



CNEN

NUCLEAR POWER AND PUBLIC OPINION

Comunicação e interação com a sociedade

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Nuclear Energy National Commission - Brazil

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The CIS Project – Communication and Interaction with Society

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Public Acceptance

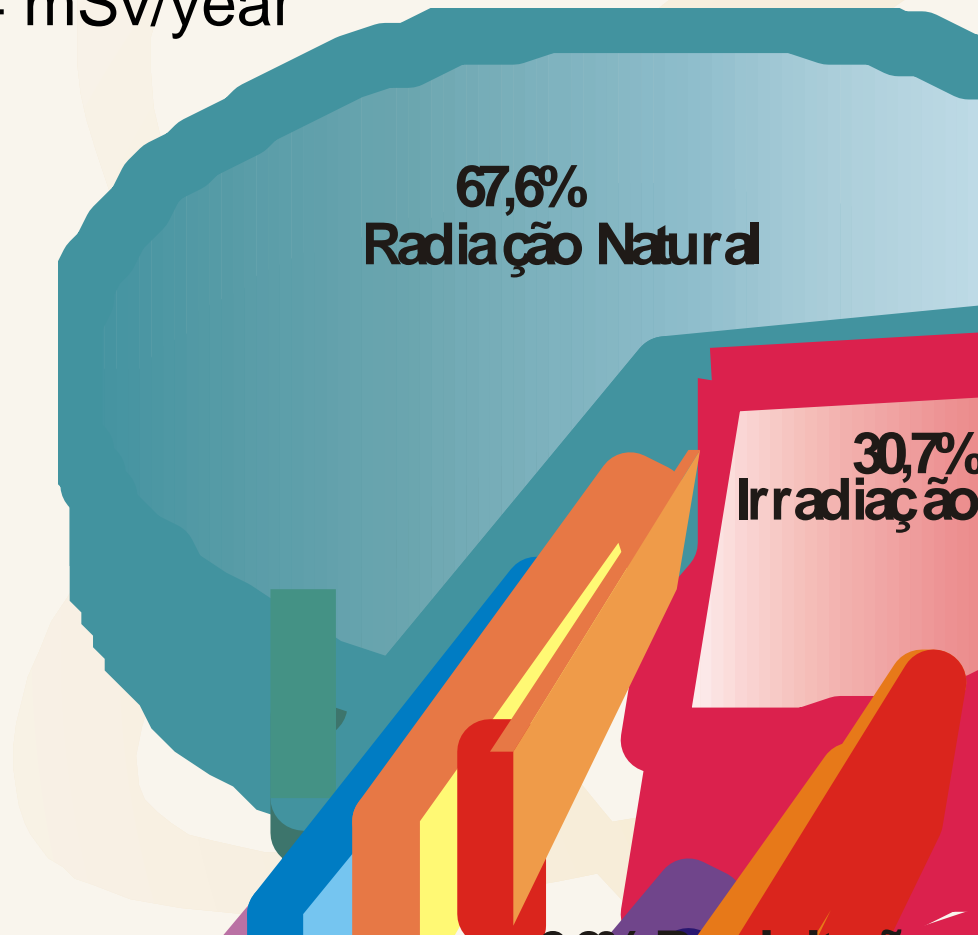
Summary

- Reasons for nuclear energy be rejected
- Public communication in the process of definition of a site for radioactive waste repository
- Public communication in crisis situation

