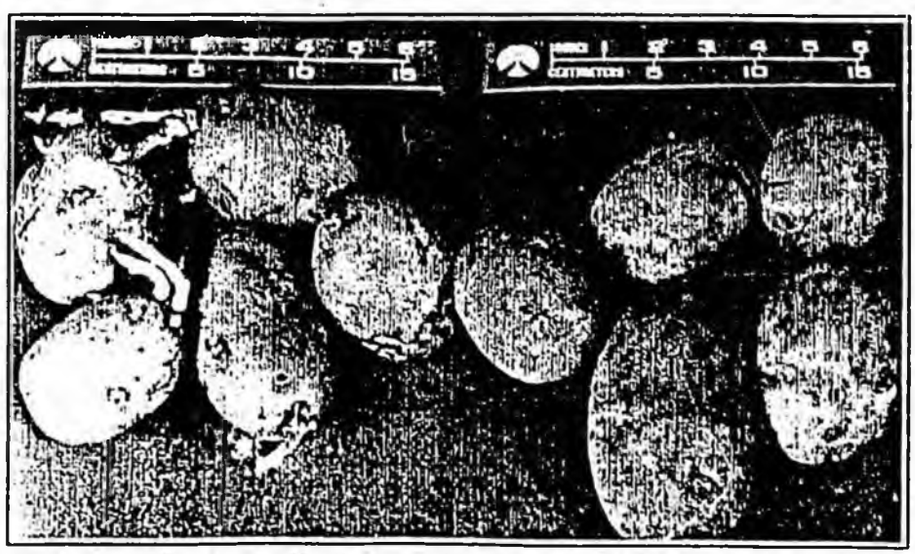
In the Indian study previously mentioned four of five malnourished children were reported to develop a chromosome abnormality known as polyploidy. In fact, most people, whether they are malnourished or not, exhibit low levels of polyploidy. In the Chinese studies, the incidence of polyploidy was actually reported to decrease when irradiated foods were consumed. In all of these studies, the "changes" observed were within the experimental error, indicating the effects were not significant.

An early review (1979) of the irradiation process was completed in Hungary by Dr. Joseph Barna. Opponents of the food irradiation process frequently cite this review as evidence that the process is unsafe (NCSFI, n.d.). In fact, Dr. Barna concluded that "neither stimulative nor adverse effects of the consumption of irradiated food are consistent, unambiguous and reproducible. Neither can specific effects be related to a given food, group, or level of radiation dose." He further emphasized the uncertainties of the evaluation, especially of the early work.

Since this review was completed and following subsequent research, the Hungarian government has given unconditional approval for using irradiation to decontaminate spices and to inhibit the sprouting of onions. Approval has also been granted to test market numerous other irradiated food products (FAO/IAEA, 1988).

Recent Reviews

Several reviews of the safety of the irradiation process have been completed in the past several years by interdisciplinary task forces. In an independent review requested by Congress, American scientists



Effect of irradiation on conventionally processed supermarket potatoes after one-month storage at room temperature: irradiated potatoes have not sprouted.

concluded that the process was safe and that nutritional adequacy compared favorably with fresh products or foods processed by traditional methods (CAST, 1986). A British task force reported similar conclusions (ACINF, 1986) as did a review by the United Nations World Health Organization (WHO, 1981). During the 1985 U.S. congressional hearings on food irradiation, the American Medical Association (AMA, 1985) testified that the process was safe and had the potential to improve public health.

References

ACINF. 1986. Report on the safety and wholesomeness of irradiated foods. Her Majesty's Stationary Office, London.

AMA. 1985. Statement of the American Medical Association to the Subcommittee on Department Operations, Research and Foreign Agriculture, Committee on Agriculture, United States House of Representatives on H.R. 696, the Federal Food Irradiation Development and Control Act of 1985. Presented by A. H. Lubin, M.D., AMA, Chicago.

Ames, B. N. 1983. Dietary carcinogens and anticarcinogens. *Science* 221:1256.

Barna, J. 1979. Compilation of bioassay data on the wholesomeness of irradiated food items. *Acta Alimentaria* 8(3):205.

Brynjolfsson, A. 1978. The high dose and low dose food irradiation programmes in the United States of America. *Food Preservation by Irradiation* 1:15. IAEA STI/PUB/470. IAEA, Vienna.

Brynjolfsson, A. 1987. Results of feeding trials of irradiated diets in human volunteers: Summary of the Chinese studies reported at the FAO/IAEA seminar for Asia and the Pacific on the practical application of food irradiation. *Food Irradiation Newsletter* 11(1):33.

CAST. 1986. Ionizing energy in food processing and pest control: I. Wholesomeness of food treated with ionizing energy. Report No. 109. Council for Agricultural Science and Technology, Ames, Iowa.

FAO/IAEA. 1988. List of clearances. *Food Irradiation Newsletter* 12(1): supplement.

Giddings, G. G. 1984. Radiation processing of fishery products. *Food Technology* 38:61.

Hall, R. 1977. Safe at the plate. *Nutrition Today* 12:1.

Josephson, E. S., M. H. Thomas, and W. K. Calhoun. 1978. Nutritional aspects of food irradiation: An overview. *Journal of Food Processing and Preservation* 2:299.

NCSFI. n.d. Food irradiation: A health hazard. National Coalition to Stop Food Irradiation, San Francisco, California.

Rowley, D. B., R. Firstenberg-Eden and G.E. Shattuck. 1983. Radiation-injured *Clostridium botulinum* type E spores: Outgrowth and repair. *Journal of Food Science* 48:1829.

WHO. 1981. Wholesomeness of irradiated food. World Health Organization Technical Report Series 659. Geneva.

Wishnok, J. S. 1984. The mutagens that cooking produces. *Chemtech* (June):348.

BASIC CONCERNS ABOUT FOOD IRRADIATION

by

Farid E. Ahmed, Ph.D.*

Senior Program Officer
Food and Nutrition Board
Institute of Medicine
National Academy of Sciences
Washington, D.C. 20418

Background

In recent years, the food processing industry in the United States has been looking increasingly to irradiation as an alternative to the use of chemicals in the post-harvest treatment of food (AIF, 1986). This interest was heightened when the U.S. Environmental Protection Agency intended to ban the use of the fumigant ethylene dibromide for post-harvest treatment of grains and fruits in 1984 (Federal Register, 1984). Another consideration for the interest in food irradiation is the concern over economic losses due to food-borne diseases. It has been estimated that 24 to 80 million cases of food-borne diarrheal diseases go unreported every year, costing yearly between 5 and 17 billion dollars in economic losses (Archer and Kvenberg, 1985).

On April 18, 1986, the Food and Drug Administration (FDA) published its final rule making it legal, for the first time, to irradiate fresh fruits and vegetables. The purpose was to extend shelf life and provide pest disinfection with low-dose radiation (up to 100 kilorads), and it raised the dose level for microbial disinfection of herbs and spices from 1,000 to 3,000 kilorads without having to seek prior, individual, product-by-product approval (Federal Register, 1986). The rule also incorporated previous approval for irradiation of other food products such as pork for trichinosis control, white potatoes for sprout inhibition, and wheat and wheat products for insect disinfection.

The U.S. Department of Agriculture Food Safety and Inspection Service reaffirmed on December 5, 1986, its clearance of pork irradiation and petitioned the FDA to allow the irradiation of poultry products to control *Salmonella*. This petition was published in the Federal Register in February 1987, and in March 1987 the FDA published a similar petition from Radiation Technology, Inc., requesting irradiation treatment of poultry to control *Salmonella* (AIF, 1987).

On January 5, 1987, the U.S. Department of Agriculture Animal and Plant Health Inspection Service

*The views expressed therein do not necessarily represent the views of the NRC, IOM, NAE, or any of their constituent units.

BOARD OF DIRECTORS:

Karl Becker
fisherman

Talyne Belka
program coordinator

Rene Christoffersen
cartographer

Ed Davis, M.B.A.
mechanical engineer

Randall Holmes
musician

Dolly Howell Krone
retired social worker

Judith MacDonald, M.A.
psychology counselor

Pamela Miller, M.E.S.
biologist

Shelia Riley
minority student services assistant

Annette K. Steiner, M.S.
psychology counselor

David Yesner, Ph.D.
anthropology professor

ADVISORY BOARD:

William A. Barnes, M.B.A.
businessman

John Havelock, Esq.
attorney

Stephen Haycox, Ph.D.
history professor

Rev. Richard K. Heacock, Jr.
retired minister

Diddy Hitchins, Ph.D.
political science professor

Joyce Honeychurch, Ph.D.
education professor

Rep. Niilo Koponen
Alaska state legislator

Donna Mack
businesswoman

David Maas, Ph.D.
political science professor

Kenneth O'Reilly, Ph.D.
history professor

Libby Roderick
singer/songwriter

Dalee Sambo
Native rights activist

Elaine Schroeder, Ph.D.
psychotherapist

Lidia Selkregg, Ph.D.
retired geology professor

Lawrence D. Weiss, Ph.D.
sociology professor

DIRECTOR:

Christopher Toal

sane/alaska

Working For Peace, Justice and Global Security

An affiliate of SANE/FREEZE: Campaign for Global Security

April 5, 1991

RECEIVED
APR - 8 P.M.

Rep. Georgianna Lincoln
Co-Chair, House Health, Education
& Social Services Committee
Alaska State Legislature
P.O. Box V
Juneau, AK 99801

Dear Rep. Lincoln,

Your committee will soon consider HB-35, a bill sponsored by Rep. Randy Phillips which would ban the sale of radiation exposed food in Alaska, with certain exceptions. Our group strongly supports HB-35. Enclosed is a packet of information and a videotape on radiation exposed food produced by the British Broadcasting Company. The videotape is especially recommended as a good overview of the entire food irradiation issue.

Over the past four years, many of our 1,000 members have expressed grave concerns about radiation exposed food due to health and safety reasons. These concerns are addressed in the enclosed scientific articles and other material. For these same health and safety reasons, radiation exposed food has already been banned or restricted in three states and in several countries. Rep. Phillips' bill passed by a large margin in the House during the past two legislative sessions.

This issue may be of particular concern to you and your constituents because food irradiation has been proposed as a "solution" to the shelf life and preservation problems of much of the food being shipped to the Bush.

We hope that you will give Rep. Phillips' bill careful consideration and would appreciate knowing your position on this issue. I plan to be in Juneau lobbying during the week of April 21 and look forward to meeting with you then.

Sincerely,

Christopher Toal

Christopher Toal

Enclosures.

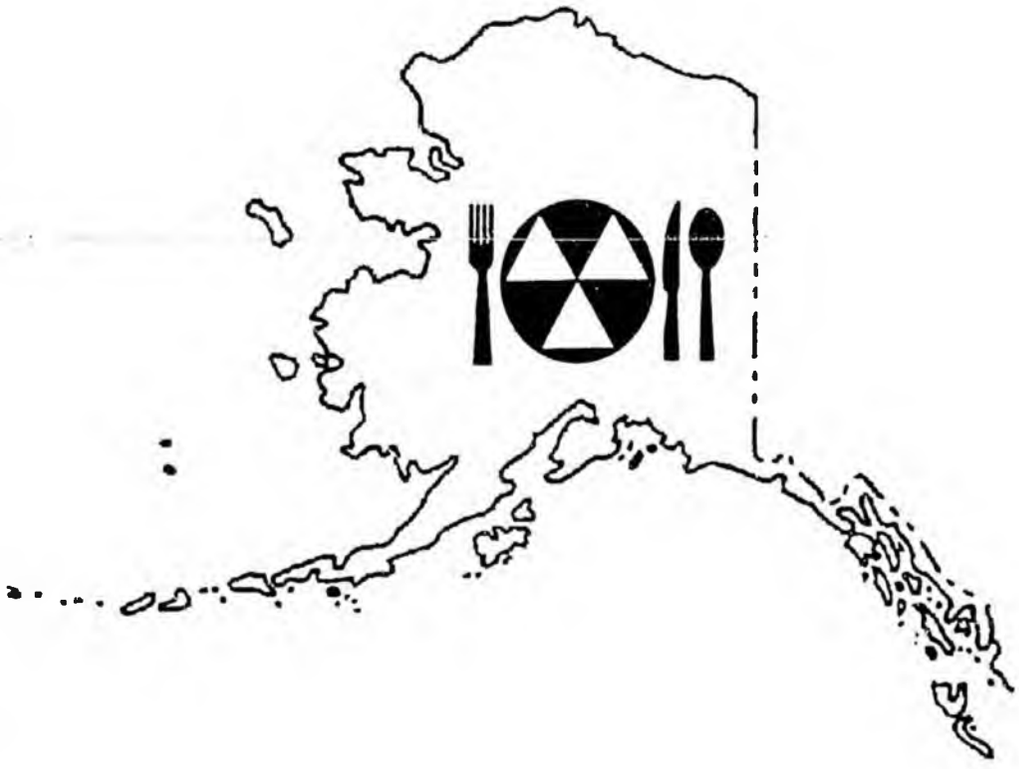
Mailing address: 3605 Arctic Blvd., #1717, Anchorage, AK 99503 Phone: (907) 272-0621

Responding to Food Irradiation

Questions and Answers About Radiation Exposed Food and Why its Sale Should be Banned in Alaska

Prepared by SANE/Alaska
(an Alaskan non-profit educational organization)

3605 Arctic Blvd., #1717
Anchorage, AK 99503
907-272-0621



Responding to Food Irradiation

Questions and Answers About Radiation Exposed Food and Why its Sale Should be Banned in Alaska

Introduction

This information packet was prepared by SANE/Alaska, a nonprofit Alaskan educational organization. It contains information gathered by an informal coalition of Alaskan groups formed to address the issue of radiation exposed foods in our state.

Coalition participants have included SANE/ Alaska, United Fishermen of Alaska, Alaskans Concerned About Food Irradiation, Public Awareness Committee for the Environment and the Alaska Public Interest Research Group (AKPIRG).

Questions about this material should be directed to Christopher Toal, 272-0621.

Question 1: Proponents of radiation exposed food contend that "alarmist rhetoric from anti-nuclear activists" is the only barrier to public acceptance of radiation exposed food. Why should the Alaska State Legislature respond to "ill-informed anti-nuclear activism" by passing HB-35?

"Alarmist rhetoric" has nothing to do with the justification for banning radiation exposed food in Alaska. Name calling, allusions to Jane Fonda and conspiracy theories about anti-nuclear activists may play well to the media and those on the extreme right, but this approach evades the key issues about radiation exposed food.

It wasn't "alarmist rhetoric" that convinced the Republican and Democratic legislators and governors of Maine, New Jersey, and New York to ban the sale of radiation exposed food in their states. It was testimony from scientists and health professionals, a careful examination of the facts and a full-blown public debate.

A similar debate took place twice in the Alaska House of Representatives. Both times the House voted overwhelmingly to ban the sale of irradiated food.

Rep. Randy Phillips decided to introduce legislation banning the sale of irradiated food in Alaska after he was contacted by physicians and his constituent. They presented Rep. Phillips with scientific evidence which led him to question the safety of radiation exposed food. Only after he had introduced the bill did his office request information and support for the bill from public interest groups like SANE/ Alaska.

The Alaska State Legislature should pass HB-35 to protect the seafood markets of its fishing industry and the safety of the food supply for its residents.

Question 2: Advocates for the proposed Department of Energy food irradiator in Kodiak (canceled by Gov. Steve Cowper in 1989) argued that irradiating seafood could extend its shelf life and expand its markets. Shouldn't we encourage this?

The DOE sponsored feasibility study conducted at the University of Alaska-Fairbanks claimed that irradiation could expand the markets for Alaskan seafood.[1] But Alaska's seafood industry does not concur according to research conducted by Governor Steve Cowper. In announcing his cancellation of the state's participation in the DOE project in 1989, he characterized fishing industry opposition to irradiation exposed food as "virtually unanimous."[2]

The Alaska Seafood Marketing Institute

spends millions of dollars each year for a nationwide marketing campaign that focuses on Alaska's "pure and pristine image."[3]

This is the latest phase of a multi-million dollar marketing and quality control program to rebuild the image of Alaska's seafood. An incidence of botulism poisoning severely hurt the industry in 1982.

The seafood industry is concerned that the presence of a seafood irradiator in Alaska will damage the public image of, and threaten the markets for all Alaskan seafood whether it is irradiated or not.[4] Irradiation is inconsistent with the "pure and pristine image" which is used to sell Alaskan seafood. The apple industry's experience with the pesticide Alar demonstrates that consumers are not willing to buy foods of questionable safety.

Several credible public opinion polls have shown that consumers do not trust radiation exposed food. For instance, a poll conducted by Lou Harris for the Food Marketing Institute reported that only 13% of American shoppers think irradiated foods are safe.[5]

Many of the important markets for Alaskan seafood including Japan, Great Britain, the Scandinavian countries, West Germany, New Zealand, and some states have either banned the sale of irradiated food for public consumption, or halted further applications of irradiated food due to consumer opposition.[6]

Question 3: Since Gov. Cowper rejected the DOE's proposed demonstration irradiator, is a ban on the sale of irradiated food still needed?

Dr. Martin Welt is sometimes referred to as the "father of the irradiation industry in America." He was recently released from prison after serving a two year term for fraud and conspiracy due to 32 safety violations at his company, Radiation Technology, Inc. (the largest case of worker radiation overexposure in U.S. history). While in prison, Dr. Welt spent his time putting together a formal petition to the FDA to approve the irradiation of seafood.

Of the four states which rejected DOE food irradiators (i.e. Alaska, Florida, Hawaii, and Washington), construction plans for irradiators have already been announced by private industry in Florida and Hawaii.[7] Plans have also been announced to build an irradiator for imported Mexican seafood in Nogales, Arizona.[8]

During the last legislative session, the largest irradiation firm in the U.S. (Isomedix, Inc.) started lobbying the Alaska State Senate just two weeks after the State House passed a radiation exposed food ban (HB-25) by a vote of 31 to 4. Isomedix, Inc. was asking that HB-25 be defeated.[9]

Governor Cowper's rejection of DOE sponsored seafood irradiator in Kodiak did nothing to physically prevent private enterprise from building a seafood irradiator there. It's only a matter of time till seafood is approved by the FDA for irradiation. Alaska needs a radiation exposed food ban now more than ever if our consumers and seafood markets are to be protected.

Question 4: The proponents of irradiation exposed food say that the groups that have "approved" the process include the U.S. Food and Drug Administration (FDA) and the American Medical Association (AMA). Doesn't this demonstrate that irradiation exposed food is safe?

Contrary to the repeated claims of food irradiation proponents, the American Medical Association has not "endorsed" irradiation exposed food! The AMA's House of Delegates simply passed a resolution supporting the classification of food irradiation as a "process" rather than a additive. This is hardly an endorsement. To claim that it is grossly distorts the truth.

The criteria used by the FDA to prove

safety are not reassuring from scientific, legal, or statistical viewpoints. The FDA's approval is based on a theoretical model and an evaluation of 441 toxicity studies on the effects of irradiated food.[10] Out of these 441 studies the FDA selected only five animal feeding studies as a basis for its approval of irradiation exposed food.

When the FDA's five studies were reviewed by Dr. Donald B. Louria and his colleagues at the Department of Preventive Medicine and Community Health of the New Jersey Medical School, two were found to be methodologically flawed, either by poor statistical analysis or because negative data were disregarded.[11]

One of the two studies also suggested that radiation exposed food could also have adverse effects on older animals. In a third FDA-cited study, animals fed a diet of radiation exposed food experienced weight loss and miscarriages, almost certainly due to irradiation-induced vitamin E dietary deficiency.

Thus, according to Dr. Louria, three of the FDA's studies do not document the safety of radiation exposed food at all. The other two studies appear to be methodologically sound, he says, but the foods used in the studies were irradiated at doses below the FDA-approved level of 100,000 rad. Therefore, they cannot be used to justify the irradiation of foods at levels currently approved. Now, the agency is considering adopting 300,000 rad as the general dosage level, but has not even requested new studies.

Additionally, neither the FDA's tests nor the model it used adhered to the traditional procedures and legal criteria for an FDA approval. Highly concentrated levels of food additives are normally fed to test animals as part of the FDA's approval process. This testing procedure for irradiated foods has not been utilized by the FDA.

Without concentrating possible carcinogens, animal feeding studies can, at best, only verify that less than one in ten, or perhaps one in a hundred animals will develop cancer. This is far from the safety level normally used by the FDA which typically requires less than one cancer incidence in a million, or even ten million cases. Further research is clearly required before Alaskans are subjected to radiation exposed foods.[12]

It is for reasons such as those outlined above that Rep. Leon Panetta (D-Calif), Chair of the House Select Committee on Hunger, has co-sponsored a bill that would withdraw the FDA's approval of radiation exposed food.

Question 5: Is there any credible evidence indicating that radiation exposed food is dangerous?

Yes. Dr. Richard Piccioni, who has a Ph.D in biophysics, is an expert on radiation exposed food. Dr. Piccione has conducted a thorough review of the scientific literature on radiation exposed food. His research review was published in the peer-reviewed scientific journal The Ecologist (1988, Vol. 18, No. 2).

Dr. Piccioni's research uncovered 40 credible scientific studies linking irradiated food with carcinogenic, mutagenic, and cytotoxic effects. These problems arise because new chemicals known as radiolytic products form when a food is exposed to ionizing radiation. The process actually causes atoms to be separated from their molecules which then form new chemicals.

Dr. Piccioni also found twelve other studies that verified the production of harmful radiolytic products in irradiated foods.[13] For example, a 1975 study by the National Institute of Nutrition (NIN) in India which fed irradiated wheat to malnourished children. This study found that a pre-cancerous chromosomal blood abnormality known as polyploidy increases when malnourished children are fed irradiated wheat. The level of polyploidy returned to normal after irradiated wheat was withdrawn from the diet.

A control group which ate non-irradiated wheat did not suffer increased levels of polyploidy. These results were reconfirmed in a 1986 study. Neither of these NIN studies have been refuted with peer-reviewed scientific research.[14]

Radiation exposed food proponents have for years, attempted to discredit these NIN studies by citing similar research conducted by the Shanghai Institutes of Radiation Medicine and Nuclear Research in the Peoples Republic of China. Until recently, this Chinese research had never been published or made available in an English translation.

When the studies were recently published, it was revealed that they confirmed the NIN studies' results. In fact, the "evidence" that irradiation proponents once used to refute the NIN studies actually expanded on the conclusions of NIN. The Chinese study found that healthy, well fed adults also experience significant increases in polyploidy levels when irradiated foods are consumed.[15]

Question 6: The World Health Organization has hailed radiation exposed food as a tool to deal with the world hunger crisis. Shouldn't we help promote this worthy goal by allowing the sale of radiation exposed food in Alaska?

The WHO is a body of the United Nations (U.N.) which is working for very worthy goals including an end to the world hunger crisis. The International Atomic Energy Agency and WHO sit on a Joint Expert Committee of the U.N., which has endorsed radiation exposed food as a tool to use in reducing food spoilage and resolving the world hunger crisis.

WHO's goals and assumptions differ dramatically from those of other experts who are working to end world hunger.

Irradiation is capital intensive and it significantly increases food prices. Commercial irradiation firms want to process high priced fancy foods like papayas, citrus, seafood, and poultry. Even after being irradiated, these foods remain perishable. They are not the kinds of foods used in famine relief efforts.

Dealing with hunger effectively requires a comprehensive plan to commit capital, technology and expertise to areas stricken by starvation and chronic, persistent hunger. The nuclear industry cannot be expected to make these kinds of commitments. Its goal is to maximize profit and (according to Congressional testimony by DOE), create a commercial demand for nuclear waste.[16]

Furthermore, every conference held or report issued om radiation exposed food by the World Health Organization has been done in conjunction with and spearheaded by the International Atomic Energy Agency, hardly an unbiased partner. No independent research on the safety of radiation exposed food has been funded or conducted by the World Health Organization.

Question 7: Proponents of radiation exposed food often present the argument that irradiated foods will be labeled and that consumers can choose not to buy them.[17] Wouldn't HB-35 pre-empt free choice for consumers who wanted to buy radiation exposed foods?

Although this might be a reasonable approach if labeling were strictly enforced, consumer choice has been and continues to be undermined. Loopholes already exist in FDA rules that allow foods containing irradiated ingredients and foods from restaurants to be sold without labeling.[18] And the FDA's attitude towards providing a real choice for consumers is not reassuring.

In 1984, the FDA proposed that no labeling be required for radiation exposed foods.[19] Since then, consumer advocates have been forced to wage vigorous campaigns to stop repeated FDA attempts to further undermine labeling requirements.

The FDA has neither the staff nor the budget

to assure that the existing labeling laws are enforced. Given the FDA's attitude about labeling, it is doubtful that consumers will be able to make an informed choice about whether to buy irradiated foods.

One purpose of government is to protect the public from unsafe products. If research indicates that radiation exposed food is hazardous, labeling will be inadequate to protect the public interest.

Question 8: Who is promoting radiation exposed food and why?

It is a documented fact that the primary advocates of radiation exposed food are the DOE and the international nuclear industry.

The food industry has reacted cautiously because of consumer opposition.[20] In fact, thousands of food wholesalers and retailers have pledged to avoid all radiation exposed foods. These include major food companies such as General Foods, Kraft, Quaker Oats, Campbell Soup Co., Kelloggs, Coca Cola, Pepsico, Borden Foods, McDonald's, Taco Bell, Pizza Hut, and Kentucky Fried Chicken.

One of the underlying reasons for promoting radiation exposed food is evident in the DOE's testimony at Congressional hearings on the By-products Utilization Program (renamed the Advanced Radiation Technology Program.) The DOE stated that its goal is:

"to transfer cesium 137 irradiation technology to the commercial sector as rapidly and successfully as possible. The measure of success will be the degree to which this technology is implemented industrially and the subsequent demand created for cesium 137." [21]

Cesium 137 is the most troublesome component in nuclear waste. It comprises just 3% of the volume, but it emits 50% of the heat and 55% of the radioactivity in nuclear waste.[22]

The nuclear power and weapons industry has been crippled by nuclear accidents, prohibitive costs, and the lack of a solution for safely disposing of nuclear wastes. If a fully developed radiation exposed food industry creates a "socially redeeming" use for nuclear wastes, the nuclear industry could actually sell its nuclear waste, saving it hundreds of millions of dollars.

Our consumers and fishermen have better things to worry about than protecting their markets from such schemes.

Question 9: The DOE demonstration irradiator proposed for Kodiak would have utilized X-ray and electron beam technology, not cesium 137. Isn't this a safe and economical technology?

Beam technology irradiators destroy vitamins and minerals and produce the same radiolytic products in food as cesium or cobalt irradiators. This means that the same public health concerns that plague nuclear waste irradiators also apply to beam irradiators.

Additionally, the threat of worker exposure to high levels of ionizing radiation in an electron beam or X-ray irradiation facility is significant. The commercial irradiation industry has a deplorable worker safety record to date. There's ample reason to conclude that Alaskan workers would be similarly at risk in a beam technology facility.

Capital costs for electron beam/X-ray facilities exceed by a factor of at least two the costs for facilities using cesium 137.[23] The DOE's proposal to use an electron beam/X-ray ionizing radiation source in Alaska was more palatable because it did not use by-products of nuclear waste. However, its proposal was not economically justified.

Little incentive exists for implementing DOE's proposal. A private investor who develops a commercial food irradiator must maximize return on the investment. DOE's beam technology proposal was not realistic

because it was made possible solely by the availability of government research funding.

Irradiation critics believe the purpose of DOE's promotion of beam technology is to get a "foot in the door" for the irradiation industry. Once established, the industry would convert to the more economical cesium irradiators.

Question 10: Has the irradiation industry been a good neighbor to its surrounding communities?

The irradiation industry is virtually unregulated as compared to the nuclear power industry. Consequently, it has a very poor safety record. Many cases are documented where radioactive leaks have contaminated both facilities and workers.[24]

A typical accident occurred on June 6, 1988 at an irradiator owned by Radiation Sterilizers, Inc. in Decatur, Georgia. Several stainless steel capsules containing cesium 137 developed leaks, contaminating the company's office area, ten workers, and water in the 25,000 gallon storage tank. Neither the State of Georgia or the company knew how to deal with an accident of this type. It took months just to figure out how to start decontaminating the facility.[25]

Three other accidents have been documented in which cesium 137 or cobalt 60 have leaked. Improper procedures at each accident resulted in either worker contamination, radioactive waste disposal in public sewers, or spills onto the ground.[26]

Dr. Martin Welt is the one individual who has done more than anyone to create a radiation exposed food industry. He recently served a two year prison term for fraud and conspiracy due to 32 safety violations at his company, Radiation Technology Inc. Dr. Welt's repeatedly dismantled safety interlock resulting in the largest case of worker radiation overexposure in U.S. history.[27]

References

1) University of Alaska-Fairbanks publication entitled "Fact Sheet: Irradiated Foods - Alaska Commodities Irradiation Project - An Options Analysis Study." It's importamt to note that this report was authored by UAF employees who stood to significantly benefit from continued research at the proposed Department of Energy demonstration irradiator in Kodiak. This report was funded by a grant from the DOE.

Also see "Alaska Commodities Irradiation Project, An Options Analysis Study," University of Alaska-Fairbanks Report #87.51, December 1, 1988. page 6-1.

2) News release #89-25, issued by Governor Steve Cowper's office, 2/7/89.

3) News release issued by the Alaska Seafood Marketing Institute, see article in All Alaska Weekly, 12/2/88 entitled "Alaska Seafood Marketed Nationwide."

4) Letter from Copper River Fisherman's Cooperative to Governor Steve Cowper, dated 1/12/89, signed by Bill Lindlow, President.

5) Food Irradiation Information Manual, National Coalition to Stop Food Irradiation, page 24.

6) Resolution unanimously adopted by United Fishermen of Alaska in 1988 and 1989. Resolution numbers #88-2 and #89-1.

Also see Food Irradiation Alert, newsletter of the National Coalition to Stop Food Irradiation, March, 1989, Vol. 3 No. 2.

Also see Food Irradiation, Who Wants It? by Tony Webb, Tim Lang, and Kathleen Tucker, Thorsons Publishers, 1987, Page 9.

7) See newspaper articles:

The Tampa Tribune, Tampa Florida, July 27, 1989, Article entitled: "Tests to begin for irradiation plant."

Hilo Tribune Herald, Hilo Hawaii, July 11, 1989, Article entitled: "NJ Company looks into isle irradiation plant to sterilize imported medical gear."

8) See newspaper article:

The Nogales International, Nogales, Arizona, August 2, 1989, Article entitled: "Processing plant may employ 150 locally - Produce and seafood from Mexico will be purified."

9) See 1989 lobbying material from Isomedix, Inc. in the legislative file for HB-35.

10) Federal Register, April 18, 1986, 21 CFR, part 179.

11) "Zapping the Food Supply," by Donald B. Louria, M.D., Bulletin of the Atomic Scientists, September, 1990, Vol. 46, No. 7, p. 34-36. [Dr. Louria is Chairman of the preventitive medicine department at the New Jersey Medical School in Newark, New Jersey]

12) Richard Piccioni, Ph.D. (biophysics), Staff Scientist for Accord Research and Educational Associates, of New York. Presentations in Anchorage and Fairbanks, November 11 and 12, 1988.

13) Ibid.

14) Department of Health, State of New York, Roswell Park Memorial Institute, letter from cancer researcher George L. Tritsch, Ph.D. 2/5/88. Letter sent to CH2M Hill Company, Dr. Jacek S. Sivinski to point out inaccuracies in the testimony by Dr. Sivinski before the Legislature of the State of Hawaii.

Also see Food Irradiation Information Manual, National Coalition to Stop Food Irradiation, Page 13.

15) See "Food Irradiation Update" dated 1-19-89, published by Accord Research and Educational Associates, Inc., 314 W. 91st Street, New York, New York 10024

16) See Congressional Testimony before "The House Subcommittee on Department Operations, Research, and Foreign Agriculture," hearing on Food Irradiation and World Hunger, November 18, 1985.

17) Claim made frequently by radiation exposed food proponents. Examples include:

Position paper, Alaska Department of Health and Social Services, 2/2/88.

"Facts on Food Irradiation," guest column by Sidney Heidersdorf, Juneau Empire, March 21, 1989.

18) Federal Register, April 18, 1986, 21 CFR part 179.

19) Food Irradiation, Who Wants It? by Tony Webb, Tim

Lang, and Kathleen Tucker, Thorsons Publishers, 1987, Page XI.

Also see Food Irradiation Information Manual, National Coalition to Stop Food Irradiation, page 8.

20) Food Irradiation. Who Wants It? by Tony Webb, Tim Lang, and Kathleen Tucker, Thorsons Publishers, 1987, page 105.

Food Irradiation Information Manual, National Coalition to Stop Food Irradiation, page 22.

21) "A Plan for Recovery and Utilization of Nuclear Byproducts from the Defense Nuclear Fuel Cycle" by William Remini and John Jicha, Jr., of the DOE's Office of Defense Waste and Byproducts Management. This DOE document was presented in testimony before the Procurement and Military Nuclear Systems Subcommittee of the Committee on Armed Services, U.S. House of Representatives, March 1 and 2, 1983.

22) "Technology Update and Future Initiatives; Byproducts Utilization Program." This pamphlet was published by CH2M Hill, 6121 Indian School Rd., NE, Suite 206, Albuquerque, New Mexico 87110. CH2M Hill is one of the DOE's primary consultants in the development of radiation exposed food technology.

23) "Alaska Commodities Irradiation Project, An Options Analysis Study," University of Alaska-Fairbanks Report #87.51, December 1, 1988. See Page 11-21.

24) Food Irradiation Alert, newsletter of the National Coalition to Stop Food Irradiation, series entitled: "The Irradiation Industry Hall of Shame", March, June, and September issues of 1989.

25) See articles from various Georgia newspapers:

Atlanta Journal & Constitution, 11/6/88 "Feds Waived Tests of Device that now has Radiation Leak."

Brunswick News, 6/13/88 "Authorities Find Where Radiation Leaking at Plant."

The Atlanta Journal, 12/23/88 "Removal of Cesium is Delayed-DOE Hesitant to Truck Capsules Across Country."

26) "Who Are They and How do They Operate?," Food Irradiation Alert, newsletter of the National Coalition to Stop Food Irradiation, November 1989.

27) Ibid.

UNITED FISHERMEN OF ALASKA

211 4th Street, Suite 106
Juneau, AK 99801
907-586-2820

UNITED FISHERMEN OF ALASKA

Resolution 88-2

WHEREAS food irradiation destroys or depletes amino acids, nucleic acids, and vitamins A, B (thiamine), B2, B3, B6, B12, C, E, K and folic acid; and

WHEREAS foods high in polyunsaturated fatty acids (which are increasingly being valued for their contribution to health), when irradiated, form large molecules that cannot be degraded by the body, can partially obstruct blood vessels and increase blood pressure; and

WHEREAS food irradiation is known to produce unstable, chemically reactive free radicals which are highly toxic and increase carcinogenesis, mutogenesis and cardiovascular disease in animals and in man; and

WHEREAS reviews of the available literature on irradiated food overwhelmingly indicate adverse effects on animals including development of testicular tumors, kidney disease, shortened life spans, loss of weight, increased rate of infertility and death of offspring; and

WHEREAS the botulism bacterium, Clostridium botulism, is perversely resistant to gamma radiation (irradiation), while most of its natural competitors, including those that alert us to the decay of foods, are destroyed; and

WHEREAS resistant strains of Salmonellae have been developed by repeated irradiation under laboratory conditions; and

WHEREAS acceptable and effective methods of preserving food (freezing, canning, vacuum packing, etc.) already exist and irradiation does not eliminate the need for refrigeration, packaging and good food hygiene; and

WHEREAS several major markets for Alaska seafood, including Japan, Great Britain, the Scandinavian countries, West Germany, New Zealand and some states, have completely banned the sale of irradiated food for public consumption or halted further exploration of irradiated food due to consumer opposition; and

WHEREAS the price of irradiated food will be 2 to 24 cents per pound higher than non-irradiated food; and

WHEREAS the Department of Energy has provided $400,000 to the University of Alaska, Fairbanks, to help Alaska determine the feasibility of irradiating fresh and frozen fish, other seafood and agricultural products; and

WHEREAS the Department of Energy is the primary promoter of food irradiation as a means of inexpensively extracting weapons-grade plutonium from the reprocessing of nuclear waste; and

WHEREAS the specific use of radioactive cesium-137 or other radioactive waste products for food irradiation treatment in Alaska involves another whole range of concerns, including but not limited to worker and public safety (permitted radioactive emissions are 20 times higher than nuclear power plants); transportation of nuclear waste; construction of a radiation facility in a seismically inactive and tsunami-free area; and contamination of groundwater, the food chain and the environment by the highly water-soluble cesium-137 (half-life 600 years);

NOW THEREFORE BE IT RESOLVED that United Fishermen of Alaska strongly opposes the irradiation of seafood in the state of Alaska; and

BE IT FURTHER RESOLVED that United Fishermen of Alaska supports Senate Bill 355 and House Bill 388 which prohibit the sale of irradiated food in Alaska.

Jim Bacon
President

3-1-88
Date

Copper River Salmon

Produced By The Copper River Fishermen's Cooperative.

Governor Steve Cowper
P O. Box A
Juneau, AK 99811

January 12, 1989

Dear Governor Cowper:

The Copper River Fishermen's Cooperative strongly urges you to oppose the development of a seafood irradiation industry in Alaska. We are a Cordova-based cooperative of 100 fishermen who catch, process, and market primarily salmon, but also halibut, herring, herring roe-on-kelp, cod and sablefish.

We are opposed to seafood irradiation for the following reasons.

1) Our major markets, including Japan, have either banned import of or withdrawn support for irradiated foods. The European Parliament has already rejected food irradiation because of the potential health hazard. Europe has recently decided to stop importing U.S. beef because of the health hazard posed by chemicals. We are concerned that a ban may be placed on irradiated seafoods for similar reasons.

2) Irradiation of seafoods destroys nutritional value and increases the health risk of eating seafoods. Experiments with irradiation of mackerel oil, cod liver oil and herring flesh show that the highly publicized Omega-3 unsaturated fat and similar lipids are changed into known carcinogens. Additionally, the fish oils are changed into large molecules that cannot be digested by our digestive enzymes and, consequently, are deposited as insoluble plaques in blood vessels, thereby potentially increasing blood pressure.

3) Irradiation increases the health risks associated with long term storage. Botulism bacteria are resistant to gamma radiation. A dose strong enough to wipe out other bacteria would leave the botulism organism intact

P.O. Box 90, Cordova, Alaska 99574 (907) 424-7191 FAX: (907) 424-3616

and without any competition to slow its growth. Irradiation also does not alleviate the need for proper handling of seafood during storage: organisms destroyed during irradiation will be quickly replaced unless preventative measures are taken.

4) Irradiation will increase the cost of seafoods to the consumer because of the additional processing.

