

## Lecture 4 Managing Technological Dangers

### *Managing Technological Danger*

- *Expert Deployment*
- *Controlled Experimentation*
- *Public Education*
- *Limited Potency of Technology*
- *Minimize Environmental Release & Exposure*
- *Protect the Susceptible*
- *Compensate Those Harmed*

### Atomic Energy Act 1946

The Atomic Energy Act of 1946 emphasized the need for secrecy, raw materials, and production of new weapons.

The law granted the government the authority to maintain complete secrecy over the program.

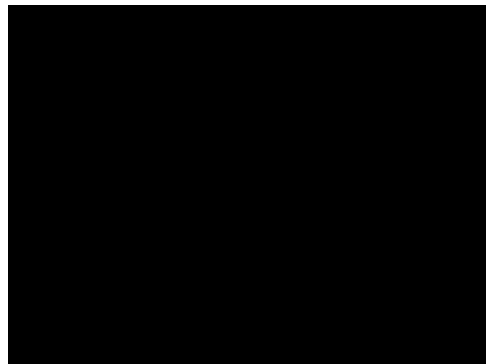
And it created a government monopoly over the technology.

All property rights to the knowledge, technology, and fuel sources were owned by the U.S.

It prohibited private, commercial application of atomic energy.

Finally, it created the five-member Atomic Energy Commission (AEC) to manage development of the technology.

### EFFECTS OF RADIATION



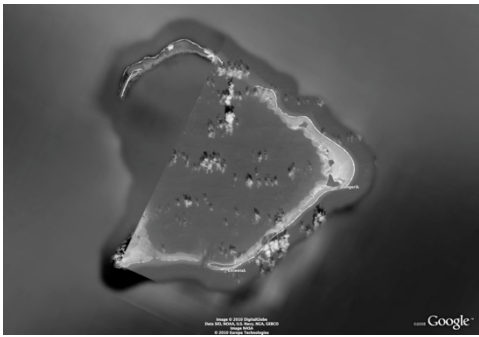


King Juda and wife Rachel on Bikini Atoll 1946  
photo courtesy of © Glenn A. Weichner