Risk Perception about the nature of ionizing radiation

Sources of Ionizing Radiation

Average dose from natural sources = 2,4 mSv/year



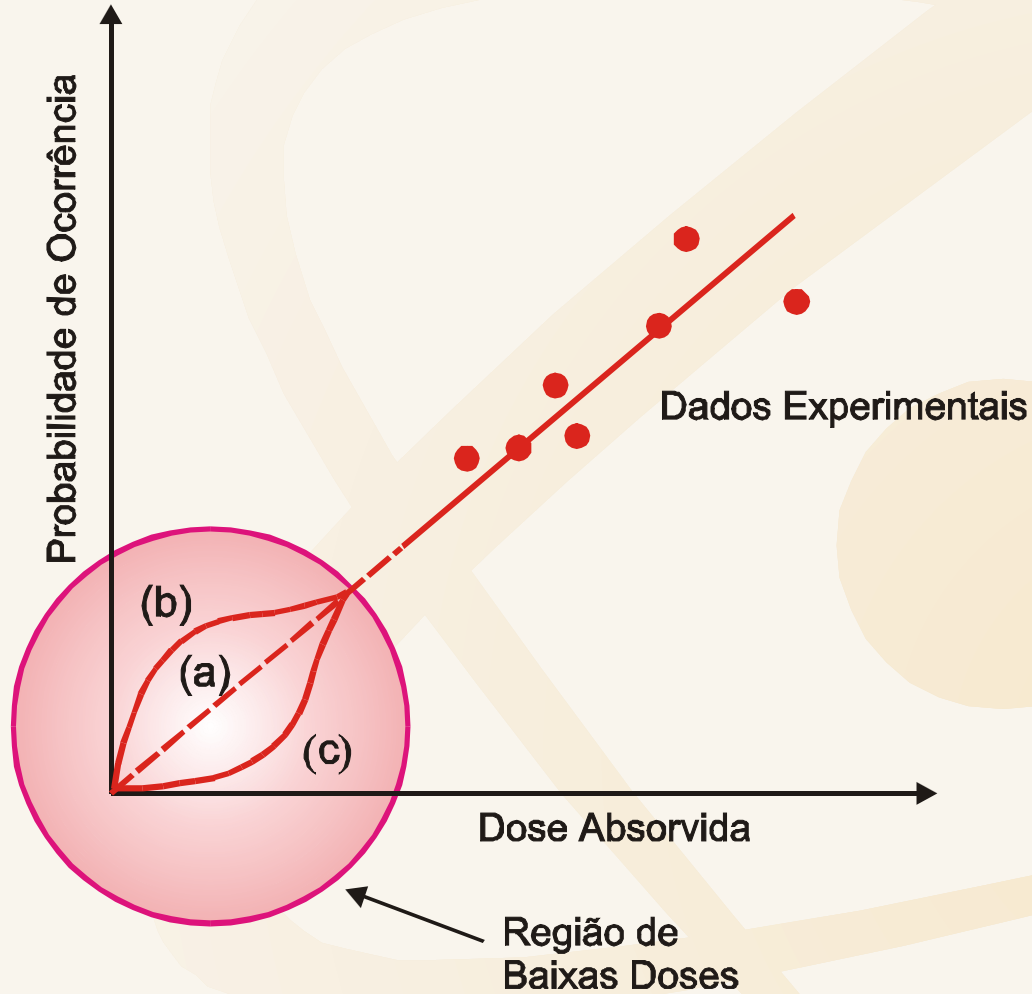
The senses and the ionizing radiation

Ionizing radiation is:

- **invisible (sight)**
- **odorless (smell)**
- **insipid (taste)**
- **inaudible (hearing)**
- **painless (touch)**