5) There is a mounting consumer opposition to irradiated foods, both domestically and abroad. Consumer acceptance is doubtful and will not be known until irradiated products are test marketed. We do not think it is economically wise to use Alaska seafood as a test market.

6) Irradiation of seafood would destroy the fishing industry's marketing image of "pure and pristine" Alaskan seafood. This would undermine the work of the Alaska Seafood and Marketing Institute which has just spent $3.2 million to develop and promote this image in nation-wide advertising campaigns. Although the Cooperative would not consider irradiating any of its product, we are concerned that consumer perception of our product would be "tainted" by irradiation of other seafood products.

7) The United Fishermen of Alaska have adopted a resolution opposing the irradiation of seafood in Alaska.

We urge you to support us and the fishing industry in our opposition to irradiation of seafood. We appreciate the opportunity to comment on this issue.

Sincerely,

Bill Lindow, President

cc: Kate Grahm, UFA

FOOD IRRADIATION NETWORK JAPAN

February 9, 1990

Senator Fred Zharoff
Alaska State Legislature
P.O. Box V (MS 3100)
Juneau AK 99811 USA

Dear Senator Fred Zharoff,

We, Japanese consumers, welcomed Gov. Steve Cowper's announcement not to build a food irradiation demonstration facility in Alaska. However, we are now concerned that the private company Isomedix Inc. may be planning to build a food irradiator in Kodiak and that they are lobbying to prevent HB-25 from being passed.

As you know, Japan imports vast quantities of Alaskan seafood. According to the figures of 1988, we imported 38,919t of Herring, 154, 591 t of Cod, 106,386t of Salmon, 28,894 t of Crab from the United States (maybe from Alaska) , the top of seafood exporting nations to Japan. We have an image of Alaskan seafood as "fresh and safety" that, however, may be changed if a food irradiator is to be built in Kodiak.

We believe that safety of irradiated food is yet to be proved. The irradiation experiment done on onion in Japan by the Science and Technology Agency has proved to cause deformity in the bones of mice, and thus the onions have not been approved for irradiation. Potatoes have been approved before the onions, but we know that there has been increase of mortality rate, decrease of body and ovary weight in the experiments on rats and we are against irradiating potatoes as well.

Consumers are not only people who oppose irradiated food in Japan. Recently The Food Irradiation Network Japan sent questionnaires to 30 major seafood importers and asked whether they are willing to import irradiated seafood. Out of 17 responses we receiced, 7 importers said they would not import any irradiated seafood even if Japanese government lifts the present ban of importing irradiated food. Other 10

importers said they will follow the government' guidance on this matter. No company said they are willing to import irradiated seafood.

The Japanese Government prohibits the import of any irradiated food. We support this ban. Furthermore, should a seafood irradiator ever be built in Alaska, we will assume that at the least some of this seafood is destined for Japan. In that occasion, we will declare a boycott of all Alaskan seafood.

We strongly support HB-25 and we urge Sen. Zharoff to let this bill out of his Senate Finance Subcommittee. We also urge passage by the Senate and ratification by Governor Steve Cowper.

Sincerely yours,

Hiroshi Satomi

Dr. P.H. Hiroshi Satomi

The Food Irradiation Network Japan
(Affiliated Organizations:
Consumers Union of Japan, Kanagawa Network of Consumers, Kanagawa Network to Expel Toxic Food, Citizens' Nuclear Information Center, Tokushima Alliance for Better Living, Liason Council for Safe Food, Consumers Association of Mitaka City, Tokyo Liason Council of Consumer Organizations, Parents Accusing Irradiated Baby Food, and others)

cc: 57 copies sent to the govenor, Senators and seafood industry representatives

FOOD IRRADIATION NETWORK JAPAN
3-11-5-310 Higashinakano Nakano-ku TOKYO JAPAN 164
Phone 03-5380-1000 Fax 03-364-2937

March 26, 1990

Senator Fred Zharoff
PO Box (MS-3100)
Juneau, AK 99811

COPY

Dear Senator Fred Zharoff,

We appreciate you had interest in and refered to our letter in the Kodiak Daily Mirror. We found your article included misstatements and half-truth and so we would like to clalify it.

Proponents for food irradiation often state ionizing radiation is same as microwave, infrared, ultraviolent ray, etc but is quite different as regards the controversial point that ionizing radiation yields in irradiated food unkown products yet to be proved for safety. Possible effect of ionizing radiation is same whether it is released by radioactive materials or an electron particle beam accelerator suggested by the Institute of the University of Alaska Fairbanks.

Secondly, there is no scientific consensus that irradiated foods are wholesome. Though you disregarded the related statement in our letter, we had explained why no other food was permitted for irradiation after the permission of potatoes in our country. It was because bone abnormality was observed among mouse fed irradiated onion. Even irradiated potatoes, the sole food permitted for commercial irradiation, were found to cause weight reduction and higher mortality among animals fed potatoes irradiated with the present allowable radiation level of 15,000 rad. We, therefore, demand our government to cancel the permission of potatoes. In your country, was it the lack of scientific consensus on wholesomeness that led New York, New Jersey and Maine to a moratorium on food irradiation?

If Isomedix Inc. has no interest in food irradiation, why are they lobbying against HB 25 concerning food irradiation? Indeed, the company, according to

the source of IAEA/FAO/AECL 1986, has irradiated spices 500 tons per year since 1984. Furthermore, we warn you that an irradiation facility may be easily misused for other purposes. As one of such notorious abuses in our country, one food company had irradiated vegetables used for babyfood for several years falsely saying for animal feed. Untill the scandal was revealed, scores of thousands of infants were fed the irradiated babyfood. In 1984, both of the food company and the irradiator were sentenced guilty.

We like to talk about our "small organization." Our affiliated members, Consumers Union of Japan, Tokyo Liaison Council of Conumer Organizations, Kanagawa Network of Consumers and others have a long history of opposing food irradiation. Since potatoes were permitted for irradiation in 1972, we have long opposed against it and in 1978 successfuly stopped irradiated potatoes to be used in school lunch. In Tokyo, vocal activities of consumers made the Shihoro Agricultural Cooperative, the operator of the facility, not to ship irradiated potatoes into Tokyo. In big cities as Tokyo, Kanagawa and Saitama where consumers have stronger voices, irradiated potatoes had been and is successfully boycotted. You will find what impact our "small" network has once you have a food irradiation facility for Alaska seafood.

Our attitude to irradiated food is the same one whether it is Florida citrus fruit or Alaska seafood. Since we have no way to know if imported seafood is irradiated or not, we will declare a boycott of Alaska seafood if you ever have a facility. If you don't want to lose a big market including Japan in the world, we suggest you to move forward with HB 25. We believe such legislation will be beneficial to your public health and your seafood industry as well as to our consumers.

Sincerely yours.

Hiroshi Satomi

Hiroshi Satomi, Dr.P.H.
The Food Irradiation Network Japan

cc: 103 copies sent to the governor, Senators, Representatives and othe related organizations

ISOMEDIX

(PRO-IRRADIATION LOBBYIST)

PLEASE DELIVER IMMEDIATELY TO:

Name: Senator Dick Eliason, Chairman
Labor & Commerce Committee

Telephone No. 907 465 4928

From: George C. Giddings, Ph.D., Consultant

Date: 12 April 1989

Time Transmission began: 4 PM (Eastern daylite saving time)

Number of pages: 19
(including cover sheet)

We are transmitting from FAX NO. (201) 887-1476)

If you do not receive all of the pages,
please phone us at (201) 887-4700.

COMMENTS:

I just learned that your Committee will be hearing HB 25 to ban sale of so-called irradiated foods in Alaska. Last year I and professional colleagues sent out considerable documented information in opposition to predecessor legislation in the Alaska State Legislature. Given the closeness of the hearing on HB 25, and rather than replicate that which was sent out by me and others last year, I am faxing herewith the following more recent items: (1) consensis document from 12/1988 International U.N. Food Irradiation Conference at WHO HQ, Geneva, (2) list of U.S. delegation, (3) WHO position paper, (4) WHO new book announcement, (5) first two pages of USDA 35 page detailed denial of a petition for a hearing on its omnibus irradiated food approval regulation of 4/16/86. Irradiated food is safe and offers proven public health benefits, already being realized in a growing number of countries, in the absence of any proven risks! Anti-nuclear organizations mistakenly associate it with their real agenda because of the tiny, self-terminating and unneeded DOE demo-irradiation program that Alaska recently dropped out of (even though it was to be a linear accelerator like Florida and Iowa's). The "bottom line" is that States should not be preempting in advance their consumer's right of informed free choice with ill-advised, misguided legislation, born of confusion and misplaced anti-nuclear activism when the worldwide trend is toward fact-based public acceptance in recognition of public health and other benefits, in the absence of significant risk.

Respectfully, G. G. Giddings
ISOMEDIX INC.

AMERICAN MEDICAL ASSOCIATION

535 NORTH DEARBORN STREET • CHICAGO, ILLINOIS 60610 • PHONE (312) 645-5000 • TWX 910-221-0300

DIVISION OF BASIC SCIENCE

WILLIAM T. McGIVNEY, Ph.D.
Director, Technology Assessment
312 645-4530

ERIC P. BATSON, M.D.
Senior Scientist
312 645-4907

ROBIN MILLER-CATCHPOLE, M.D.
Senior Scientist
312 645-4571

ANDREA L. SCHNEIDER
Program Administrator
312 645-4532

April 11, 1988

John V. Kelly
Essex County
Assemblyman 30th District
484 Bloomfield Avenue
Suite 11
Montclair, New Jersey 07042

Dear Assemblyman Kelly:

The American Medical Association, apart from Dr. Lubin's testimony, has not conducted any studies or issued reports on the safety of food irradiation. At the present time, neither the AMA's Council on Scientific Affairs nor the Group on Science and Technology has any plans to conduct such a study.

If we proceed with a report in the future, I shall see to it that you are so notified.

Sincerely yours,

William T. McGivney, Ph.D.

WTH:pjc

(Note fom Kelly Staff: A review of Dr. Lubin's testimony, the AMA Constitution ar Bylaws disclosed the following: The House of Delegates is the policy making body the AMA [Article VI, AMA Constitution]. In June 1984, AMA House of Delegates pass Resolution No. 128, which supported "legislation classifying irradiation as food process rather than a food additive." Testimony is not policy, it simply may not "conflict with the policies of the House of Delegates" (AMA Bylaw 12.20) The AMA House of Delegates never said irradiated food was safe, they simply said it shou be considered a process. Even the "process" resolution has little significance, s it was voted on a consent calender, meaning the House of Delegates never discusse the issue. The introduction to the resolution, (the whereas section) is not the resolution, nor was it read to the House, it serves as "fill". Reference to food irradiation being safe in the introduction to the resolution, and Dr. Lubin"s testimony has been taken out of context to falsely imply that the AMA House of Delegates has endorsed the safety of irradiated food. The confusion is understan

A-3

FAIRBANKS
Daily News-Miner
Your Locally Owned Independent Daily Newspaper
Sunday A.M.
VOL. LXXIVI. No 314 FAIRBANKS, ALASKA, SUNDAY, NOVEMBER 13, 1988 $1.00 Per Copy 100 Pages

Expert finds dangers in food irradiation

By PATRICK HUND
Staff Writer

The Food and Drug Administration has approved the use of irradiation for some food products without proving it is safe for human consumption, says a doctor from a New York-based health research organization.

"FDA approval of irradiation testing is not based on stringent scientific standards," said Dr. Richard Piccioni, who has a doctorate in biophysics and works for Accord Research and Educational Associates. "I think it's wishful thinking."

Piccioni spoke about food irradiation at 7 p.m. Saturday at Wood Center on the University of Alaska Fairbanks campus.

Food irradiation prolongs the shelf life of food products by killing bacteria and delaying the ripening process. Irradiation has been approved by FDA for use in spices, some vegetables, and to sterilize medical supplies.

Currently, a team of UAF researchers are completing a report that will be submitted to the state on whether the state should consider irradiation for seafood and agricultural products. The $400,000 report should reach Gov. Steve Cowper in the next month.

Radiation is the release of nuclear particles. The particles can be released from either machine devices such as X-ray machines or with the use of gamma sources such as Cesium, a by-product of nuclear power plants.

Piccioni claims that FDA hasn't shown how food is chemically changed in the irradiation process. Irradiation leaves unknown residues and undefined chemical changes in food products, some of which may be cancer-causing he said.

RICHARD PICCIONI
More research needed

"If you're talking about feeding millions of people irradiated food, you have to make sure the residues are not carcinogenic," he said.

He said the FDA has used research tests that conclude lab animals weren't physically harmed by irradiated food. Instead, the administration should have fed high concentrated levels of irradiated food to lab animals, he said.

In most food research tests, lab animals are fed concentrated levels of substances much higher than humans would normally consume. That's to prove beyond a shadow of a doubt that the substances won't have serious long-term health effects in people, he said.

"It is presumed that the basic toxological issues have been re-

(See IRRADIATION, page A-2)

IRRADIATION

(Continued from page A-1)

solved," he said. "They haven't."

Piccioni points to conclusions of dozens of studies that indicate irradiation can damage chromosomes and pose other health risks.

However, a significantly larger number of studies show that the irradiation process isn't dangerous, he said.

He said a number of independent scientists have called for further research in food irradiation before the FDA approves the process in more food products.

Piccioni said $200,000 grant was suggested for a study of irradiation by the National Academy of Sciences, but the grant was denied by the U.S. Congress.

Irradiation isn't like other processes that change the chemical composition of food products such as pasteurization of milk, he said.

Astronauts might be able to use irradiated food in space without suffering short-term health problems, but research hasn't shown what could happen to them in the long run, he said.

If the technology is to be used in Alaska, the UAF team has recommended that electron beams, not radioactive isotopes, become the energy source for the process.

One UAF research member, Ruthann Swanson, says most of the food on a menu could pose health hazards if taken in large enough quantities.

"There are lots of natural ingredients in foods that are toxic," she said.

The use of irradiation in Alaska food products could have far-reaching effects, she said.

"If the technology becomes accepted, there is potential for Alaska products to enter bigger and more distant markets," she said.

This newspaper was transported compliments of Northern Air Cargo 1-800-478-3330

PROPERTY OF:
Fairbanks North Star Borough Public Library
1215 Cowles Street
Fairbanks, Alaska 99701

MAR 23 1990

the Kodiak daily mirror

VOL. 50 NO. 21 | WEDNESDAY, MARCH 21, 1990 | KODIAK, ALASKA | 28 PAGES | 50 CENTS

Pressure builds for ban on irradiated food in Alaska

By CECIL RANNEY
Editor

The struggle over use of nuclear technology has once again focused on Kodiak.

Irradiation of food, a controversial preserving method that utilizes radioactive material to destroy bacteria has been suggested for use on seafood.

Proponents of nuclear energy hope a beneficial use of nuclear waste for such projects as food irradiation will give their industry a more positive image.

Opponents worry about health risks to workers and consumers from any use of nuclear waste material and say irradiation would destroy seafood's healthy image.

The issue has come to focus on a bill, HB-25, that would ban the sale of irradiated food in Alaska. HB-25 passed the House last year but since last April has been held up in a Senate Finance subcommittee by Sen. Fred Zharoff.

Anti-nuclear activists in Alaska, led primarily by SANE/Alaska, an Anchorage-based group, have targeted Sen. Zharoff with a letter-writing campaign to try to force him to pass HB-25 out of committee.

The attack on irradiated food focuses on the pure and pristine image of Alaska's seafood, especially in Japan. A Japanese consumer group has threatened a boycott of Alaskan seafood if an irradiator were to be built in Alaska.

Japan is the major market for Alaska seafood and has banned the import of irradiated foods.

Many of the letters claim a seafood irradiator will be built in Kodiak, although no evidence of any plans for such a plant have been offered or revealed.

Last year, the University of Alaska studied a proposal to construct a test irradiation facility with $400,000 of federal money. The University was to place a linear accelerator in Kodiak as part of the Fisheries Industrial Technology Center.

Governor Steve Cowper killed the plan by refusing the federal money offered. At the time he said he was concerned Alaska seafood might be associated with food irradiation, and that might have a detrimental effect on seafood sales.

Dr. John French, of the FITC in Kodiak, said there were no plans to build an irradiator in Kodiak now.

"Things are very much on hold," he said. "The state government is not pursuing it and the University is not interested, especially since there is no federal money."

Zharoff said he felt it was premature to ban a technology that could possibly be of benefit to the fishing industry.

"It's been my experience that once something gets banned it is very difficult to get it back."

Ed Davis, vice president of SANE said that without HB-25 the irradiation industry would have a green light.

"Private enterprise has already announced plans to build irradiators in two of the four states that rejected Department of Energy irradiators. The largest irradiation firm in the country, Isomedix, Inc. is lobbying to kill HB-25," he said.

In a lobbying report, an Isomedix consultant portrayed HB-25 as an attempt to limit the free choice of consumers with "ill-advised, misguided legislation, born of confusion and misplaced nuclear activism when the worldwide trend is toward fact-based public acceptance in recognition of public health and other benefits in the absence of significant risk."

If HB-25 is not passed by the Senate before the end of the current session it will be dead and that is apparently the wish of Sen Zharoff. He said he plans to continue to hold the bill in his subcommittee for further study.

The Pioneer 50¢

ALL-ALASKA WEEKLY

Vol. 18, No. 35 Fairbanks, Alaska February 9, 1989

Irradiated food facility stalled

by Lin Gale

Gov. Steve Cowper announced Tuesday that Alaska has decided against building a food irradiation demonstration facility in Kodiak.

The governor said the decision was made in large part because of opposition from Alaska's seafood industry. Fishermen and seafood industry officials say public fears about irradiated food could put a sizeable dent in the sales of Alaska seafood. Major markets such as Japan and European countries have banned imports of irradiated food.

Food irradiation is the process of treating food with ionizing radiation to kill microorganisms and extend shelf-life.

The University of Alaska Fairbanks Institute of Northern Engineering recently completed a feasibility study of food irradiation and recommended seeking $3.5 million in federal funds to build a demonstration facility in Kodiak.

University researchers banking on the facility and its accompanying federal funding to continue their research feel Cowper based his decision on the irrational fears of the facilities' proponents.

"I am disappointed that the scientists here in the state will not have a chance to follow up on research suggested in the study," said William Workman, a UAF resource management professor who participated in the study.

James Drew, dean of UAF's School of Agriculture and Land Resources Management, believes the governor's decision was swayed by politics, not by knowledge. Drew said the study's participants were asking to research, not to irradiate. In Drew's opinion, emotions expressed to the governor from the seafood industry and nuclear energy opponents proved more effective than facts and figures presented by university researchers.

"Facts and figures are a poor tool against emotion," Drew said.

The study's principle researchers, Ruthann B. Swanson, UAF assistant professor of resource management, and John

See FOOD, Page 16

Food irradiation plant rejected . . .

From Page 1

Zarling, associate dean of UAF's School of Engineering, were unavailable for comment.

Aside from unanimous opposition from the state's seafood industry, a group called The Alaska Chapter of the Committee for a Sane Nuclear Policy, (SANE/ALASKA) waged a strong and effective letter-writing and media campaign against the facility. (The federal Food and Drug Administration has determined that irradiated food is safe for human consumption but has not approved irradiation for the processing of fishery products.)

Ed Davis, president of SANE/ALASKA, is pleased with Cowper's decision but vows to continue the fight.

"I'm really elated to see that Gov. Cowper decided not to go ahead with the food irradiator — and he's doing it for all the right reasons too," Davis said. "But, he's not digging into this as far as I'm concerned. Essentially what Cowper's doing is keep the back-door open. It's pretty obvious that Cowper's going out of his way to not criticize it as being unsafe."

SANE/ALASKA's opposition to food irradiation is based on its members' claims that irradiated foods have not been proved safe. Another overriding concern is that food irradiation is a Department of Energy ploy to create a demand for nuclear waste products, such as cesium-137, and thus legitimize the nuclear power industry.

"The goal of this program is to create a demand for cesium," Davis said. "It legitimizes the need for nuclear power if there's a demand for cesium."

Ionizing energy required for food irradiation can be produced by machines that emit high-energy electron beams or X-rays, or by radioactive isotopes such as cesium-137 that emit gamma rays. University researchers recommended machines that emit high-energy electron beams or x-rays rather than radioactive isotopes as the ionizing energy source for a research and demonstration facility in Alaska.

Though the university recommends X-rays rather than radioactive isotopes for Alaska's irradiation facility, Davis opposes any irradiation facility in Alaska.

"It looks like they're trying to get their foot in the door for food irradiation," Davis said.

Though the proposed food irradiator has been laid to rest, SANE/ALASKA members have only begun their fight against food irradiation. Legislation banning the sale of irradiated foods (HB-25) is now in the House Finance committee. An identical bill (HB-388) passed in the State House by a vote of 32-7 last year but died in the Senate.

Bills that would outlaw the sale of irradiated food are being considered in Massachusetts, Vermont, New Hampshire, New York, Pennsylvania, Oregon and Minnesota. Similar legislation has already passed in Maine, and most recently New Jersey.

Dear Editor:

The February 9 edition of the All-Alaska Weekly had an article with some statements by UAF food irradiation researchers which require some clarification. Researchers portrayed their opponents as "emotional" people touting "irrational fears."

SANE/Alaska was very careful throughout the campaign to present arguments that were based on scientific evidence or that were well documented. What is irrational and emotional about facts such as these?

1) Over 40 scientific studies have found that exposure to irradiated foods causes mutagenic, carcinogenic, or cytotoxic effects. SANE/Alaska paid to bring an expert on food irradiation research, Dr. Richard Piccioni (who has a Ph.D in biophysics), to Alaska to discuss this scientific evidence.

2) Revealing quotes were made by Department of Energy (DOE) officials who lobbied for the program that funded the UAF food irradiation study. One official stated that the success of this program will be measured by "the degree to which this technology is implemented industrially and the subsequent demand created for cesium-137."

Cesium-137 is the most troublesome component in nuclear waste. It comprises just 3 percent of the volume, but emits 50 percent of the heat and 55 percent of the radioactivity in nuclear waste.

3) UAF staffers portrayed their proposal as a research irradiator. Their proposed "research" excluded any analysis of whether irradiated food damages health. Instead they proposed research to help commercialize the technology.

4) The seafood industry and the general public overwhelmingly opposed this irradiator. This opposition was not based on emotionalism or alarmist rhetoric. Rather, it spontaneously arose because UAF, FDA and DOE refuse to acknowledge and address valid concerns such as these.

Gov. Cowper was correct in noting that Alaska's seafood market would suffer. The public and the seafood industry do not appreciate being used as guinea pigs.

Sincerely,
Ed Davis, President, SANE/Alaska
Box 1616, Fairbanks, Ak. 99707

FAIRBANKS
Daily News-Miner
Your Locally Owned Independent Daily Newspaper
Wednesday
VOL. LXXXVII No. 38 FAIRBANKS, ALASKA, WEDNESDAY, FEBRUARY 8, 1989 50¢ per copy 36 Pages

State won't seek funding for food irradiation plan

Staff and AP reports

Despite a university report recommending a food irradiation demonstration project in Alaska, Gov. Steve Cowper said Tuesday that the state will not seek federal funding for the plant.

At issue is whether the state should apply for federal funds to build a test facility to expose foods to small doses of radiation to kill bacteria and parasites, Cowper said.

"I don't normally discourage the seeking of information about new techniques," he said. "But I'm convinced that the association of Alaska with food irradiation will have a detrimental effect on Alaska seafood sales."

The state's seafood industry opposes the irradiation project, Cowper said.

At least two commercial fishing groups recently sent letters to Cowper opposing the test use of irradiation in the seafood industry. The Copper River Fishermen's Cooperative and the United Fishermen of Alaska both expressed concern on the potential health risks associated with the process and that many countries already ban the sale of irradiated food products.

The idea also has come under fire from SANE/Alaska, which is questioning the Food and Drug Administration's approval of food irradiation. The federal agency already has approved the use of irradiation in spices, medical supplies and some vegetables.

Ed Davis, president of the group, believes there has been insufficient research on irradiation to prove that it doesn't pose health risks.

The University of Alaska Fairbanks Institute of Northern Engineering recently completed a $400,000 analysis of food irradiation and recommended a test facility in Alaska late in 1988.

William Workman, associate professor of economics and a member of the university research team, said the state's position on the issue could be a "missed opportunity."

He said many of the questions posed by opposing groups would be answered if a research facility was built.

"This isn't an immediate proposal for commercial application," he said. "I don't understand how commercial sales of Alaska seafood could be affected negatively with a research facility in the state."

Supporters of food irradiation say it would extend the shelf-life of food products and would benefit producers and retailers.

Legislation to prohibit the sale of irradiated food in Alaska was considered by lawmakers last year and is under review again this session.

Bills that would ban the sale of irradiated food are being considered in Massachusetts, Vermont, New Hampshire, New York, Pennsylvania, Oregon and Minnesota, according to a SANE/Alaska news release.

Opponents of using radiation to kill food bacteria say the U.S. Food and Drug Administration has not approved the process for wide use and consumers are suspicious of the process.

FAIRBANKS
Daily News-Miner
Your Locally Owned Independent Daily Newspaper
VOL. LXXXVI No. 338 FAIRBANKS, ALASKA, THURSDAY DECEMBER 8, 1988 50¢ Per Copy 32 Pages

Seafood irradiation center recommended

By PATRICK HUND
Staff Writer

A University of Alaska Fairbanks research team has recommended that a research and demonstration food irradiation facility be built in the state to test market seafood. The preliminary cost of the facility is estimated at $3.5 million.

However, results of the $400,000 study continue to come under fire from SANE/Alaska, a citizens' committe advocating sane nuclear policy. The group and other opponents of food irradiation say the process lacks sufficient scientic testing.

Seafood irradiation could be a boon to the state economy because it would increase the market value of seafood, allowing Alaska to enter markets in areas around the world.

The report, delivered to Gov. Steve Cowper's office earlier this week by the research team, said commercialization of the process in the state is premature for several reasons.

- Food irradiation hasn't been approved by the Food and Drug Administration for seafood products.
- The effects of irradiation on the seafood processing industry are unknown.
- Customer acceptance won't be known until irradiated products are test marketed.

Food irradiation prolongs the shelf life of food products by killing bacteria and insects and delaying the ripening process. FDA has already approved the use of irradiation in spices, medical supplies and some vegetables.

The process has gained approval from most scientific groups including the World Health Organization and the American Medical Association. Yet, some studies indicate that food irradiation poses health hazards.

Opponents say irradiation leaves residual and undefined chemical changes in food. It may produce cancer-causing carcinogens, they contend.

Ed Davis, president of SANE/Alaska, says that laboratory tests are inconclusive because animals were not fed concentrated amounts of irradiated food. He believes further testing is necessary.

Davis charges that UAF approval of the study will be used by the Department of Energy to get private industry to build food irradiators using cesium-137 as an ionizing source. The research report recommends that funding for the demonstration facility come through DOE.

Davis and other opponents believe that DOE wants to get rid of surplus cesium-137 produced by nuclear power plants by supporting irradiation.

Alaska was one of six states commissioned to conduct studies to determine the commercial potential of food irradiation.

Letters to the Editor

The Daily News-Miner welcomes letters to the editor, P.O. Box 710, Fairbanks, AK 99707. Each letter must carry the name and address of the writer, which will be published. Letters that are libelous or in poor taste will be rejected. Thank-you letters will be published in the "Applause" column. Because of space limitations, the following rules generally apply: A letter may not be longer than 300 words. Copies of letters from one person to another will not be published. No one may publish more than one letter per month. Political endorsement letters from outside our readership area will not be published. The Daily News-Miner reserves the right to edit or reject any letter submitted.

Halt irradiation

Dec. 16, 1988
P.O. Box 1618
Fairbanks, AK 99707

To the editor:

The Fairbanks Daily News-Miner printed an article on Dec. 8 regarding the UAF's recommendation to build a food irradiator in Alaska. I would like to expand on some points it made.

The university claimed that the FDA and the AMA approved the process. These claims need closer public scrutiny.

The AMA was asked to explain their endorsement just before the New Jersey State Assembly voted overwhelmingly to outlaw the sale of irradiated food earlier this year. The AMA responded that it had never conducted any studies or issued reports on the safety of food irradiation.

Although the FDA has approved food irradiation, the tests they used to prove safety are not reassuring. Their approval is based on five animal feeding studies, none of which utilized a critical test procedure. Studies in which highly concentrated levels of radiolytic products are fed to test animals are absent in evaluating food irradiation's safety.

Without concentrating possible carcinogens, animal feeding studies only verify that there will be less than one cancer incidence in about 100 rats. This is far from the safety levels normally used by the FDA which typically allows no more than one cancer incidence in 10 million cases.

Over 40 scientific studies analyzing the safety of irradiated foods found adverse health effects including carcinogenicity, mutagenicity, and cytotoxicity.

Alaskans should understand how the UAF's proposal fits into the overall picture. The DOE program which funded the UAF study has a goal of establishing a fully developed food irradiation industry. Congress was told during hearings on this issue that this DOE program's success will be measured by "the degree to which this technology is implemented industrially and the subsequent demand created for cesium-137."

The UAF study recommends X-ray and electron beam technology rather than cesium-137. This was an admirable decision, but only a nearsighted policy-maker would find it attractive.

If Gov. Cowper buys this tactic, the UAF project will establish a new "food irradiation frontier" in Alaska. It's unfortunate, but when industry moves in to settle this frontier, Alaskans will have little hope of extracting "admirable" decisions from the nuclear industry.

Sincerely,
Ed Davis, President
SANE/Alaska

Bristol Bay Times & Dutch Harbor Fisherman

BULK RATE
U.S. POSTAGE
PAID
ANCH. AK.
PERMIT NO. 125

50¢

FEB 27 1990
PUBLIC LIBRARY

D.J. LOUSSAC PUBLIC LIBRARY
TECHNICAL SERVICE-SERIALS
3600 DENALI STREET
ANCHORAGE . AK 99503-6093
U . A

Vol. 10 No. 8 "Spawned Weekly In Southwest Alaska" Feb 23 90 February 28, 1990

Fish irradiation prospects worry Japanese

by David McElroy
Staff Writer

JUNEAU — A Japanese threat to boycott Alaska seafood may cancel plans to build the state's first food irradiation plant in Kodiak.

The Food Irradiation Network (FIN) in Tokyo, Japan, wrote Alaskan legislators and editors to support a ban on irradiating food in the state after learning "that the private company Isomedix inc. may be planning to build a food irradiator in Kodiak."

The Japanese government prohibits the import of any irradiated food. Irradiated food is exposed to low doses of radiation to increase its shelf life.

FIN said "should a seafood irradiator ever be built in Alaska, we will assume that at least some of this seafood is destined for Japan. In that occasion, we will declare a boycott of all Alaskan seafood."

FIN, a Japanese consumer group, cited Japanese Science and Technology Agency tests of irradiated food. "There has been increase of mortality rate, decrease of body and ovary weight in experiments on rats."

The group urges passage of House Bill 25, which would ban food irradiation in Alaska.

FIN "welcomed Gov. Steve Cowper's announcement not to build a food irradiation demonstration facility."

See IRRADIATION Page 2

Irradiation worries Japanese consumer group

Cont'd. from Page 1

HB 25 has been lingering in the Senate Finance Committee chaired by Sen. Fred Zharoff since last April.

"There seems to be some reluctance on Fred's part to move on that bill," said sponsor Randy Phillips (R-Chugiak-Eagle River).

"Japan consumes about a third of our fish," Phillips noted. "If HB 25 gets on the floor of the Senate, I think it has a very good chance to get passed."

Zharoff aide Michael Thill said Wednesday "at this time, it may be imprudent to invoke a total ban" on irradiated foods.

"Incomplete scientific data" was cited by Thill in commenting on Zharoff's intransience on HB 25. Irradiation "may be a problem," he conceded, although "some tests say it is not."

But another Zharoff aide said the senator is "undecided" about banning food irradiation in Alaska. He said it was the University of Alaska which "concluded there weren't any problems with food irradiation."

Jerry Burnett, Phillips' aide, spoke of "the potential effect of seafood marketing in Japan if we had an irradiation facilitity, since Japan is our largest market." Phillips is a commercial fisherman himself, Burnett said.

Isomedix Inc. could not be reached for comment.

Of FIN, Zharoff aide Penelope Goforth said "nobody seems to have heard of them. We're checking to see if they're a legitimate group."

FIN declared that their own survey indicated many fish importers would refuse irradiated seafood even if the Japanese government allowed it.

In 1988, Japan purchased more than 200 tons of Alaska salmon, herring and crab.

Times BUSINESS (ANCHORAGE TIMES)

Thursday, March 15,

Fishermen promote new bill to ban irradiated food sales

By JAY STANGE
Times Business Writer

Alaska fishermen are watching a House bill that would ban the sale of irradiated foods in Alaska, saying such legislation would help protect the pristine image of the state's $1.096 billion in seafood exports.

Although no food irradiation plant is planned for Alaska, United Fishermen of Alaska supports House Bill 25 to ban the sale of irradiated food, said Ken Castner, the group's executive director.

The state House passed the bill 31-4 last April. It is being held by Sen. Fred Zharoff in a Senate Finance subcommittee.

The Consumers Union of Japan — a coalition of 25 consumer groups — has told Zharoff it will boycott all Alaskan seafood if a seafood irradiator is ever built in Alaska. In 1989 Japan imported Alaska seafood worth $999 million, or more than 95 percent of the state's total seafood exports, said a spokesman at the Alaska Center for International Business.

Zharoff said he is holding the bill in committee for further study. The state was hasty in dismissing a research project offered by federal agencies, he said.

A year ago, Governor Steve Cowper declined federal funding for a small scale U.S. Department of Energy irradiation pilot project. At the time, the proposal was made to six states with large agricultural resources, said a DOE spokesman.

"The governor was hoodwinked into saying he didn't want to conduct research," Zharoff said.

Last year, the University of Alaska Fairbanks Institute of Northern Engineering studied the proposal to construct a test irradiation facility with $400,000 of federal money, said Ed Davis of SANE/Alaska, an Anchorage-based political action group. The study proposed the placement in Kodiak of a linear accelerator one-fourth the size of a commercial irradiator.

It found irradiation of the type specified for the Kodiak site to be completely safe, Zharoff said.

Cowper said at the time he was concerned Alaska seafood might be associated with food irradiation, and that might have a detrimental effect on seafood sales.

Irradiation of seafood in the U.S. has not been approved by the Food and Drug Administration, Zharoff said.

The process was first approved for use on wheat and wheat flour by the FDA in 1963. It exposes foodstuffs to ionizing radiation to kill bacteria and insects and prolong shelf-life of vegetables and fruits by slowing the growth of sprouts. Food is irradiated in the U.S. by exposing it to electron beams, X-rays or gamma rays created by Cobalt-60 or Cesium-137.

Proponents of irradiation testified during an irradiation hearing before a congressional Health and the Environment subcommittee in June of 1987 that irradiation can prolong the shelf-life of products.

"We're looking at the overall impact," Zharoff said. "If we completely disallow the study (of irradiation) that may cause serious problems for food technology in the future."

"We think it's (irradiation) a bad idea," Castner said. "We're in a world market where fish product quality is a cornerstone. Quality is a big issue. If there is a public perception of 'dutching' where they take semi-poor quality food and irradiate it — that something we can't allow to take place."

Retailers, as much as processors, could be interested in the process, Castner said.

"It would be like backing nuclear reactor power in Alaska. Why do that when we have such good sources of power in the state like gas, coal and oil?" Castner said.

The seafood irradiation issue has attracted the attention of citizen groups like SANE/Alaska and Food and W Inc. of New Jersey.

"The Kodiak plan (to use an ele source of irradiation) was really a to get a (DOE) foot in the door fo use of the Cesium-137 isotope (t product is the creation of plutoniu use in military weaponry)," said D SANE/Alaska's vice president.

The DOE is trying to create a m for their waste products like Ces 137, Davis said.

"We agree more research is n sary. (But) we need objective rese by biophysicists," he said.

Sen. Fred Zharoff
... holding bill for study

NOTE: HB 25 DOES NOT PROHIBIT RESEARCH!

(A-3)

U.S. planes join Colombia drug war

-PAGE 13

SPORTS

Angoon's 'Hill' key to season's first X-C meet

-PAGE 9

TUESDAY
September 5, 1989
VOLUME 78 NUMBER 173
18 PAGES 2 SECTIONS 50 CENTS

JUNEAU EMPIRE

"The Voice of Alaska's Capital City"

MY TURN

Food irradiation

By ED DAVIS

A column by Sidney Heidersdorf published last spring on food irradiation contained a number of inaccuracies.

SANE/Alaska (a group which advocates SANE nuclear policies) waged an effective campaign to stop a seafood irradiator, which was proposed in Kodiak. As President of this group, I feel compelled to set the record straight.

Mr. Heidersdorf dismissed the opposition to food irradiation as a "strong emotional response" against nuclear technology. As a professional engineer, I know the importance of framing the debate in this type of campaign around scientific evidence rather than emotional arguments.

Our group organized a speaking tour in Alaska for Dr. Richard Piccioni, an expert on food irradiation research from New York. He has a Ph.D. in biophysics.

His research has uncovered an overwhelming body of scientific evidence linking irradiated food with carcinogenic, mutagenic, and cytotoxic effects. These problems arise because new chemicals known as radiolytic products form when a food is exposed to ionizing radiation. Both the FDA and Mr. Heidersdorf's guest column used "sleight of hand" arguments to dismiss this evidence.

A prime example is a study by the National Institute of Nutrition in India which fed irradiated wheat to malnourished children. This study found that a chromosomal blood abnormality known as polyploidy increases when malnourished children are fed irradiated wheat. The level of polyploidy returned to normal after irradiated wheat was withdrawn from the diet.

A control group which ate nonirradiated wheat did not suffer increased levels of polyploidy. These results have never been refuted with peer reviewed scientific literature. This is only one of many scientific studies which the FDA has failed to address in a scientific manner.

The tests used by the FDA to prove safety are not reassuring from a statistical viewpoint. Their approval is based on five animal feeding studies, none of which utilized a critical test procedure.

Studies in which highly concentrated levels of radiolytic products are fed to test animals are severely lacking in determining the real safety of irradiating foods.

Without concentrating possible carcinogens, animal feeding studies of this type can, at best, only verify that less than 1 in 10, or perhaps 1 in 100 rats will develop cancer. This is far from the safety level normally used by the FDA which requires less than one cancer incidence in 10 million cases.

The FDA issued approvals in 1986 for irradiation of fruits, vegetables, pork and spices. This action relies on a relatively new policy known as "deminimis." It allows approval of food additives if the FDA determines that cancer risks are very small (by law, food irradiation is treated as a food additive).

A federal law known as the Delaney Clause conflicts with the Diminimis Policy. It requires a chemical to be proven safe before it can be approved as a food additive. This law states that "no additive shall be deemed safe if it is found to induce cancer when ingested by man or animal."