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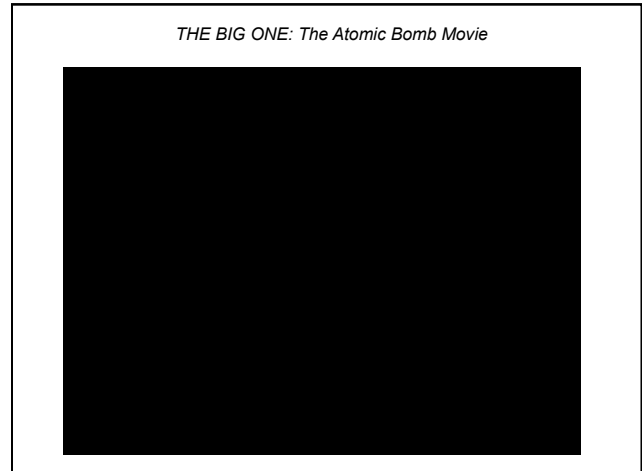
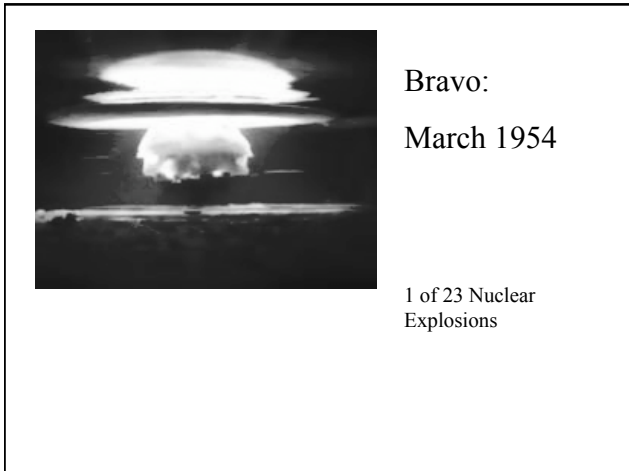
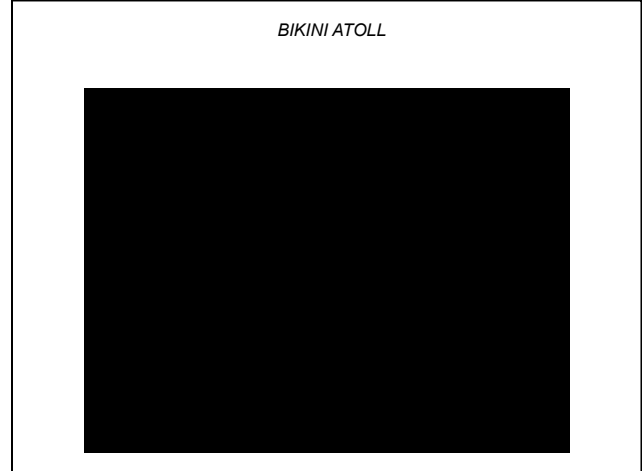
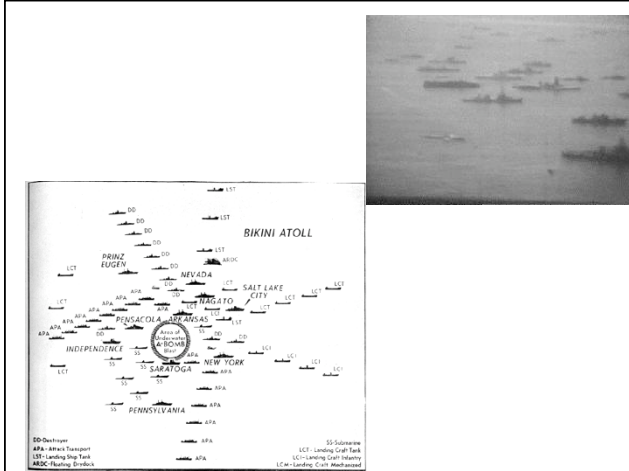
Bikinians Moved to Rongerik in 1946. Fires Destroyed Coconut Trees



Moved to Kwajalein in 1946...and then to Kili.

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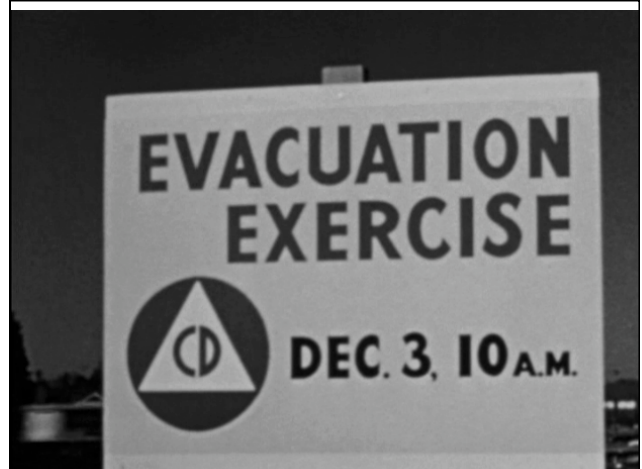
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## Connecticut Evacuation

- **All of Connecticut ordered evacuated by mistake. Feb 2, 2005.**
  - ASSOCIATED PRESS
- State police said they had received no calls related to the alert to evacuate Connecticut. NYT FEB 2, 2005



## Hurricane Katrina



## CUMULATIVE FORCE

Although the Bikinians were promised that only one or two tests would be conducted on their homeland island, more nuclear energy was eventually released there than any other site in human history.

The cumulative force of the bombs exploded was nearly 4 times the energy released in 928 tests conducted at the Nevada Test Site.