This contributes to affect the risk perception

Low Doses



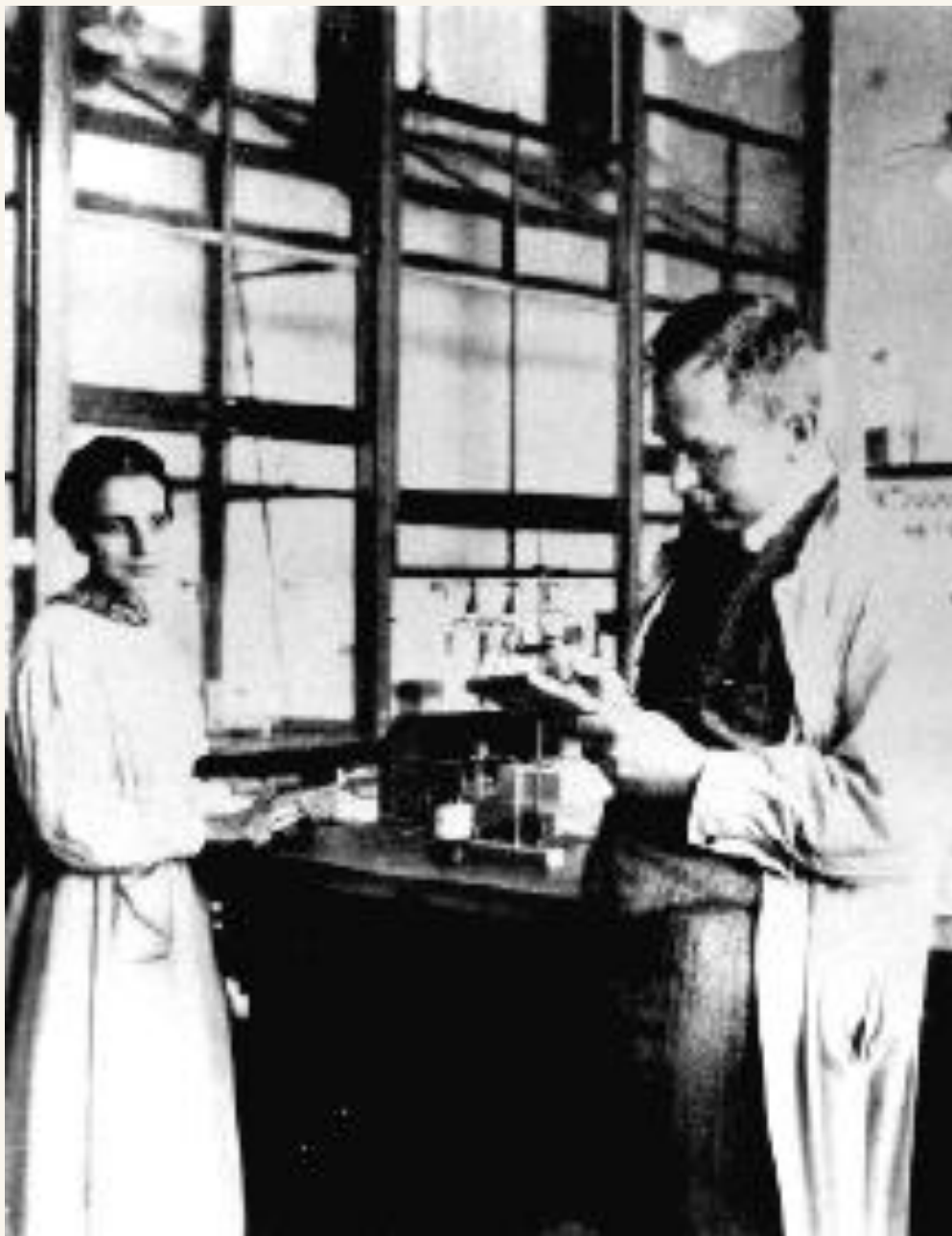
Accidents caused by Radiation

- Most of the situations: the victim do not realize that suffered irradiation.
- Acute radiation syndrome is similar to several ill symptoms that can affect human body
- Even low doses can (have probability of) cause cancer and leukemia.
- The biological effects of exposition to radiation, when they happen, can appear several years after the exposition.