When the approval of certain slightly carcinogenic red food dyes was challenged in a recent court case, the FDA's Diminimis Policy was found illegal. FDA's approval of food irradiation also lies on a tenuous legal foundation.

The University of Alaska-Fairbanks issued a report last December that recommended building a demonstration food irradiator in Kodiak. A relatively small facility was recommended which would utilize electron beam and X-ray sources of ionizing radiation. Its proposed capacity was about 1,500 to 1,900 tons of seafood and agricultural products per year.

The irradiator was proposed primarily to: 1) produce irradiated seafood for test marketing, 2) to do research that will pave the way for commercializing the process, and 3) provide assistance in winning FDA approval of irradiated seafood.

Food irradiation proponents proposed this as a research facility. They claimed that the safety problems would not exist because machine (as opposed to isotope) sources of ionizing radiation were proposed. It was ironic, that proponents were capitalizing on messages traditionally used to stop food irradiation by admitting that more research is required and by admitting that cesium-137 has a poor safety record.

SANE/Alaska countered this effort by pointing out that the UAF proposed research to commercialize food irradiation rather than to find answers about health and safety.

Gov. Steve Cowper rejected the proposal due to overwhelming opposition from the seafood industry. Although the UAF study claims that irradiation will expand the markets for Alaskan seafood, the industry did not agree. Governor Cowper characterized industry opposition as virtually unanimous.

The Alaska Seafood Marketing Institute is spending $3.3 million this year in a nationwide marketing campaign that focuses on Alaska's "pure and pristine image." This is the latest phase of a multi-million-dollar marketing and quality control program to rebuild the image of Alaska's seafood. An incidence of botulism poisoning severely hurt the industry about 10 years ago.

The seafood industry is concerned that the proposed irradiator will hurt the public image and marketability of all Alaskan seafood whether it is irradiated or not. Irradiation is inconsistent with a pure and pristine image.

Many of the important markets for Alaskan seafood including Japan, Great Britain, The Scandanavian countries, West Germany, New Zealand, and some states have either banned the sale of irradiated food for public consumption, or halted further applications of irradiated food due to consumer opposition.

Legislators in 10 states are advocating bills to ban the sale of irradiated food. This is happening because the scientific evidence is compelling once you dig into it.

New Jersey's health commissioner, Dr. Molly Coye, opposed such a ban last year. After New Jersey's Assembly overwhelmingly passed a ban, she convinced Gov. Thomas Kean to veto it.

Dr. Piccioni recently met with Dr. Coye to discuss the same scientific evidence used in SANE/Alaska's campaign. After examining this evidence, her position changed. She now supports a two-year ban during which the missing research will hopefully be conducted. Full passage of the New Jersey ban appears certain this year.

The negative response to food irradiation by consumers and the seafood industry is not based on emotional arguments as Mr. Heidersdorf suggested. Rather, it represents a rational response to scientific evidence.

Ed Davis is a professional engineer from Fairbanks who serves as president of SANE/Alaska.

FAIRBANKS
Daily News-Miner
Your Locally Owned Independent Daily Newspaper

VOL. LXXXVII. No. 68 | FAIRBANKS, ALASKA, FRIDAY, MARCH 10, 1989 | 50¢ per copy | 40 Pages

Friday

Irradiation study puts cart before horse

Guest Opinion

By ED DAVIS

SANE/Alaska's role in stopping the proposed food irradiator requires clarification. A Feb. 21 editorial in the Fairbanks Daily News-Miner portrayed opposition to food irradiation as irrational. This editorial and a Feb. 8 article implied that the questions posed by opponents would have been answered if the "research" facility was built.

We agree that new objective research is required to determine the long-term health effects to irradiated foods. Unfortunately, the UAF proposal excluded studies on health effects. Instead, it only proposed research to help commercialize the process.

This places the cart before the horse. It would have been irrational to let this project proceed without bringing facts such as these before the public:

1) The FDA has failed to produce evidence that refutes in a scientific manner, over 40 studies linking irradiated foods to mutagenic, carcinogenic, and cytotoxic effects.

SANE/Alaska paid to bring an expert on food irradiation research, Dr. Richard Picciono, who has a Ph.D in biophysics, to Alaska to discuss this scientific evidence.

2) Legislators in 10 states are advocating bills to ban the sale of irradiated food. This is happening because the scientific evidence is compelling once you dig into it.

New Jersey's Health Commissioner Dr. Molly Coye opposed such a ban last year. After New Jersey's assembly overwhelmingly passed a ban, she convinced Gov. Thomas Kean to veto it.

Picciono recently met Coye to discuss the same scientific evidence presented in SANE/Alaska's campaign. After examining this evidence, her position changed. She now supports a two-year ban during which the missing research will hopefully be conducted. Full passage of the ban appears certain this year.

3) Revealing quotes were made by Department of Energy officials who lobbied for the program that funded the UAF food irradiation study. One official stated that the success of this program will be measured by "the degree to which this technology is implemented industrially and the subsequent demand created for cesium-137."

Cesium-137 is the most troublesome component in nuclear waste. It comprises just 3 percent of the volume, but emits 50 percent of the heat and 55 percent of the radioactivity in nuclear waste.

4) Alaska's seafood is marketed nationwide by associating our "pure and pristine image" with the quality of our seafood. The seafood industry opposes irradiation because it undermines their primary marketing strategy.

Polls show that very few consumers will knowingly buy irradiated foods. The damage irradiation could impose on Alaska's seafood market is not based on emotionalism or alarmist rhetoric. Rather, it's the public's rational response to UAF, FDA and DOE actions which fail to acknowledge and responsibly address valid concerns such as these.

Governor Cowper was correct in noting that Alaska's market would suffer. The public and the seafood industry do not appreciate being used as guinea pigs.

Ed Davis is president of SANE/Alaska.

FAIRBANKS
Daily News - Miner
Your Locally Owned Independent Daily Newspaper
VOL. CXXXVI No. 318 FAIRBANKS, ALASKA, THURSDAY, NOVEMBER 17, 1988 50¢ Per Copy 28 Pages

Opinion

Food project a case of misplaced priorities

Celia Hunter

Views expressed here do not necessarily represent those of the Daily News-Miner

Selling government surplus property is a common practice, many times benefiting the average citizen. The surplus disposition unit at 6 Mile Richardson Highway has furnished many an Interior residence, and provided a variety of useful items to enhance living up here in the North country.

However, when the federal government begins to figure out ways to market surplus radioactive materials for uses which place the average citizen at risk, we have a right—indeed a duty—to protest.

One such proposal is the use of surplus Cesium 137, Cobalt 60, and X-rays to irradiate foods to prevent spoilage. This project has aroused intense controversy throughout the United States.

Even though the Federal Drug Administration has stated that the safety of irradiated foods has been demonstrated, opponents of such practices continue to point out that research so far is inadequate and misleading.

The undue haste of the FDA to establish a food irradiation program has resulted in officials failing to investigate the extensive scientific literature which already exists which points out that irradiation may destroy vitamins and other nutrients in foods.

In addition to such losses, research has discovered that irradiation can result in the creation of new, unknown chemicals, known as radiolytic products. Some radiolytic products are known carcinogens, and the consumption of irradiated foods may cause cancer or have other detrimental health effects.

The debate about the safety of irradiation is particularly timely here in Alaska, because Sen. Ted Stevens has intervened to secure a Department of Energy By-products Utilization Program grant for the University of Alaska Fairbanks to participate in the DOE's pilot food irradiation program.

Unfortunately, this grant will not cover studies to determine the potential effects of irradiation of foods on human health and well-being, but will concentrate on determining the feasibility of constructing a food irradiator in Alaska and on the marketing of irradiated seafood products.

This seems like a clear case of misplaced priorities. Until irradiation has obtained a clean bill of health after lengthy and intensive research, it makes little sense to figure out whether contruction of such facilities are viable. It makes even less sense to set up a marketing program, in which the intent is to convince the consumer that "irradiation is good for you."

SANE/Alaska is opposed to studies designed to speed up construction of irradiation facilities and marketing studies for irradiated seafood products until there is conclusive evidence that irradiation offers no hazard to human health.

In line with this policy, SANE/Alaska invited Dr. Richard Piccione, who holds a Ph.D. in biophysics, and is a recognized world authority on food irradiation, to be the featured speaker in a public lecture at the Woods Center Ballroom UAF campus last Saturday.

Another interesting aspect of the DOE sales pitch for radioactive materials is the ongoing crisis at most major nuclear plants operated by the DOE. It is now becoming public knowledge that these plants, many of them constructed in the 1950s are in a deplorable state of repair, with the liklihood of a serious accident occurring at any time.

Carelessness on the part of the operators of these plants has resulted in the release of thousands of tons of radioactive uranium waste into the environment. In the news recently, a congressional inquiry unearthed the information that those in charge of a DOE uranium processing plant at Fernald, Ohio, have known for years that the plant was leaking radioactivity into the air, and contaminating underground water tables with liquid wastes containing unacceptable levels of radioactivity.

Such callousness on the part of DOE administrators from the top down doesn't give their arguments as to the safety of irradiation much credibility. The lack of adequate safety of the entire system of nuclear facilities devoted to weapons material enrichment is a national disgrace.

Cleanup and repairs to existing plants is estimated to cost in the billions. At the same time, the DOE is pressuring for a permit to construct an nuclear enrichment plant west of Idaho Falls, in an area of the state already laced with a huge complex of nuclear facilities.

Idaho residents have organized vociferous opposition to the new plant, pointing out among other things that it will make a mockery of U.S. efforts to scale down the nuclear arms race with the Soviets.

All of these different DOE activities directly affect us as citizens.

Celia Hunter is the creator of Camp Denali, one of the first Alaska wilderness vacation camps, and has been active in the Alaska conservation movement since 1960.

JOURNAL
more than just the tip of the news Vol. 12, No. 10, October 1989 $1.50

FISHERMAN'S FORUM

Why Alaska Should Say No To Seafood Irradiation

by Ed Davis

Editor's note: Ed Davis has an MBA and is a professional engineer from Fairbanks, Alaska. He serves as Vice-President of SANE/Alaska. He worked on a shrimp trawler and salmon tender out of Valdez between 1982 and 1985.

Alaska's seafood market survived its first close encounter with food irradiation. On February 7, 1989, Governor Cowper declined Department of Energy (DOE) funding for a food irradiator in Kodiak, Alaska. However, the possibility still remains that a food irradiator will be built for Alaska seafood.

Extensive scientific evidence has linked irradiated foods with a variety of adverse health effects. To protect the seafood markets and public health, a continuing campaign is needed to enact a responsible food irradiation policy.

The Institute of Northern Engineering at the University of Alaska-Fairbanks (UAF) created a statewide controversy over food irradiation with a report issued in December of 1988. It recommended construction of a demonstration seafood irradiator.

By exposing seafood to ionizing radiation, UAF hopes to kill food bacteria and extend shelf life. Irradiation does not make food radioactive.

The proposed facility was relatively small and would have utilized electron beam and X-ray sources of ionizing radiation. Its capacity was 1,500 to 1,900 tons of seafood and agricultural products per year.

It was to be used primarily for: 1) producing irradiated seafood for test marketing, 2) performing research to pave the way for commercializing the process, and 3) providing assistance in winning FDA approval for irradiating seafood.

Threat to AK Seafood Industry

The UAF report claimed that irradiation could expand the markets for Alaska seafood. That claim is debatable.

The Alaska Seafood Marketing Institute is spending $3.3 million this year in a nationwide marketing campaign that focuses on Alaska's "pure and pristine image." This is the latest phase of a multi-million dollar marketing and quality control program to rebuild the image of Alaska's seafood. An incidence of botulism poisoning severely hurt the industry in 1982.

Irradiation opponents are concerned that the proposed irradiator will damage the public image of, and threaten the markets for, all Alaska seafood whether it is irradiated or not. The apple industry's experience with Alar demonstrates that consumers are not willing to buy foods of questionable safety.

A recent poll conducted by Lou Harris for the Food Marketing Institute showed that only 13 percent of American shoppers think irradiated foods are safe. Irradiation is inconsistent with the "pure and pristine image" which is used to sell Alaska seafood.

Many of the important markets for Alaska seafood including Japan, Great Britain, the Scandinavian countries, West Germany, New Zealand, and some states have either banned the sale of irradiated food for public consumption, or halted further applications of irradiated food due to consumer opposition.

Scientific Evidence Justifies Caution

Proponents of food irradiation attribute consumer opposition to emotional and irrational responses to nuclear technology and alarmist rhetoric. To counter these charges, SANE/Alaska spearheaded an educational campaign in conjunction with the seafood industry and various public interest groups.

This effort focused on the scientific, economic, and legal criteria for concerns about food irradiation. An objective review of this information yields compelling and rational justification for opposing food irradiation.

To illustrate the campaign's scientific validity, SANE/Alaska organized an Alaska speaking tour for Dr. Richard Piccioni, an expert on food irradiation research from New York. He has a Ph.D in biophysics.

Dr. Piccioni's research has uncovered 40 scientific studies linking irradiated food with carcinogenic, mutagenic, and cytotoxic effects. These problems arise because new chemicals known as radiolytic products form when a food is exposed to ionizing radiation.

Dr. Piccioni uncovered twelve other studies that verified the production of harmful radiolytic products in irradiated foods. Unfortu-

6—Fairbanks Daily News-Miner, Fairbanks, Alaska, Wednesday, February 8, 1989

State won't seek funding for food irradiation plan

Staff and AP reports

Despite a university report recommending a food irradiation demonstration project in Alaska, Gov. Steve Cowper said Tuesday that the state will not seek federal funding for the plant.

At issue is whether the state should apply for federal funds to build a test facility to expose foods to small doses of radiation to kill bacteria and parasites, Cowper said.

"I don't normally discourage the seeking of information about new techniques," he said. "But I'm convinced that the association of Alaska with food irradiation will have a detrimental effect on Alaska seafood sales."

The state's seafood industry opposes the irradiation project, Cowper said.

At least two commercial fishing groups recently sent letters to Cowper opposing the test use of irradiation in the seafood industry. The Copper River Fishermen's Cooperative and the United Fishermen of Alaska both expressed concern on the potential health risks associated with the process and that many countries already ban the sale of irradiated food products.

The idea also has come under fire from SANE/Alaska, which is questioning the Food and Drug Administration's approval of food irradiation. The federal agency already has approved the use of irradiation in spices, medical supplies and some vegetables.

Ed Davis, president of the group, believes there has been insufficient research on irradiation to prove that it doesn't pose health risks.

The University of Alaska Fairbanks Institute of Northern Engineering recently completed a $400,000 analysis of food irradiation and recommended a test facility in Alaska late in 1988.

William Workman, associate professor of economics and a member of the university research team, said the state's position on the issue could be a "missed opportunity."

He said many of the questions posed by opposing groups would be answered if a research facility was built.

"This isn't an immediate proposal for commercial application," he said. "I don't understand how commercial sales of Alaska seafood could be affected negatively with a research facility in the state."

Supporters of food irradiation say it would extend the shelf-life of food products and would benefit producers and retailers.

Legislation to prohibit the sale of irradiated food in Alaska was considered by lawmakers last year and is under review again this session.

Bills that would ban the sale of irradiated food are being considered in Massachusetts, Vermont, New Hampshire, New York, Pennsylvania, Oregon and Minnesota, according to a SANE/Alaska news release.

Opponents of using radiation to kill food bacteria say the U.S. Food and Drug Administration has not approved the process for wide use and consumers are suspicious of the process.

nately, the FDA used "sleight of hand" arguments to dismiss this evidence during the approval process for food irradiation.

A prime example is a 1976 study by the National Institute of Nutrition (NIN) in India which fed irradiated wheat to malnourished children. This study found that a precancerous chromosomal blood abnormality known as polyploidy increases when malnourished children are fed irradiated wheat. The level of polyploidy returned to normal after irradiated wheat was withdrawn from the diet.

A control group which ate non-irradiated wheat did not suffer increased levels of polyploidy. These results were reconfirmed in a 1986 study. Neither of these NIN studies have been refuted with peer-reviewed scientific research.

Food irradiation proponents attempt to discredit these NIN studies by citing similar research conducted in China which tested healthy male medical students.

This Chinese study is not recognized as peer-reviewed research. It also fails to address the conclusion that children or weakened populations are at risk when consuming irradiated foods. It was highly unprofessional for food irradiation advocates to selectively dismiss scientific studies without solid evidence that irradiation is safe as defined by federal law.

The criteria used by the FDA to prove safety are not reassuring from either scientific, legal, or statistical viewpoints. The FDA's approval is based on five animal feeding studies and a theoretical model. Neither the tests nor the model adhered to the traditional procedures and legal criteria for an FDA approval.

Highly concentrated levels of food additives are normally fed to test animals as part of the FDA's approval process. This testing has yet to be conducted on irradiated foods.

Without concentrating possible carcinogens, animal feeding studies can, at best, only verify that less than one in ten, or perhaps one in a hundred rats, will develop cancer. This is far from the safety level normally used by the FDA which typically requires less than one cancer incidence in a million, or even ten million cases. Further research is clearly required.

UAF presented the seafood irradiator as a research facility. The type of research they proposed however, is not intended to resolve questions about the long-term health effects of irradiated food. UAF chose instead, to place the cart before the horse by only proposing research to help commercialize food irradiation.

Questionable Legal Foundation

The FDA issued approvals in 1986 for the irradiation of fruits, vegetables, pork and spices. This action relied on a relatively new FDA policy known as "de minimis." The policy allows approval of food additives if the FDA determines that cancer risks are very small. By law, food irradiation is treated as a food additive because new chemicals are created in the food.

The FDA's reliance on the de minimis policy ignores a conflicting federal law known as the Delaney Clause. This law requires that a chemical be proven safe before it can be approved as a food additive. It states that "no additive shall be deemed safe if it is found to induce cancer when ingested by man or animal."

When the FDA's approval of certain slightly carcinogenic red food dyes was challenged in a recent court case, the FDA's de minimis policy was found illegal. FDA's approval of food irradiation is highly questionable under the court's interpretation of the Delaney Clause.

Proponents of food irradiation often present the argument that irradiated foods will be labeled and that consumers can choose not to buy them. Although this would be a reasonable approach if labeling were strictly enforced, consumer choice has been and continues to be undermined.

Loopholes already exist in FDA rules that allow foods containing irradiated ingredients and foods from restaurants to be sold without labeling. The FDA's attitude towards providing a real choice for consumers is not reassuring.

Consumer advocates have been forced to wage vigorous campaigns to stop repeated FDA attempts to further undermine labeling requirements. In 1984, the FDA proposed that no labeling should be required on irradiated foods.

> *Through irradiation, the U.S. Dept. of Energy is trying to create a commercial demand for cesium 137, the most troublesome component in nuclear waste. It comprises just 3 percent of the volume, but it emits 50 percent of the heat and 55 percent of the radioactivity in nuclear waste.*

Nuclear Industry Campaign

The primary advocates of food irradiation are the DOE and the nuclear industry's commercial sector. The food industry has reacted cautiously because of consumer opposition.

The underlying reasons for promoting food irradiation are evident in the DOE's testimony at Congressional hearings on the By-products Utilization Program (Now renamed the Advanced Radiation Technology Program. This program funded UAF's $400,000 food irradiation study.) The DOE stated that their strategy is: "to transfer cesium 137 irradiation technology to the commercial sector as rapidly and successfully as possible. The measure of success will be the degree to which this technology is implemented industrially and the subsequent demand created for cesium 137."

Cesium 137 is the most troublesome component in nuclear waste. It comprises just 3 percent of the volume, but it emits 50 percent of the heat and 55 percent of the radioactivity in nuclear waste.

Capital costs for electron beam/X-ray facilities exceed, by a factor of at least two, the costs for cesium 137 facilities. The UAF's decision to propose an electron beam/X-ray ionizing radiation source was admirable because it minimizes worker safety and environmental threats. Their decision, however, was not economically justified.

Little incentive will exist for copying the UAF's "admirable" decisions if private investors eventually develop commercial food irradiators. That UAF decision was a luxury made possible by the availability of government research funding.

UAF's proposal uses relatively benign X-ray/electron beam food irradiation technologies to provide a foot in the door for the DOE's ultimate goal; establishing a commercial demand for cesium-137.

Cesium 137 irradiators have a very poor safety record. Many cases are documented where radioactive leaks have contaminated both facilities and workers. The latest accident was discovered on June 6, 1988, at an irradiator owned by Radiation Sterilizers Inc. in Decatur, Georgia.

Several stainless steel capsules containing cesium 137 developed leaks, contaminating the office area, 10 workers, and water in the 25,000 gallon storage tank. Nobody knew how to deal with an accident of this type. It took months just to figure out how to start decontaminating the facility.

New York, New Jersey, and Maine have outlawed the sale of irradiated foods. Legislatures in Alaska and five other states are now considering bills to ban the sale of irradiated food. Responses of this magnitude are generally based on compelling scientific evidence rather than emotionalism.

For example, the Health Commissioner of New Jersey, Dr. Molly Coye, opposed a food irradiation ban last year. After New Jersey's Assembly overwhelmingly passed a ban in 1988, she persuaded Governor Thomas Kean to veto it.

Dr. Piccioni recently met with Dr. Coye to discuss the same scientific evidence that SANE/Alaska used in its public education effort. After examining this evidence, her position changed. She supported the 1989 food irradiation ban signed by Governor Kean.

Alaska's State Legislature is considering a bill (HB-25) which would make the sale of irradiated food illegal in Alaska. It also contains provisions for the Commissioner of the Department of Environmental Conservation to embargo foods that are irradiated.

The bill passed in the State House on March 31, 1989, by a vote of 31-4. Its progress in the Senate was abruptly halted when Sen. Fred Zharoff (D-Kodiak) asked that HB-25 be assigned to a subcommittee consisting of himself. The bill's chances for passage in next year's legislative session are threatened unless Sen. Zharoff releases the bill for further consideration by the Senate.

SANE/Alaska is advocating passage of this bill. Alaska needs a sensible and well defined food irradiation policy which addresses the topics covered in this article.

Without such a policy, private

enteryrise may step in. Governor Cowper's action fell short of precluding this possibility.

Isomedix Inc. and University of Alaska staff members are waging an effort in Juneau to kill HB-25. Isomedix owns more licenses to operate irradiation facilities than any other U.S. firm.

It took an overwhelming display of public opposition to convince Gov. Cowper that the state should stay out of food irradiation. Unless Alaskans continue to press their leaders for passage of HB-25, the market for Alaska seafood may soon face even closer encounters with food irradiation.□

St. Petersburg Times
ST. PETERSBURG, FLA.
SUN. 471,472
FL-213

NOV 25 1990
BURRELLE'S

Irradiation plant worries neighbors

By SALLY HICKS
Times Staff Writer

Next Thanksgiving, Sam Whitney says he will be eating turkey that has been exposed to radiation.

That's a promise that makes some people in the community of Mulberry very, very nervous.

By next year, the businessman expects to have completed the nation's first food irradiator, a $6.4-million plant where fruits, vegetables and poultry will be exposed to gamma rays to kill fruit fly larvae, insects and parasites and to extend shelf life.

The plan has brought this Polk County community of 4,200 people into the center of a bitter international debate over the dangers and possibilities of food irradiation.

After five years of planning and a year of battling with residents, Whitney says he and his backers are nearly ready to make cleaner, longer-lasting food.

Opponents say Whitney's company, Vindicator of Florida, will expose them and the people who eat its products to unnecessary health risks.

"We've got everything from vacuum-packing to freezing and canning that have been around for hundreds of years. Why take the chance?" asked Jan Privett, a special investigator for the Polk County-based Concerned Citizens League of America.

Whitney and about 75 investors began investigating the idea of food irradiation to kill fruit fly larvae when the pesticide EDB was banned.

It seemed a perfect solution for citrus growers looking to market fruit in areas such as Japan and Arizona, which need to protect local growers from the pests.

About a year ago, they settled on a site in Mulberry, about 40 miles east of Tampa on State Road 60.

Opponents jammed City Commission meetings, and national experts traveled to City Hall to testify on both sides. The city's attempt to block the plant failed when a judge overturned a moratorium on such plants; it was approved in September after a commissioner said he received a divine message to vote in favor of it.

Vindicator broke ground Oct. 1 on the plant, a large warehouse where packaged food would be moved through a concrete room with 6-foot-thick walls to be exposed to radiation.

Whitney said construction should be finished by May, and the plant will begin treating food about a month later.

The food, water and building will not become radioactive during the process, said Dan Nash, manager of the state Office of Radiation Control.

"There's a big difference between irradiation and contamination," he said. "I think people are frightened because they don't know the difference."

Irradiation has been approved by the U.S. Food and Drug Administration since 1963. Poultry was added in May to the list of foods that can be irradiated safely.

Groups such as the World Health Organization, the American Medical Association and the U.S. Department of Agriculture have endorsed irradiation, and it is used in more than 30 countries. Astronauts and military personnel have eaten irradiated foods.

In addition to the argument over food safety, opponents also fear that an accident at the plant could expose workers and Mulberry residents to radiation.

But whether irradiation is dangerous could be less critical than whether it's *appetizing*.

Whitney says he is confident that the fruit, vegetable and poultry industry will use his irradiator and that people will buy the products. He predicts the company will gross $2.4-million in its first 12 months of operation and turn a small profit. He estimated the plant will process each year 30-million pounds of strawberries to slow spoilage and up to 40-million pounds of poultry to kill salmonella.

But Quaker Oats, McDonald's Corp., Campbell Soup Co. and many poultry companies have abandoned the process because of fears of a consumer backlash. New York, New Jersey and Maine have banned irradiated food.

One of Florida's largest grocery chains, Publix, already is assuring its customers it won't put irradiated food on its shelves.

Whitney dismisses my questions about the economic success of the business.

"We know there's a market. We're not concerned about Publix. We're convinced they're going to be a fine customer of ours — of the industry."

So why aren't they saying so?

"They'd be crazy to say it because somebody would be over there tomorrow with a sign," he said.

The Star-Ledger
Friday, October 20, 1989

ACTION IN TRENTON

A special section reporting major actions during yesterday's meeting of the State Legislature

Two-year ban on food irradiation passes overwhelmingly in Senate

By MATTHEW REILLY

A bill to place a two-year ban on the use of irradiation to preserve food was approved yesterday by the Senate.

The Senate voted 35-1 to concur with changes in the bill (S-1816) recommended by Gov. Thomas Kean, who conditionally vetoed the original version. The amended bill mirrors legislation enacted recently in New York.

Kean's conditional veto was based on his belief that the issue would be better addressed at the federal level and on the state Health Department's claim that there was insufficient evidence to support a permanent ban.

Senate Minority Leader John Dorsey (R-Morris), the sponsor of the bill, said he is convinced there is enough evidence available on the dangers of food irradiation to warrant a permanent ban.

"I consider a two-year ban to be an effective compromise between the original proposal, which called for a permanent ban, and those who opposed any restrictions on irradiated food," Dorsey said. "A two-year moratorium on irradiation will give the state a good time period to weigh the question of whether irradiation should be banned permanently."

The bill now includes a recommendation by the Governor that the bill contain a "sunset clause" that provides for the expiration of the ban two years after enactment. During that two-year period, the Department of Health would be responsible for concluding toxicological tests to determine the effects of the gamma radiation process.

The moratorium stipulates that food products and fruits and vegetables treated with gamma radiation, a process used to destroy microorganisms, control insects or delay ripening, could not be sold or distributed in New Jersey.

Proponents of the ban maintain that radiation causes chemical changes in the food, including the production of formaldehyde, that can be dangerous to consumers and may cause cancer, birth defects or genetic mutations.

"Aside from the health aspects, questions have been raised as to whether irradiation of food is really necessary at all," Dorsey said. "After all, it destroys nutrients in fruits and vegetables and does not eliminate the need for pesticides."

CORPORATE RESPONSIBILITY

Food Irradiation Process Opposed

By Guy Halverson
Staff writer of The Christian Science Monitor

NEW YORK

PUBLIC interest groups eager to promote "corporate responsibility" are now taking an innovative approach here: They are seeking to limit or curtail certain production processes.

Last month, the Quaker Oats Company announced at its annual meeting that it would no longer irradiate food products or buy irradiated food. That decision followed a campaign by public interest activists who had – among other steps – filed a shareholder's resolution with the Chicago-based food company seeking clarification of Quaker Oat's food preparation policies. Stockholders learned that the company's Golden Grain subsidiary, which makes pasta products, had once used irradiated mushrooms in its food preparation process.

Irradiation is a federally approved production process for vegetables, fruits, nuts, certain meats, flour, and grains that lengthens their shelf life. Some activists dislike the process because it requires that food be exposed to ionizing radiation from cobalt 60 and cesium 137, both radioactive sources.

"When the food is subjected to irradiation, molecules are hit so hard that they break apart; but when they come back together, new chemicals are formed. It is our contention that it is just impossible to determine the safety of these new chemicals at this time," says Christina Roessler, executive director for Food & Water Inc. The non-profit public interest group, based in Denville, N.J., is determined to curb the practice.

To say that Food & Water Inc. has been successful so far may be somewhat of an understatement, according to food industry analysts. Prior to the decision by Quaker Oats to adopt an anti-irradiation policy, H. J. Heinz & Company announced in September that it would adopt an anti-irradiation policy. Another food producer, Ralston-Purina, has agreed that it will announce such a policy at its annual meeting this January, according to Ms. Roessler.

New Jersey's legislature passed a bill earlier this month, just signed into law by Governor Thomas Kean, banning irradiated foods for two years. Several other states, including New York

Quaker Oats, H. J. Heinz, and Ralston-Purina plan to stop irradiating food. New Jersey, New York, and Maine plan to restrict the sale of such food.

and Maine, have either imposed or are considering curbs on the sale of irradiated food.

Currently, Food & Water Inc. is seeking to block the construction of a poultry plant in central Florida that would use irradiation. On the national level, the organization works with such groups as the Interfaith Center on Corporate Responsibility, which is made up of a number of Roman Catholic and Protestant congregations who seek to influence corporations through the corporate shareholder process.

Corporate experts note that while seeking to persuade companies to adopt specific public policy issues is not new – such as asking companies to divest holdings in South Africa, for example – attempting to persuade firms to alter or abolish actual production processes is somewhat unique.

Corporations come under the scrutiny of public interest groups over other issues. On Jan. 9, for example, the Council On Economic Priorities, in cooperation with Ballantine Books, will issue its latest edition of "Shopping For A Better World," a handbook that rates companies on a number of public policy issues. "Some 168 companies will be looked at, including over 1800 brands," according to Alice Tepper Marlin, executive director of the Council.

F.Y.I.

San Francisco Chronicle
SAN FRANCISCO, CA.

FEB 1 1990
BURRELLE'S

San Francisco Chronicle 2/14/90

THE FARM REPORTER

Henry Schacht

Why Irradiated Food Items Never Found Their Market

9798

What ever happened to irradiated foods?

In case anyone is asking, we can report that there is no ready demand for them and that the food industry is showing no interest. Contrast that with the many news reports in 1983-87 suggesting that irradiation was about to sweep the industry.

Focusing gamma rays on food, it was predicted, would free them of all manner of pests and diseases, keep them in top condition indefinitely on shelves and protect the public from food-borne disease organisms such as salmonella.

Irradiation had long been approved for spices and seasonings. Then the Food and Drug Administration OKd it for fresh pork and some fruits and vegetables. Poultry was thought to be next.

But a strange thing happened. Consumers showed no great interest in irradiated products. That being the case, neither did food distributors nor investors who might have set up irradiation facilities. The attitude within the food industry was: Who needs it?

Despite reassurance from the FDA and from the scientific community, questions arose about the safety of irradiated products. Not that irradiation would render the products radioactive. But fears were raised that it might create new and dangerous byproducts.

California and Florida supermarkets that offered irradiated mangoes and papaya found crowds of placard-carrying protesters at their doors. It was suggested that approval of radiation was a government plot to dispose of radioactive wastes in hundreds of concrete bunkers masquerading as irradiation plants.

Before long, the food industry lost whatever enthusiasm it had for irradiation.

Now the FDA has recognized the reality. The FDA developed a distinctive logo to be placed on irradiated products. The agency predicted that by April 19 this logo would be so familiar to consumers that food products would no longer have to be labeled "treated with irradiation."

Now the FDA has backed off that plan. Labels on irradiated products will have to carry the statement. The logo has been so little seen that few consumers recognize it.

Irradiation supporters point out that microwave ovens were also looked upon with suspicion at first, but now are found in millions of households. Whatever hope that observation raises for irradiation is faint indeed.

WEDNESDAY, SEPTEMBER 24, 1986
Copyright © 1986 The New York Times
The New York Times

Fruit, Fish and Gamma Rays

Insects, bacteria and mold are the enemies of fresh food. All can be arrested by energetic radiation — typically a zap of gamma rays. The Food and Drug Administration recently approved the sale of irradiated fruit and may soon allow that of fish and poultry too. Is that hasty? Irradiated food sounds unappetizing. Is it also unsafe?

The food itself does not become radioactive. The main safety concern is that the gamma rays, from a radioactive source, produce what chemists call free radicals. These disruptive agents agitate among other molecules and create new chemicals in the irradiated food. The Food and Drug Administration does not consider free radicals a serious menace. It contends that the new products are so similar to natural chemicals as to pose no unusual problem — and besides, they're created in insignificant amounts.

That's an interesting theory. Where's the proof? Preserving food by radiation is an old idea. A raft of studies has accumulated on feeding irradiated food to animals. The agency recently reviewed more than 400, and rejected all but 67 as worthless. Of the 67, about half conclude that irradiated food is toxic, half that it isn't. That's hardly a seal of approval. But the agency then conducted another review, after which only five studies were deemed to meet modern toxicology standards. All five showed no adverse effects.

Maybe this backward-looking procedure justifies giving the irradiation technique a chance. It's been safely used for some time on spices. But they form a tiny part of the diet. For major items like fruit and meat: more persuasive evidence of safety would be comforting. Before the F.D.A. goes much further, it should ask an independent group like the National Academy of Sciences to review its rationale, as proposed in a bill by Representative Douglas Bosco, Democrat of California.

Proponents say irradiation will permit abandoning toxic fumigants like EDB, kill the agents of food poisoning in chicken and of trichinosis in pork and provide indefinite shelf life. These are substantial benefits. But to kill bacteria demands even higher radiation dosages than those already approved, producing more of those chemicals.

The higher doses are also more likely to degrade vitamins and nutrients. Another concern is that irradiation may alter the natural balance among bacteria in food and remove the stink that warns of taint and toxins.

New technology should be allowed every reasonable chance of finding useful market niches. Food irradiation is an old and dubious technology that deserves a chance but no special break. At present, irradiated food must bear a logo and the label "treated with radiation," but the F.D.A. proposes to let the labeling requirement lapse after two years. If the agency wants to help the technique along, let it demand more compelling proof of safety, not acquiesce in hiding the gamma rays and plunging consumers into the dark.

The Star-Ledger

The Newspaper for New Jersey, Saturday, December 9, 1989

Governor 'zaps' irradiated food

By ROBERT SCHWANEBERG

The sale or manufacture of irradiated food is banned in New Jersey for two years under a bill signed yesterday by Gov. Thomas Kean.

"There are just a whole lot of questions involved with irradiated food and not a whole lot of answers," Kean said. "I just felt it was better to be safe than sorry."

Irradiation kills insects and other organisms in food and extends the shelf life of some food items. Critics claim it also causes chemical changes with effects that have not been fully studied.

Kean proposed the two-year moratorium in August as an alternative to a permanent ban on the sale of irradiated food—a measure he had earlier vetoed.

Although the federal Food and Drug Administration has approved irradiation of some food items since 1963, Kean said "a public consensus has yet to be achieved over the safety of food irradiation."

The bill (S-1816) was sponsored by Sen. John Dorsey (R-Morris). Assemblyman John Kelly (R-Essex) sponsored identical legislation in the lower house. The moratorium does not apply to irradiated spices.

The new law, which took effect immediately, made New Jersey the third state to ban irradiated food. New York adopted a two-year moratorium in August, while Maine has banned the sale of irradiated food indefinitely.

Food and Water Inc., a Denville-based group that has lobbied against food irradiation, praised Kean's two-year moratorium. Dr. Walter Burnstein, the group's president,

Please turn to Page 13

Continued from Page One

said the benefits of food irradiation "are insignificant when compared to the detrimental effects to human health and the environment."

George Giddings, a Whippany radiation processing consultant, was "very upset" by the moratorium. He said there is an "overwhelming consensus" within the scientific community, though perhaps not the general public, "that irradiated food is safe and wholesome."

Giddings also said the moratorium would have "minimal" practical effect, as almost no irradiated food is currently produced in or imported into New Jersey. He said there was a possibility the FDA might soon approve irradiation of poultry to control salmonella and other organisms, in which case New Jersey consumers would "be denied that public health benefit."

Michael Colby, associate director of Food and Water, argued exposing poultry to irradiation would only be "adding a problem to a problem." He said salmonella in poultry is a result of unsanitary processing and should be addressed by "cleaning up the process."

Colby and Giddings agreed the major effect of the bill would be to set the stage for a continuing battle as to whether food irradiation should be banned permanently.

Colby said there is enough evidence of health and environmental hazards to justify such a ban. Giddings said, "I'm confident that the basis for reaching a public consensus on the safety of irradiated food will continue to grow."

Food irradiation: Is it a safe process for consumer health?

7-7-88

Public awaits outcome of debate to make informed choice

FRESNO, Calif. (AP) — Zapping fresh foods with radiation may increase their shelf life and make them safer to eat. But the notion of eating irradiated fruits, vegetables and meats leaves a bad taste in some mouths.

Despite claims by some scientists, the federal government and others that irradiation is a safe way to rid foods of bacteria, microorganisms or insects, anti-nuclear activists and other scientists insist it can harm people.

The process involves running produce on a conveyor belt around a radiation source for a few seconds or minutes. Eighteen-inch long rods containing either cobalt 60 or cesium 137 treat the foods without raising their temperature. When not in use, the rods are immersed in water as a safety precaution.

X-rays and gamma rays break chemical bonds and "either disrupt the ongoing process of decay or any contaminant on the food," said Christine Bruhn, consumer food marketing specialist with the University of California Cooperative Extension at Davis.

Supporters say food does not become radioactive at the doses used and is safe to handle and eat immediately after irradiation. They say it can extend shelf life of some produce and meats and rid pork of dangerous parasites.

"Irradiated food has been shown repeatedly to produce adverse health effects . . ."
— Denis Mosgofian, director of Coalition to Stop Food Irradiation

"Scientists say it is safer than products contaminated with microorganisms or mold or some chemically approved products," Bruhn said.

Opponents contend that studies showing adverse effects have been ignored or suppressed. One found chromosome damage in humans four weeks after they ate freshly irradiated wheat, said Denis Mosgofian, director of the San Francisco-based Coalition to Stop Food Irradiation.