One Decade After the Bombing Ceased in 1958,

The Bikinians returned to their homeland.

•1973: House Appropriations Committee hearings:

- Cs137 Concentration Were 10 x 1970 levels
- Attributed to foods grown on island.

• Additional AEC Radiological Surveys

- Topsoil had been scraped off but underlying sands and water were contaminated, leading to plant absorption of Sr & Cs.

• 1978: Body Burdens exceeded maximum permissible level.

• Bikini Residents Were Again Relocated to Kili Island.

### *Conflicting Interpretations of Risk:*

#### *Dualing Experts*

US Nuclear Regulatory Commission reduced the radiation dose of the inhabitants by averaging in the population less exposed.

This is like telling one smoking member of a family his or her risk of lung cancer is lowered if the other nonsmoking members of the family are included and an average risk is given. It is a scientifically ridiculous approach to public health.

Dr. Rosalie Bertell NRC. 1979.

### *GAO Report 1979: Restrict Access*

Return of former residents could expose them to dangerous levels of radiation, despite \$100 million spent to clean up the atoll.

*DOE: 1980*

Bikinians Could Return to Eneu Island in the Bikini Atoll...

If....

- They ate no more than 50% of locally grown foods
- And spent no more than 10% of their time on Bikini Island.

Pero Joel: 1989 Reflecting on 2<sup>nd</sup> Exodus from Bikini

- ❖ Finally, the Americans and their scientists came back a few years later saying that we had to leave Bikini.
- ❖ They said we had ingested too much poison and that it wasn't safe to live on Bikini anymore.
- ❖ We didn't care at this point because we had already started to get that hopeless feeling again; though because we all wanted to stay on Bikini we did explore all possibilities in an attempt to find a way out of this problem.
- ❖ We kept thinking, 'The Americans first told us that it was safe to live here. Then they changed their minds and made some rules for us to follow. Now they are telling us to leave. Should we go?'

*Thyroid Disease on Rongelap*

*(120 mi E of Bikini)*

More than 1/3 of all residents have thyroid disease.

19 of 21 Children Developed thyroid disease.

*Remedies for Those Exposed?*

- *Litigation*
- *Financial Compensation*
- *Financial Support*
- *Community Development*
- *Medical Monitoring & Treatment*
- *Restoration Costs*

### The Resettlement Trust Fund for the People of Bikini

- \$20 million entitled, later supplemented with \$90 million in additional funds to provide for a cleanup of Bikini and Eneu islands of Bikini Atoll.
- These funds are also used for construction and resettlement activities for Bikinians living on Kili Island and Majuro Atoll, including Ejit Island. A typical fiscal year budget ranges from between \$7 million and \$10 million.

### The Bikini Claims Trust Fund (U.S. Public Law #99-239).

- The Bikini Claims Trust Fund is currently worth approximately \$54 million [31 October 2004].
- This trust fund will exist in perpetuity and shall continue to provide the Bikinians with an annual payment of 70% of the income from the trust.



Navy cleanup of the Prinz Eugen in an attempt to reduce radiation levels after the July 25, 1946, nuclear test blast at Bikini Atoll in the Marshall Islands. Photo by U.S. Naval Institute

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33,000 Protesters Over City's Redevelopment Plan for 1400 acres.

*Downwinders.*

\$50,000 is available to an eligible individual who was physically present in one of the affected areas downwind of the Nevada Test Site during a period of atmospheric nuclear testing, and later contracted a specified compensable disease.

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## Radiation Exposure Compensation Act 1990

- Providing for compassionate payments to individuals who contracted certain cancers and other serious diseases as a result of their exposure to radiation released during above-ground nuclear weapons tests or as a result of their exposure to radiation during employment in underground uranium mines.