All of these contributes to affect the risk perception => FEAR

Risk Perception linked to Weapons and Political Issues

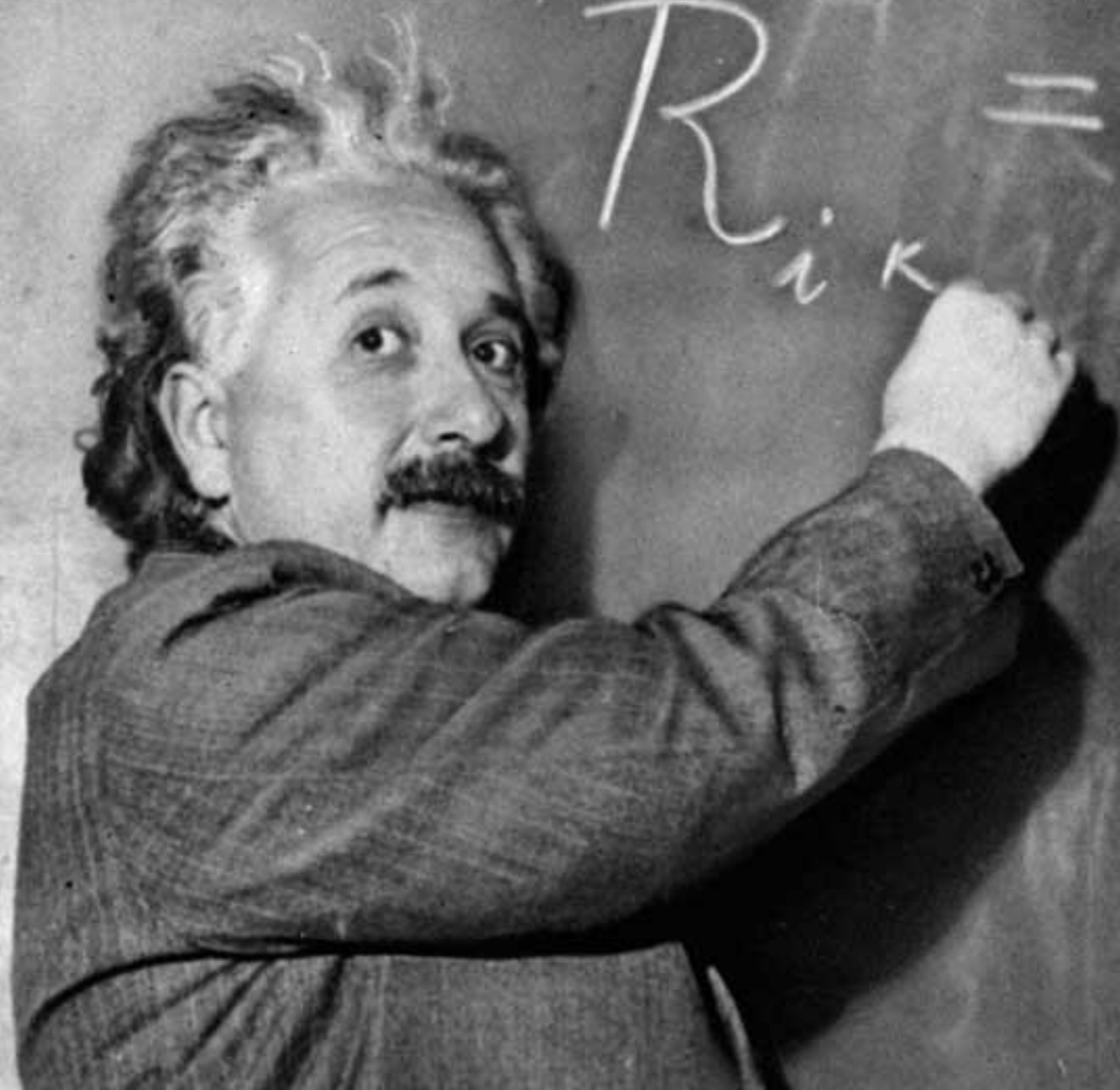




**Otto Hahn &
Lisa Meitner**



**Leonard
Szilard**



$$R_{ik} = 0$$

Albert Einstein
Old Grove Rd.
Nassau Point
Peconic, Long Island

August 2nd, 1939

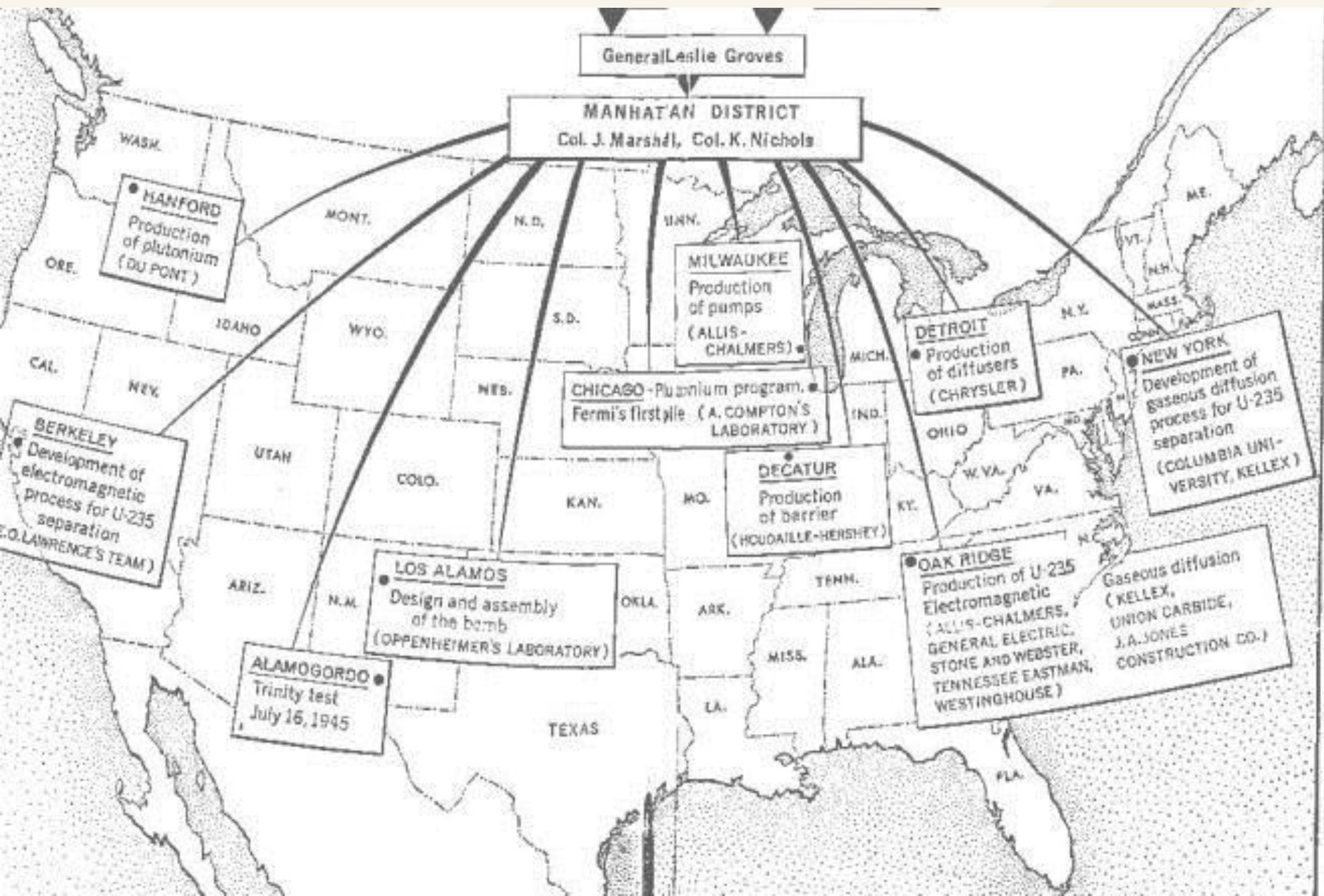
F.D. Roosevelt,
President of the United States,
White House
Washington, D.C.

Sir:

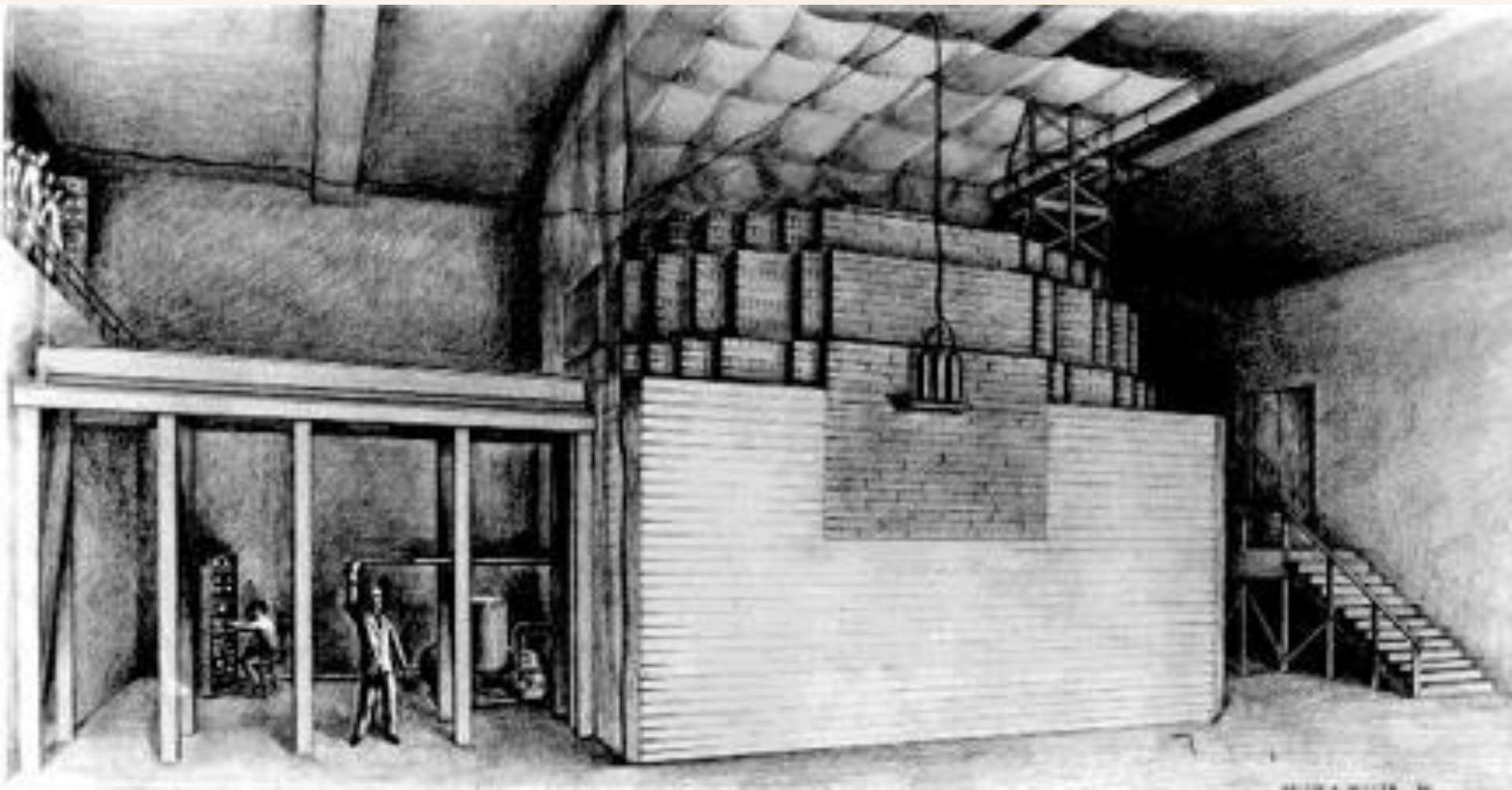
Some recent work by E.Fermi and L. Szilard, which has been communicated to me in manuscript, leads me to expect that the element uranium may be turned into a new and important source of energy in the immediate future. Certain aspects of the situation which has arisen seem to call for watchfulness and, if necessary, quick action on the part of the Administration. I believe therefore that it is my duty to bring to your attention the following facts and recommendations:

In the course of the last four months it has been made probable - through the work of Joliot in France as well as Fermi and Szilard in America - that it may become possible to set up a nuclear chain reaction in a large mass of uranium, by which vast amounts of power and large quantities of new radium-like elements would be generated. Now it appears almost certain that this could be achieved in the immediate future.