"Irradiation of food actually changes the food, rearranges its chemistry, creates new chemicals, many of which are toxic," Mosgofian said. "Irradiated food has been shown repeatedly to produce adverse health effects to both animals and humans who consumed it."

Rep. Douglas Bosco, D-Calif., introduced legislation in March to rescind a 1986 ruling by the Food and Drug Administration allowing the sale of irradiated foods. He also called for a National Academy of Sciences study of the process.

Bosco said he wanted "any new technology proven safe before it is allowed to permeate our food chain."

Concern also has been raised that irradiation might allow mutations of bacterias or viruses, but a World Health Organization study turned up none. "It could happen in the future," Bruhn said. "It's unlikely."

Irradiated food is rare at U.S. supermarkets, partly because fumigation is cheaper. But the process is used to sterilize medical equipment at 40 plants in the United States, and some spices are irradiated to kill microbes.

Produce and pork can be treated with radiation before marketing, but consumers are leery

Irradiated food: Is it safe?

■ Imagine sinking your teeth into a feast of irradiated pork chops, asparagus zapped with gamma rays and, for dessert, strawberries à la cobalt 60.

Yummy or not, it's an American menu of tomorrow—if some federal officials and food processors get their way.

Radiation is being touted by the nuclear industry and food companies as a safe alternative to chemical pesticides and a way to kill parasites like trichina found in some swine herds.

The Food and Drug Administration in April approved its use on fruits, vegetables and fresh pork, and the U.S. Agriculture Department wants the FDA to authorize it for poultry as a way of controlling salmonella, bacteria that kill 2,000 Americans yearly.

Sometime this fall, in a limited-market test of consumer acceptance, a few stores will begin selling radiation-treated potatoes or onions in the Pacific Northwest. The industry will keep locations secret for fear of protesters. And there's the hitch. FDA rule making on irradiation has drawn more mail from worried consumers than any issue in recent times. Resolutions urging a ban on irradiation or stricter labeling have been introduced in at least six states. Faced with rising opposition, the food industry is taking a wait-and-see attitude before pushing treated meats and produce to market.

The process leaves no radiation residue on food, and agencies from the FDA to the World Health Organization say that foods exposed to low doses are safe for human consumption. However, the subject is shrouded in fear and scientific unknowns. The few tests of irradiated food on people have been brief, and critics charge that not enough reliable animal studies have been done. Irradiation does break down chemical bonds in food, potentially creating toxins that, in sufficient strength, could cause cancer. But advocates contend that cooking can create as many food toxins.

"The health effects of food irradiation are simply unknown," asserts Dr. John Gofman, professor emeritus of medical physics at the University of California at Berkeley. He says an enormous human experiment lasting 20 years would be needed for a definitive answer.

Public concerns over safety extend to the handling of radioactive cobalt used in the process. In June, the Nuclear Regulatory Commission accused Radiation Technology, Inc.—which had planned to sell irradiated pork, asparagus, avocados and mangoes this summer—of lying to investigators about disconnecting a safety lock on a radiation room door. The firm's license at its Rockaway, N.J., plant was yanked, and the company now faces possible criminal prosecution. Another irradiation firm, International Nutronics, Inc., was indicted on charges of conspiring to cover up a 1982 accident in which radioactive water seeped into soil at its Dover, N.J., plant.

Defenders of the technology contend that the 45 U.S. irradiation plants now used to sterilize medical instruments have a fairly clean safety record. Only two workers have been injured through accidental exposures in the past 20 years. And because no nuclear core is involved, it is impossible for a meltdown to occur.

The food-treatment process is simple. Foods put on a conveyor belt pass near a concrete-and-lead-shielded chamber housing the radioactive source, typically cobalt. Emitted gamma rays destroy insects and bacteria. Higher doses—generally above those allowed by the FDA—also could extend the shelf life of perishables. The process does not work on all foods: It causes leafy vegetables to lose their green color, grapes to become soft and bananas to develop brown spots.

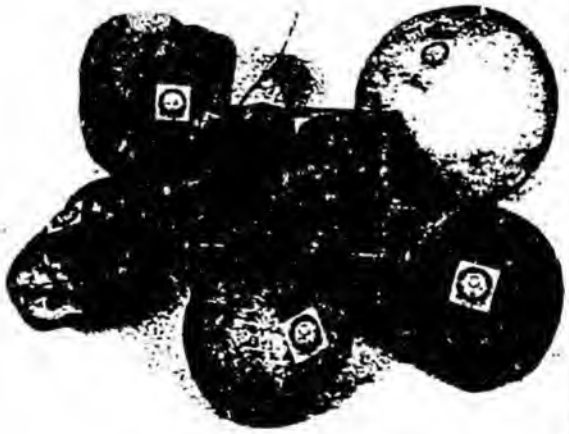
Americans have been eating some irradiated ingredients for the past three years, including dried spices used in some prepared foods such as frozen pizza and cookies. But authorities say less than 1 percent of the spices consumed in the U.S. are treated this way.

The labeling of irradiated food is nearly as controversial as its safety. Surveys show most shoppers would not buy produce labeled as irradiated. However, the FDA plans in two years to drop its rule that foods display the phrase "treated with radiation." Instead, it will continue to require only an international symbol for irradiation—a broken black circle and geometric design—used in countries such as Japan and Holland, where irradiated food has been sold for several years.

Consumer groups are charging that shoppers are kept in the dark because prepared foods that include irradiated ingredients are not required to be labeled. Mark Rosengarden of the National Coalition to Stop Food Irradiation complains: "I don't want my 3½-year-old son eating irradiated food, and there's no way of keeping it out of his mouth."

"This industry will develop slowly," says Bahar Gidwani, a stock analyst at Kidder, Peabody & Company. By the year 2000, though, some promoters envision hundreds of irradiation plants sending such perishables as mangoes to Minnesota and fresh shrimp to South Dakota, and irradiation rivaling canning as a way to preserve foods. Predicts Gidwani: "Within a decade, we'll see every food processor worth his salt in this industry." ■

by Peter Dworkin



■ These fruits and vegetables are good candidates for gamma-ray treatment to kill insects

■ FDA approval of process draws protest from the National Coalition to Stop Food Irradiation

Plant safety also is a concern

Jack Anderson

Zapping Our Food

WASHINGTON — Preserving fresh fruit and vegetables by zapping them with radioactive rays may be the technique of choice in 10 or 15 years, but its safety is still a matter of debate. Meanwhile, a veritable mushroom cloud of controversy has arisen over the Energy Department's bumbling intervention in the situation.

Anderson

The department isn't in the food processing business, of course, nor is it responsible for determining the safety of irradiated food. But as custodian of the government's nuclear waste, the department found itself with a large quantity of radioactive cesium 137 it wanted to unload. It decided that food processors, and medical-equipment sterilizers were the ones who could take the stuff off its hands.

That alone was enough to arouse the wrath of the Health and Energy Institute, a non-profit watchdog group concerned with the dangers of radiation. The Energy Department "is not trying to find the best way to preserve food or protect human health," the institute charges. "It's trying to find a convenient way to get rid of some of its nuclear garbage created by building nuclear weapons."

The uproar over cesium is a recent development. The Energy Department had been trying for years to sell the 77 million curies of cesium it had. There were no critics of the sale plan — mainly because there were no buyers, even when the department dropped its price to a giveaway level of 10 cents per curie.

But within the past few years, three things happened: The government forbade use of the chemical ethylene dibromide — EDB — as a food preservative, which enhanced the attractiveness of the irradiation process. At the same time, cobalt 60, the preferred radioactive material for food processing, was in temporarily short supply, and federal regulations governing food irradiation were broadened.

All of this created a sudden demand for the Energy Department's previously unwanted cesium. And this, in turn, stirred concern among environmentalists.

Even Rep. Sid Morrison, R-Wash., who would dearly love to get the government's cesium out of its present storage site near Richland, Wash., is leery about selling the dangerous material outright. "Selling it is a perilous venture," he told our associate Vicki Warren. "I prefer leasing, because then the government is responsible for the transportation, handling and disposal. They continue to own it."

The Health and Energy Institute is not impressed with this distinction. It points out that, regardless of who owns cesium, and whether it's sold or leased for food irradiation, the radioactive material will still be transported to food processors all over the country by truck and train. This will create a serious risk of accidental leaks or spills, the institute says.

In addition, institute officials note, cesium is stored in cold water when not being used. "Any accidental release of cesium 137 into the cooling pool or the environment would therefore pose serious contamination problems," one official said. "If cesium 137 were introduced into the groundwater, the damage would be irreversible."

So far, the Energy Department has signed only two contracts — both with medical-equipment sterilizers — to lease its cesium. One is with Iotech Inc. of North Glen, Colo., for 12 million curies at $124,200 a year plus $550,000 in start-up costs, with an additional 7 million on order. The other is with Radiation Sterilizer Inc. of Menlo Park for 12 million curies at $173,880 a year plus $800,000 in start-up costs, with a future lease of an additional 9 million curies.

Even here the Energy Department is criticized — for not charging more for its cesium.

"A significant return on investment can come back to the U.S. Treasury through the lease of irradiation source materials to private and public agencies," Morrison told us. But not at the department's bargain-basement prices.

Accord Research and Educational Associates, Inc.
314 West 91st Street New York, N.Y. 10024
Phone: (212) 580-3889

A-3

EXCERPT

HEARINGS

ON

H.R. 2496

[H.R. 2797]

DEPARTMENT OF ENERGY NATIONAL SECURITY AND MILITARY APPLICATIONS OF NUCLEAR ENERGY AUTHORIZATION ACT OF 1984

BEFORE THE

PROCUREMENT AND MILITARY NUCLEAR SYSTEMS SUBCOMMITTEE

OF THE

COMMITTEE ON ARMED SERVICES
HOUSE OF REPRESENTATIVES
NINETY-EIGHTH CONGRESS
FIRST SESSION

HEARINGS HELD MARCH 1 AND 2, 1983

STATEMENT OF DR. F. CHARLES GILBERT, DEPUTY ASSISTANT SECRETARY FOR NUCLEAR MATERIALS, ACCOMPANIED BY RONALD W. COCHRAN, DIRECTOR, OFFICE OF NUCLEAR MATERIALS PRODUCTION, AND GOETZ K. OERTEL, DIRECTOR, OFFICE OF DEFENSE WASTE AND BYPRODUCTS MANAGEMENT

Excerpt, page 195

BYPRODUCTS UTILIZATION

I might comment that I personally feel that the beneficial uses program that we have here is very important and very valuable in two ways. In one way, the utilization of these radioactive materials simply reduces our waste handling problem, at least in the near future, in that we get some of these very hot elements like cesium and strontium out of the waste.

A PLAN FOR RECOVERY AND UTILIZATION OF
NUCLEAR BYPRODUCTS FROM THE DEFENSE NUCLEAR FUEL CYCLE

William C. Renini
John J. Jicha, Jr.
Office of Defense Waste and Byproducts Management
Department of Energy
Washington, DC 20545

Excerpt, page 202

DOE BYPRODUCTS UTILIZATION PROGRAM
JOINT VENTURE SUMMARIES

The strategy being pursued by DOE's Byproducts Utilization Program is designed to transfer federally developed cesium-137 irradiation technology to the commercial sector as rapidly and successfully as possible. The measure of success will be the degree to which this technology is implemented industrially and the subsequent demand created for cesium-137.

WHY DOE IS PROMOTING FOOD IRRADIATION

Isomedix Decontamination Questioned

New Jersey Daily Record
MAY 3 1981

Probe Asked At Irradiation Plant

By CHRIS DUFFY
Business Writer

PARSIPPANY — Former workers at Isomedix Inc. are asking the U.S. Nuclear Regulatory Commission (NRC) to investigate the company's decontamination of several rooms at Isomedix's plant here between 1976 and 1980.

The employees — who left the company after a labor dispute last fall — are questioning how certain areas of the plant became contaminated with radiation after an accident at the plant at 35 Eastmans Road in 1976.

Isomedix is a firm that specializes in sterilizing medical products and treating other materials by exposing them to lasting radiation from cobalt 60.

NRC spokesmen say they are aware of most of the incidents that the former workers want investigated, but say that as far as they can tell, the plant was cleaned up properly.

John Kinneman, the chief of Materials Radiological Protection Service at the NRC's office in King of Prussia, Pa., says the agency will review the complaints of the former workers when they make a regular inspection in the near future.

The NRC was not able last week to provide exact dates for many of the incidents that followed the 1976 accident, because officials did not have time to review the company's files.

John Deitz, the president of Isomedix, openly discussed the accident and cleanup but was also reluctant to give some details because he was unsure of exact dates and because "I don't want to get into something that happened a long, long time ago."

Deitz added that the company "had gone to a lot of effort to do the cleanup right," spending "several hundreds of thousands of dollars, an amount comparable for a firm our size to what it's costing Jersey Central Power & Light to clean up Three Mile Island."

Isomedix's growth and position as a leader in the irradiation business is the subject of a feature article called "Gamma rays have a glowing future" in the current issue of Fortune magazine.

In 1976, company officials say a cobalt "pencil" — powdered radioactive cobalt encased in a double walled stainless steel rod — ruptured while it was inside a shielding pool — a deep concrete pit filled with water that absorbs the gamma rays the cobalt pencil gives off.

The company's president, George Deitz, says the firm is not absolutely certain what caused the rupture, but says it may have been caused by corrosion from fire extinguisher chemicals that got in the shielding pond when a worker put out a small fire at the plant.

According Deitz and former workers, a welder was doing some work near the shielding pond when slag hit some paper covering the pond and caught on fire.

Whatever the cause, after the ruptured pencil was discovered, Deitz said the cobalt pencils were withdrawn from the shielding pond and kept in a "hot cell" — a small concrete shielded room next to the pond.

George Berton and Frank Brazilis — the two workers who are asking the NRC to look into the cleanup, are questioning whether the company promptly reported the ruptured pencil to the NRC.

Deitz said the company did, and Kinneman, while not having complete records to review, also believes the NRC was told of the leak promptly.

While storing the cobalt pencils in the hot cell — Kinneman says it was a safe place to keep them since they are manufactured in similar rooms — Isomedix moved to clean up the water in the shielding pond using ion exchange resin filters.

Ion exchange filters remove the cobalt molecules in the water and replace them with hydrogen.

When the water was cleaned to permissible levels, it was dumped down a toilet in the plant.

This is another area that con-

> "I don't want to get into something that happened a long, long time ago."
>
> — John Deitz, Isomedix

cerns Berton and Brazilis, because they say that when a more extensive cleanup that they worked on was done several years later, the toilet and its drain pipe were found to be radioactive and removed.

After the water in the pond was cleaned, lead plates were placed over the pond and the surrounding area was used only on a limited basis for the next few years.

Deitz said the company did not finish the cleanup job at that point because of a lack of funds, but in 1979 it decided to "decommission" the area and clean it up to the point where it could turned over to the owner of the building, the Electro-Protective Corp.

When the company began the cleanup, Deitz said Isomedix expected the job would take several weeks.

It hired Chem-Nuclear Systems Inc., a Bellevue, Wash., company that specializes in cleanup work to supervise the job.

But instead of being able to wipe down the area and remove the radiation with brushes and various cleaning agents, the company was forced to use jack hammers to chip away large amounts of concrete.

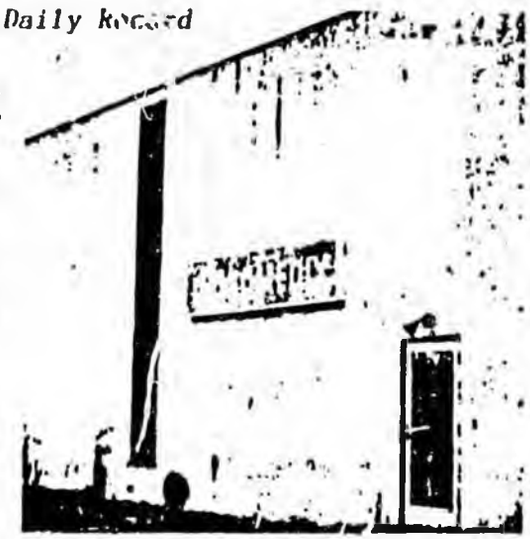
In the shielding pool, up to six inches of concrete was stripped away from the wall and floor of the pool, and the floor surrounding the pool was also chipped away, according to Deitz and workers on the job.

It was during this job that the toilet and pipe were found to be radioactive and removed.

Kinneman says the toilet could have become radioactive from the earlier cleanup of water in the shielding pond in 1976.

He says iron plate is a particularly good absorber of cobalt and might show detectable levels of radiation after absorbing the small amounts of radiation that Isomedix was allowed to dump into the sewage system.

According to a Chem-Nuclear



Isomedix plant on Eastmans Road in Parsippany where radiation accident took place.

worker, at least some parts of the toilet showed radiation levels of 25 milliroms.

Kinneman says 1 milliroms is a level used by many firms as a permissible level of radiation to monitor when a facility is acceptable for unrestricted use.

A Chem-Nuclear worker said his company became upset when after telling the company about the "hot" toilet, officials of the company tried to reduce radiation levels by washing it down with cleaning solutions that included hydrochloric acid.

He said Chem-Nuclear threatened to leave the job if the company didn't follow its advice to rip out the toilet and send it to a landfill.

Another potential problem that the workers are pointing to is several radioactive tools at the company's plant which they say were removed to another rented facility in West Orange.

Deitz says those tools were brought back to the plant and eventually shipped to a landfill, but the workers want to know if the West Orange plant was ever inspected for possible contamination.

Berton and Brazilis were two of about a half dozen workers who walked off their jobs last fall when some workers were barred from voting in an election that sought to have the Teamsters represent workers at the plant on Eastman's Road because the National Labor Relations Board classified them as supervisors.

Nuclear panel finds company violated nine regulations

By LIV OSBY
Daily Record Staff Writer

DOVER — The Nuclear Regulatory Commission found nine violations of regulations governing radiation facilities at International Nuclear Inc. here following a December 1981 leak.

Among the violations, according to an NRC report just released, was the failure of the Route 46 company to report the radiation leak. But John Glenn of the NRC Region I Office said yesterday an investigation to determine whether the company attempted to cover up the leak is not complete.

Maximum fines for each charge range up to $5,000, but Glenn said penalties have not yet been ordered.

"We're holding up the enforcement action because we're waiting to see how they progress with their cleanup of the facility," he said. The cleanup is more important."

However, Glenn said the company which used Cobalt 60 to sterilize medical equipment, will be sent a notice of violation sometime in the future.

He said the deadline for removal of all the contaminated materials is October, with the two Cobalt 60 pools used for sterilization to be removed by early September. The plant has not done any sterilizing since September 1981.

International Nuclear officials were unavailable for comment.

Other violations include possession of unauthorized radioactive materials, improper procedures during decontamination operations and no surveys of materials released from the plant. No significant evidence of ground water contamination was found, the report stated, and Glenn said the NRC concluded there was no real threat outside the building.

The report also noted that contaminated water was dumped into a shower stall at the site allowing the liquid to escape into the sewer system. Contamination of the air and the roof also was documented.

While Glenn said less than one

minute's exposure to Cobalt 60 could be lethal, the facilities are constructed so that workers and people outside the plant are not exposed to high doses levels.

There are a number of operating radiation facilities near schools, such as the research reactor at Seton Hall University, which across the street from Hamilton Field and the East Dover Elementary School, Glenn said. But he noted that the incident was "probably the worst" of its kind for such a facility.

Capsule That Leaked Cesium Not Intended For Commercial Use

Feds, State Probing DeKalb Incident

By Hal Straus
Science/Medicine Writer

The stainless steel capsule that leaked radioactive cesium at a DeKalb County sterilization plant last year was never intended to be used commercially, according to two groups investigating the incident.

The 21-inch-long capsule, and hundreds of others like it, were designed and manufactured for the storage of radioactive waste from the production of nuclear weapons.

But after undergoing tests that federal officials now acknowledge were probably inadequate, the capsules and their contents were shipped to Radiation Sterilization Inc. (RSI) and used to sterilize medical supplies.

"It's pretty clear these things should not have been used the way they were used," said Dr. Ronald Hultgren, chairman of the investigative board set up by the federal Department of Energy, which leased the capsules to RSI.

Dr. Hultgren and James L. Setser, chairman of a state task force on the incident, say the six-month leak — which cost the firm and government agencies millions of dollars — may have been caused by the way the Energy Department loaded the capsule with cesium or by impurities in the cesium that the department knew about years before the leak occurred.

Dr. Hultgren and Mr. Setser say they won't know for at least a month what caused the leak. But they say there is evidence that RSI was not adequately monitored and its sterilization process was not adequately reviewed by federal or state officials.

"There are pictures emerging," Mr. Setser said. "Certainly, there appear to have been problems with the testing and the manufacturing. I think everybody on the task force agrees there need to be some pretty major changes in the way these op-

RSI Continued on **5C**

Atlanta Constitution

February 4, 1989

RSI

From Page 1C

erations do business, the way they're regulated."

RSI opened plants in Westerville, Ohio, and in the Snapfinger Woods Business Park in DeKalb in 1985 and 1986. When first proposed and licensed by the state Department of Human Resources (DHR) and its Ohio counterpart, the plants were supposed to use capsules filled with cobalt-60 to kill bacteria on surgical gloves, sutures and other medical supplies.

The cobalt-60 manufacturing process was already in use at more than two dozen federal irradiation plants and had been studied extensively by regulatory agencies. But shortly before the RSI plants opened, the Canadian supplier delayed shipping the cobalt capsules.

In response, according to Dr. Hultgren, the firm turned to the Energy Department, whose Byproducts Utilization Program was looking for commercial firms that could use cesium-137. The cesium — a byproduct of U.S. nuclear weapons production — was stored in temperature-controlled pools of water at the Department of Energy's (DOE) reservation near Hanford, Wash.

The integrity of the cesium capsules and RSI's proposed use of them was reviewed by the Nuclear Regulatory Commission and, in Georgia, approved by the DHR. The Decatur plant began operation in 1986. On June 6, 1988, sensors at the Dekalb facility detected a cesium leak. It took six months to locate the source of the leak.

It will be eight weeks before the state task force and the DOE investigative team issue their reports about exactly how the leak occurred and what regulatory changes should be made, but both Dr. Hultgren and Mr. Setser say they have reached several conclusions.

They say the double-walled cesium capsules were designed and manufactured by the DOE to be stored indefinitely at Hanford — not repeatedly taken from a cooling pool and loaded into irradiators at commercial irradiation plant.

"These capsules were not designed, were not constructed for use in an irradiation facility," Dr. Hultgren said. "They were laying in the pool in Hanford and then somebody decided that, hey, this would be a good idea to use these things for some other purpose."

The leak may have been caused by the way the capsule was loaded. According to DOE records, the capsule was partially filled, allowed to cool, then "topped off."

That procedure would not have been a problem had the cannister stayed at Hanford, Dr. Hultgren said, but it might have been at RSI because the capsule was allowed to heat up in the irradiation process.

Experiments at DOE's Oak Ridge National Laboratory in January showed that a stainless steel beaker filled with non-radioactive cesium, then topped off, buckled slightly when heated.

The leaking cannister shows evidence of buckling — although officials still do not know if the leak occurred because of the buckling.

The leak also may have been caused by cesium impurities first noted by the DOE technicians who filled the capsule at Hanford. Dr. Hultgren said experiments show that impure cesium expands at lower temperatures than pure cesium — a difference that could buckle a capsule and cause it to leak.

The task force and the investigative team have also found that:

- RSI told the Georgia DHR during the license review that the Energy Department had the equipment to isolate and remove a leaking capsule quickly. The equipment actually had to be built after the leak was discovered.
- Other states require irradiators to have more sensitive leak-detection equipment than Georgia required RSI to have. Records suggest that the cannister could have leaked cesium for more than a month before it was detected.
- The Georgia DHR required RSI technicians to take only 60 hours of vocational and university-as trainees. Both Mr. Setser and Dr. Hultgren said that was not enough.

"Anybody can run a facility, as long as it's running well," Dr. Hultgren said. "When you're dealing with material like you're dealing with in the RSI facility, I would hope the operators are better trained than they were."

Charges that radioactive spills were covered up have also been lodged by the NRC against other plants.

And in December 1982, workers at a Dover, N.J., radiation sterilization plant found several inches of radiation-contaminated water covering the floor of a sterilization plant because a hose had blown.

Radioactive Leak Slips by Regulatory System

■ **Feb. 1, 1985** — The Nuclear Regulatory Commission (NRC) says it is not satisfied that the cesium-137 capsules are safe when they are used in the "wet storage/dry irradiation sterilization" process, in which they are intermittently hung in air and then cooled in water.

■ **Feb. 8, 1985** — The Georgia Department of Human Resources (DHR) licenses Radiation Sterilizers Inc. to use cobalt-60 in its DeKalb plant.

■ **April 8, 1985** — NRC gives Radiation Sterilizers a license to use cesium-137 capsules in wet-storage process provided the company operates a "demonstration plant" for one year and tests capsules for problems. No other facility can use the process until tests are completed.

■ **July 22, 1985** — Radiation Sterilizers, unable to get cobalt for its DeKalb plant, asks the NRC to curtail the one-year waiting period.

■ **July 25, 1985** — The NRC replies that it is still concerned about the safety of the capsules, and that the firm must proceed with operating the "demonstration facility" for one year.

■ **Aug. 5, 1985** — Radiation Sterilizers begins operation of the "demonstration facility" in Westerville, Ohio. It promises that after 12 months, a cesium capsule will be removed and tested.

■ **Sept. 6, 1985** — The Department of Energy (DOE) asks the NRC to change its mind about the one-year moratorium. The department says limited data indicate the capsules are safe in the wet-storage process.

■ **Oct. 16, 1985** — The NRC lifts the moratorium and tells Georgia officials they can process the company's application to use cesium-137 in the wet-storage process.

■ **Jan. 6, 1986** — The Georgia DHR amends the company's license to allow the use of cesium-137.

■ **Jan. 20, 1988** — Results of tests of cesium capsules from the Westerville facility show no serious problems.

■ **June 6** — A radioactive leak in the cesium-storage pool at Radiation Sterilizers' DeKalb plant is detected. Radiation-sensing devices automatically shut the plant down.

■ **June 11** — Georgia officials ask DOE to find the leaking capsule, remove it and decontaminate the area. A state and federal team is formed to carry it out.

■ **Oct. 12** — The amount of cesium leaking from the still-unidentified capsule suddenly increases tenfold. Officials, fearing the capsule may rupture, bring in new equipment and workers to find the leak.

■ **Nov. 5** — The leaking capsule is still unidentified. DOE plans to bring in still more equipment to locate the leak.

Feds Waived Tests of Device That Now Has Radiation Leak

By Charles Seabrook
Environment Writer

A DeKalb County radiation sterilization plant where a continuing leak of radioactive cesium has baffled nuclear experts for five months, was allowed to use capsules of the radioactive isotope before they were fully tested, state and federal records show.

The Nuclear Regulatory Commission (NRC) expressed concern in 1985 that plans by Radiation Sterilizers Inc. (RSI) to repeatedly immerse the capsules in water might cause corrosion and leakage of their radioactive contents.

The NRC's office of nuclear material safety and safeguards urged in February 1985 that the capsules of cesium-137, a byproduct of the nation's nuclear weapons waste, be tested for at least a year at a "demonstration facility" in Ohio before being used at the DeKalb County facility, which uses radiation to sterilize medical supplies.

But in October 1985, the federal agency waived the requirement after the Department of Energy, which leases the capsules to private firms, and the company itself asked the agency to forgo the one-year testing period.

Company officials said RSI stood to "suffer financially" if a year of testing were required. The Energy Department said limited testing results already had indicated the stainless steel, cesium-filled capsules were safe.

The NRC lifted the requirement. Four months later the Georgia Department of Human Resources (DHR) authorized the company to use 12.3 million curies of radioactive cesium — the largest inventory of radioactive material in Georgia outside the state's three commercial nuclear power plants and a research reactor operated by Georgia Tech — to irradiate surgical gloves, bandages, sutures and other medical supplies.

On June 6, two years after the plant began operations, sensors at the plant detected a leak in the pool of water holding 252 of the 21-inch-long capsules of cesium. Despite five months and at least $1 million of effort, the source of the problem is still undetected — and the leak has grown worse.

The cause of the leak — and the possibility that regulatory agencies acted too hastily in allowing the firm to use the radioactive capsules — is now the subject of an intensive investigation by state and federal authorities.

It also has prompted a sweeping review of the country's radiation sterilization industry, which operates more than 30 plants in more than a dozen states.

"We're reviewing our policy of putting such huge quantities of radioactive material into private hands," said Dr. Ronald Hultgren, who works at the Department of Energy's Oak Ridge Operations Office and heads an investigation at the DeKalb plant. "There will be a lot of lessons learned from this leak, and a number of new strict policies may emerge from all of this."

Dr. Hultgren said the results of the investigation won't be released until February, but the leak — already described by some officials as the "Three Mile Island" of the U.S. sterilization industry — already has prompted calls for major reforms in the regulation of plants that use radioactive isotopes to sterilize medical supplies and food.

Some authorities question the wisdom of allowing such plants to be located near major residential areas. Georgia officials say the uncontrolled leak of cesium at the plant has not endangered public health, but other authorities say sabotage or a major fire at the plant could spread radiation to nearby areas, which include an office park, apartments and homes.

"It doesn't seem to me to be a good idea to put these things in the middle of residential and business areas," said Dr. James Ruttenber, a radiological health expert at the national Centers for Disease Control.

Authorities say the fact that three workers at the plant — at 2300 Mellon Court in the Snapfinger Woods Business Park in north DeKalb — contaminated themselves, their homes and their automobiles with radiation before the leak was discovered is an indication that the plant did not have sufficient safety procedures to prevent outside contamination.

Cesium-contaminated carpet at the workers' homes — and a seat in one of the employees' cars — had to be ripped out and trucked to a radioactive waste burial site in Barnwell, S.C.

"The fact that workers got out of that building with radioactive contamination sticks out like a sore thumb," said James L. Setser, a Georgia Department of Natural Resources (DNR) official who heads a state task force investigating the cause of the leak.

Although the DHR licensed the firm, Gov. Joe Frank Harris put the natural resources agency in charge of efforts to stop the leak and investigate its causes.

Natural resources officials have complained that they did not even know of the existence of the plant until the leak was reported in June and radiation-sensing devices shut the operations down.

DNR is responsible for controlling radiation problems outside buildings, while the human resources agency handles radiation problems that are contained within buildings.

One of the effects of the incident at the DeKalb plant has been to bolster legislative efforts to consolidate radiation protection services in a single agency.

Meanwhile, the leak continues unabated. Last week, a team of state and federal workers brought in additional equipment to stem the radioactive cesium leak into the 25,000-gallon pool of water in which the capsules are stored.

The Atlanta Journal

FRIDAY, DECEMBER 23, 1988

Removal Of Cesium Is Delayed

DOE Hesitant to Truck Capsules Across Country

By Charles Seabrook
Environment Writer

State officials said Thursday that the 247 remaining capsules of radioactive cesium at a DeKalb County sterilization plant must be removed as soon as possible — but federal authorities said the removal may be delayed for months while they decide how to ship the capsules safely to a West Coast disposal site.

The immediate threat at the plant was resolved earlier this week when two damaged capsules — one the source of a leak since June — were taken to Oak Ridge National Laboratory in Tennessee, where scientists will try to determine what caused the damage. Both capsules had bulges, and one was cracked.

But now federal authorities are not sure how to handle the remaining capsules, which were trucked three years ago from the Hanford Reserve nuclear defense plant in Washington state and installed at Radiation Sterilizers Inc. (RSI) in DeKalb and a sister plant in Ohio. Hanford, which produced the radioactive isotope cesium-137 as a nuclear waste byproduct, manufactured the capsules.

State officials want the remaining capsules out of the plant because of the possibility that others may start leaking. The capsules at the DeKalb site represent the largest inventory of radioactive material in Georgia outside the state's three commercial nuclear power reactors and a research reactor operated by Georgia Tech.

The capsules originally were shipped to Georgia in specially designed casks to shield their deadly radiation. But Department of Energy (DOE) officials said Thursday the stubborn leak that developed last June in one of the capsules raised questions of whether stricter measures — and stronger casks — were needed to transport the capsules safely back to Hanford.

CAPSULES Continued on 4B

Capsules

From Page 1B

The capsules, each containing 47,000 curies of cesium-137, were recalled by Hanford in August, two months after a radioactive leak closed RSI, which used the capsules to sterilize surgical gloves, bandages and other medical products.

The damaged capsules were shipped in an "over-packed cask" specially made to haul them to Oak Ridge.

But the Nuclear Regulatory Commission (NRC) warned that, in light of the leak, the casks DOE intended to use to ship the undamaged capsules back to Hanford may not withstand an accident. NRC ordered Hanford to determine the suitability of the casks before shipping the capsules back from Georgia and Ohio.

DOE officials have acknowledged that they did not believe the capsules could leak radiation, and therefore they had no equipment readily available to deal with such a problem.

Ronald Gurton, director of Hanford's waste management division, said DOE will decide within the next few weeks whether it will have to develop a more suitable shipping container.

Regardless, removal of the capsules from the DeKalb plant will not begin before early summer.

The initial schedule called for 180 capsules at the RSI plant in Westerville, Ohio, to be removed by January. After that, the capsules at the DeKalb plant would have been retrieved.

Because of the delays, removal of the capsules at the Ohio plant may not be completed until late spring, at the earliest.

The effort to stop the leak and clean up the contaminated plant already has cost more than $2 million, and the cost will go up until the capsules are removed and the building decontaminated.

"We want those capsules out of the plant as soon as possible," said James L. Setser, a state Department of Natural Resources official who leads a special team investigating the leak. "We can't rule out the likelihood that something else won't go wrong with the remaining capsules, but we don't know what that likelihood is. And because of that, we want to get them out of there."

Mr. Setser said that as long as the capsules are there, the state will have to maintain a skeleton crew of workers at the facility. He said it could be a year before the plant could reopen.

Mr. Setser's task force is trying to determine the cause of the leak and decide whether stiffer regulations are needed.

An in-house investigation is trying to determine if DOE violated or bypassed basic safety guidelines in allowing private firms to use the capsules.

THE SUNDAY STAR

July 9, 1989
75 CENTS
June/89 Sunday paid circulation 525,677

Canadian-made equipment cited in El Salvador irradiation mishap

By Olivia Ward Toronto Star

Three people suffered serious radiation injuries in El Salvador last February when their Canadian-made irradiation equipment malfunctioned, according to a report obtained by The Star.

But the Salvadoran government says "human error" and not equipment was responsible for their mishap.

The men, aged 19 to 26, suffered burns and radiation sickness from exposure to cobalt sterilizing equipment at the Delmed irradiation plant in San Salvador. The company bought its radioactive cobalt material from the federal government-owned Atomic Energy of Canada Ltd. in 1975.

According to the Salvadoran plant manager, the machine operator handling the equipment had received no training, except for instructions from a manual left by AECL.

Neither Ottawa nor the Salvadorans have made the accident public, and the Salvadoran embassy in Ottawa says it has not been notified of the event.

But the incident raises questions about Canada's role as a leading supplier of both cobalt and irradiation equipment.

Irradiation involves exposing objects to radioactive gamma rays. The practice of irradiating fruit and vegetables to kill germs and lengthen shelf life, for example, is an ongoing health and safety controversy.

The Salvadoran plant involved in the accident was using irradiation to sterilize medical equipment, a common use of the technology.

Canadian officials say they first heard of the accident Feb. 10, when Delmed called for help from Nordion, an AECL spinoff company that sells and services cobalt equipment. Canadian inspectors had been kept away from the plant since 1984 by a police warning that the area was unsafe due to its ongoing civil war.

But two days after the acci-

Please see THREE/page A5

Three injured in irradiation accident

El Salvador mishap raises concern about Canadian equipment

Continued from page A1

dent a Nordion team went to El Salvador to dismantle the plant's radioactive cobalt equipment, including what technicians refer to as the "cobalt source" material, and prevent further radiation emissions.

"At that time we had no idea people had been injured," says Donna Coates, Nordion's director of public affairs. The company wasn't told until Feb. 28, she said.

The men injured in the accident were sent to Mexico City for intensive care, and a specialist team from the Radiation Emergency Assistance Centre at Oak Ridge, Tennessee, was called in by the Salvadoran government.

A medical team from the Pan American Health Organization of the United Nations is also investigating the accident.

A report from the Oak Ridge centre, obtained by The Star, showed the three injured men were exposed to dangerous doses of radiation, and one, Roque Tobar, 26, received a dose generally considered fatal

Tobar is still under the care of Mexican bone marrow transplant specialist Dr. Raphael Hurtado.

Eleven other workers were tested for radiation exposure, but plant manager Orlando Lenus said the results were negative.

"Nobody really knows how the accident happened, and the only person who does is the one who was seriously injured," Lenus told The Star's Nomi Morris in a phone interview from San Salvador.

Tobar, the only machine operator on the night shift, entered the chamber where medical equipment was being irradiated.

The plant's irradiation equipment resembles a rack of pencils, with each pencil containing a slug of radioactive cobalt. When in use, the rack of pencils is raised from a vat of water which normally shields the gamma radiation it gives off.

The pencils are supposed to safely drop back into the water when the radiation has done its job

Lenus said Tobar may have entered the cobalt chamber without a radiation monitor, not realizing that one of the 'pencils' was stuck above the water. The two other men, Jose Vasconselos and Jose Martinez, probably joined him there, and were badly burned.

'Nothing 100% safe'

"As long as there are humans involved, nothing is 100 per cent safe," Lenus said.

Lenus says he is negotiating with Nordion to replace the plant's radioactive cobalt and restart the equipment.

According to Donna Coates, Nordion's technicians believed the cobalt equipment was unsafe, and disabled it "until (Delmed) can meet safety standards and the Salvadoran regulatory authorities give clearance."

Coates said that Nordion makes a practice of inspecting equipment every 18 months, when the short-lived cobalt 'pencils' are replaced, although El Salvador's civil war prevented such inspections.

However Michael Colby, associate director of Food and Water, a New Jersey-based pollution monitoring group, says that accidents to irradiation equipment are common, and neither laws nor inspection procedures are tough enough

"In the US alone there are 38 irradiation facilities," he said "At least six, and possibly ten accidents have happened here."

Some American plants are using Canadian equipment, Colby said.

Charges were recently laid against operators of one US plant, where hundreds of gallons of cobalt-contaminated water spilled out of its container and was cleaned up by janitors and discharged into the drains and water supply.

Canada is a leading supplier of radioactive isotopes produced from rare cobalt metal, and earns more than $50 million a year from sales of irradiating equipment.

"Food irradiation isn't popular in North America, so it's been exported to the Third World," Colby said. "It's unfortunate that Canada is getting into this. It could be a real black eye."

There are no international regulations for countries that sell irradiating equipment outside their own borders.