## Effective Radiation Dose: 1951-1962

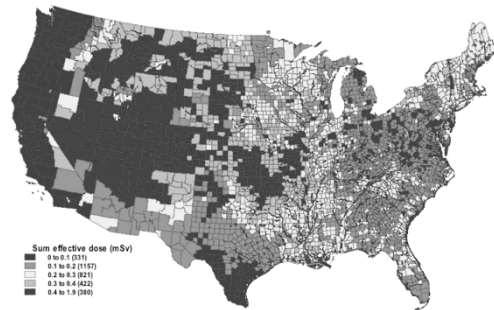


Fig. 26. Map of the effective dose by geographical area for the tests conducted from 1951 through 1962.

### ***Onsite Participants:***

*Nevada, Pacific, Trinity, or South Atlantic Test Sites*

A payment of \$75,000 is available to eligible individuals who participated onsite in a test involving the atmospheric detonation of a nuclear device, and later developed a specified compensable disease.



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## *Uranium Miners, Millworkers & Ore Transporters*

\$100,000 is available to eligible individuals employed in aboveground or underground uranium mines

If mines were located in Colorado, New Mexico, Arizona, Wyoming, South Dakota, Washington, Utah, Idaho, North Dakota, Oregon, and Texas

Any time during the period beginning on January 1, 1942, and ending on December 31, 1971.

| Claim Type Desc    | Approved      | \$ Approved            | Denied       | Total         |
|--------------------|---------------|------------------------|--------------|---------------|
| Downwinder         | 12,793        | \$639,620,000          | 3,498        | 16,683        |
| Onsite Participant | 1,274         | \$91,058,476           | 1,527        | 2,849         |
| Uranium Miner      | 4,989         | \$498,174,560          | 2,979        | 8,112         |
| Uranium Miller     | 1,204         | \$120,400,000          | 319          | 1,562         |
| Ore Transporter    | 246           | \$24,600,000           | 95           | 347           |
| <b>Total:</b>      | <b>20,506</b> | <b>\$1,373,853,036</b> | <b>8,418</b> | <b>29,553</b> |

## *Environmental and Health Lessons from Nuclear Weapons Testing*

- *Persistence: Half life & Residency*
- *Movement: Atmosphere, Oceans, Water, Soils..*
- *Fate: Human Tissues*
- *Effects: Thyroid, Cancer, Heritable Mutations*
- *Dose Response*
- *Susceptibility*
- *Surveillance*



*Nuremberg Trial 1946*

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*23 Medical Doctors on trial for murder, torture and other atrocities performed in the name of medical science in concentration camps.*

*American Medical Association Guidelines*

- *Voluntary and Understanding Consent of Subject*
- *Prior Animal Experimentation*
- *Appropriate Medical Supervision*



Isotope Injections at Brookhaven National Lab

***Government Funded  
Human Experiments***

Between 1944 and 1974 the AEC/DOE sponsored pediatric research with radioactive compounds to better understand children's physiology, pathology, and diagnostic technology.

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81 studies involved children's participation in radiation research.

21 studies supported by federal funds were determined to be "non-therapeutic"...no benefit to the participating child could possibly result.

***AEC Medical Advisor:***

*Recommending suppression of evidence of plutonium injections...*

"There are a large number of papers that do not violate national security, but do cause considerable concern.

"Papers referring to levels of soil and water contamination surrounding AEC installations, idle speculation on the future genetic effects of radiation and papers dealing with potential process hazards to employees are definitely prejudicial to the best interests of the government.

" Every such release is reflected in an increase in insurance claims, increased difficulty in labor relations and adverse public sentiment. "

Vanderbilt Hospital Nashville Tennessee  
1945-1947

829 pregnant women  
fed radioactive tracer cocktails

University of Tennessee College of  
Medicine, and the John Gaston Hospital

In 1951, two African American women, ages 22 and 33 years old were administered  $I^{131}$ , while nursing infants 4 months in age.

Both mothers had been diagnosed with thyroid disease.