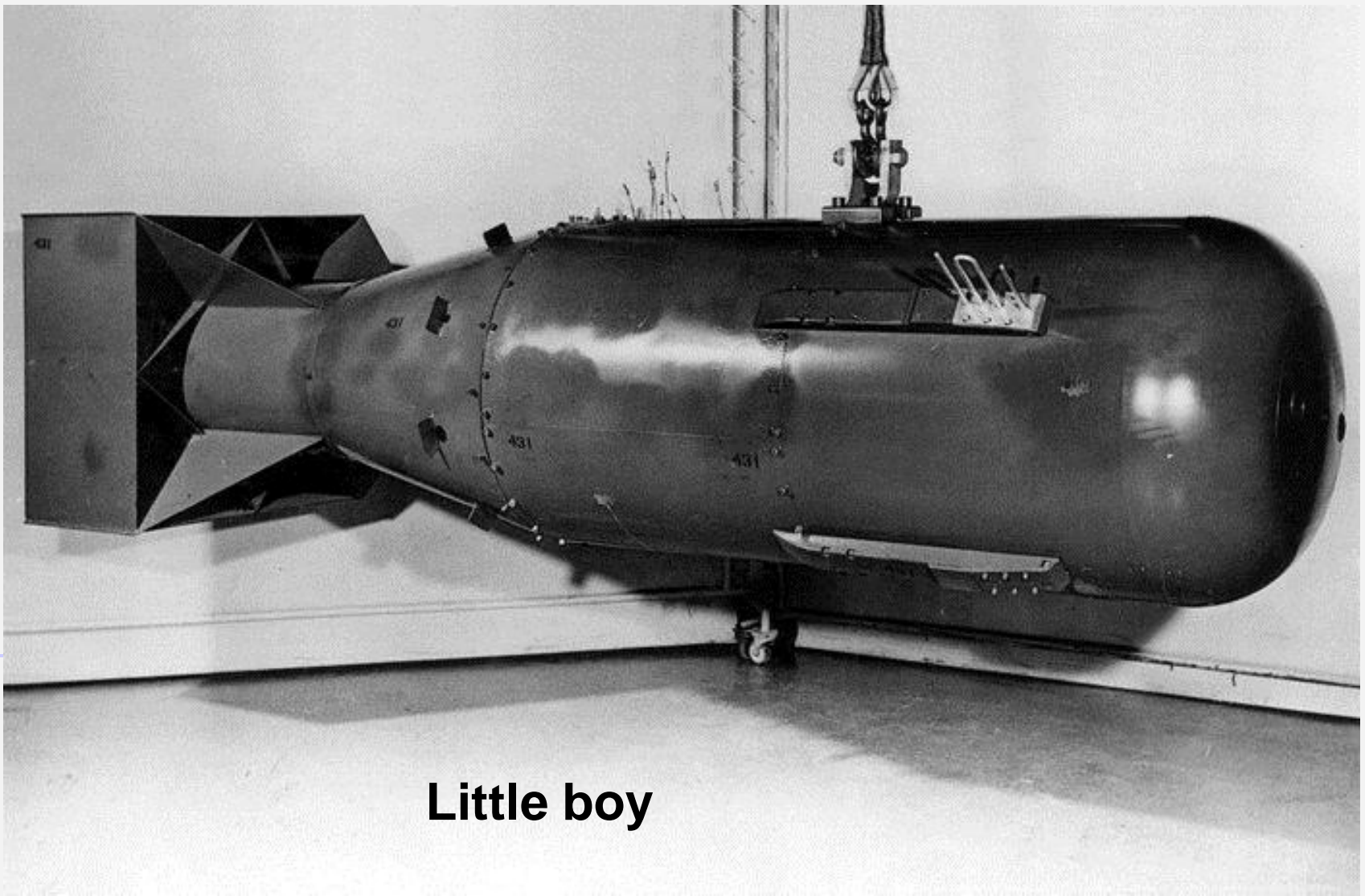
This new phenomenon would also lead to the construction of bombs, and it is conceivable - though much less certain - that extremely powerful bombs of a new type may thus be constructed. A single bomb of this type, carried by boat and exploded in a port, might very well destroy the whole port together with some of the surrounding territory. However, such bombs might very well prove to be too heavy for transportation by air.