AECL said it no longer has any connection with the Salvadoran equipment it originally sold. Nordion, an 11-month-old crown agency expected to be sold to private interests soon, says it was unable to inspect the plant until the emergency call last February.

"When we sell (radioactive cobalt) to any country we make sure it is accepted by the local regulatory authorities, and that there's a licensed radiation officer on the site," says Coates. "We do training of staff to make sure they're qualified."

But after the initial installation, she said, the safety of ongoing plant operations must be left to the countries that buy the equipment.

"We are careful not to be patronizing to (Third World) countries. "They have people who are quite adequate and well trained."

The Salvadoran plant manager admits that Tobar, who worked at the company for 18 months before the accident, had no on-the-job training.

Irradiation firm charged in radioactive water spill

NEWARK, N.J. (AP) — A federal grand jury on Tuesday indicted an irradiation company and two employees on charges of concealing a spill of radiation-contaminated water allegedly flushed down bathroom drains at the company's New Jersey plant into the local sewer system.

"There is currently no danger to the community," U.S. Attorney Thomas Greelish said in announcing the indictment against International Nutronics Inc. of Palo Alto, and two employees arising from the December 1982 spill at its Dover Township plant.

But, he added, it is "impossible" to say whether the spill, covered up partly by rigged radiation detection badges the employees were required to wear, posed a health hazard at the time.

The half dozen employees at the plant — which irradiated organic products such as liver meal for dog food to destroy bacteria, and certain semi-precious gems to enhance their color — showed no signs of sickness, Greelish said.

Named in the indictment are the company, Eugene T. O'Sullivan, 60, of San Jose, Calif., a company vice president and corporation radiation safety officer; and Bruce J. Thomas, 33, of Somerville, N.J., manager and radiation safety officer at the plant.

They are accused of conspiracy, concealing the spill, mail fraud and wire fraud in trying to hide the spill from the Nuclear Regulatory Commission.

The indictment also alleges the defendants failed to notify the NRC within 24 hours that the spill would cause more than $2,[illegible]0 in property damage and the loss of more than one day of operations.

A telephone message left at the company's headquarters was not returned.

O'Sullivan's attorney, James M. Weinberg, a federal public defender here, said his client was innocent of the charges. He said the plant was closed at the time of the spill, so the incident did not need to be reported to the NRC.

Thomas, reached at the plant, declined to comment on the indictment. He said the company has been closing down the facility for two and half years for economic and other reasons. He declined to elaborate.

Greelish said there was no way to determine the amount of water that spilled during the incident.

The spill occurred when a filter pump connected to the pool of water containing the cobalt used in irradiation was allowed to run unsupervised overnight — in violation of NRC regulations, Greelish said.

That caused radioactive water to spill onto the floor, he said.

Employees were instructed to carry the contaminated water in buckets and pour it down the plant's bathroom drains, the prosecutor added.

The company then delayed an NRC inspection and, to mask the amount of radiation released, chiseled holes in the walls and floors, filled them with lead wool and repainted over them, the indictment alleged.

Other measures taken to reduce detection included placing liver meal along the building's walls and directing employees to alter the way in which they wore their radiation detection badges so the devices recorded lower dosages, the indictment said.

Greelish added that the employees knew that the badges were being rigged.

The incident did not come to the NRC's attention until almost a year later, when several employees spoke up.

The incident required a $2 million clean-up effort, some of which was paid for by the company, federal authorities said.

Federal officials said that in the late 1950s, O'Sullivan worked at the Atomic Energy Commission, which later was divided between the NRC and the U.S. Energy Department.

Kari Abraham, a spokesman for the NRC's regional office in King of Prussia, Pa., said International Nutronics was given a license in 1981.

In October 1985, the company agreed to discontinue irradiation processes and to submit a plan on how the pool would be decontaminated, Abraham said.

"From the Press of Georgia"

The Rauson Company

SUITE 114, SETA BUILDING / TWO NORTHSIDE 75
ATLANTA, GEORGIA 30318 / 404-352-1777

Advertising Public Relations

CLIPPING SERVICE DEPARTMENT

Client

Brunswick News
Name of Georgia Newspaper

JUN 13 1988
Date

Authorities Find Area Where Radiation Leaking at Plant

By WILLIAM E. SCHULZ
Associated Press Writer

ATLANTA (AP) — Inspectors have found the area where radiation is leaking inside a suburban Atlanta plant, and have virtually proven no employees were exposed to serious levels of radiation.

There has been only very minor contamination outside the Radiation Sterilizers, Inc., building, Jim Setser of the Georgia Department of Natural Resources' Environmental Protection Division, said Sunday night.

Inspectors working through the weekend found 10 employees of the company may have been exposed to radiation. Tests have showed that the blood samples from those employees were normal, Setser said. Their radiation badges showed no radiation contamination.

"If their urine tests are OK, we'll be pretty sure they're clean," he said.

Inspectors found small amounts of radioactivity on the seat of one employee's car and in the carpets of two employees' homes. The contaminated materials had been cut out and taken back to the plant for proper disposal, he said.

"The contamination was significant, but not what we would think of as a major health hazard," Setser said.

The radiation is leaking from one of more than 250 containers in a storage pool inside the building, but inspectors are still trying to determine which one.

"There are 252 stainless steel canisters, each containing 50,000 curies of Cesium 137. They are in a nest in this 25,000-gallon pool of water," Setser said Sunday night.

"One of those canisters has a pinpoint leak of some kind and the water in that pool is gradually getting more radioactive."

He said state officials and experts from Radiation Sterilizers Inc., which sterilizes medical products, are consulting with scientists across the country to try to find a way to find and stop the leak.

"We're going to meet tomorrow (Monday) to see if we have a plan" to stop it, Setser said.

The radiation leak was discovered more than a week ago.

Virtually all of the radiation is contained within the Radiation Sterilizers building, and there is no threat to public health, he added.

He said 80 percent of the packages from Radiation Sterlizers sent to businesses in the Atlanta area had been located and tested by Sunday night and none were found to be contaminated. Others are being sought nationwide.

Radiation Sterilizers sterilizes medical packaging products and ships them across the country, Setser said.

Setser said the company, which voluntarily shut down June 6, uses radioactive Cesium 137 in the sterilizing process.

The first indication of the leak was June 4, when a higher than normal level of radiation was detected in the indoor water pool where the Cesium 137 is stored, he said.

Two years' probation in nuclear spill case

NEWARK, N.J. (AP) — A former nuclear regulatory official who was convicted of covering up a spill of radioactive water at his company was sentenced to two years' probation by a judge who said the man had been punished enough.

U.S. District Judge Herbert Stern on Thursday sentenced Eugene T. O'Sullivan for concealing the spill at an International Nutronics Inc. plant in Dover. The company also has plants in Palo Alto and Irvine. O'Sullivan, 61, of San Jose, was a company vice president at the time of the incident.

O'Sullivan could have received 39 years in jail and a $26,000 fine. He was convicted Oct. 29 on charges of conspiracy, mail and wire fraud and violating Nuclear Regulatory Commission regulations.

"The crime you have committed warrants and deserves jail," Stern told O'Sullivan, who was a member of the Atomic Energy Commission, forerunner of the NRC.

"On the other hand, we sit here to do justice not only for the crime but for those who committed it," the judge said.

Prosecutors said O'Sullivan and the company concealed the December 1982 spill and ordered employees to flush the water down bathroom drains and into the local sewer system.

The jury also found the company guilty of covering up the spill, and Stern fined it the maximum $35,000.

During the trial, the government alleged that the company masked the amount of radiation released in the accident by chiseling holes in the walls and floors, filling them with lead wool and painting over them.

Other measures taken to conceal the spill included placing liver meal along the building walls and directing employees to alter the way they wore their radiation detection badges so the devices would record lower dosages.

The company irradiated organic products such as liver meal for dog food to destroy bacteria and certain semiprecious gems to enhance their color.

At the Palo Alto and Irvine plants, medical equipment is irradiated.

UNITED STATES
ATOMIC ENERGY COMMISSION
DIRECTORATE OF REGULATORY OPERATIONS
REGION I
631 PARK AVENUE
KING OF PRUSSIA, PENNSYLVANIA 19406

RO:I - L
CONTACT: Karl Abraham
Tel. A.C. 215-337-1150

FOR IMMEDIATE RELEASE
(Friday, June 14, 1974)

TEXT OF ANNOUNCEMENT

Isomedix, Incorporated, of (25 Eastmans Road) Parsippany, New Jersey, informed the Atomic Energy Commission on June 13, 1974 that one of its employees had received an apparently high overexposure of radiation.

The man, chief of radiation operations for the company, was treating a drum full of plastic material with intense radiation from a Cobalt-60 source when the accident occurred, said the company.

He apparently entered the room where the source was located while the source was not completely inside steel and concrete radiation shielding, and was briefly exposed. When he realized what had happened, he left the room and summoned aid, said the company.

The man has been hospitalized. The Cobalt source, used by the company to sterilize medical and other products, has been secured and poses no threat to other workers, or to the general public. Its radiation, similar to X-rays, does not cause contamination.

AEC medical consultants are on the case, and the Regulatory Staff of the AEC is investigating the circumstances of the accident.

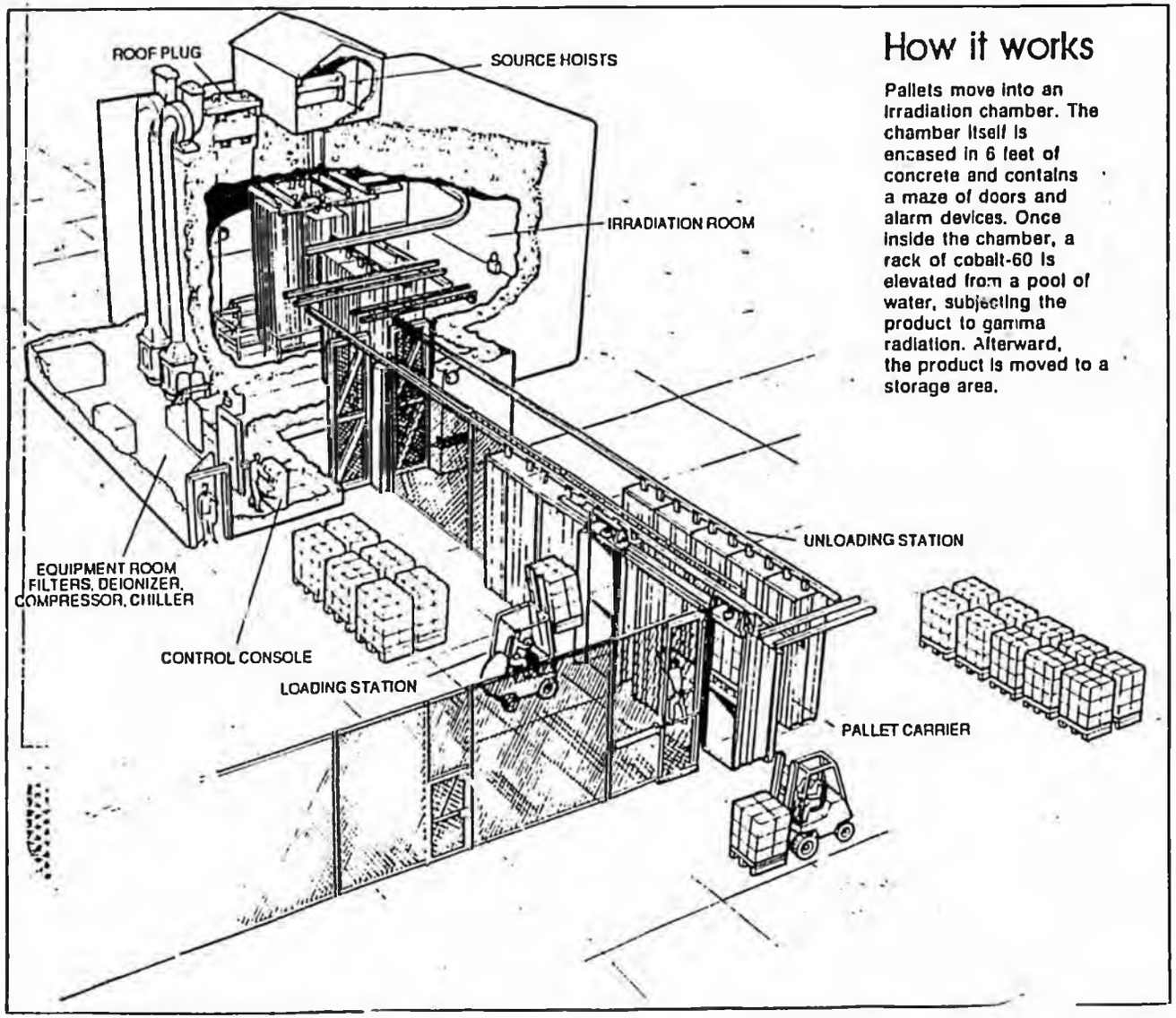
The company said that it appeared the normal procedure of having workers approach the door to the irradiation area with a hand-held radiation meter was not followed in this case. The facility was last inspected by the AEC on May 15, 1974, and was found to be in compliance with AEC regulations.

The State of New Jersey was notified.

###

The exposure was estimated to have been 400 R, based on chromosome studies — R

Food Irradiation Response
Box 5183
Santa Cruz, CA 95063
408 426-2734



How it works

Pallets move into an irradiation chamber. The chamber itself is encased in 6 feet of concrete and contains a maze of doors and alarm devices. Once inside the chamber, a rack of cobalt-60 is elevated from a pool of water, subjecting the product to gamma radiation. Afterward, the product is moved to a storage area.

NRC has recorded 54 plant accidents

The Nuclear Regulatory Commission has documented 54 accidents at 132 irradiation plants operating in 39 countries since 1974, when the NRC came into existence.

The following is a list of the fatal, near-fatal and recent accidents:

■ 1975, Stimos, Italy: A worker climbed onto a conveyor belt and by mistake exposed himself to cobalt-60. When his partner attempted to reverse the belt to bring him back, the belt instead lunged forward and the victim's entire body was exposed to the radiation. He died 12 days later.

■ 1974, Parsippany, N.J.: A 61-year-old worker was critically injured after exposure to cobalt-60 following four straight days working 10- to 12-hour shifts.

■ 1982, Norway: A service technician is exposed while trying to fix a jammed conveyor belt. He died 13 days later.

■ 1982, Dover, N.J.: Cobalt-60 contaminates a containment pool. Quantities are found in soil samples taken from areas adjacent to the plant. Six months later, a federal grand jury indicts two employees who instructed others to flush the radioactive water into the sewer system.

■ 1988, Decatur, Ga.: The Department of Energy reports a possible leak at the Radiation Sterilizers Inc. facility. Employees working in the facility received clothing and skin contamination. Boxes of medical products, irradiated at the facility, were also slightly contaminated but had been shipped from the facility.

NRC officials say circumstances leading to accidents involving fatalities have been corrected with enhanced safeguards.

NRC officials say circumstances leading to accidents involving fatalities have been corrected with enhanced safeguards.

Most accidents, they say, occur when workers circumvent safety measures.

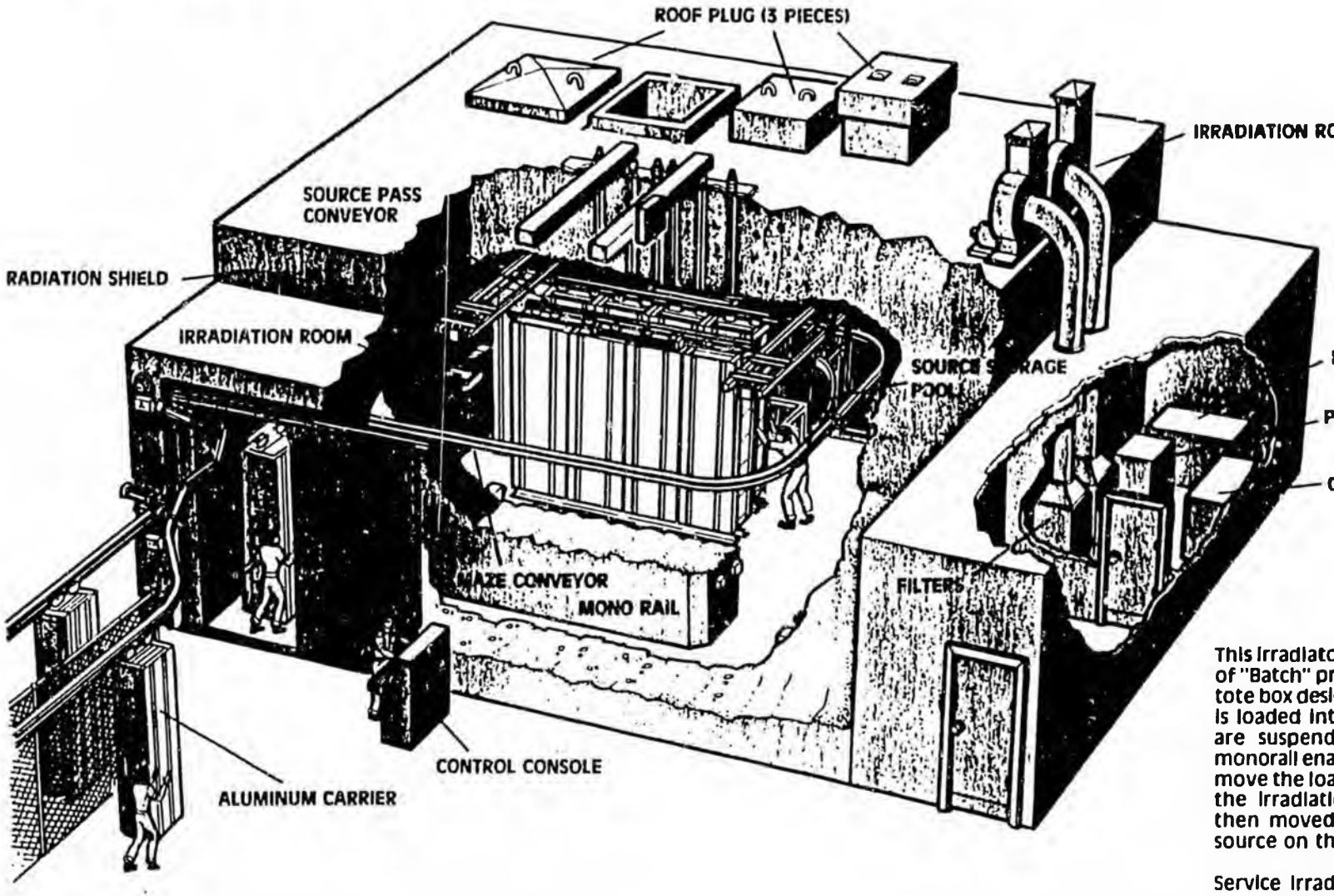
"The problem with most facilities is that they rely on the human element," said Steven L. Baggett, health physicist with the NRC. "Either through malice or some other reason" workers bypass procedures, he said.

In Florida, the state Department of Health and Rehabilitative Services' Nuclear Materials Section would perform annual, unannounced inspections of the Vindicator facility.

HRS Nuclear Materials Section Director Dan Nash said that as part of its licensing procedure, it will require Vindicator to provide the measures Vindicator would take in the event of an accident.

Nevertheless, Commissioner Andy Scrocca said the possibility of an accident is his main concern. "We have no facilities to handle this," he said. "I spoke to the fire chief, he didn't know what to do in the case of an accident."

CARRIER IRRADIATOR-MANUAL BATCH LOADING



This irradiator provides another metho of "Batch" processing. It differs from th tote box design in that the boxed produ is loaded into aluminum carriers whic are suspended from a monorail. Th monorail enables the operators to rapid move the loaded carriers into and out c the irradiation room. The carriers a then moved automatically around th source on the same monorail system.

Service irradiation companies find th design especially relevant to their need Batches of diverse product and box si can be proces ed quickly with goo packing efficiency.

Upgrading to an automated facility a inclusion of an incremental Dose syste is possible and re t to applications

FOOD & WATER, Inc.
225 Lafayette Street #
New York, N.Y. 10012

THE VICE PRESIDENT
AT THE U.S HEADQUARTERS
REFUSED TO CONFIRM THAT
THIS IS THEIR COMPANY
POLICY
4-6-90

BURRELLE'S

Spices company decides against using irradiation

By Clay Harris, Consumer Industries Editor

McCORMICK, the world's largest supplier of spices, has decided not to use the controversial process of irradiation.

Its plan to use steam pasteurisation to ensure the purity of spices may play a significant role in determining whether food irradiation succeeds commercially in Europe.

Irradiation involves bombarding food with gamma rays, electrons or X-rays to kill bacteria or prolong shelf life. The UK Government plans to legalise its use for all foodstuffs later this year, but it is banned in West Germany, while the European Community is considering its position.

The European Parliament has signalled its opposition to allowing the use of irradiation on any food product except herbs and spices.

McCormick is building a new plant on Merseyside which will have the capacity to treat all the spices used in Britain, as well as to supply a large proportion of demand from elsewhere in Europe.

The US-owned company, which accounts for more than half of UK retail sales of spices, will offer to treat spices for competitors under contract. Its use of a natural process, using steam under pressure, is likely to prove a competitive advantage against any rival suppliers which use irradiation.

Dr Johannes Friedrich Diehl, director of West Germany's Federal Research Centre for Nutrition, said his institute had tested alternative methods to the irradiation of spices, including heat. He said if the European Parliament succeeded in having the use of irradiation confined to herbs and spices, "that's the end of food irradiation in Europe."

Spices are often dried in conditions that lead to contamination by insects or other sources. Proponents of irradiation see spices as an ideal product on which to apply the process because the main alternative method, fumigation with ethylene oxide, uses a mutagenic gas and is forbidden in many countries. Britain's ban on ethylene oxide takes effect at the end of 1990.

Mr Roger Jones, McCormick's UK manufacturing director, said the company had decided against irradiation primarily on cost grounds. "But we would have been fools to fly in the face of the consumer reaction to irradiation," he added.

International Organization of Consumers Unions
Regional Office for Asia and the Pacific
P.O. Box 1045, 10830 Penang, Malaysia • Phone [redacted] (+ 60-4)371390
Cable: Interocu Penang • Telex: MA 40164 APIOCU • Fax: (+ 60-4)366506

"Consumer Reports" is published by the American affiliate

The Executive Director
Florida Citrus Commission
PO Box 1240
Fort Pierce, Florida 34954
U S A

2nd November, 1989

Dear Sir,

It has been brought to our attention that Vindicators of Florida is planning to build an irradiation facility to irradiate agricultural produce from Florida, particularly citrus fruits.

The International Organization of Consumers Unions (IOCU) is a federation of over 160 consumer groups in some 70 industrialised and developing countries worldwide. IOCU has Consultative Status Category 1 with UN ECOSOC, as well as official status with several specialised UN agencies like WHO, FAO, UNEP, UNIDO, etc. IOCU is also a co-founder and key actor in some 20 issue-oriented international coalitions of citizens groups working on specific issues of global consumer and environmental concern, including food irradiation. In December 1988, IOCU helped co-found Food Irradiation Network (FIN), a global coalition of like-minded citizens groups and individuals opposed to food irradiation unless and until all outstanding issues surrounding the technology are fully resolved and subject to public scrutiny.

At its 12th IOCU World Congress held in Madrid, Spain, in September 1987, the IOCU General Assembly unanimously adopted a resolution which called for "a worldwide moratorium on the further use and development of food irradiation, until there is a satisfactory resolution of issues of nutrition, safety, labelling and detection". The resolution also called upon "scientists, governments and the food industry, the world over, to research into more desirable methods of food irradiation". A copy of the full text of the aforesaid resolution on food irradiation is attached for your information.

The IOCU position on food irradiation has since been endorsed by environmental, trade union and other citizens groups worldwide at various international fora, most recently at the IV Bienniel Congress on the Fate and Hope of the Earth held in Managua, Nicaragua (see attached copy of the Managua resolution on food irradiation).

...2/-

IOCU is a federation of consumer organisations dedicated to the protection and promotion of consumer interests worldwide through research, information and education activities. An independent non-profit foundation registered in the Netherlands, IOCU links the activities of consumer organisations in some 80 countries and represents the consumer interest at international forums. The IOCU Central Office is at 9 Emmastraat, 2595 EG The Hague, Netherlands. Phone (+ 31-70)476331, Cable: Interocu, Telex: 33561 iocu nl, Fax: (+ 31-70)834078. Its Regional Office for Latin America and the Caribbean is at Casilla 10903, Sucursal 2, Montevideo, Uruguay. Phone: (+ 598-2)904532, Telex: 23133 iocu uy.

SEAFOOD IRRADIATION

FOOD INSTITUTE REPORT

FAIR LAWN, NJ
WEEKLY 6,000

MAR 17 1990

-2705 BURRELLE'S CS

9795 **IRRADIATED SEAFOOD?:** Alpha Omega Technology, Inc., 1279 Route 46 East, Parsippany, NJ 07054, has filed a petition with the Food and Drug Administration (FDA) proposing that the additive regulation *Ionizing Radiation for the Treatment of Food* be amended to provide for the safe use of a source of radiation to irradiate shellfish and finfish for the purpose of extending shelf life and to control infection of microorganisms and parasites. For more information, contact Clyde A. Takeguchi of the Center for Food Safety and Applied Nutrition at (202) 472-5740. — Mar. 15, 1990, 55 FR 9772.

FOOD & WATER, INC.
225 Lafayette Street
New York, N.Y. 10012

THE PACKER MARCH 3, 1990

Irradiation plant planned

NOGALES, ARIZ. — Ground breaking for a produce irradiation plant at the border is scheduled to begin before June, a principal in the deal said Feb. 22.

Ray MacNamara of Emergent Technologies Inc., Pleasanton, Calif., said the irradiation facility, with a $28 million budget that includes construction and the first 18 months of operation, could be open by the end of the year.

Parent company McConnell-Peel Resources Ltd., Vancouver, British Columbia, has signed an agreement with the state to lease land along the Mexican border near the crossing that most trucks use, he said. The company had considered locating on a square-mile plot east of the city, said Rebecca Bregen, executive director of the Nogales-Santa Cruz County Chamber of Commerce.

Jim Soudriette, owner of The Galaxy Organization, a management consulting firm, said he introduced company representatives to businessmen and politicians who might be involved in approving the site. Soudriette is a minor shareholder in the Canadian company.

He predicted the plant may be opposed by some citizens and said one Tucson man has written treatises on the subject.

"Radiation is a psychological problem," he said, referring to the frightened response the word often elicits.

And shippers are unsure the facility will be built, considering that resident opposition might be just as strong. Shippers also questioned the necessity of the facility.

But Soudriette said in December that a large shipper in Nogales has committed to packing produce from the plant, which would irradiate fruits, vegetables and seafood.

The process, which Soudriette likens to getting X-rays at the dentist, is designed to kill microorganisms that infest food products. He said irradiation has been used for years on spices and some cereal products.

ARIZONA PLANT TO IRRADIATE SEAFOOD

FOOD & WATER, INC.
225 Lafayette Street #6.2
New York, N.Y. 10012

Honolulu Star-Bulletin

Sept. 25, 1986
©Gannett Pacific Corp.
All Rights Reserved.
Neighbor Isla

Hilo Group Joins National Coalition to Oppose Papaya Irradiation Project

By Rod Thompson
Big Island Correspondent

HILO — A national organization planning a boycott of papayas if they are irradiated has supporters on the Big Island, where growers will meet tomorrow and discuss the need for the controversial technology.

The East Hawaii Coalition to Stop Food Irradiation, which opposes irradiation of food on health and safety grounds, contends that the irradiation consulting firm hired by the state is too closely allied with the U.S. Department of Energy, which is promoting commercial irradiation.

The group, which is the local chapter of the national Coalition, questions health and safety aspects of irradiation. The U.S. Food and Drug Administration approved irradiation of foods in April following two years of study and public comment.

The FDA's study of irradiation followed action by the U.S. Environmental Protection Agency in 1984 banning the sale of fruit treated with ethylene dibromide, a chemical insecticide widely used by fruit growers and also a suspected carcinogen.

The $10 million-a-year Hawaii papaya industry's search for alternative fruit-fly controls led to the double-dip method now in use. Papayas are dipped in hot and warm water to kill flies, but the treatment has been criticized as disrupting harvesting schedules.

PAPAYA Administrative Committee manager Robert Souza says double dip is "OK" but "we need something better." Irradiation will be a major discussion topic at tomorrow's Hawaii Papaya Industry Association conference.

Concerned about the papaya industry's future, the state Legislature this year appropriated $200,000 to study the feasibility of irradiation to kill fruit flies.

The Big Island group contends CH2M Hill, the international science, engineering and planning firm recently hired by the state to study the feasibility of papaya irradiation, may have a conflict of interest in the matter.

The firm is also under contract to the New Mexico office of the federal Energy Department's Civilian Byproducts Utilization Program, which is hoping to develop commercial uses

Turn to Page A-18, Col. 1

RADIATION SPILL SITE—Radioactive material lay on the ground outside this state Agriculture Department building for 13 years until it was cleaned up in 1980. —Star-Bulletin Photo by Dennis Oda.

Radioactive Leak on Oahu Disclosed

By Rod Thompson
Star-Bulletin Writer

HILO — Radioactive material lay on the ground outside a state-run irradiation facility in Honolulu for 13 years until it was cleaned up in 1980, according to the East Hawaii Coalition to Stop Food Irradiation.

Although the public never was notified of the leak, no injuries resulted, according to a state Department of Agriculture official.

The contamination outside the building followed spillage of radioactive cobalt-60 inside the Hawaii Development Irradiator building at Fort Armstrong in 1967, Coalition spokeswoman Kathy Dorn said.

The coalition planned to disclose the incident at a press conference on the Big Island today.

Dorn cited the spill as an example of the danger an irradiator can pose to a community. A commercial irradiator is being considered for construction on the Big Island.

THE HAWAII Development Irradiator was operated by the state Department of Agriculture with federal money from 1957 to 1971, according to state documents obtained by Dorn. Dismantling of the facility was delayed until 1980, the documents show.

The facility irradiated papayas for studies of how well they held up in shipment and how wholesome they were, said Department of Agriculture administrator Masao Hanaoka.

Hanaoka confirmed that nine curies of cobalt-60 spilled inside the facility. He became safety officer for the facility after the spill was cleaned up, he said. Nine curies of cobalt-60 could give the equivalent of 180 chest X-rays per hour, said Brian Sprinstock of Food Irradiation Response in Santa Cruz, California.

Sprinstock estimated the material on the ground outside the facility could give the equivalent of two chest X-rays per hour when it was cleaned up in 1980, and eight chest X-rays per hour in 1967, before its strength declined.

No injuries are known to have resulted from the spill, Hanaoka said.

THE SPILL was due to defects in the manufacture of steel capsules which contained the cobalt, Hanaoka said. The spilled cobalt was confined to a pool of water used to shield workers from radioactivity, he said.

Some of that water washed onto the ground when a lead cask containing the damaged capsules was removed in 1967, Hanaoka said.

The soil contamination was discovered when consultant Ralph M. Baltzo decontaminated the entire facility in 1980, Baltzo said in a report to the state Department of Agriculture.

Although the radiation spillage was never publicized, Hanaoka said, there was no coverup. No laws were violated, and state and federal officials "didn't think it was that much of a hazard to the public," he said.

Irradiation opponent Dorn disagreed about the danger. A similar spill at a proposed Big Island food irradiator could be worse if water soluble cesium-137 is used there instead of cobalt-60, Dorn said.

A cesium 137 leak "would be immediately washed into the groundwater," Dorn said. "It would inevitably lead to higher rates of cancer, birth defects, and damage to peoples immune systems, making them more susceptible to infection," she said.

Dangerous Chemical and Biological Effects Seen

By Rod Thompson
Big Island Correspondent

HILO — A Big Island group contends irradiation produces dangerous chemical and biological changes in treated food.

The charge by the East Hawaii Coalition to Stop Food Irradiation flies in the face of safety assurances from the U.S. Food and Drug Administration, which in April approved irradiation of fruits and vegetables to rid them of insect pests.

The state of Hawaii and papaya growers are currently considering gamma-ray irradiation as a means of controlling fruit-fly infestation.

The FDA's green light for food irradiation followed more than two years of deliberation and review of thousands of written comments of proponents and opponents.

The idea of food irradiation may be new to most consumers but research in the area has been going on for more than 40 years, much of it by the federal government. America's astronauts have been eating irradiated food almost from the beginning of the space program.

The FDA reviewed more than 441 studies of possible poisons in irradiated foods but concluded only five studies were done properly by 1980 standards, according to the Federal Register.

The five studies showed "no adverse effects from the irradiated foods fed to test animals."

BESIDES setting maximum radiation levels, the FDA also spelled out labeling requirements for irradiated foods for the next two years.

Labels of packaged foods sold in retail stores will have to clearly state they have been treated with radiation. They also must have a special logo, or symbol, to inform shoppers they have been irradiated.

Retailers also will be required to identify fresh fruits and vegetables that have been treated with irradiation.

A recent British government report says laboratory animals are increasingly being fed entire diets irradiated at 1 million to 5 million rads.

The reason is "the beneficial effects which have been noted in the general health of animals fed irradiated diets," said the report, circulated here by the state Department of Planning and Economic Development.

THE FDA authorized irradiating fruits and vegetables with up to 100,000 rads, a unit measuring absorbed radiation. The permitted dose is 100 times the level needed to kill a human being.

The maximum dose is not needed for papayas, says University of Hawaii food engineering professor James Moy, who studied papaya irradiation in the late 1980s.

Moy says he holds the "unofficial world's record" for eating irradiated papayas and is still healthy.

The U.S. Animal and Plant Health Inspection Service has yet to decide whether to require 26,000 rads to kill fruit flies, or 15,000 rads to leave them alive but sexually sterile, Moy said.

There is general agreement that 100,000 rads or less does not produce secondary radiation in foods. But opponents say irradiation produces dangerous by-products in treated foods.

One of the concerns of opponents is "unique radiolytic products" — URPs — which are chemicals formed by radiation breaking apart natural chemicals in food.

The FDA contends these substances are similar to natural chemicals in food, and at three parts per million, their concentrations are too low to test their effects.

MOY SAID the biggest danger of URPs comes from irradiated fats. Papayas have practically no fat, he said.

The Coalition also says irradiation may not kill microorganisms that cause botulism, while killing those that cause food to spoil, warning people not to eat it.

The warning microorganisms are not killed at the permitted radiation levels, the FDA has said.

The East Hawaii Coalition cites a 1980 FDA study which found certain irradiated fungi greatly increased their production of the cancer-causing chemical aflatoxin.

Moy says the fungi which produce aflatoxins don't grow on papayas.

Opponents say irradiation destroys vitamins. The FDA said "there are no nutritional differences" between unirradiated food and food irradiated at the the permitted level.

Papayas are high in vitamin C. The Council for Agricultural Science and Technology said irradiation changes "a significant proportion" of vitamin C to a related chemical which has "almost the same vitamin C value."

Radiation of Papaya Is Opposed

Continued from Page A-10

radiation facilities, said Yoshihara.

Maurice Kaya of CH2M Hill's Honolulu office denied any conflict of interest: "By working through the Department of Energy, we bring experience, knowledge, and credibility to the project.

"I like to think we were selected on the basis of our qualifications," he said.

The East Hawaii chapter is part of the National Coalition to Stop Food Irradiation, Dorn said. The local chapter consists of a core group of eight people assisted by about 40 others, with little formal structure, she said.

The national Coalition is allied with other groups such as Food Irradiation Response of Santa Cruz, California, and the Health and Energy Institute and the Health Research Group of Washington, D. C., she said.

While disagreement on the feasibility of papaya irradiation remains, people interested in it are adjusting their attitudes.

AMFAC, THE state's largest papaya packer, has softened its stand against irradiation. Amfac Agribusiness president Dennis Teranishi now says it is proper to consider radiation. Four months ago he said, "I don't want to fool with it."

Teranishi noted the idle lands formerly used for sugar production by Amfac subsidiary Puna Sugar Co. He suggested irradiation may be useful in processing any alternate crop which the company can find for those lands.

Former state agriculture director John Farias says he has stopped working on a private irradiation project for the Big Island. Two officers of a corporation he was working with, International Nutronics Inc. in California, are under federal indictment on charges related to allegedly covering up a 1982 radiation spill.

Hilo Group Opposes Radiation

Continued from Page One

of nuclear-reactor wastes.

Ron Holton, program coordinator in Albuquerque, said CH2M Hill is providing technical expertise on irradiators to that office.

A CH2M Hill subsidiary, Isotech, last year began operating an irradiator in Colorado for medical instruments.

A DIFFERENT contractor provides expertise to the federal department's Richland, Washington office, which oversees the by-products program in Hawaii.

Karen Wheeless, spokeswoman for the Richland office, said the purpose of the program is to demonstrate the economic and technical feasibility of irradiators.

"Initially we're looking at cesium" as the radiation source for the irradiators, she said.

The Big Island group is opposed to using radioactive cesium 137 because it would be used in the form of a water-soluble salt, increasing the dangers in the event of a spill, said spokeswoman Kathy Dorn.

An accident could result in the salt being dissolved in the Big Island's ground water if a cesium-based irradiator is built here, she said.

Since cesium-137 is a waste product from making plutonium for nuclear bombs, irradiation opponents also see the government's byproducts utilization program as a way of creating a demand for cesium, so more plutonium will be processed for bombs.

THE GOVERNMENT has no plans to reprocess plutonium and cesium-137 from stockpiled wastes, Wheeless said.

Takeshi Yoshinara, head of the energy division of the state Department of Planning and Economic Development, said CH2M Hill was selected because it was the most qualified of seven applicants.

The primary business of the other applicants is operating ir-

Turn to Page A-11, Col. 1

New Jersey Daily Record

Radioactive Responsibility

OCT 2 1977

By JAN BARRY

If there was a serious radiation accident anywhere in the world this year which could have been prevented, it was the recent exposure of a worker at Radiation Technology Inc. in Rockaway Township.

When residents in the area raised safety questions about the plant last fall, local reporters were assured by company president Dr. Martin A. Welt and a spokesman for the federal Nuclear Regulatory Commission that precisely the kind of accident which occurred Sept. 22 could not happen.

Dr. Welt, a nuclear physicist formerly with the Atomic Energy Commission, informed reporters at a press conference in the plant nearly a year ago and in a subsequent tour of the radiation area that his industrial radiation operations were entirely safe and his employees protected from accidental exposure.

Learning of the 1976 accident at Isomedix Inc., Parsippany, in which worker William McKimm was exposed to a potentially lethal level of Cobalt 60 radiation, I went to the NRC Region 1 headquarters in King of Prussia, Pa., last October to review the records of that case and to ask whether a similar accident was possible at the Rockaway Township plant.