The infants continued to nurse, and the levels of  $I^{131}$  were monitored in the mothers breast milk and thyroid, and the infants thyroid.

The infants accumulation of  $I^{131}$  in their thyroids was significant, prompting the researchers to warn against the administration of  $I^{131}$  to lactating women.

## Harvard, BU and Mass General:

Experiment on “mentally retarded children” in 1961 at the Wrentham State School.

The experiment was designed to understand whether non-radioactive iodine could block thyroid uptake of radioactive  $I^{131}$ .

## *NIH, AEC & Quaker Oats Inc.*

Students living at the Walter E. Fernald School, a Massachusetts institution for “mentally retarded” children were fed breakfast food containing radioactive iron and calcium.

Research, designed to understand how the body absorbs iron, calcium, and other minerals from dietary sources and to explore the effects of various compounds in cereals on mineral absorption.

Nine boys between 10 and 15 years in age, and one 21 year old served as subjects. They were divided into two groups, the first receiving an intravenous injection of  $Ca^{45}$ , while the others received it orally in the breakfast cereals.

Several letters were sent to the parents of students, who would become members of the “Science Club” if they agreed to participate

Dear Parent:

In previous years we have done some examinations in connection with the nutritional department of the Massachusetts Institute of Technology, with the purposes of helping to improve the nutrition of our children and to help them in general. For the checking up of the children, we occasionally need to take some blood samples, which are then analyzed. The blood samples are taken after one test meal which consists of a special breakfast meal containing a certain amount of calcium. We have asked for volunteers to give a sample of blood once a month for three months, and your son has agreed to volunteer because the boys who belong to the Science Club have many additional privileges. They get a quart of milk daily during that time, and are taken to a baseball game, to the beach and to some outside dinners and they enjoy it greatly. I hope that you have no objection that your son is voluntarily participating in this study. The first study will start on Monday, June 8th, and if you have not expressed any objections we will assume that your son may participate.

Sincerely yours,

Clemens E. Benda, M.D.

Clinical Director and

Malcom J. Farrell, M.D.

Superintendent

## Secrecy & Risk Assessment

- "As the secrecy system took hold, it prevented American government from accurately assessing the enemy and then dealing rationally with them..."

## Clinton Era Reforms

- President Clinton's 1995 EO on declassification
- 400 million pages of records were declassified between 1990-2000.
- 20 percent or so reduction in the total backlog.
- However new declassification programs have been initiated in CIA, the National Security Agency, and the National Reconnaissance Office.

## DOE Reforms

- Former Energy Secretary Hazel O'Leary undertook her "openness initiative" in 1993.
- Resulted in the recent declassification of some 70 categories of information previously restricted under the Atomic Energy Act.
- In 5 years, DOE declassified more information than during the previous five decades combined.

## National Security Administration

- Largest Intelligence Agency in World
- Exempt from FOIA.
- Recent request for intelligence budget information for 1947 rejected as a threat to national security.
- Secret Programs: \$23.2 billion: 17% Pentagon's total budget for 2004.

## *Concluding Thoughts*

- *Secrecy is a Form of Control or Regulation*
- *Concentrates Knowledge Among Those with Authority and Power*
- *Secrecy Inhibits Public Intelligence*
- *Undermines Democracy*
- *Secrecy Prevents Accountability*
- *Secrecy Breeds Clandestine Surveillance: And Normally Invades Privacy*
- *May Restrict Individual Liberty—Limit Rights (e.g. 911 detainees)*
- *Enhances the Persuasive Power of Elites: Provides Narrative Advantage*
- *Secrets Turn Information into a Commodity of Great Value: Property*
- *..Yet Their Value Limits their Lifespan....*

*Forms of Social Control*

*Authority: Law and Regulation*

*Markets*

*Persuasion*

*Charismatic Leadership*

*Knowledge*

*Secrecy*

*When is Secrecy Justified?*