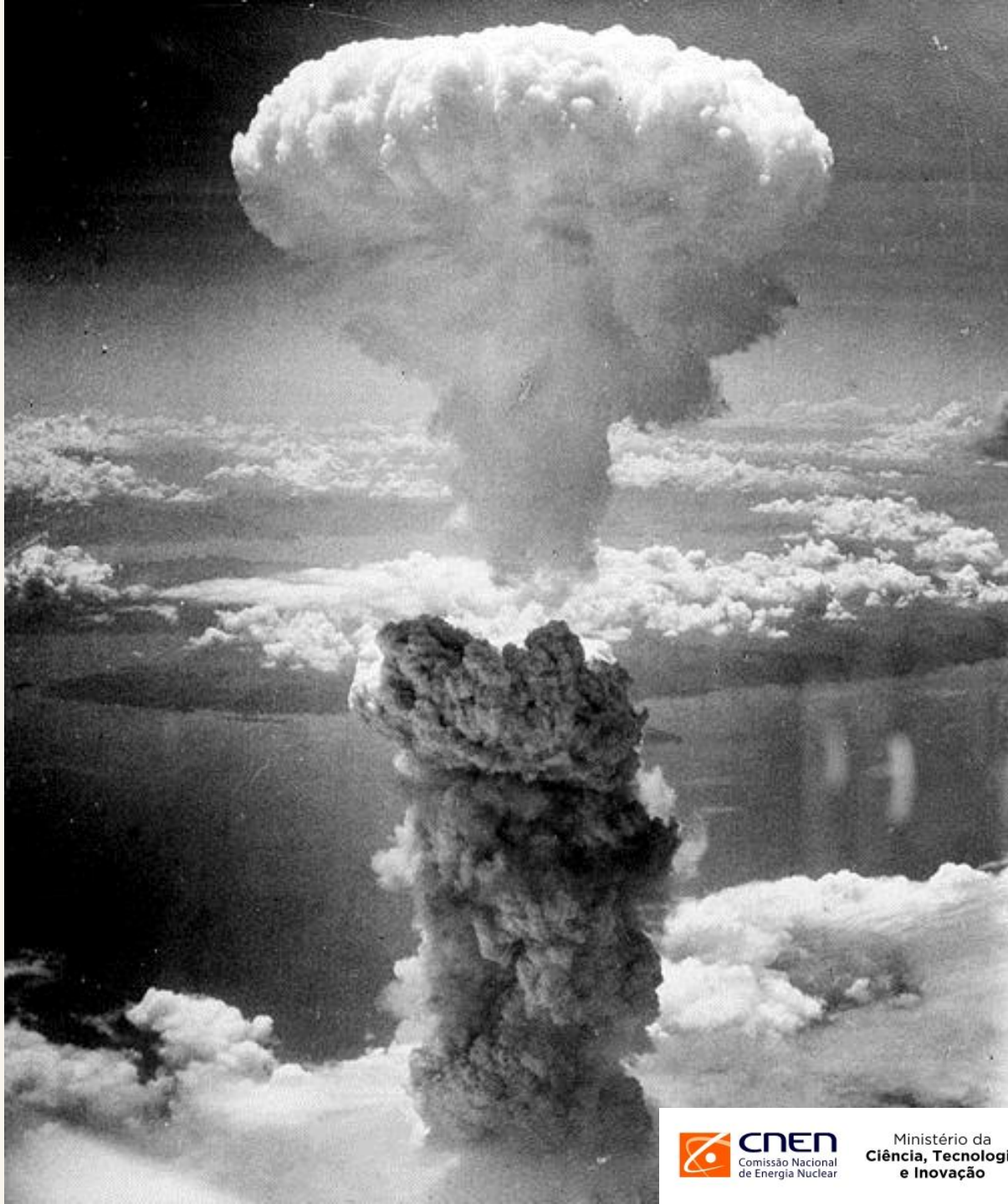
1942: Fermi's atomic pile



1945: The atomic bombs

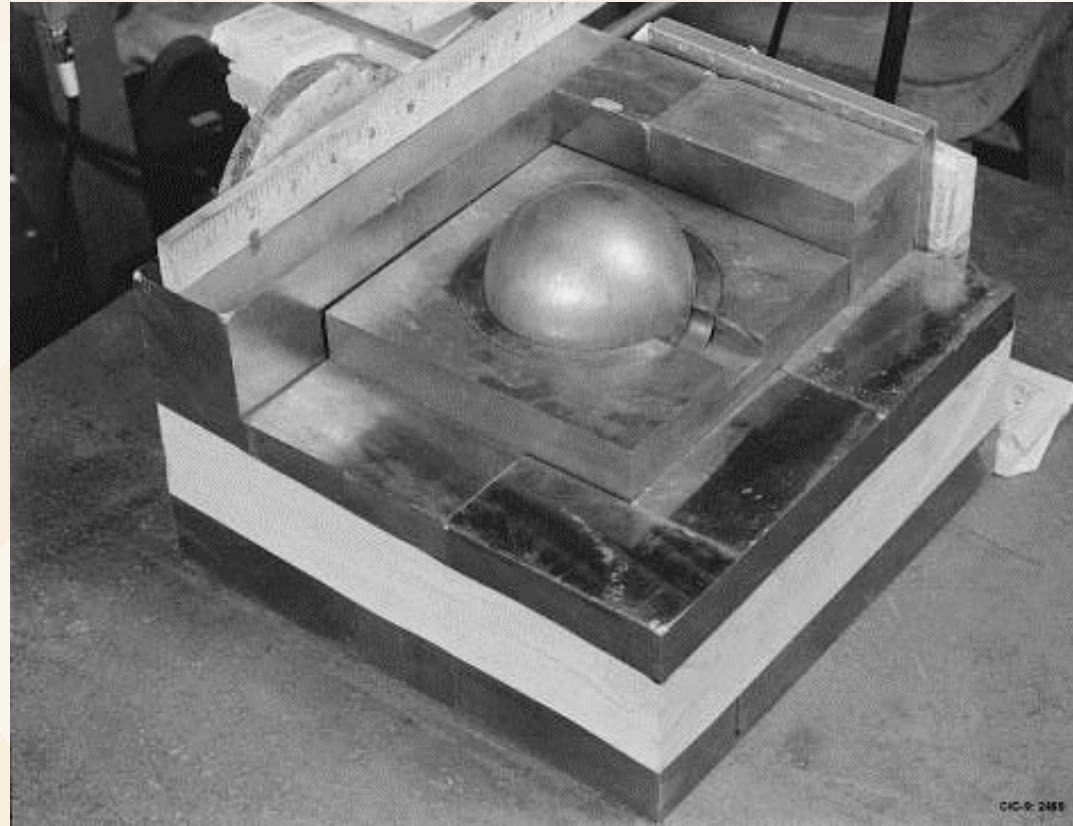


Little boy



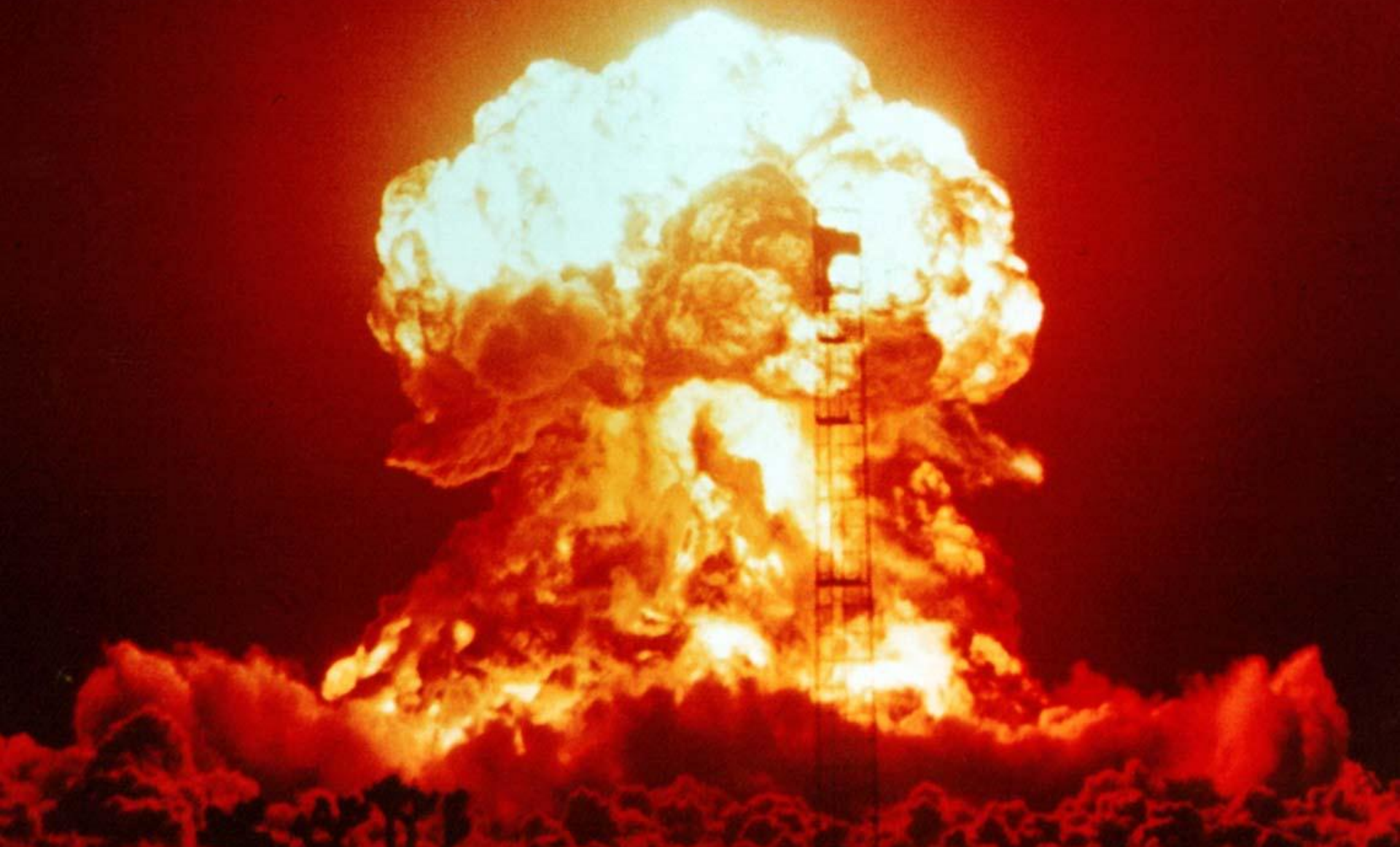
The Plutonium