Public affairs officer Karl Abraham, who blamed the Isomedix accident on a "lack of knowledge" by key personnel, including the exposed operator, of the function of the remote alarm defeat switch," said the Radiation Technology plant design would not allow a worker to enter the radiation area and have an unexpected encounter with a highly lethal basket load of Cobalt-60 "pencils" in the exposed position above the protective pool of water.

Should such an accident happen, Abraham said in a subsequent interview, the amount of Cobalt-60 at Radiation Technology could kill a person fully exposed to it "in 12 seconds."

Abraham emphasized, however, that the federal agency is "in the preventive maintenance business" and that its regulations for the radiation industry provide "an enormous margin of safety."

Yet, the accident which couldn't happen at Radiation Technology happened within a year of these official assurances.

That it could happen was clearly the responsibility of the regulatory agency to do everything in its power to prevent.

Indeed, last January the NRC slapped the radiation firm with $4,200 in fines for nine violations of federal radiation safety standards uncovered in last fall's investigation.

NRC officials ordered Dr. Welt to correct the violations and to submit a report describing how he intended to "strengthen management control of your licensed operations to assure a strong radiation safety program for the protection of your employees and the public."

In light of the NRC special investigation, fines and orders, how was it possible only months later for Michael Pierson to walk right into the radiation chamber while the Cobalt-60 was exposed?

The question the public and plant employees clearly have a right to call nuclear regulatory agency officials on the carpet for has yet to be answered.

Daily Record Staff Photo

This International Nutronics Inc. plant in Dover is under probe.

OCT 13 1981

Dover radiation leak investigated by NRC

DOVER — The Nuclear Regulatory Commission says it may take months before it can confirm or deny charges that a Route 46 plant covered up a radiation leak nearly a year ago.

The leak was discovered on Sept. 30 by the NRC, which notified town officials on Oct. 6, said Dr. John Glenn of the commission's Region 1 office in Pennsylvania.

Glenn said whether International Nutronics Inc. concealed the December 1980 leak of Cobalt 60 "will be determined later" since inspection of the site could go on for months. Company officials were not available for comment yesterday.

Glenn said that while no fine has been determined yet, the usual fine for such a leak ranges from $400 to $8,000. If a coverup is found, he said, any fine could be increased.

The levels of radiation found in the soil and water inside and immediately surrounding the plant are "slightly over Results," Glenn said. And while studies are continuing to determine if employees or ground water supplies have been contaminated, he said the levels found so far are not harmful.

The leak came to light after the regulatory commission routinely inspected the plant, which uses radiation to sterilize pharmaceutical equipment, because the company is closing, he said. Normally, such inspections are done yearly or biennially, depending on what is found, Glenn said. The plant has been at the site since 1970, he said.

"The fact that (the company) did not call the NRC immediately is the scary part," said Mayor Aldo Ciccheti. "Who knows if it ever happened before?"

The incident is evidence such facilities should not be located in densely populated areas, he said, adding that once the building is vacated he will discourage a radiation facility at the site or elsewhere in town.

Officials also are concerned over possible hazards in case of fire, because water could spread the contamination, and 10,000 gallons of propane and an unknown amount of fuel oil border the plant.

Man To Blame For Own Accident

By ROBERT SCOTT

ROCKAWAY TWP. — A man exposed to large amounts of radiation in an accident at Radiation Technology is partly to blame for his own accident, a spokesman for the federal Nuclear Regulatory Commission says.

Karl Abraham, public information officer for the commission, said the accident could have been avoided if the worker, Michael Pierson, 32, had been carrying a personal radiation survey instrument.

Asked if the accident was partially Pierson's fault, Abraham replied, "his fault in conjunction with others." Abraham did not mention Pierson by name since the NRC has refused to confirm his identity.

Pierson has remained in St. Barnabas Hospital in satisfactory condition since the Sept. 27 accident.

Abraham said if Pierson had been carrying a radiation survey instrument and regularly reading and using it, he never would have entered the room where he was exposed to an unshielded Cobalt 60 source.

The instrument would have revealed the presence of intense radiation, Abraham said.

Abraham has estimated Pierson remained in the room about 25 seconds and would have received a fatal radiation dose had he remained there another 30 seconds.

Pierson was placed in "reverse isolation" at St. Barnabas to prevent contact with disease-bearing germs since his bodies natural defenses may have been destroyed by the radiation exposure.

The firm's license, suspended the day of the accident, was partially restored on Monday.

There are two rooms which Radiation Technology uses to expose various substances to radiation. The one involved in the accident remains closed. The other, where wood is exposed to a Cobalt source which is kept under water at all times, can now be used again.

Abraham has cited two other factors, both violations of commission regulations, as having helped contribute to the accident.

The door to the room Pierson entered had been removed from its hinges and a safety lock which should have prevented anyone from entering the room while the cobalt was exposed, had been disconnected.

Abraham said the commission considers these two violations serious because they were intentional acts involving "willful disregard" of regulations.

Nutronics denies cover-up of leak

By LIV OSBY

Daily Record Staff Writer OCT 15 1981

DOVER — An official of International Instruments Inc. denies there was a cover-up of a radiation leak that occurred nearly a year ago at the Route 46 plant.

"At no time did we attempt to cover up the leak," said Gregory Parker, corporate counsel and vice president of the California based company.

Parker said the leak was the result of a broken rod which allowed Cobalt 60 to enter a pool in 1976, which was immediately reported to the Nuclear Regulatory Commission. The break was repaired, he said, but recurred in October of 1980 when the commission was notified again.

"The NRC accepted our plan for repair and cleanup and for the last year we're been working on it," Parker said.

And when the discovery of low level radiation contamination was made at the plant again this past September, he said the NRC was notified once again.

But Dr. John Glenn of the NRC Region 1 office reiterated his earlier comment that the leak was discovered Sept. 30 during a routine inspection ordered because the facility was in the process of closing. He also said the commission was not notified of the December 1980 leak and that it was the NRC which informed the town of the leak on Oct. 6.

"We didn't notify the town because it is our belief there was no public health hazard," Parker said. "If there had been any question of a hazard, we would have notified the town immediately."

But Mayor Aldo Ciccheti said, "Anytime there is a potential for a hazard the town should be notified. It is our right to know."

Parker said the plant is being shut down because the loss of work during the cleanup would not justify its reopening and because headquarters decided to concentrate its efforts on the West Coast.

HEALTH & ENERGY INSTITUTE

236 Massachusetts Avenue, N.E. • Suite 506 • Washington, D.C. 20002 U.S.A. • Phone (202) 543-1070

CESIUM-137 FACT SHEET

Cesium is a silver-white, soft, malleable element of the alkali metal group with an atomic number of 55 and an atomic weight of 132.9. 1 Cesium-137 is a radioactive isotope of cesium with an atomic mass number of 137. Cesium-137 is a fission product created by nuclear explosions or nuclear reactors.

A half life for a radioactive isotope is the time in which half of its radiation is released, and the half-life for cesium-137 is 30.5 years. 2 That means that in 30.5 years, half of the energy of cesium-137 will be released, and in another 30.5 years half of the remaining energy will be released, and so on. Cesium-137 is considered dangerous for 300 years.

As cesium-137 decays, it gives off gamma rays of intermediate energy and beta rays of intermediate energy. 3 Gamma rays are very penetrating, and can pass through walls, clothing and our physical bodies. Shielding of several inches of lead or several feet of concrete is needed to stop gamma rays. 4 Beta radiation is particulate radiation that is not very penetrating. Beta radiation can penetrate the outer layers of skin, and at least a quarter of an inch of aluminum is needed to stop it. The main health hazard to humans from beta radiation occurs when it gets inside the body, where it can constantly bombard living tissue. A mere 77 microcuries (a micro curie is one millionth of a curie) of ingested cesium-137 will result in a dose to the whole body of 10 rads in the first year. 5 (A dose of 10r is twice the dose allowed for workers and 25 times the dose allowed for the general public from the nuclear fuel cycle.)

Radioactive isotopes can concentrate in the food chain. Cesium-137 is chemically similar to potassium and will spread throughout the soft tissues of the bodies of fish, wild and domestic animals, and humans. Animals and people retain more cesium-137 than potassium, so as cesium-137 moves up the food chain, higher cesium-potassium ratios occur at each level. 6 Pathways to humans for cesium-137 include plants to cows to milk and plants to meat. Cesium-137 is likely to lodge in muscle, the spleen, the liver or other parts of the body. 7

Cesium-137 inventories in the United States have been estimated by the Department of Energy as follows:

Hanford Reservation, Washington: As of June, 1984, a total of 77 million curies existed, encapsulated in 1575 capsules. Another 38.5 million curies are projected from future Purex wastes by 1991.

Savannah River Plant, South Carolina: As of January, 1983, 102 million curies were present at the Savannah River Plant, and another 109 million curies is projected by 2001.

---

1 Websters New Collegiate Dictionary, pp.183 & 368 (1977).
2 V. Brodine, Radioactive Contamination, 166 (1975).
3 Ibid.
4 J. Stellman & S. Daum, Work Is Dangerous to Your Health, 147 (1973).
5 V. Brodine, op. cit. 2 at 161.
6 Ibid. at 38-39.
7 Ibid. at 168-169.

Butterworth says city can't restrict food plant

By BILL HEERY
Tribune Staff Writer

MULBERRY — Cities cannot use zoning laws to ban businesses that use radioactive materials from operating within their boundaries, Attorney General Bob Butterworth said this week.

Mulberry City Attorney Frank Comparetto Jr. had asked for the opinion in light of a Plant City company's proposal to build a $6.2 million food irradiation plant here.

In his request, Comparetto said most city commissioners objected to the business being located within the city because of potential hazards associated with radiation.

Butterworth's opinion was based on the 1983 Florida Radiation Protection Act, which designates the state Department of Health and Rehabilitative Services (HRS) as the agency to administer a statewide radiation protection program.

That act prohibits counties and cities from regulating the possession, use or transportation of radiation sources.

While cities can use zoning laws for certain health, safety and general welfare objectives, the act prohibits them from banning sources of radiation, states the opinion, issued Monday.

Comparetto, through a secretary, declined to comment on it Wednesday.

Vindicator of Florida Inc. wants to build the irradiation plant in an industrial park just west of Prairie Mine Road. The plant would use cobalt 60 to produce small doses of radiation to kill microorganisms and to prolong the shelf life of certain foods.

Opponents contend it would pose an environmental danger and that the long-term effect of eating irradiated foods is unknown.

The property, annexed into the city last year, is zoned for general industrial use — the county zoning it had before annexation. That zoning would permit the irradiation plant, City Manager Floyd Woods said Wednesday.

Mulberry annexed the property as part of a plan to expand its existing industrial park. Under Florida law, more stringent zoning cannot be placed on annexed property unless the property owner requests a zoning change, Woods said.

The City Commission Feb. 7 approved an ordinance placing a moratorium of as much as one year on issuing building permits

See MULBERRY, Page 10B

Mulberry plans to keep moratorium

■ From Page 1B

for food irradiation plants and other businesses that store or use hazardous materials.

The moratorium was to give city officials time to learn more about the irradiation process and to research the legality of banning such businesses within city limits.

Woods said the attorney general's ruling will not affect the moratorium since the opinion is not law.

"My opinion is that the moratorium is in effect, and it's legal until someone challenges it in court," he said.

Helga Druguet of Eaton Park, spokeswoman for the Polk County Coalition to Stop Food Irradiation, a grass-roots organization with about 12 members, said she disagreed with the attorney general's opinion. So did Mulberry resident Jan Privett, another plant opponent.

"You're talking about home rule," Druguet said. "Every municipality in the United States can control what they allow to come into their city."

Said Privett: "I really think there's a way that a city can determine its future, just like I believe the food they irradiate should be labeled so that people can make the choice."

Mulberry City Commissioner Andy Scrocca, one of the most outspoken opponents of the plant, said the opinion is only that, "and the attorney general of Florida is entitled to his. I just wish they would listen to the opinions of the people in the city of Mulberry. Five hundred people attended a meeting — one of the largest we've ever had — to protest" the plant.

Sam Whitney, president of Vindicator, said he was not surprised by Butterworth's opinion because "the law is very clear." He said HRS' Office of Radiation Control approved the proposed site for the irradiation plant last November.

FOOD & WATER, INC.
125 Lafayette Street #612
New York, N.Y. 10012

A Short History of Trouble

Irradiation Hall Of Shame

The industrial irradiation industry is relatively new. Created in the mid 1970's to sterilize medical supplies and packaging materials, this young industry has had a troublesome safety record. Problems have included radioactive leaks, spills, worker overexposures, failed or bypassed safety systems and failure to report to the Nuclear Regulatory Commission. The state of New Jersey hosts many of these problem plants. What follows is a summary of the 13 most significant incidents which have occurred in the last 12 years.

JUNE 16, 1974 *Chief of radiation operations at the Isomedix irradiation plant in Parsippany, N.J. received an estimated 400 rem radiation dose, when he failed to take proper safety precautions. William McKinn barely survived the one or two second overexposure to 147,000 curries of cobalt-60. Mr. McKinn was in critical condition for one month before recovering.*

1976-1980 *In 1976 a double encapsulated cobalt-60 source was found leaking at the Isomedix irradiation plant in Parsippany, N.J. Following ion-exchange filtration, the source pool water was dumped down the plant's toilet. An extensive cleanup program followed which involved jackhammering concrete from the walls and floor of the source pool. During cleanup operation, Chem-Nuclear Corp. found the toilet and toilet pipe to be radioactive. Eventually, the toilet, tools, and parts of the source pool were shipped to a radioactive burial ground.*

MARCH 14, 1977 *The Nuclear Regulatory Commission fines Radiation Technology Inc. [RTI] $4050.00 following an October 1976 inspection which identified 10 violations of RTI's license. Violations incuded, failure to report a leaking cobalt-60 source, failure to adequately evaluate radiation doses to workers, disposing of radioactive material as normal trash and failure to provide required training to employees.*

SEPTEMBER 23, 1977 *An employee at the Radiation Technology Inc. [RTI] plant in Rockaway, N.J. entered the radiation cell for 10-20 seconds and received a whole body dose between 150-300 rems. The direct cause of the overexposure was a decision by RTI management to operate the facility with the safety interlock system inoperative.*

SEPTEMBER 2, 1982 *A service technician at the irradiation plant at the Institute for Energy Technology, Norway, was exposed briefly to the 650,000 curie cobalt-60 source. The plant worker received an estimated dose of 1,000 rems, and died on September 15, 1982 from radiation injury.*

JUNE 11, 1986 *Radiation Technology Inc., cited in 1982 as a source of ground water pollution, was ordered by the State of New Jersey to pay a $600,000 directive to study the problem. Volatile organics such as trichloroethylene, methylene chloride, and trichloroethane were found in test wells drilled on RTI's 15 acre site in Rockaway, N.J. The toxic products were stored in 100 bulging, rusty, leaky 55 gallon drums on the company's property.*

JUNE 24, 1986 *A federal grand jury indicts Eugene T. O'Sullivan, San Jose, Calif., and Bruce J. Thomas of Somerville, N.J., both employees of International Nutronics Inc. [INI] of Palo Alto, Calif. INI and the two employees are charged with conspiracy, mail fraud, wire fraud, and concealing a radiation spill from the Nuclear Regulatory Commission [NRC]. In 1982, INI found a leaking cobalt-60 source in their source pool. A cleanup was begun which involved pumping the radioactive water through filters. During the filter operations, which were left running unattended overnight, a discharge line became detatched, spilling radioactive water onto the floor of the plant. INI employees were then instructed to dump the water down bathroom drains and into the public sewer system. INI then delayed an NRC inspection and attempted to hide radiation contamination from inspectors. (see detailed article in this issue)*

JUNE 24, 1986 *The Nuclear Regulatory Commission [NRC] revokes operating licenses for Radiation Technology Inc. [RTI] at their Rockaway, N.J. facilities. The license suspension comes after an NRC investigation into charges that RTI lied and deceived the NRC in regards to a March 3, 1986 shutdown. The March shutdown came after the NRC found RTI had bypassed safety equipment during plant operations, a repeated RTI failure, identical to the failure which lead to the worker overexposure in Sept. 1977. The NRC has turned this case over to the N.J. Justice Dept. for consideration.*

SCIENCE BOX

COBALT-60 *is a radioactive isotope of the metal cobalt, it is created by bombarding nonradioactive cobalt rods in a nuclear power reactor. Cobalt-60 gives off gamma rays and beta particles as it decays.*

REMS *are an arbitrary measure of radiation effects on living tissue. Like degrees or pounds, the number of rems increase as exposure to radiation increases. One chest X-ray, given to a 150 pound adult gives a dose of 5/100ths of one rem.*

Bulletin of the Atomic Scientists
Vol. 46, No. 7 (September 1990)

The Bulletin of the Atomic Scientists is one of the best sources of information on nuclear and disarmament issues available. It's an easy-to-read journal for scientists and non-scientists alike! To subscribe, send $24 (for ten issues per year) to: Bulletin of the Atomic Scientists, 6042 South Kimbark Ave., Chicago, IL 60637-9989.

ZAPPING THE FOOD SUPPLY

By DONALD B. LOURIA

Irradiated food is not radioactive, but is it good for you? If irradiation becomes widespread, we may never know.

New arguments are boiling up over an old idea—irradiating food with ionizing radiation to kill microorganisms and prolong shelf life. The idea of exposing food to gamma radiation is over 30 years old, and in 1963 the Food and Drug Administration (FDA) began to permit the irradiation of wheat. Over the years, a few more foodstuffs such as spices and tea were added to the FDA's list of candidates for irradiation. But in 1984 the FDA started to approve irradiation of a much broader list of products which now includes meat, poultry, and fresh fruits and vegetables. Simultaneously the FDA has increased the levels of radiation that may be used. The FDA's recent willingness to allow most of the food supply to be irradiated—and at high doses—has triggered an acrimonious debate.

The amount of radiation involved is substantial. The FDA has approved a 3,000,000 rad dosage for treating spices, 300,000 rad for pork, and 100,000 rad for fresh fruits and vegetables. These intensities are millions of times greater than that of an ordinary chest X-ray (which is typically about 20 millirad). The announced goal of promoters of food irradiation is to obtain general approval for the use of up to one million rad.

Irradiation does not make food radioactive, nor has alleged radioactivity been at issue in the debate. But there is concern that foods processed by irradiation may contain radiolytic products that could have toxic effects.

The source of radiation is either cobalt 60 or cesium 137. The prospect of increased transportation and handling of cobalt and cesium—dangerous substances—has caused negative publicity. Some irradiation proponents say food processors could theoretically use as-yet-undeveloped linear acceleration techniques instead. But if food irradiation becomes commonplace any time soon, cesium or cobalt will be used.

The major objective of irradiation is to destroy microorganisms that cause food to spoil. For example, irradiating chicken should reduce the outbreaks of salmonella that are probably caused by careless or unhygienic methods in production and processing. Irradiating pork might reduce the already limited risk of trichinosis, and irradiating turkey would diminish the number of episodes of diarrhea that result from eating undercooked meat. William McGivney, an advocate of the technology, asserts that "irradiation offers a means to decontaminate, disinfect and retard the spoilage of the food supply."[1] Most opponents counter that adequate cooking and hygienic preparation will accomplish the same goal.

Promoters of irradiation emphasize that the shelf life of various foods will be increased. But these proponents have not produced any projections of the actual economic, or other, benefits of longer shelf life, especially in a developed country that has an abundant food supply. It may be easier to imagine that less developed countries might benefit if the shelf life of foodstuffs could be prolonged. But advocates have made no estimates of the extent to which better preservation would reduce world hunger, or of the cost of widespread food irradiation in less developed countries.

Irradiation is expected to reduce the need to use toxic chemicals as post-harvest fumigants, but some evidence indicates that irradiated foods are more, not less, subject to infection with certain fungi.[2]

At dispute in the controversy over food irradiation are the quality of the FDA's safety assessment, the loss of nutritional value that irradiated foods undergo, the risk of environmental contamination posed by irradiation facilities, and the possible cancer-causing nature of irradiated foods. An additional dispute revolves around the motives of the Energy Department, which has promoted irradiation and is the potential supplier of cesium 137, a waste byproduct of nuclear reactors.

■ **Safety.** The FDA judged safety based on five of 441 available toxicity studies. Of the available literature, claimed the FDA, only these five animal studies were "properly conducted, fully adequate by 1980 toxicological standards and able to stand alone in support of safety."[3]

But when these studies were reviewed at the Department of Preventive Medicine and Community Health of the New Jersey Medical School, two were found to be methodologically flawed, either by poor statistical analyses or because negative data were disregarded.[4] One of the two also suggested that irradiated food could have adverse effects on older animals. In a

Donald B. Louria is chairman of the preventive medicine department at the New Jersey Medical School in Newark, New Jersey.

third FDA-cited study, animals fed a diet of irradiated food experienced weight loss and miscarriage, almost certainly due to irradiation-induced vitamin E dietary deficiency.[5] This study, which used foods that had been subjected to large doses of radiation, indicated that irradiated food suffered nutritional loss.

These three studies do not document the safety of food irradiation, and why the FDA relied on them is mystifying. The two other studies cited by FDA appear to be sound, but these studies investigated the effects of diets consisting of foods irradiated at doses below the current FDA-approved general level of 100,000 rad. Therefore they cannot be used to justify irradiation of foods at the levels currently approved by the FDA. Now, as the FDA considers adopting 300,000 rad as the general dosage level, the agency has not requested new studies, but is relying on some of the older studies it failed to include as methodologically sound.

Ethical and methodological barriers make it nearly impossible to study the effects of a diet of irradiated foods in human subjects. One small, controversial study carried out in India in the mid-1970s looked at the effects of feeding irradiated and unirradiated foods to 15 children with severe protein and total-calorie malnutrition.[6] Five children were fed unirradiated wheat, five freshly irradiated wheat, and five ate irradiated wheat that had been stored for a minimum of three months. Children who had eaten freshly irradiated wheat had unusually high rates of chromosomal abnormalities in their blood (especially polyploidy). No such changes occurred in the group that ate irradiated wheat that had been stored. Although some animal studies have supported the results of this study, it has provoked an acerbic debate. Clearly, the study has major flaws: the size of the sample is too small, subjects were not properly randomized, and statistical methods are unclear.

A more recent study of 70 subjects was conducted in China.[7] In contrast to the severely malnourished subjects in the Indian study, all the Chinese subjects were healthy young men and women. The experimental group ate irradiated foods that had been stored for an extended period of time. (Also, the group's diet was essentially wheat-free.) Both groups—those receiving irradiated foods and the control group—showed some increases in chromosomal abnormalities during the test period. Those given irradiated foods appeared to have a slightly increased rate of abnormalities. While neither of these studies are conclusive, they should not be dismissed. If the malnourished are particularly vulnerable to the dangers of an irradiated diet, hundreds of millions of malnourished people could be at risk. More studies on chromosomal abnormalities are necessary, but there are ethical as well as methodological problems in designing and conducting them.

The radura, international symbol for irradiated food.

■ **Nutrition.** There is impressive evidence that irradiated foods lose vitamin content, particularly vitamins A, C, E, and some of the B complex.[8] The amount of vitamin loss varies from one type of food to another, but in general there is a direct relationship between the amount of irradiation and the extent of nutritional value lost. Data on foods irradiated with 100,000 rad cannot be relied on to predict vitamin losses in foods irradiated with 300,000 or 1,000,000 rad. Some studies indicate that cooking irradiated foods causes an additional, inordinate loss of nutrients.[9] In addition, little is known about the nutritional effects of freezing and thawing food that has been irradiated.

Those who favor irradiation do not deny the loss of vitamin content, but often assert that these nutritional losses will not harm people who eat a generally nutritious and balanced diet. Others suggest that irradiated foods should be fortified with vitamins, or that the public should be urged to take vitamin supplements. In less developed countries, reducing the food supply's nutritional value would seem to raise a major ethical question. Asking the world's 800 million malnourished and 2 billion undernourished to make a possible trade-off between longer shelf life and less nutrition seems harsh, particularly before more complete information on the nutritional value of irradiated foods is available.

■ **Environmental issues.** Opponents of food irradiation have raised four interrelated environmental issues: the dangers of transporting radioactive isotopes to hundreds of treatment facilities, the environmental practices of those facilities, the danger of worker exposure in environments where irradiation chambers are frequently opened to allow foodstuffs to pass in and out rapidly, and potential security problems at irradiation plants.

If all the poultry in the United States were to be irradiated, hundreds of new irradiation plants would be needed. There are about forty plants of a size suitable for food irradiation already in operation. Most of these plants are used primarily to irradiate disposable medical equipment. In New Jersey, which has the highest concentration of these facilities, plant safety records are not encouraging. Virtually every New Jersey plant has a record of environmental contamination, worker overexposure, and regulatory failings.

A serious accident occurred at a Decatur, Georgia, cesium irradiator in June 1988. That facility was shut down after a cesium leak exposed 10 workers to radiation and contaminated medical supplies and consumer products.[10] Clean-up costs at the Decatur plant have climbed to more than $15 million, and no conclusions have been reached about the cause of the accident.

Unlike major nuclear facilities, irradiation plants will be relatively small and are unlikely to be well protected. Opponents fear these plants will be particularly vulnerable to sabotage or terrorist attack and express similar concerns about the safety and security of large numbers of shipments of highly radioactive materials. If food irradiation becomes commonplace, hundreds of irradiation plants will need to have their inventories of cesium 137 or cobalt 60 replenished on a regular basis.

■ **The cancer threat.** The irradiation process produces unique radiolytic

products whose chemical and toxic properties have not been characterized. In-vitro tests in the laboratory suggest that some of these products may cause mutations, and these tests have led critics of irradiation to contend that some irradiated foods may prove carcinogenic. But there are no substantial data from epidemiological studies on either animals or humans to support that contention. Unless the chemical properties of all the radiolytic products are identified, and animals studies using amplified doses are conducted, there is no way to prove that a cancer risk exists and, if so, whether it would fall within acceptable limits. Adequate evidence for prudent decisions on the cancer risk of food irradiation will not be available for some time.

■ **The Energy Department connection.** The Energy Department, through its Byproducts Utilization Program, tries to develop commercial uses for radioactive waste products. Creating a commercial demand for cesium, which is a waste product of both weapons production and civilian nuclear power, has been one of its expressed goals since the early 1980s. Energy Department memoranda indicate that the department's plan included pricing cesium so low that it would drive Canadian cobalt out of the market.[11]

Some critics charge that the Energy Department has been even more devious. They claim that the department was less interested in disposing of cesium than it was in overturning the ban on reprocessing civilian nuclear fuel. These critics claim that the department calculated that widespread food irradiation would eventually deplete the available supplies of cesium 137. At that point, the irradiation industry would begin to lobby for the reprocessing of spent fuel, and the department could use the industry to overcome the political and economic obstacles to reprocessing nuclear fuel. Once reprocessing was permitted, the Energy Department could separate the plutonium in spent fuel, which it could then use in weapons.[12]

There is no reason to adopt every new technology that is suggested. Ideally, food irradiation should be made to compete on a commercial basis with other technologies. If it had no disadvantages or dangers, the marketplace alone would decide its fate. Most food processors now think that irradiation is costly and less effective than other methods of preservation, and consumers are resistant to the idea of radiation-treated foods. But the adoption of food irradiation technologies raises questions of public health. Many local authorities have opted for alternative technologies. In Florida, the Citrus Commission/Department of Agriculture has chosen to use two other processes—fly-free zones and cold treatment. Hawaiian officials rejected federal funds offered to build an irradiation facility for processing papaya; instead, the papaya processor will use nonchemical treatments such as dry and steam heat or double hot water dips. Some biotechnological researchers are confident that recombinant DNA technologies will eventually create pest-resistant fruits and vegetables with extraordinarily long shelf lives.

If food irradiation is adopted prematurely, research on its health effects will be hampered. Widespread use of the technology will make it impossible to detect any but the most obvious of adverse effects, because it will be impossible to define a control population for purposes of study. This problem will be further complicated if irradiation levels are increased to 1 million rad.

Labeling is currently required to notify the consumer when whole foods have been irradiated. The label includes written notice and the international irradiation symbol, the "radura"—a stylized flower which has caused some confusion because of its close resemblance to the Environmental Protection Agency's logo. Prepared or packaged foods, foods prepared for restaurant or school cafeteria use, and foods which merely contain some irradiated ingredients are exempt from labeling.

While the FDA has approved wholesale food irradiation, other regulators are less eager. More than a dozen state legislatures, concerned about the environmental and health risks of irradiated food, have restricted its sale and distribution. Maine has banned both irradiation facilities and all irradiated food except spices. New York and New Jersey recently enacted two-year moratoriums on the sale or distribution of irradiated foods, and New Jersey has prohibited the "manufacture" of such food items. Other states contemplating restrictive legislation include Massachusetts, Pennsylvania, Minnesota, Oregon, and Alaska. Bills have been introduced in Congress to place a two-year moratorium on irradiated foods while the National Academy of Sciences reviews the health, environment, and worker safety issues. Great Britain has banned irradiated food, although legislation has been introduced into Parliament to overturn the ban. West Germany, Australia, Denmark, Sweden, and New Zealand have all banned or severely limited the implementation of food irradiation. ■

1. William T. McGivney, "Preservation of Food Products by Irradiation," *Seminars in Nuclear Medicine*, vol. 18 (Jan. 1988), p. 36.

2. Richard Piccioni, "Food Irradiation: Contaminating Our Food," *The Ecologist*, vol. 18, no. 2 (April 1988), p. 48.

3. "Irradiation in the Processing and Handling of Food," *Federal Register* (April 1986), p. 13376.

4. J.K. Hickman, L.A. McLean, and F.J. Ley, "Rat Feeding Studies on Wheat Treated with Gamma Radiation," *Food and Cosmetic Toxicology*, vol. 2, no. 2 (1964), pp. (175–180); J.L. Radomski et al, "Chronic Toxicity Studies in Irradiated Beef Stew and Evaporated Milk," *Toxicology and Applied Pharmacology*, vol. 7, no. 1 (1965), pp. 113–21.

5. H.W. Renner and D. Reichelt, "Zur Frage der gesundheitlichen Unbedenklichkeit hoher Konzentrationen von freien Radikalen in bestrahlten Lebesmitteln," *Zentralblatt für Veterina Medizi*, vol. 20, no. 8 (1973), pp. 648–60.

6. C. Bhaskaram and G. Sadasivan, "Effects of Feeding Irradiated Wheat to Malnourished Children," *American Journal of Clinical Nutrition*, vol. 28, no. 2 (1975), pp. 130–35.

7. Shanghai Institute of Radiation Medicine and Shanghai Institute of Nuclear Research, "Safety Evaluation of 35 Kinds of Irradiated Human Foods," *Chinese Medical Journal*, vol. 100, no. 9 (1987), pp. 715–18.

8. E. Wierbicki et al., *Ionizing Energy in Food Processing and Pest Control, Part 1*. (Council for Agricultural Science and Technology, July 1986); A.B. Khattak and C.F. Klopfenstein, "Effects of Gamma Irradiation on the Nutritional Quality of Grains and Legumes," *Cereal Chemistry*, vol. 66, no. 3 (1989), pp. 171–72; N. Raica, Jr., J. Scott, and N. Nielson, "Nutritional Quality of Irradiated Foods," *Radiation Research Review*, vol. 3, no. 4 (1972), pp. 447–57.

9. *Food Chemical News* (Nov. 10, 1986), p. 42.

10. Georgia Department of Natural Resources, U.S. Department of Energy, Nuclear Regulatory Commission, "First Interim Report of the RSI Incident Evaluation Task Force" (June 1989).

11. K. Terry, "Why is DoE for Food Irradiation?" *The Nation* (Feb. 7, 1987), pp. 142–56.

12. Piccioni, "Food Irradiation"; Terry, "Why is DoE for Food Irradiation?"

Commercial irradiation of strawberries. The bugs may not be killed and carcinogenic substances are created as an additional menace.

The Ecologist
Vol. 18, No. 2
(1988)

Food Irradiation: Contaminating our Food

by Richard Piccioni

Food irradiation has long been promoted by the nuclear industry as an effective and safe means of preserving food at minimum risk to the public. In fact, irradiation not only depletes the nutritional value of food but it also masks the bacterial contamination of rotting food. Moreover, irradiation exposes the consumer to a whole new range of carcinogens. Indeed, food irradiation should be seen for what it is: an unwarranted attempt to find a commercial use for nuclear wastes.

In the last three years, the approval and implementation of food irradiation has created a growing concern amongst both the scientific community and the general public. In the United States, the debate centres around a series of approvals recently passed by the Food and Drug Administration (FDA) for irradiation of all grains, fruits, vegetables, pork, and spices at doses ranging from 10,000 to 3 million rads. Approval is now pending for the irradiation of poultry at 300,000 rads to protect against bacterial contamination. A second federal agency, the Department of Energy (DOE), recently received funding to promote food irradiation technology and to continue research and development in this area. At the same time, the Delaney Amendment, which prohibits the addition of carcinogenic substances to processed foods, has recently been upheld. This amendment represents a serious legal challenge to the FDA's decisions on food irradiation.

A wide-scale food irradiation programme in the US and abroad would have an adverse impact on public health in a number of ways:

- Through the consumption of carcinogenic substances generated in irradiated foods:
- Through the use of irradiation to mask bacteriological contamination of spoiled food:
- Through the replacement of fresh foods with nutritionally depleted irradiated foods:
- Through accidents involving leaks or the mishandling of the multi-megacurie radiation sources used in food irradiation plants:
- And, finally, through the environmental damage attending the operation of nuclear reactors and the reprocessing of spent nuclear fuel to provide the required radioactive isotopes for the food irradiation industry.

The food irradiation market is potentially enormous; irradiation of a substantial fraction of the grain and poultry consumed in the US would require the operation of hundreds of irradiation facilities.[1] Large potential markets exist in the treatment of foods and spices imported from foreign countries with lower standards of food hygiene.[2] Currently, the DOE is planning the construction of five demonstration plants, fuelled with radioactive caesium-137 generated during the production of nuclear weapons. If the plants go ahead, food irradiation would thus become a major (and dangerous) route by which military nuclear wastes are dispersed throughout the environment. A number of private companies which now irradiate medical equipment and other non-food items, using caesium-137 or cobalt-60, are actively seeking to expand their product line to include foods such as grains, poultry, citrus fruits, and berries.

Dr. Richard Piccioni is senior staff scientist with Accord Research and Educational Associates, 314 West 91st Street, New York, NY 10024, USA. He has testified before several US State and Federal Committees on the subject of food irradiation.

Carcinogenic and Mutagenic Risks

During radiation treatment, foods are exposed to a source of gamma-emitting cobalt-60 or caesium-137. As the radiation penetrates the food, part of the energy contained in each gamma photon is dissipatedd by the ionizing of water, protein, carbohydrate, fat, nucleic acids, vitamins, minerals, and other food components. The ionizing of these substances causes them to undergo drastic and complex chemical changes, resulting in a residue of chemically transformed material. This residue is referred to as a 'radiolytic product'. The complexity of food chemistry and the limitations of chemical analysis make it impossible to identify all radiolytic products. This, together with experimental results, causes concern that the diverse mixture of chemicals generated in irradiated food contains substances that are capable of causing cancer or genetic damage.

Examination of the scientific literature reveals a large number of research reports which attest to the presence of carcinogenic or mutagenic activity in irradiated foods and food components. Table I gives details of the diverse effects which have been observed and reported. One series of papers documents the mutagenicity of irradiated solutions of ribose, deoxyribose, and thymidine, all widespread constituents of food.[3,4,5] In work by several investigators (*see* Table I), an increased frequency of lethal sex-linked recessive mutations was observed in *Drosophila melanogaster* cultured on an irradiated medium.[6,7,8] Multiple effects have been reported in mice, rats, and hamsters fed an irradiated diet, including lethal mutations in developing germ cells, reduced sperm counts, and aneuploidy and chromosome damage in bone marrow cells (*see* Table I). Irradiated sucrose solutions have produced chromosome breaks in cultured human lymphocytes.[9] A series of experiments, using mice, rats and monkeys confirms a finding first made in a study of malnourished children[10] that a diet containing freshly irradiated wheat increased the incidence of polyploidy in peripheral blood lymphocytes.[11,12,13,14]

The majority of these studies were carried out without any attempt to determine mutagenic activity; often irradiated material was only a small component of an otherwise non-irradiated medium or diet. Thus the observation of genotoxicity is all the more alarming.

A number of workers have been able to analyse irradiated foods and food components chemically and to identify known carcinogenic and mutagenic compounds (*see* Table II). In particular, the radiolytic generation of such known mutagens as formaldehyde, formic acid, glyoxal, malondialdehyde, lipid peroxides, and quinones, is well-documented in the scientific literature (*see* references in Table II). Experiments performed by the US Army attest to the presence of benzene, a known carcinogen, in cooked, irradiated beef at levels over seven times higher than those found in cooked, non-irradiated controls.[15] One study relevant to the proposed irradiation of fish showed a synergistic effect in which lipid peroxide intermediates, formed on irradiation of unsaturated fatty acid preparations, increased the rate of oxidation of benzo(a)pyrene (an environmental carcinogen precursor widely distributed in many foods) to its active carcinogenic form.[16]

Inadequate Testing

Nonetheless, proponents of food irradiation continue to argue that safety studies show no evidence of adverse effects, other than vitamin depletion at very high doses.[17] The FDA has arbitrarily labelled as 'remote' the possibility that any radiolytic products are carcinogenic, and has granted permission to irradiate broad categories of foods, thereby eliminating the requirement for carcinogenicity testing of any specific food items.[18] The FDA has also declared an arbitrary dose of 100,000 rads to be safe for fruits and vegetables. The proposed dose for poultry is three times higher, yet the FDA has not sought evidence from would-be irradiators to determine whether or not the irradiated carcasses are carcinogenic.[19]

This position is out of line both with the FDA's legal obligation to protect the health and safety of the American people, and with the agency's usual approach to the regulation of carcinogenic substances in foods, drugs and cosmetics. Companies approaching the FDA for permission to market food additives, for example, are required to provide estimates, derived from animal studies, of the maximum carcinogenic potential of their product. The studies involve animals being observed over significant periods and tested with exaggeration factors of 1,000 or more. This approach has

Table I. BIOASSAYS ON IRRADIATED ORGANIC MEDIA AND FOODS SHOWING POSITIVE MUTAGENICITY, CHROMOSOMAL DAMAGE, TERATOGENICITY, OR CYTOTOXICITY

author(s)	date	irradiated material	observation	observed in
Kuzin & Kryukova	1961	plant leaves	Chromosomal damage	plant embryos
Swaminathan et al	1962	potato mash	Chromosomal damage	barley embryos
Kuzin	1963	plant leaves	mutagenicity of extracts	plant cells
Swaminathan et al	1963	culture medium	mutagenicity	Drosophila
Chopra & Swaminathan	1963	potato mash	devel. abnormalities	barley embryos
Molin & Ehrenberg	1964	culture medium	cytotoxicity	bacteria
Berry et al	1965	glucose, fructose	cytotoxicity	human & mouse cells
Chopra	1965	culture medium	probable mutagenicity	bacteria
Holsten et al	1965	coconut milk, sucrose	chromosomal damage	carrot explants
Parkash	1965	nucleic acids	mutagenicity	Drosophila
Rinehart & Rally	1965	culture medium	mutagenicity	Drosophila
Frey & Pollard	1966	culture medium	mutagenicity	bacteria
Shaw & Hayes	1966	sucrose	chromosomal damage	human lymphocytes
Hills & Berry	1967	glucose	cytotoxicity	mouse fibroblasts
Hollowell & Littlefield	1967	plasma	chromosomal damage	human lymphocytes
Mäkinen et al	1967	pineapple	chromosomal damage	onion roots
Parkash	1967	nucleic acids	mutagenicity	Drosophila
Rinehart & Rally	1967	culture medium	mutagenicity	Drosophila
Schubert et al	1967	sucrose	cytotoxicity	bacteria
Steward et al	1967	sucrose	cytotoxicity	carrot explants
Hollowell & Littlefield	1968	plasma	chromosomal damage	human leucocytes
Metalli et al	1968	wheat endosperm	mutagenicity	wheat
Ammirato & Steward	1969	sucrose	devel. abnormalities	plant root cells
Chopra	1969	culture medium	mutagenicity	bacteria
Moutschen-Dahmen et al	1970	laboratory diet	preimplantation death	mouse
Schubert and Sanders	1971	various sugars	cytotoxicity	bacteria
Kopytov et al	1972	potatoes	mutagenicity of extracts	mouse (sperm cells)
Bhaskaram & Sadasivan	1975	wheat	polyploidy	malnourished children
Vijayalaxmi & Sadasivan	1975	wheat	chromosomal damage	rat (bone marrow)
Vijayalaxmi	1975	wheat	polyploidy	rat (bone marrow)
Vijayalaxmi	1976	wheat	mutagenicity	mouse
Vijayalaxmi	1976	wheat	sperm count reduction	mouse
Vijayalaxmi	1976	wheat	polyploidy	mouse (bone marrow)
Vijayalaxmi	1976	wheat	aneuploidy	mouse (sperm cells)
Vijayalaxmi & Rao	1976	wheat	mutagenicity	rat
Vijayalaxmi & Rao	1976	wheat	sperm count reduction	rat
Aiyar & Subba Rao	1977	various sugars	mutagenicity	bacteria
RAO/IAEA/WHO	1977	potatoes	mutagenicity of extracts	mouse
Renner	1977	laboratory diet	polyploidy	hamster
Levina & Ivanov	1978	laboratory diet	autoimmune disease	rat
Vijayalaxmi	1978a	wheat	low antibody levels	rat
Vijayalaxmi	1978b	wheat	polyploidy, other effects	monkey
Wimmer et al	1980	nucleic acids	mutagenicity	bacteria
Ivanov & Levina	1981	laboratory diet	testicular abnormalities	rat
Wimmer et al	1981	nucleosides	mutagenicity	bacteria
Wimmer & Natarajan	1981	deoxyribose	chromosomal aberrations	hamster cells

Accord Research and Educational Associates
New York NY (212) 580-3849

7/15/87

formed the basis on which thousands of compounds have been approved or banned.[20]

In the case of food irradiation, a special problem exists. Because radiolytic products do not represent a defined group of chemical compounds, they cannot be tested individually at high concentrations. The alternative, feeding animals thousands of times as much food as they would otherwise eat, or irradiating the food at doses thousands of times higher than is proposed, is not possible. There is no simple way to achieve the dose exaggeration factor required to protect the health of large populations consuming irradiated foods. As long ago as 1967, the FDA itself acknowledged the special difficulties of ascertaining the safety of irradiated food,[21] and, in 1968, the agency rescinded its earlier approval of food irradiation after serious questions arose regarding the conduct and interpretation of the experiments on which the FDA had relied. Originally, the FDA claimed that early experiments showed irradiated food not to be carcinogenic. In fact, these experiments showed a significant increase in tumours in animals fed irradiated food.[22]

In 1979, after over a decade of controversy, the FDA set up the Bureau of Food's Irradiated Food Committee (BFIFC) to develop criteria for establishing the safety of irradiated foods.[23] This group developed a theoretical model to predict levels of what they called 'unique radiolytic products' (URPs). It was the assertion of the BFIFC that only URPs – that is, substances found to be unique to irradiated foods – were of regulatory concern. To take an actual example, irradiation of beef generates the carcinogen benzene as a radiolytic product; however, because charcoal broiling also generates benzene, benzene will not qualify as a URP and is excluded from further consideration as a hazard accompanying radiation processing.

Arbitrary Limits

Lacking meaningful toxicological data, the BFIFC made a theoretical estimate of the possible risks of eating irradiated foods. At a dose of 100,000 rads, BFIFC predicted that some 30 parts per million (ppm) of total radiolytic product would be formed, and that 10 per cent of this could be unique to radiation processing; in other words, food treated with 100,000 rads would contain at mo 3 ppm of URPs. The committee then made an extraordinary leap of faith: without any experimental evidence, they used their hypothetical arguments to lay down regulations defining actual use. Moreover, they stated that the 3 ppm of chemically and toxicologically undefined substances, formed in food as a result of radiation processing, would be "similar to natural food components" and safe to include as a substantial part of the diet of some 240 million Americans. Given the possible consumption of many kilograms of irradiated food per person per year by virtually the entire US population, the acceptance of the 3 ppm level is an extreme departure from known precedents for regulating numerous food substances hazardous at far lower concentrations.[24]

Currently, the FDA has adopted the BFIFC's recommendation to permit the irradiation of a wide range of food at up to 100,000 rads, without the necessity of actual toxicological testing. The BFIFC has also recommended that spices, because of their smaller contribution to the total diet, be exempted from testing at up to 3 million rads.[23] The FDA undertook a literature survey before adopting the BFIFC's theoretical approach. Of over 400 studies reviewed, only 69 satisfied the criteria for technical acceptability. Of the 69 acceptable studies, 32 reported adverse effects from feeding irradiated foods, while 37 "appeared to support safety".[25] When further selection criteria were applied, only five studies remained (roughly one per cent of published reports). These five studies reported the absence of statistically significant increases in tumours in numbers of animals fed whole irradiated foods. In none of the studies was there a significant dose exaggeration factor, leading the FDA to report:

> "... the extreme dilution of the potentially toxic unique radiolytic products in proportion to the high levels of the irradiated foods themselves, would result in an inability, as in traditional toxicology testing, to exaggerate the dose of the

Table II. IDENTIFICATION OF MUTAGENIC, CARCINOGENIC, OR CYTOTOXIC RADIOLYTIC PRODUCTS IN IRRADIATED ORGANIC MEDIA OR FOOD

author(s)	date	irradiated material	radiolytic product	comments
Phillips et al	1958	dextrose, fructose	glyoxal formaldehyde	mutagenic mutagenic
Kuzin	1963	plant tissues	organic peroxides orthoquinones	mutagenic carcinogenic
Frey & Pollard	1966	minimal cell medium	hydrogen peroxide	mutagenic, generates secondary mutagens
Kuzin	1966	plants, rat thymus, tyrosine	orthoquinones orthophenols	carcinogenic carcinogenic
Schubert et al	1967	sucrose	hydroxyalkyl peroxides glyoxal	mutagenic mutagenic
Steward et al	1967	sucrose	formic acid	mutagenic
Brooks & Klamerth	1968	glucose	glyoxal malonyldialdehyde	mutagenic, binds to DNA mutagenic, binds to DNA
Chopra	1969	glucose	organic peroxides	mutagenic
Schubert & Sanders	1971	D-glucose, D-fructose, D-mannose, D-rhamnose, D-galactose, D-fucose	alpha, beta unsaturated carbonyl sugars	cytotoxic (toxicity increased upon heating irradiated solution)
El Zeany	1980	buffalo meat	peroxides carbonyl compounds	mutagenic cytotoxic
Wilmer et al	1981	deoxy-D-ribose, D-ribose	hydrogen peroxide malonaldehyde carbonyl compounds	mutagenic mutagenic cytotoxic
Gower & Wills	1986	benzo(a)pyrene, starch & oil mixtures	benzo(a)pyrene (oxidized) quinones malonaldehyde lipid peroxides	carcinogenic carcinogenic mutagenic mutagenic

Accord Research and Educational Associates New York, NY (212) 580 3869 7 15 87

test compound. For these reasons it would be difficult to devise a traditional toxicology study of sufficient sensitivity to provide assurances of safety for the population exposed to unique radiolytic products from irradiated foods constituting a major portion of the total diet."[25]

In spite of this, the FDA concluded that "studies with irradiated foods do not appear to show adverse toxicological effects", and it reverted to the same theoretical '3 ppm' argument which it had been supposed to replace with toxicological data.[26]

There is an alternative approach to the carcinogenicity testing of irradiated foods; namely, to prepare concentrated extracts of foods after radiation exposure, and to compare the biological activity of such concentrates with similar preparations for non-irradiated controls. In a letter to *Science*, published in 1984, Drs. Samuel Epstein and John Gofman called for caution over the approval of food irradiation, and specifically suggested the testing of concentrated extracts of irradiated foods, using methodologies that have been applied elsewhere in the analysis of naturally occurring carcinogens and mutagens.[27] A small amount of work of this kind has been done, indicating the occurrence of dominant lethal mutations in the spermatozoids, spermatids, and spermatocytes of mice fed an alcohol extract of gamma-irradiated potatoes, as compared to extracts of non-irradiated controls.[28] The effect was not reproduced, however, by a Japanese group.[29] A report on food irradiation by a joint committee of the Food and Agricultural Organization (FAO), the International Atomic Energy Agency (IAEA), and the World Health Organization (WHO), notes, without citing references, that mutagenic activity has been detected in alcohol extracts of irradiated wheat.[30] Significantly, the effect, which was described as "worthy of further study" is not mentioned in the joint committee's 1981 report.[31]

Nuclear Waste and Irradiated Foods

Worldwide, there are currently some 132 large irradiation facilities in operation of a size appropriate for food irradiation; 50 of these are in the US. With minor exceptions, these facilities process exclusively non-food items, primarily disposable medical equipment.[32] If dedicated to food irradiation, each of these large irradiation plants could process approximately 150,000 metric tons of food a year at a dose of 100,000 rads.[1] Since the average North American consumes roughly 800 kg of food annually (directly or in the form of feed fed to animals), irradiation of the US food supply at 100,000 rads would require the operation of over 1,200 irradiation plants.[33] Higher doses would require more plants. For example, consumption of poultry (primarily chicken) is expected to rise to 8.6 million metric tons per year in 1987.[34] A total of 170 plants would be required to irradiate this commodity alone at the dose level laid down by the USDA (300,000 rads). Thus, in order to implement the irradiation of food on a wide scale, the number of large irradiation facilities in operation will have to increase dramatically.

Large irradiation facilities (of the type assumed in the preceding calculations) contain one million curies of gamma-emitting cobalt-60 or 4-6 million curies of caesium-137.To compensate for radioactive decay, either type of plant will have to be resupplied with approximately 120,000 curies each year.Given the number of facilities required, the quantity of installed radioactive material which would be needed for extensive food irradiation in the US alone would be in the range of one to several billion curies.[35] Thus, by pressuring the FDA to approve food irradiation, the US government has created a market for enormous quantities of radioactive material.

Significantly, the only isotope which is available in sufficient quantities for widespread food irradiation is caesium-137, a waste product of nuclear weapons production and of the civil nuclear power programme. The US Department of Energy and its predecessors have long promoted the use of caesium-137 'byproduct material' in the treatment of foods.[36] A statement from congressional testimony submitted by the DOE in 1983 provides an illuminating glimpse into the nature of the DOE's interest in food irradiation:

> "The strategy being pursued by DOE's Byproducts Utilization Program is designed to transfer federally developed caesium-137 irradiation technology to the commercial sector as rapidly and successfully as possible.The measure of success will be the degree to which this technology is implemented industrially and the subsequent demand created for Cs-137".[37]

With the DOE as supplier, food irradiation has the purpose of ridding the military of vast amounts of its nuclear wastes. The DOE has made immediately available 77 megacuries of caesium-137, obtained from military plutonium production reactors at the Hanford facility in Richland, Washington. This source of the isotope will be immediately used for the irradiation of agricultural commodities in the five prototype demonstration facilities to be constructed in the next few years. This material is only a small portion of the inventory of caesium-137 at the DOE's Hanford and Savannah River weapons plants.[38]

The quantity of caesium-137 which has been and will be produced in commercial nuclear power reactors dwarfs even the

amount produced in military installations. The cumulative total of caesium-137 produced in commercial US reactors amounted to some 1,100 megacuries by the end of 1985, with an annual production rate of approximately 200 megacuries per year.[39,40] This would be sufficient to fuel 540 food irradiation plants with 5 megacuries of caesium-137 in each. Congressional testimony presented by DOE officials in 1984 indicated that the DOE is interested in using caesium-137 obtained from reprocessed spent fuel from civilian reactors for food irradiation.[41] A widely circulated brochure, produced by CH2M-Hill, a major DOE contractor, presents commercial reprocessing of spent fuel as virtually the only means of supplying sufficient radioactive material to implement food irradiation on a large scale.[42]

In order to obtain caesium-137 from spent commercial reactor fuel, the fuel must first be reprocessed. Although the DOE's Barnwell facility in South Carolina is complete, no facilities are yet in operation in the US for reprocessing spent commercial fuel. Reprocessing is being carried out in England at the Sellafield facility and in France at Cap La Hague. Work has been underway for several years to modify the existing chemicals separations facility[43] at Hanford to accommodate high burn-up, zirconium-clad fuels, which would include those obtained from commercial reactors. The programme is currently on hold because of a shortage of funds. However, the DOE is apparently considering using the existing submarine fuel reprocessing facilities at Idaho National Engineering Laboratory (INEL).[44]

The DOE does not advertise its interest in commercial spent fuel reprocessing, probably because of the 1982 Mitchell-Hart-Simpson Amendment to the 1954 Atomic Energy Act, which specifically prohibits plutonium obtained from the reprocessing of spent fuel from civil reactors being used in nuclear weapons. This amendment, which was actively opposed by the DOE at the time of its enactment[45] contains a loophole in an exclusion clause permitting weapons use of civil plutonium "in case of national emergency". Thus the future of plutonium from commercial spent fuel has been kept open. The DOE continues the construction of its laser isotope separation facility at INEL which would enable DOE to make weapons grade plutonium from commercial reactor waste.

Pesticide replacement

In the absence of quantitative studies to estimate the carcinogenic risk posed by consuming irradiated foods, there is no basis to the claim that food irradiation could replace the use of carcinogenic pesticides as a means of food preservation. In 1987, the National Academy of Sciences identified 23 pesticides which together were held responsible for the vast majority of the total carcinogenic risk from pesticide residues in the US food supply.[20] Food irradiation would not eliminate these pesticides since most are herbicides, insecticides, or fungicides applied in the field to prevent pre-harvest losses.[46] In fact, since irradiated products are more susceptible to infection by moulds and fungi,[47,48] irradiation may well increase the need for post-harvest fungicides on fruits and vegetables.

Pathogens in Poultry

The highly automated and poorly regulated nature of many of the poultry production plants in the US has led to the increased danger of widespread contamination of supermarket chicken with Salmonella and other pathogenic bacteria. As part of a recent study of the poultry industry in the US, the National Academy of Sciences (NAS) estimated the health effects of the bacterial contamination of chicken carcasses during slaughter. The NAS committee called for the upgrading of hygienic standards in slaughterhouses, and recommended the setting up of a comprehensive quality assurance programme with improved methods of monitoring compliance by poultry producers.[49] These recommendations are in line with those of other critics of the poultry industry, who see the current problem of bacterial contamination as the result both of regulatory lassitude on the part of the US Department of Agriculture and of the drive to increase production on the part of the poultry producers. Reform of the industry is the subject of pending federal legislation.

Hazards of Food Irradiation Facilities

A large food irradiation plant contains roughly 100 times as much radioactivity as a typical cobalt-60 source used in hospital cancer therapy. The inventory of caesium-137 present in a large irradiator is comparable to that in a 1000 megawatt nuclear power reactor.[50] Furthermore, irradiators are inevitably open structures since food must be able to pass freely in and out of the irradiation chamber.

Workers therefore run a high risk of exposure to lethal or near-lethal doses of gamma radiation.[50,51,52] Equally, the opportunities for sabotage are numerous. The contamination of shielding pools from leaking source elements has been documented in existing irradiation plants, as has the leakage and spillage of shielding water into the surrounding environment. The mishandling of discarded gamma sources has led to two serious contamination incidents in recent years.[53,54] Indeed, as a result of mismanagement at an irradiation plant, the Nuclear Regulatory Commission (NRC) revoked the licence of a major company in the US irradiation industry.[55]

In the light of these facts, it is extraordinary that the US Environmental Protection Agency (EPA) does not require an environmental impact statement prior to the siting of irradiation facilities, and that the NRC does not require special security measures. Clearly, the pressure to 'solve' the nuclear waste problem is guiding agency decisions, as non-regulation will greatly facilitate the licensing of hundreds of new irradiation facilities. Such facilities, however, cannot be in the best interest of those who work in or live near them, nor of the general public who will have no choice but to eat food which has effectively been legally contaminated.

Conclusion

The viability of food irradiation as a processing technology is based upon three false assumptions: first, that ionizing radiation can be used safely and effectively to destroy living organisms in food without producing dangerous changes in food chemistry; second, that hazardous by-products of nuclear weapons manufacture can be used safely and effectively in the civilian sector; and third, that dispersing radioactive materials into the environment results in an acceptable level of radiation exposure for any single individual.

In fact, the chemical changes in food produced by ionizing radiation are already known to be hazardous, and the FDA's claimed ignorance of that well-documented hazard is unques-

tionably in violation of the law: recently, the Justice Department upheld a decision against the FDA by the District Court of Appeals in Washington, DC, charging that FDA had violated the Food, Drug and Cosmetic Act when it approved the use of two dyes shown by animal testing to be weak carcinogens.[56] The effect of this decision is to strengthen further the Delaney Amendment, which forbids the addition of any known human or animal carcinogen to food, drugs, or cosmetics. Since food irradiation is defined as a food additive,[18] the evidence set out in Table II shows it would be a violation of the Delaney Amendment to permit the treatment of food with irradiation.[57]

The view that the FDA's actions in the field of food irradiation have been unlawful and dangerous to public health has also been expressed at the state level; legislation banning the sale of irradiated foods has been enacted in the state of Maine, and is pending in New York, New Jersey, Alaska, Vermont, New Hampshire, and Pennsylvania. Citizen initiatives to ban irradiated food are underway in Florida and Oregon. Efforts to disperse into society at large the wastes from the manufacture of nuclear weapons is hardly a proper basis for food and public health policy. It represents a real threat to our existence, comparable to, if more protracted than, the direct use of those weapons on civilian populations. It cannot be allowed to continue.

References:

1. M.C.Lagunas-Solar, "New considerations for radiation technology transfer programmes for developing countries", in *Food Irradiation Processing: Proceedings of a Symposium*, Washington, D.C., March 4-8, 1985. IAEA-SM-271, International Atomic Energy Agency, Vienna, Austria, pp.499-508.
2. W.M.Urbain, "Significant milestones of progress to date in food irradiation and identification of areas of future advances", in *Food Irradiation Processing: Proceedings of a Symposium*, Washington, D.C., March 4-8, 1985. IAEA-SM-271, International Atomic Energy Agency, Vienna, Austria, pp.509-518
3. J. Wilmer, J.Schubert, H.Leveling, "Mutagenicity of gamma-irradiated oxygenated and deoxygenated solutions of 2-deoxy-D-ribose and D-ribose in Salmonella typhimurium", *Mutation Research*, 1981; 90:385-397.
4. J.Wilmer, A.T.Natarajan, "Induction of sister chromatid exchanges and chromosome abberations by gamma-irradiated nucleic acid constituents in CHO cells", *Mutation Research*, 1981; 88:99-107.
5. A.S. Aiyar, V.Subba Rao, "Studies on mutagenicity of irradiated sugar solutions in Salmonella typhimurium", *Mutation Research*, 1977;48:17-28.
6. M.S.Swaminathan, S. Nirula, A.T.Natarajan, R.P Sharma, "Mutations: incidence in Drosophila melanogaster reared on irradiated medium", *Science* 1963; 141:637-638.
7. O.Parkash, "Mutagenic effect of irradiated DNA in Drosophila melanogaster", *Nature*, 1967; 4:611-612.
8. R.R.Rinehart, F. J. Ratty, "Mutation in Drosophila melanogaster cultured on irradiated food", *Genetics* 1965; 52:1119-1126.
9. M.W.Shaw, E.Hayes, "Effects of irradiated sucrose on the chromosomes of human lymphocytes in vitro", *Nature* 1966; 211: 1254-56.
10. C. Bhaskuram, G. Sadasivan, "Effects of feeding irradiated wheat to malnourished children," *Am. J. Clin. Nutr.* 1975; 28:130-135.
11. Vijayalaxmi, "Cytogenetic studies in rats fed irradiated wheat", *Int. J. Radiat. Biol.* 1975; 27:283-5.
12. Vijayalaxmi, "Genetic effects of feeding irradiated wheat to mice," *Can. J. Genet. Cytol.* 1976; 18:231-238.
13. Vijayalaxmi,"Cytogenetic studies in monkeys fed irradiated wheat", *Toxicology* 1978(b); 9.181-4.
14. H.W.Renner, "Chromosome studies on bone-marrow cells of Chinese hamsters fed a radio-sterilized diet", *Toxicology* 1977;8:213-222.
15. FASEB (Federation of American Societies for Experimental Biology), "Evaluation of the health aspects of certain compounds found in irradiated beef", PB84-187087, August, 1977.
16. J.D.Gower, E.D.Wills, "The oxidation of benzo[a]pyrene mediated by lipid peroxidation in irradiated synthetic diets", *Int. J. Radiat. Biol.* 1986; 49:471-484.
17. E.Weirbicki et al., *Ionizing energy in food processing and pest control: Wholesomeness of Food Treated with Ionizing Energy*, Council for Agricultural Science and Technology (CAST). Report No. 109, July, 1986
18. *Federal Register*, 1986a, April 18, 51:13376-13399. 21 CFR Part 179: Irradiation in the production, processing, and handling of food: final rule.

19. S.A. Miller, Centre for Food Safety and Applied Nutrition, correspondence to Donald Houston, Administrator, U.S. Department of Agriculture, November 1988.
20. National Academy of Sciences, *Regulating Pesticides in Food*, Washington, DC: National Academy Press, 1987.
21. Bureau of Science Staff, *Preparation and processing of food additive petitions: Radiation application to food*, US Food and Drugs Administration USDHEW, 1967.
22. A.T.Sipher, *Food irradiation: an FDA report*, FDA Papers, October, 1968:15-16.
23. A.P.Brunetti et al., *Recommendations for evaluating the safety of irradiated foods. Final report prepared for the Director, Bureau of Foods*, July, 1980.
24. For example: the New York State Health Department guidelines set a limit of .005 ppm for benzene in drinking water; two-tenths of a ppm of aflatoxin in peanuts is considered high, and a large volume of this commodity, containing over .025 ppm, must by law be rejected for human consumption [Dickens (1977)]; the maximum amount of N-nitrosamines reported in fried bacon is .055 ppm. (R.A.Scanlan, "Formation and occurrence of nitrosamines in food", *Cancer Research* (Suppl.) 1983; 43:2435S-2440S.
25. Food Additives Evaluation Branch, *Final report for the task group for the review of toxicology data on irradiated foods. Memorandum to W. Gary Flamm*, April 9, 1982.
26. In fact, the design and documentation of the five selected studies have been severely criticised by independent scientists. (*see* D. Lourie, *Testimony before the House Subcommittee on Health and the Environment*, June 19, 1987.)
27. S.S.Epstein, J.W. Gofman, "Irradiation of Foods", *Science*, 1984; 223:1354.
28. V.A.Kopylov, I.N.Osipova, A.M.Kuzin, "Mutagenic effect of extracts from gamma-irradiated potato tubers on sex cells of male mice", *Radiobiologiya* 1972; 12:524-8.
29. Y.Shinozaki et.al. "Mutagenicity studies on alcohol extracts from gamma-irradiated potatoes: preparation of samples and their chemical analysis", *Radioisotopes* 1981; 30(12):655-61.
30. FAO/IAEA/WHO, Report of a Joint Expert Committee, *Wholesomeness of Irradiated Food: Technical Report Series 604*, Geneva: World Health Organization, 1977.
31. FAO/IAEA/WHO Report of a Joint Expert Committee, *Wholesomeness of Irradiated Food: Technical Report Series 659*, Geneva: World Health Organization, 1981.
32. F.M.Fraser, "Cobalt-60 availablity for radiation processing", 17th Japan Conference on Radiation and Radioisotopes, September 2-4, 1985, Tokyo, Japan.
33. Just irradiating the 1982 US orange crop (9.5 million metric tons over a five month period) at a dose of 100,000 rads would require 160 large irradiation facilities. (See M.C. Lagunas-Solar, "New considerations for radiation technology transfer programmes for developing countries", in *Food Irradiation Processsing: Proceedings of a Symposium*, Washington, D.C., March 4-8, 1985. IAEA-SM-271. International Atomic Energy Agency, Austria, pp.499-508.
34. T.K.Smith, *Wall Street Journal*, September 17, 1987.
35. Cobalt-60 obtained from Atomic Energy of Canada Limited's Pickering Nuclear Generating Station in Ontario. The AECL supplies about 90 per cent of the world's cobalt, currently at the rate of 20-25 megacuries per year. By 1996, AECL predicts that some 250 megacuries will be in service for the sterilization of disposable medical products (see Fraser 1985). Even to meet this demand, AECL will have to increase output substantially. Another source of isotope must be found. (See G.L.Tingey, *Technology of food Irradiation*, Testimony before the Subcommittee on Energy Research and Production, Committee on Science and Technology, US House of Representatives, Hearings on the Status of the Technical Infrastructure to Support Domestic Food Irradiation, July 26, 1984: 166-177.
36. The DOE's support of food irradiation culminates in their support of the Civilian Byproducts Utilization Program, very recently renamed the Advanced Radiation Technology Program.
37. W.C.Remint, J.J.Jicha, "A plan for the recovery and utilization of nuclear byproducts from the defense nuclear fuel cycle", in F.C.Gilbert, *Testimony before the Procurement and Military Nuclear Systems Subcommittee of the Committee on Armed Services*, US House of Representatives, Hearings on H.R. 2496, March 1 and 2, 1983: 195-203.
38. The inventory of caesium-137 at Savannah River and Hanford is expected to total some 250 megacuries by 1991. (See W.H.McMullen and D.P.Sloan, "Caesium-137 as a radiation source" in J.A. Moy (ed), *Radiation Disinfestation of Food and Agricultural Products*, Honolulu: University of Hawaii Press, 1985.
39. International Atomic Energy Agency, *Nuclear Power Reactors in the World*, Reference Data Series No. 2, April 1986 Edition.
40. T.H. Pigford, "Environmental aspects of nuclear energy production", *Ann. Rev. Nuclear Sci.* 1974; 24:515-559.
41. G.L.Tingey, "Technology of food irradiation", *Testimony before the Subcommittee on Energy Research and Production, Committee on Science and Technology*, US House of Representatives, Hearings on the Status of the Technical Infrastructure to Support Domestic Food Irradiation, July 26, 1984: 166-177.
42. CH2M-Hill, *Technology Update and Future Initiatives: Byproducts Utilization Program*.
43. M.M.Beary et. al., *Functional Design Criteria, Process Facility Modification, SD-414-FDS-001, Rockwell Hanford Operations for the U.S. Department of Energy*, Richland, WA., January 1983.
44. INEL (Idaho National Engineering Laboratory), *Annual Report*, 1986.
45. F.C.Gilbert, *Testimony before the Subcommittee on Energy, Nuclear Proliferation, and Government Processes*, November 19, 1981.
46. Chemical and Pharmaceutical Press, *Crop Protection Chemicals Reference*, Third edition, New York: John Wiley and Sons, 1987.
47. N.F.Sommer, R.J.Fortlage, "Ionizing radiation for control of postharvest diseases of fruits and vegetables", *Advan. Food Res.* 1966; 15:147-193.
48. J.G.Niemand, H.J. van der Linde, W.H.Holzapfel, "Interaction phenomena in the radurization of meat", in *Food Irradiation Processing*, Vienna: International Atomic Energy Agency, 1985: 243 (IAEA/SM-271/39P).
49. Committee on Public Health Risk Assessment of Poultry Inspection Programs, *National Research Council Poultry Inspection: The Basis for a Risk-Assessment Approach*, Washington, D.C.: National Academy Press, 1987.
50. K.D.Steidley, "A Co-60 hot cell accident", *Health Phys.* 1976: 31:382-385.
51. K.D.Steidley, "Another Co-60 hot cell accident" *Health Phys.* 1979; 36:437-441.
52. P. Stavem, A.Brogger, F.Devik, J.Flatby, C.B. van der Hagen, T. Henriksen, P.S.Hoel, H.Host, K.Kett, B.Petersen, "Lethal acute gamma radiation accident at Kjeller, Norway: Report of a case", *Acta Radiologica Oncol.*, 1985, 24:61-63.
53. E. Marshall, "Juarez: an unprecedented radiation accident", *Science* 1984; 223:1152-1154.
54. L.Roberts, "Radiation Accident Grips Goiania", *Science* 1987; 238:1028-1031.
55. *Federal Register*, 1986b, June 30: 51:23612-23613. *Radiation Technology, Inc: Order Suspending Licenses (Effective Immediately)*.
56. US Court of Appeals for the District of Columbia Court, Public Citizen et al. vs Dr. Frank Young, Commissioner, FDA (No. 86-1548) and Public Citizen vs Department of Health and Human Services (No. 86-5150), October 23, 1987.
57. This argument is the basis of a petition submitted to FDA by two members of the New Jersey State Legislature, John H. Dorsey and John Kelly, in 1988.

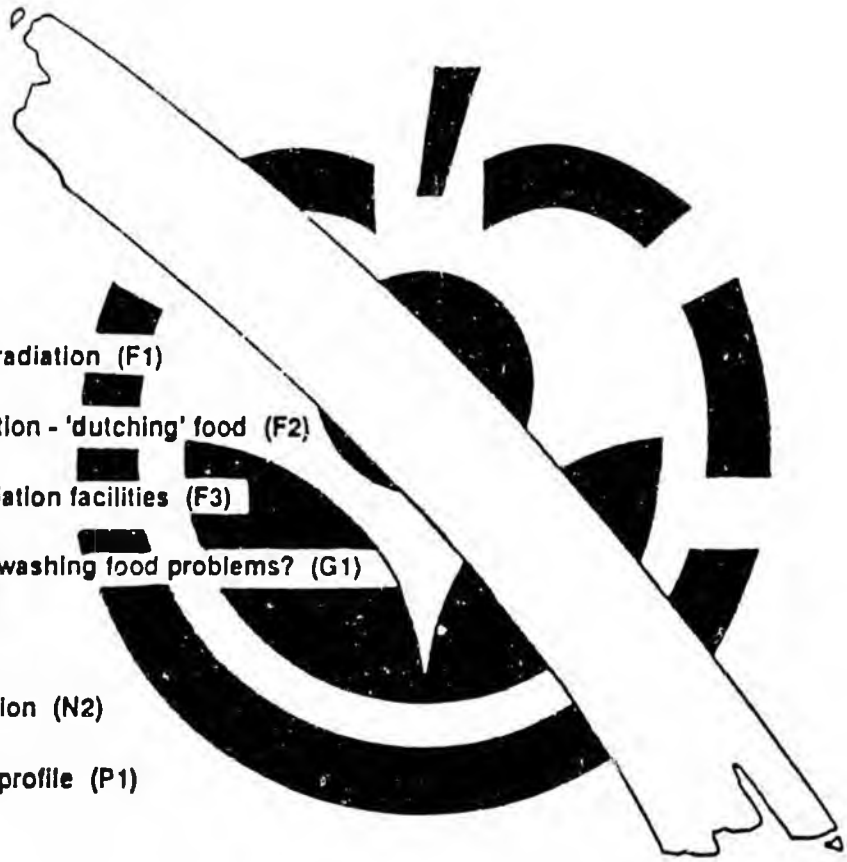
FIN LINK

FOOD IRRADIATION NETWORK

FIN - the Food Irradiation Network - is an informal worldwide coalition of like-minded groups and individuals opposed to food irradiation unless and until all outstanding issues are fully resolved.

No: 1

November 1989



CONTENTS:

1. History of food irradiation (F1)
2. Abuses of irradiation - 'dutching' food (F2)
3. Accidents at irradiation facilities (F3)
4. Irradiation - Whitewashing food problems? (G1)
5. News briefs (N1)
6. Managua Declaration (N2)
7. Malaysia national profile (P1)

- This issue of FIN LINK was produced by the Education and Research Association (ERA) for Consumers, Malaysia, with assistance from the International Organization of Consumers Unions (IOCU) Regional Office for Asia and the Pacific, Malaysia. Volunteers and sponsors for the production of future issues of FIN LINK are welcome - interested partners may get in touch with any of the five FIN Regional Contact Points (see overleaf for addresses).

FIN links the activities of like-minded groups and individuals worldwide through five Regional Contact Points, which exchange information among themselves and disseminate news to FIN partners in their respective regions. Information sent to the five Regional Contact Points (see overleaf for addresses) will reach all other FIN partners via the information service called FIN LINK and other means of information exchange.

FIN AIMS

- call for a global moratorium on food irradiation unless and until all issues relating to its need, appropriateness, safety, detectability, labelling, wholesomeness, control and overall costs to society and the environment have been fully evaluated and subjected to public scrutiny
- call on the World Health Organization to reopen and thoroughly investigate all aspects of safety associated with irradiated food
- call upon the World Bank and other financial institutions/aid agencies not to include food irradiation in their programmes and projects
- support the development of appropriate technologies which improve the quality, quantity and safety of the world's food supply
- call for public participation in all decision making processes related to food irradiation.

FIN REGIONAL CONTACT POINTS:

- AFRICA
  Environment Liaison Centre International (ELCI)
  PO Box 72461
  Nairobi
  Kenya
  Phone: 2542-562015
  Fax: 2542-562175
  Telex: 23240 ELC KE

- ASIA/PACIFIC
  International Organization of Consumers Unions (IOCU)
  PO Box 1045
  10830 Penang
  Malaysia
  Phone: 604-371396
  Fax: 604-366506
  Telex: MA 40164 APIOCU

- EUROPE
  London Food Commission (LFC)
  88 Old St
  London EC1V 9AR
  UK
  Phone: 441-2539513
  Fax: 441-6081279

- LATIN AMERICA/CARIBBEAN
  Asociacion Mexicana de Estudios para la Defensa del Consumidor (AMEDC)
  Amores 109-Bis A
  Mexico 03100 DF
  Mexico
  Phone: 525-5237342
  Fax: 525-5212763

- NORTH AMERICA
  Food and Water Inc. (FWI)
  225 Lafayette St
  Rm 612
  New York NY 10012
  USA
  Phone: 1212-9419340
  Fax: 1212-9415678.

A HISTORY OF FOOD IRRADIATION

(Compiled by Tony Webb and Leah Bloomfield)

1916 *Sweden experiments with irradiation of strawberries

1921 *US takes out irradiation patents

1930 *France takes out patents

1953 *Food irradiation announced as one of the 'atoms for peace' technologies
*US Army begins research into irradiation

1957 *West Germany irradiates spices

1958 *West Germany bans food irradiation
*USSR permits irradiation of potatoes
*US classifies irradiation as a food additive; safety testing required.

1960 *Canada permits irradiation of potatoes

1963 *US permits irradiation of wheat, potatoes and bacon

1964 *IAEA, FAO and WHO set up Joint Expert Committee on Food Irradiation (JECFI) to review research data
*UK Dept of Health Report raises critical questions on the safety of irradiated food

1967 *UK prohibits irradiation and sale of imported irradiated food

1968 *US FDA withdraws permit for bacon when review finds adverse effects and poorly conducted experiments.
*Accident at Hawaii irradiator. Contamination still detectable in 1980

1969 *First JECFI meeting, followed by report in 1970, on safety and wholesomeness of irradiated foods. Provisional clearance given for potatoes, wheat, wheat products at specified doses

1971 *International Food Irradiation Project (IFIP) established with headquarters at Karlsruhe, West Germany

1972 *Japan grants permit to irradiate potatoes

1974 *Accidents at US irradiation facilities (Isomedix) (International Nutronics - uncovered in 1982)

1975 *Radiation leaks and worker exposure in accidents at irradiator facilities in US (Radiation Technology) and Italy (Stimos)

1976 *Second JECFI meeting, followed by report in 1977, relaxes toxicology testing requirements for irradiated foods clearances given (unconditionally) to potatoes, wheat, strawberries, papaya, chicken and (provisionally) to onions, rice, cod, redfish
*Australia grants first of two special permits to irradiate prawns to cover up bacterial contamination (second in 1979)

1977 *Worker exposed in accident at US irradiator facility (Radiation Technology)

1978 *Japanese baby food scandal - illegally irradiated vegetables used in baby foods since 1974. Studies show harmful effects in onions - onion irradiation not permitted

1980 *Third JECFI meeting, followed by report in 1981. Unconditional clearance given for all foods up to average dose 10 kGy

1981 *Fire at US irradiator (Becton Dickinson)

1982 *UK government Advisory Committee (ACINF) established
*Worker dies from irradiation accident in Norway
*IFIP research project terminated

1983 *UN Codex Alimentarius Commission approves International General Standards for Irradiated Foods and Recommended International Code of Practice for the Operation of Radiation Facilities for the Treatment of Foods
*Officials of IBT Ltd convicted of doing fraudulent research for government and industry - six years of food irradiation study data from 1970s, costing $4 million, is worthless.
*Pollution Probe (Canada) publishes first critical report on food irradiation
*IAEA/FAO/WHO set up International Consultative Group on Food Irradiation (ICGFI) to promote food irradiation

1984 *US FDA proposal to permit unlabelled irradiated food withdrawn after public opposition

1985 *US Department of Energy (DOE) proposes six demonstration plants
*Campaigns launched by US Health and Energy Institute, National Coalition to Stop Food Irradiation, Food and Water and others
*London Food Commission establishes working group on food irradiation.

1986 *US FDA permits pork,fruit and vegetables (up to 1 kGy) and spices (up to 30 kGy)
*Abuse of irradiation uncovered. British food companies irradiate seafood in the Netherlands to hide bacterial contamination - known in the trade as 'dutching'
*UK ACINF Committee reports no special safety problems with irradiated food up to 10 kGy. MPs question controls to prevent dutching and conflict of interest of ACINF technical advisor
*IAEA Marketing Strategy outlines worldwide campaign for promoting food irradiation
*First meeting of Food Irradiation Network - groups opposing irradiation held in the Netherlands
*Opinion poll in New Zealand/Aotearoa finds overwhelming opposition to irradiated food
*Denmark permits irradiated spices revokes permit for potatoes

1987 •London Food Commission launches Food Irradiation Campaign to retain UK ban on irradiation with support of consumers, environmental groups, trade unions, public health, farmers and food industry representatives
•Public opinion polls find 93% of UK population and 75% of Canadians oppose food irradiation
•UK food manufacturers body reverses position, calls for ban
•Leading UK supermarket chains declare opposition to selling irradiated food
•British Medical Association criticises ACINF, suggests possible long term health risks
•European Parliament votes against general clearance and for research on alternative preservation methods
•International Union of Foodworkers (IUF) calls for Europe-wide ban on irradiation
•Further 'dutching' scandal - Danish mussels
•US irradiated mushrooms scandal - Quaker Oats Co
•European Scientific Committee endorses 1980 JECFI position
•12th IOCU World Congress calls for moratorium until safety, control and other issues resolved. IOCU office in Penang, Malaysia, coordinates international consumer opposition
•Second European Food Irradiation Network meeting - Brussels
•Canadian Parliament report calls for safety research, recommends ban on irradiation of wheat
•Public demonstrations halt test marketing of irradiated potatoes in Canada and papayas in US and construction of irradiator in New Zealand/Aotearoa
•Australian Consumers Association report to Australian government endorses IOCU position
•California grocers' association opposes irradiated food
•US state of Maine bans sale of irradiated food

1988 •Second UK ACINF report recommends food irradiation but admits insufficient evidence on some safety issues, government retains ban because of concern over controls to prevent abuse
•Caesium leak at US irradiator (Radiation Sterilizers) State investigator calls for tighter regulation and controls
•New Zealand/Aotearoa government bans irradiation
•First meeting of Asia/Pacific Region Food Irradiation Network, Canberra, Australia
•Groups in Canada and Thailand unite to protest Canadian aid money being used to fund Thailand irradiator Similar 'aid' to Jamaica and Malaysia exposed
•IAEA 'research' meeting Bangkok (RPFI phase III) plans promotion of consumer acceptance in the Asia/Pacific region Consumer groups alert President Cory Aquino about plans for promotion in the Philippines
•European Commission proposes directive to force all EEC countries to permit irradiation
•Australian parliament report recommends ban, calls on WHO to reopen safety investigation and produce a proper scientific report
•IAEA/WHO/FAO/ITC-UNCTAD/GATT conference in Geneva to promote food irradiation fails to achieve consensus, rejects statements that there are no unresolved safety problems. 11 of the 54 countries present express reservations about food irradiation
•Public interest groups criticise WHO promotional booklet 'Food Irradiation - a technique for preserving and improving the safety of food' as biased, misleading and inaccurate. ICGFI produces promotion video, TV programme
•Food Irradiation Network (FIN) formally launched

1989 •Consumers force ICGFI to withdraw proposal to cripple existing labelling standards at Codex meeting, Ottawa, Canada
•100 legislators support US federal bill to ban irradiation
•US Congress refuses further funds for DOE irradiator program
•New York and New Jersey ban sale of irradiated food. Ban Bills introduced in Vermont, New Hampshire, Massachusetts, Pennsylvania, Minnesota, Oregon, Washington and California
•Three workers exposed at (Delmed) irradiator in El Salvador
•Martin Welt, (ex-President Radiation Technology) finally convicted for conspiracy over safety violations Forms new company, Alpha and Omega technology, to promote irradiation in SE Asia
•US FDA extends labelling requirement to 1990
•IUF Asia/Pacific Regional Congress opposes irradiation
•Public pressure stops plans for papaya irradiator in Hawaii, seafood irradiator in Alaska and apple irradiator in Washington
•Further 'dutching' of seafood uncovered. Companies under-irradiating to avoid port health detection and re-documenting consignments to avoid customs duty
•Canada extends permits for irradiation
•UK Retail Consortium, representing the major supermarket chains, joins consumer, and public health/food law bodies in demanding the UK ban remain
•European Parliament's Environment Committee votes for Europe-wide ban on irradiation (spices exempted)
•Danish Parliament's Consensus Conference rejects food irradiation as an inappropriate technology
•UK government announces intention to permit irradiation
•Conference on Fate and Hope of the Earth, Managua, Nicaragua, calls for worldwide moratorium on food irradiation
•Food Irradiation Network launches international seafood campaign

1990 •The tide turns ?

------oo------ D.

ABUSE OF IRRADIATION - THE "DUTCHING" OF FOOD

The abuse of irradiation - the illegal cover-up of high levels of bacterial contamination - is a major isssue of concern. Contaminated reject foods are frequently sent to the Netherlands where they are irradiated for resale. The practice has become known as 'dutching'. It is only half-heartedly condemned by governments and the international promoters of irradiation.

'Dutching' is difficult to eradicate since there are no reliable methods for detecting whether a food has been irradiated and if so, how many times and with what doses. Far from being a treatrnent which can make food safer, irradiation has made obsolete many of the methods which public health agencies use to check that food is wholesome and fit to eat.

The following cases have been reported since 1986. Health officials and honest food traders believe that the documented cases are just the tip of the iceberg.

o Young's ('Admiral' brand) prawns (UK)

In 1986 a consignment of Malaysian prawns originally imported into the UK by Young's Seafoods (now part of the US/UK Hanson Trust) was found to be contaminated. The prawns were shipped to Gammaster irradiation plant in the Netherlands, irradiated, illegally reimported into Britain and sold under the 'Admiral' label.

o Flying Goose ('Dan-Maid' brand) prawns (Sweden)

The Flying Goose company, part of the International Allied Lyons group, irradiated contaminated prawns using the IRE plant in Belgium before shipping them to Sweden. Sweden prohibits the importation of irradiated food. The company claimed the shipment was a mistake and the practice would not continue*. The consignment was rejected by the customer in Sweden following a tip-off and re-exported. The Flying Goose company is believed to have legally sold it as a reject consignment. Its final destination is unknown but reports from within the food trade indicate that it changed hands several times and may have been repackaged to remove the original brand labels.
* See below: A regular trade in 'dutched' seafood

o Insurance rackets

The International Maritime Bureau is investigating cases of possible insurance fraud where seafood and frogs legs may have been over-insured before being rejected by authorities in the US. After the insurance claims have been made, the consignments are said to be resold as reject lots and then 'dutched' in Europe.

o Romoe-Musell mussels (Danmark)

The Dutch parent company of the Danish Roemoe Musell company was fined in 1988 for importing 32 tonnes of irradiated mussels. Danish authorities had rejected them because of contamination with E. coli bacteria. The company sent them to Gammaster for irradiation and illegally re-imported them into Denmark. Gammaster was not prosecuted. The product was being irradiated for export! Gammaster which claims that food is tested for bacterial contamination before being irradiated.

o **Baby food (Wakado, Meiji and Snow brands) (Japan)**

From 1974-78 the Na-Kagami Shokuhin company, a subcontractor to Japanese food processing companies Wakodo, Meiji and Snow Brand, irradiated vegetables for baby foods in containers labelled 'animal feedstuffs'. The fraud was discovered when a driver reported that the boxes had been relabelled 'vegetables for babyfood' on the way back from the Radiye Kogyo irradiation plant. The company president was given an eight month prison sentence.

o **Quaker Oats (Golden Grain brand) products (US)**

In the US it is permitted to irradiate spices at 30 kGy as opposed to 1 kGy for vegetables. In 1988, the Quaker Oats company used illegally irradiated dried mushrooms in two of its products - Golden Grain Chicken and Mushroom Rice-a-Roni and Chicken and Mushroon Noodle-Roni. The Taiwanese mushrooms were imported by Cade-Grayson company, California, and were given ten times the dose permitted for vegetables in the US at the plant of Precision Materials Corporation, Mine Hill, New Jersey. Quaker Oats/Golden Grain has stopped using irradiated mushrooms.

o **A regular trade in 'dutched' seafood**

In June 1989, a UK journalist posing as a representative of non-existent seafood company, showed how easy it would be to import irradiated seafood. A British House of Commons motion identifies connections between Hank DeBruijne, a trader in reject seafood, Gammaster irradiation company, a haulage company recommended by Gammaster, and three UK companies (including Lyons International) who trade with the Dutch companies. In this case the reject seafood originated in Malaysia. Product from Oman, Bangladesh, Pakistan and Taiwan was also offered.

Port health authorities may not be able to detect whether a food has been irradiated, but they become suspicious if food has an abnormally low bacterial load. DeBruijne offers to irradiate at only half the recommended dose. This leaves a low level of residual contamination so as not to arouse suspicions.

o **'Dutching' - a holiday in Holland!**

In August 1989, The Sunday Times revealed how a 16 ton consignment of Indian prawns, condemned by US authorities because of Salmonella, was offered for sale by Landauer, a London firm of commodity brokers. One of Landauer's dealers is reported to have offered to send the prawns 'on holiday to Holland' (another trade expression for irradiating the food in the Netherlands). Landauer's said 'We tell our customers it has been rejected. What they do with it is entirely up to them. We would place them through irradiation for customers.'

A potential profit of £100,000 after irradiation is a considerable incentive for a company to take up an offer like this, provided they can evade the various controls on such abuse.

Source London Food Commission: Food Irradiation - The Myth and the Reality (Thorsons, UK, 1990).

------oo-----

ACCIDENTS AT IRRADIATION FACILITIES

Irradiation is a hazardous process. Exposure to the unshielded source can be a fatal. Routine exposures to even low levels may cause long-term harm. The radioactive materials have to be transported into the plant, the spent sources (still radioactive) removed and any contaminated material disposed of.

Accidents may happen at any stage, causing exposure of workers, the public and the environment. Often, lack of local expertise means that maintenance teams have to be flown in from overseas to deal with emergencies.

The following accidents all happened in plants built and operated under the internationally agreed system of regulation and control. Trade unions with members in the food industry have reason to be concerned about the health and safety of their members.

o Radiation Technology Inc (RTI), New Jersey, USA.

In 1986, the US Nuclear Regulatory Commission (NRC) revoked the RTI licence for repeated wilful violations of worker and environmental safety. Incidents included by-passing safety interlock systems resulting in exposure of a worker to the unshielded source (1977) and illegally burying contaminated material from a leaking Cobalt 60 source (1975).

Martin Welt, the company president, ordered employees to lie to the NRC investigators. The NRC action resulted in his resignation. The US Department of Energy (DOE) promptly hired him to advise on its food irradiation program. Welt was eventually convicted of conspiracy in the US courts in 1988. His new company, Alpha Omega Technology, has approached the World Bank for funds to build irradiation facilities in South East Asia.

o Isomedix, New Jersey, USA.

A leaking source contaminated the pond water which was then disposed of down the toilets, contaminating the sewerage system, and exposing workers to radiation. Workers reported the cover-up. Radioactive contamination was still detectable five years later.

The NRC has cited the company for allegedly overexposing workers, failing to signpost radiation areas, allowing food and cigarettes in radiation areas, operating without authorised personnel and failing to monitor water disposed to the sewer.

o International Nutronics, New Jersey, USA.

The company was fined in 1986 after cover-up of a radioactive spill in 1982. Management ordered employees to dispose of the radioactive water down shower stalls, and move their radiation badges from belt to collar to record a lower dose. The contamination was still detectable outside the building ten months later.

o Hawaii Demonstration Irradiator, USA.

A radioactive leak at an irradiator in Hawaii in 1967 contaminated the pond water, shipping cask, roof, machine room, tools and workers' clothing. The cleanup cost the state $385,000 in 1979. Dangerously high levels of contamination were still detectable outside the building in 1980.

o **Radiation Sterilizers Inc, Georgia, USA.**

A leaking caesium source in June 1988 contaminated the pond water, workers' clothing, cars, and home carpets,as well as some of the irradiated products including medical supplies and milk cartons. The clean-up was still, in the going on in 1989 with at a cost of several million dollars. The investigating team recommended that new regulations on radiation safety and emergency plans are needed for all US irradiators.

o **University of Tennessee, USA.**

A worker bypassed the safety system of an irradiation facility at the University of Tennessee in 1971. He survived the high dose of radiation.

o **Becton Dickinson, North Canaan Connecticut. USA.**

Aluminium boxes containing products being irradiated, jammed into the source rack in 1981, preventing it from being lowered. Despite this, the control panel indicated that the cobalt source was safely inside its storage pool. It was only the radiation monitors indicating high radiation levels that warned of the problem. Technicians had to be called in from AECL, Canada, (now Nordion). While lowering the rack they dislodged several cobalt rods which had to be recovered using long-handled tools and mirrors.

o **Stimos, Pontecico, Italy.**

A maintenance worker entered the irradiation cell of a corn irradiation facility on the conveyor belt while the source was operational. He received a high radiation dose and died 12 days later.

o **Institute for Energy Technology Irradiation Plant, Kjellet, Norway.**

Failure of safety devices allowed a maintenance technician to enter the iradiation cell with the source exposed. He died 13 days later.

o **Delmed plant, San Salvador, El Salvador.**

Three workers at the Delmed plant received serious radiation injuries after irradiation equipment malfunctioned in February 1989.Delmed had to call Nordion, the suppliers of the plant, to send a maintenance team from Canada to remove the cobalt from the defective source rack.

o **Steritech, Dandenong, Australia.**

This plant had to be shut down for five days because a wire cable controlling the Cobalt 60 source rods had jammed, preventing the rods being lowered into the pool. A maintenance team had to be flown from Canada to remedy the problem. Technicians and equipment to deal with such emergencies are not available in Australia.

Source: London Food Commission: Food Irradiation - The Myth and the Reality (Thorsons, UK ,1990).

—oo—

RESOLUTION ON FOOD IRRADIATION

ADOPTED BY THE FOURTH BIENNIAL CONGRESS ON THE FATE AND HOPE OF THE EARTH

(MANAGUA, NICARAGUA, 5-9 JUNE, 1989)

Believing that the potential benefits of food irradiation, particularly its need and appropriateness, have been generally overplayed, while its potential problems, particularly its safety and control, have been grossly underplayed;

Realizing that controls on the use and abuse of food irradiation cannot be adequately enforced or monitored in the absence of reliable tests to detect irradiated foods;

Concerned that the effects of irradiation on pesticide residues in food have not been sufficiently studied;

Reiterating that the bulk of agricultural pesticides are applied pre-harvest - as such, a post-harvest technology like food irradiation would not reduce the total amount of agricultural pesticides manufactured, traded or used in any significant manner;

Noting that in many Third World countries, the improper transportation and storage of grains and other foods, coupled with the scourge of rodents, contribute substantially to post-harvest food losses - a situation that will not be solved by food irradiation;

Understanding that food irradiation will involve the use of other chemical additives to maintain or enhance the organoleptic properties of irradiated foods;

Recognizing that the nuclear industry worldwide is facing severe economic difficulties and is promoting the proliferation of nuclear technologies, including food irradiation, at any cost, in order to keep itself alive;

Noting that the use of food irradiation implies greater centralization of food production systems, removing local control from small producers and thus potentially contributing to food shortages and increased hunger;

Recalling that food irradiation is being aggressively promoted, despite widespread opposition by consumer, environmental and other citizens groups;

We, the participants of the Fourth Biennial Congress on the "Fate and Hope of the Earth", in Managua, Nicaragua, 5-9 June, 1989;

Declare that all attempts to foist food irradiation, particularly on Third World countries, without the active and informed participation of independent, public interest, citizens groups be thwarted;

Urge that the World Health Organization (WHO) reopen and thoroughly investigate all aspects of safety associated with irradiation;

Urge that the World Bank, other international financial institutions and aid agencies not include food irradiation projects in their foreign aid programmes, particularly in the case of Third World countries;

Call for a global moratorium on the further use and development of food irradiation, unless and until all issues relating to its need, appropriateness, safety, detectability, labelling, wholesomeness, control and overall costs to society and the environment have been fully evaluated and subjected to public scrutiny;

Support the activities of the Food Irradiation Network (FIN) in fostering closer cooperation and coordination amongst citizens group working on the issue of food irradiation using the resources that FIN will make available.

The above declaration was adopted unanimously by more than 1,200 participants from more than 60 nations (representing numerous groups and organisations from every continent) who met in Managua, Nicaragua, between 5-9 June, 1989, for the Fourth Biennial Congress on the Fate and Hope of the Earth to discuss strategies on development, environmental conservation and restoration, peace and disarmament. The Congress explored the linkages between these issues and shared experiences in order to forge cooperative efforts to move towards global sustainability.

—oo—

I.

FIN NEWS BRIEFS

FIN National Profiles

Future issues of FIN LINK will contain brief profiles on the situation in a number of countries. Some of these are in production. Some are awaiting information from the network. The profiles will contain information on

1. Permits for food irradiation (or government policy)
2. Facilities available (and planned) for irradiating food
3. Foods likely to be irradiated for home consumption, export and likley imports
4. Major food trading partners where irradiaton might be involved
5. FIN contacts.

As an example see FIN COUNTRY PROFILE - P1 - Malaysia.

FIN Fact Sheets

The first three - history, abuses, and accidents - are included in this issue of FIN LINK.
In production are fact sheets on

- the IAEA marketing strategy
- the safety of irradiated food
- food irradiation and food poisoning.

Suggestions (and content) for other titles are welcomed.

FIN Graphics

Included in this issue of FIN LINK is a graphic highlighting the way irradiation acts as a cover for low quality food. Examples of other graphics you have found useful are welcome.

FIN News Briefs

Future issues of FIN LINK will contain brief reports on developments around the world and contacts for further information. In this issue we highlight:

1. The US Campaign to Stop Food Irradiation

Despite permits for food irradiation in the US since 1963 there is no irradiated food openly sold in the US. Test marketing trials of papaya and potatoes were called off after consumer opposition. Three states, Maine, New York and New Jersey have banned the sale of irradiated food. Legislation is pending in 10 other states. 100 federal legislators have supported legislation to ban irradiation and force fuller scientific investigation of its safety. None of the six demonstration irradiation facilities planned by the government in 1986 have been built. A nation-wide petition is being organized and the support for this used to pressure food companies to declare they will not use irradiation. There is a network of groups campaigning to stop food irradiation in most of the 50 states. The US national coordinating groups work closely with contacts in Canada, Asia/Pacific and Europe. More work needs to go into contacts with Latin America and the Caribbean.
For further information contact Food and Water Inc., USA.

2. The Thailand/Canada Initiative

A successful letter writing campaign drew international press coverage for opposition to the Thailand/Canada irradiation agreement. FIN groups in each country wrote to the Canadian and Thai premiers protesting against the proposal to construct an irradiation facility in Thailand, using Canadian aid funds, and sell the food irradiated there to Canada. The plant has been in operation since mid 1989. Plans for CIDA to fund irradiation facilities in Malaysia and Jamaica were uncovered as a result of this campaign.

3. The International Seafood Campaign

The 'dutching' of food (see FIN Factsheet - F2 - Abuse of Food Irradiation) hurts the seafood trade in developing nations. It also hurts reputable traders who have never needed irradiation. An international campaign has been launched to produce a positive list of companies - exporters in developing countries, importers in N America, Europe, Japan and Australasia - who can guarantee they provide quality, clean seafoods and not irradiated, contaminated seafoods.

For further information about the campaign, contact the London Food Commission, UK, or any of the other FIN Regional Contact Points.

4. Promotion Conference on Food Irradiation

As part of the global marketing strategy, a number of UN agencies held a conference on 'the acceptance, control of and trade in irradiated food' in Geneva, Switzerland, 12-16 December, 1988. The conference failed to achieve what the organizers hoped for. The organizers were forced to:

- stage a special session to discuss safety and abuse of irradiation
- withdraw a statement that there were no unresolved safety issues
- withdraw a proposal that governments should promote irradiation

11 of the 54 countries present expressed reservations about food irradiation.

The World Health Organization's promotional booklet on food irradiation, which was distributed at the Geneva conference, was described as being "biased, misleading and inaccurate" by the citizens groups present at the conference. A critique of the WHO booklet is available from the London Food Commission, UK.

Further information and references:
IAEA report on the Geneva conference (ISBN 92-0-010189/5 ISSN 0074.1989).
Consumer report on the Geneva conference and briefing kit is available from the International Organization of Consumers Unions, Malaysia.
'Food Irradiation - a technique for preserving and improving the safety of food' (ISBN 92 4 154240 3, WHO 1988).

5. Japan

We are often told Japan permits irradiation of potatoes. The fact is that the use of irradiated potatoes has fallen dramatically from 21 000 tons/year in 1976 to around 8 000 tons/year in 1989. The Japanese government withheld these figures and also withheld reports from the food irradiation safety research program of the Japan Atomic Energy Commission. Leaked reports indicate adverse effects on the health of animals fed irradiated potatoes and onions. Japan refused to give clearance for irradiated onions. No food imported into Japan is allowed to be irradiated.
Further information from Mrs K Hamatami, Sonan 2-10-10, Sagamihara City, Kanagawa, Japan.

6. Europe

The European Commission proposes a Directive to force all EC nations to permit irradiation by 1992. This is opposed by West Germany and Denmark. The British government decided to permit irradiation in 1990, against widespread opposition from the British Medical Association, large supermarkets, consumer organizations. The European Parliament's Environment Committee voted for a general ban on irradiation (with spices the only exception).
Further information and developments from the London Food Commission, UK.

7. Australia and New Zealand

The New Zealand government banned irradiation in 1988, finding that there is no need for the technology. An Australian parliamentary committee also recommended a ban in 1988, and called on the WHO to reopen the scientific investigation into issues of safety and nutrition. An statement of the official Australian government position is expected in late 1989.
Further information from Mark Lawrence, Food Preservers Union of Australia, 227 Regency Rd, Croydon Park 5008 SA, Australia.

8. Latin America

La Voz del Consumidor has devoted an entire issue (Vol. 7 No.1 1989) to food irradiation, providing a comprehensive analysis of the issues written in Spanish.
For further information contact: Asociacion Mexicana de Estudios para la Defensa del Consumidor, Mexico.

9. Africa

The Environment Liaison Centre International, Kenya, has produced and will make available upon request a special issue of ECO-PROBE on food irradiation.

FUTURE ISSUES

Information for future issues of FIN LINK should be sent to any of the five FIN Regional Contact Points (see back page of cover sheet of this issue of FIN LINK for addresses).

—oo—

K.

PROFILE ON MALAYSIA

FOOD IRRADIATION PERMITS

None.
No food can be irradiated except with permission of the Director-General of the Ministry of Health.

IRRADIATION FACILITIES

- Research facility (cobalt), University of Malaya, operating since 1974.
- Research and demonstration facility (cobalt), Puspati, at Bangi in the state of Selangor. Operated by the Nuclear Energy Unit, Prime Minister's Department. Funded jointly by Malaysian government and Canadian International Development Agency (CIDA).
- Commercial medical supplies facility (cobalt) in Malacca. Operated since 1979 by Ansell-Sterltech (part of Dunlop International).

POTENTIAL EXPORT FOODS TARGETED FOR IRRADIATION

- Pepper (black and white): about 95% of pepper production is exported, mainly through Kuching and Sarawak.
- Shrimp: mostly cooked, peeled and frozen. About 10 large companies export mainly to US, Australia, Belgium, Netherlands, Sweden. Some of these exports are currently irradiated ('dutched') in The Netherlands.
- Cocoa beans: about 85% production exported. There can be problems with irradiation because of the high fat content. Transport and marketing infrastructure would need to be developed before irradiation could be used.
- Fruit (bananas, pineapple, possibly others): little data available on efficacy of irradiation for these products in Malaysia.

Summary

Infrastructure for irradiation generally is lacking. Handling and storage methods would need to be changed significantly. Impact on rural economy has not been investigated. The European Commission's FAST report indicates potential economic problems which may be relevant to Malaysia.

POTENTIAL IMPORT FOODS TARGETED FOR IRRADIATION

- Rice: about 15% of Malaysia's rice is imported and usually stored for up to 18 months (the locally grown rice is sold first). Main entry points are the ports of Kelang, Penang and Kuching. Jute and woven polypropylene packaging materials would have to be replaced by plastic to make irradiation usable. The International Atomic Energy Agency is sponsoring 'research' on consumer acceptance of irradiated rice within the Asia/Pacific region.

REFERENCE SOURCES

- FAST Report. Developments and Issues Relating to Food Irradiation in Europe. Forecasting and Assessment in Science and Technology Report No.134 Directorate-General for Science, Research and Development, Commission of the European Communities, Jan 1987.
- Assessment of Market Potential for Canadian Food Irradiation and Related Technologies in Thailand and Malaysia. Prepared for Canadian External Affairs, SE Asia Trade and Development Section, by Atomic Energy of Canada Radiochemical Company Ltd.(now called Nordion), January 1986.

FIN PARTNER

For more information about the situation in Malaysia, contact: Josie Zaini, Education and Research Association for Consumers, 11 Kilat Lane, Off Jalan Silibin, 30100 Ipoh, Perak, Malaysia.

—oo—

INTERNATIONAL ORGANIZATION OF CONSUMERS UNIONS (IOCU)
MEMBERS:

ASSOCIATES IN 1988

Australia
Australian Consumers' Association
Australian Federation of Consumer Organizations Inc.
Canberra Consumers Inc.

Austria
Verein für Konsumenteninformation

Bangladesh
Consumers' Association of Bangladesh (CAB)

Belgium
Association des Consommateurs/ Verbruikersunie

China
China Consumers' Association

Cyprus
Cyprus Consumers' Association

Denmark
Forbrugerrådet

Fiji
Consumer Council of Fiji

Finland
Kuluttajat-Konsumenterna ry

France
Union Fédérale des Consommateurs

Germany, F.R.
Arbeitsgemeinschaft der Verbraucherverbände
Stiftung Warentest

Hong Kong
Consumer Council

Iceland
Neytendasamtökin

India
Consumer Guidance Society of India

Indonesia
Yayasan Lembaga Konsumen Indonesia (YLK)

Ireland
Consumers' Association of Ireland

Israel
Histadrut Consumers' Protection Authority
Israel Consumer Council
Israel Consumers' Association

Jamaica
National Consumers' League

Japan
Nihon Shohisha Kyokai
Nihon Shohisha Renmei

Korea
Citizen's Alliance for Consumer Protection of Korea
Consumers Union of Korea

Luxembourg
Union Luxembourgeoise des Consommateurs

Malaysia
Consumers' Association of Penang
Federation of Malaysian Consumers Associations
Selangor and Federal Territory Consumers Association

Mauritius
Association des Consommateurs de l'Ile Maurice

Mexico
Asociacion Mexicana de Estudios para la Defensa del Consumidor

Netherlands
Consumentenbond
Stichting Vergelijkend Warenonderzoek

Netherlands Antilles
Fundashon pa Konsumidó

New Zealand
Consumers' Institute of New Zealand Inc.

Norway
Forbrukerrådet

Philippines
Consumers Federated Groups of the Philippines, Inc.
Kilusan NG MGA Mamimili NG Pilipinas Ink

Spain
Organització de Consumidors i Usuaris de Catalunya
Organizacion de Consumidores y Usuarios

Switzerland
Fédération Romande des Consommatrices
Konsumentinnenforum der Deutschen Schweiz

United Kingdom
Association for Consumer Research
National Consumer Council
National Federation of Consumer Groups
Research Institute for Consumer Affairs

United States of America
American Council on Consumer Interests
Consumer Federation of America
Consumers Union of United States, Inc.
(Consumer Reports)

SUPPORTING MEMBER

Sweden
Konsumentverket

M.

CORRESPONDENTS IN 1988

Argentina
Accion del Consumidor
Fundación Salud Publica
Liga de Amas de Casa de la República Argentina
SUMAR - Asociación de Consumidores de la República Argentina

Australia
Business and Consumer Affairs
Consumer Action Movement
Consumer Affairs Bureau, Queensland
Consumer Affairs Council of the Australian Capital Territory
Consumer Affairs Council, Northern Territory
Consumer Affairs Council of Tasmania
Consumers' Association of Victoria
Federal Bureau of Consumer Affairs
Ministry of Consumer Affairs
National Consumer Affairs Advisory Council
Trade Practices Commission

Belgium
Bureau Européen des Unions de Consommateurs
Centre de Droit de la Consommation

Brazil
Comissao Municipal de Defesa do Consumidor do Rio de Janeiro
Conselho Nacional de Defesa do Consumidor
Coordenadoria de Proteçao e Orientaçao ao Consumidor
Grupo Recifence de Defesa do Consumidor de Medicamentos
Instituto Brasileiro de Defesa do Consumidor
PROCON-MS - Secretaria Executiva de Orientaçao e Proteçao ao Consumidor
PROCON-SP - Grupo Executivo de Proteçao ao Consumidor

Canada
Department of Consumer and Corporate Affairs
Office de la Protection du Consommateur
Service d'aide au Consommateur

Chile
Asociacion Chilena de Defensa del Consumidor

Colombia
Confederacion Colombiana de Consumidores

Costa Rica
Asociacion Costaricense de Defensa del Consumidor

Cuba
Instituto Cubano de Investigaciones y Orientacion de la Demanda Interna

Dominican Republic
Departamento de Educacion al Consumidor

Ecuador
Centro Ecuatoriano para la Promocion y Accion de la Mujer
Direccion Nacional de Proteccion al Consumidor del Instituto Ecuatoriano de Normalizacion

Finland
Kuluttajaneuvosto
Suomen Kuluttajaliitto ry

France
Organisation Générale des Consommateurs

Germany, F.R.
Bundesforschungsanstalt für Ernährung
Die Verbraucher Initiative

Greece
Instituto Prostasias Katanaloton
Kentro Prostasias Katanaloton

Guyana
Guyana Consumers' Association

Hungary
Kereskedelmi Minőségellenőrző Intézet Kermi

India
Consumer Association
Consumer Education Centre
Consumer Education and Research Centre
Consumer Protection Council
Indian Federation of Consumers Organisations
Jagrut Grahak
Karnataka Consumer Service Society
Visakha Consumers' Council

Ireland
Office of Consumer Affairs and Fair Trade

Israel
Consumer and Price Division, Ministry of Trade and Industry

Italy
Associazione Italiana Agricoltura Alimentazione Salute
Difesa del Consumatore Quaderni di Controinformazione Alimentare

Japan
Kokumin Seikatsu Center
Shodanren

N.

Japan (Contd.)
Shufurengokai
Yakugai Joho Center

Kenya
African Council on Communication Education
Kenya Consumers' Organization
Public Law Institute

Korea
Korea Consumer Council
Korean Women's Association
National Council of Consumer Protection Organizations

Malaysia
Education and Research Association for Consumers, Perak
Pahang Association of Consumers

Mauritius
Mauritian Action for the Promotion of Breast Feeding & Infant Nutrition

Malta
Consumers' Union of Malta

Mexico
Instituto Nacional del Consumidor

Netherlands
Ministerie van Economische Zaken, Direktie Consumentenbeleid
Stichting Consument en Veiligheid
Stichting Wetenschappelijk Onderzoek Konsumentenaangelegenheden

New Zealand
Ministry of Consumer Affairs, Department of Trade and Industry

Nigeria
Consumer Education and Protection Council of Nigeria
National Consumers Nigeria

Norway
Forbrukeravdelingen, Forbruker-og Administrasjonsdepartementet
Forbrukerombudet
Statens Institutt for Forbruksforskning

Peru
Comité Peruano Pro-Alimentacion Infantil

Philippines
Church-Based Consumers' Movement
Citizens' Alliance for Consumer Protection

Poland
Rada Krajowa Federacji Konsumentow

Portugal
Associaçao Nacional dos Consumidores
Associaçao Portuguesa para a Defesa do Consumidor
Instituto Nacional de Defesa do Consumidor

Puerto Rico
Departamento de Asuntos del Consumidor

Senegal
Environnement Developpement Action Tiers Monde

Spain
Confederacion Estatal de Consumidores y Usuarios
Direccion de Consumo del Gobierno Vasco
Federacion de Consumidores de Euzkadi
Federacion Española de Asociaciones de Amas de Casa, Consumidores y Usuarios Institut Català de Consum
Union de Consumidores de España
Union de Consumidores de España

Sweden
Kooperativa Konsumentgillesforbundet

Switzerland
Schweizerische Stiftung für Konsumentenschutz
Schweizerischer Konsumentenbund

Thailand
Consumer Affairs Project
Consumer Protection Association
Consumers Group of Siam
Thai Association of University Women
Voluntary Group for Consumers of Thailand

Turkey
Consumer Bureau Türk-is

United Kingdom
European Research into Consumer Affairs
Office of Fair Trading

United States of America
New York City Board of Education Employees, Local 372

Uruguay
Coordinadora de Grupos de Consumidores de Uruguay
Direccion Nacional de Comercio y Abastecimento
Liga Uruguaya de Defensa del Consumidor

Zimbabwe
Consumer Council of Zimbabwe

HB35

Dear House of Education and Social Services Committee 5-1-91

I am writing in regards to an irradiator plant that is trying to be built in Alaska. It brings me to tears just thinking about how all of our childrens and grandchildren lives will be adversely effected by this. It is a grave concern in my household.

First of all, I have children that absolutely cannot tolerate anything other than whole-natural foods. Their bodies just give out otherwise. And if it weren't for the God given natural foods - my children would not be here with us today. Just a matter of fact.

Also I don't understand what the need for irradiation is for anyway. Food does not need to be preserved for so long like their studies indicate. We believe the reason they want this is for the windfall profits. (LET THE GOVERNMENT FOOT THE BILL). After all, a strong promoter of irradiated food is a criminal of convicted felons involving his irradiator facility. He's petitioning the FDA to approve sea-food for the process.

We also believe that the American people are being used as guinea pigs as they were during WW II nuclear

testing. We question the effects this food has upon consumption but also the nutritional value of the food itself once radiated.

We are asking you to protect our food by advocating thorough, peer-reviewed, scientific, long term research conducted on the effects of eating irradiated food BEFORE the process is utilized commercially and ② studies be conducted on the dangers and costs to workers and consumers of using high-level nuclear waste by-products like Cesium to irradiate our food.

We ask you to support HB-35. It's for our families, now and later.

Sincerely

Mr & Mrs. Charles Nichols
3081 Zulu Ct
North Pole, AK 99705

FISCAL NOTE

STATE OF ALASKA
1991 LEGISLATIVE SESSION

BILL NO. HB35

Revision Date: _____ Department Affected: Environmental Conservation

Title: An Act prohibiting the knowing sale of irradiated food. BRU: Environmental Health

Component: Sanitation

Sponsor: Rep. Phillips

Requestor: Rep. Phillips COMPONENT SERIAL NO. | | 6 | 5 | 0 |

Expenditures/Revenues: (Thousands of Dollars)

OPERATING	FY 92	FY 93	FY 94	FY 95	FY 96	FY 97
PERSONAL SERVICES						
TRAVEL						
CONTRACTUAL						
SUPPLIES						
EQUIPMENT						
LAND & STRUCTURES						
GRANTS, CLAIMS						
MISCELLANEOUS						
TOTAL OPERATING	-0-	-0-	-0-	-0-	-0-	-0-
CAPITAL	-0-	-0-	-0-	-0-	-0-	-0-
REVENUE	-0-	-0-	-0-	-0-	-0-	-0-

FUNDING: (Thousands of Dollars)

GENERAL FUND	-0-	-0-	-0-	-0-	-0-	-0-
FEDERAL FUNDS	-0-	-0-	-0-	-0-	-0-	-0-
OTHER	-0-	-0-	-0-	-0-	-0-	-0-
TOTAL	-0-	-0-	-0-	-0-	-0-	-0-

POSITIONS:

FULL-TIME	-0-	-0-	-0-	-0-	-0-	-0-
PART-TIME	-0-	-0-	-0-	-0-	-0-	-0-
TEMPORARY	-0-	-0-	-0-	-0-	-0-	-0-

Estimate of current year impact: -0-

ANALYSIS: (Attach a separate page if necessary.)

See attached.

Prepared By: Douglas C. Donegan, Director Phone: 465-2696

Division: Environmental Health Date: January 22, 1991

Approved by Commissioner: _____

Agency: Department of Environmental Conservation Date: _____

Distribution (by preparer): Legislative Finance, Legislative Sponsor, Requestor, OMB, & Impacted Agency(ies).

Rev 10/90

FN @ DEC

ANALYSIS:

We are submitting a zero fiscal note with the understanding that investigation and enforcement will take place on a complaint-basis only. We will not be monitoring retail food establishments for irradiated foods.

STATE OF ALASKA

WALTER J. HICKEL, GOVERNOR

DEPT. OF ENVIRONMENTAL CONSERVATION

POSITION PAPER

BILL NUMBER: HB 35

TITLE: "An act prohibiting the knowing sale of irradiated food."

DEPARTMENT POSITION:

The Department has not taken a position on this bill due to the fact that the Department's expertise is in inspecting the sanitary operation of food production facilities; we do not have any staff with training or experience in the irradiation of food.

ANALYSIS:

U.S. Food and Drug Administration (FDA) Requirements

The FDA has concluded that food irradiated at doses up to 1 kilogray is wholesome and safe for human consumption, even where the food that is irradiated may constitute a substantial portion of the diet. FDA has approved the following application dosages: for foods which comprise more than 0.01% of the daily diet, the treatment dosage cannot exceed 1 kilograys (kGy); for foods which comprise less than 0.01% of the daily diet (such as spices), treatment dosage cannot exceed 30 kGy. FDA's position is that the chemical difference between foods irradiated at doses allowed by this regulation and non-irradiated foods are too small to cause concern about the safety of irradiated foods.

FDA Approves Sources of Irradiation

Approved ionizing irradiation sources include: radioactive isotopes (Cobalt-60 and Cesium-137) and machines (x-ray or eletron beam).

FDA Foods Approved for Irradiation

FDA has approved the application of irradiation for the treatment of foods under the following conditions: for control of Trichinella spiralis in pork carcasses or fresh, non-heat treated processed cuts of pork carcasses; for growth and maturation inhibition of fresh foods; for inhibition of arthropod pests in food; for microbial disinfection of dry or dehydrated enzyme preparations; for microbial disinfection of vegetable substances (spices) when used as ingredients in small amounts solely for flavoring/aroma; and for control of foodborne pathogens in certain fresh or frozen, uncooked poultry products.

FDA Labeling Requirements

FDA requires that treated products (other than spices) have a label statement which contains the international irradiation

process logo (tulip) and the statement "treated with radiation" or "treated by irradiation".

Department Role

The Department wound enforce the provisions of this bill on a complaint only basis. When a complaint was received, the alleged violation would be investigated through review of food products held at food distributors, warehouses and retail and wholesale outlets as appropriate. Product would be inspected for the federally required irradiation symbol and product statement. If irradiated food was found, the department would embargo the product under the authority of AS 17.20.230 and require that it be destroyed or returned to an out-of-state distributor.

John A. Sandor, Commissioner