Naturally-occurring radium is about 200 times more radiotoxic than plutonium, and some organic toxins like Botulism toxin are billions of times more toxic than plutonium.



Demon Core

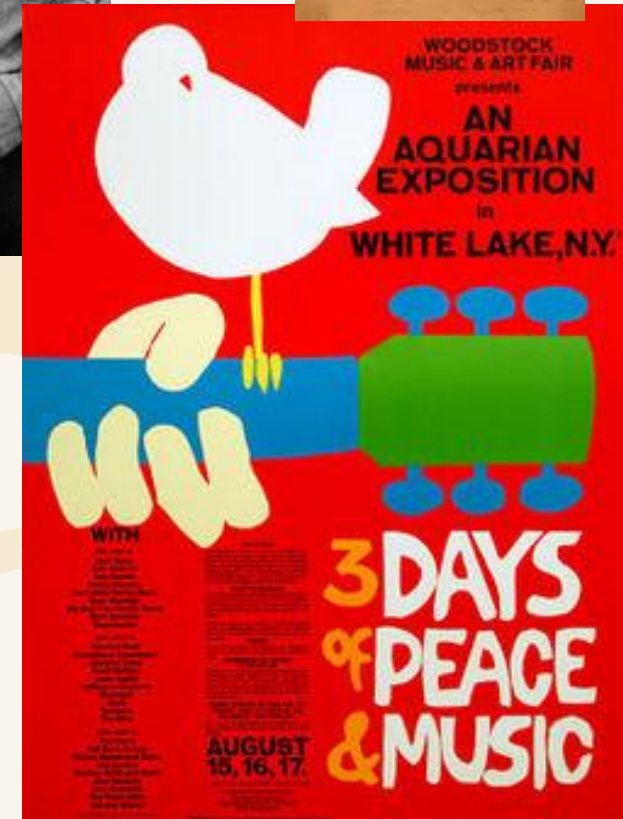
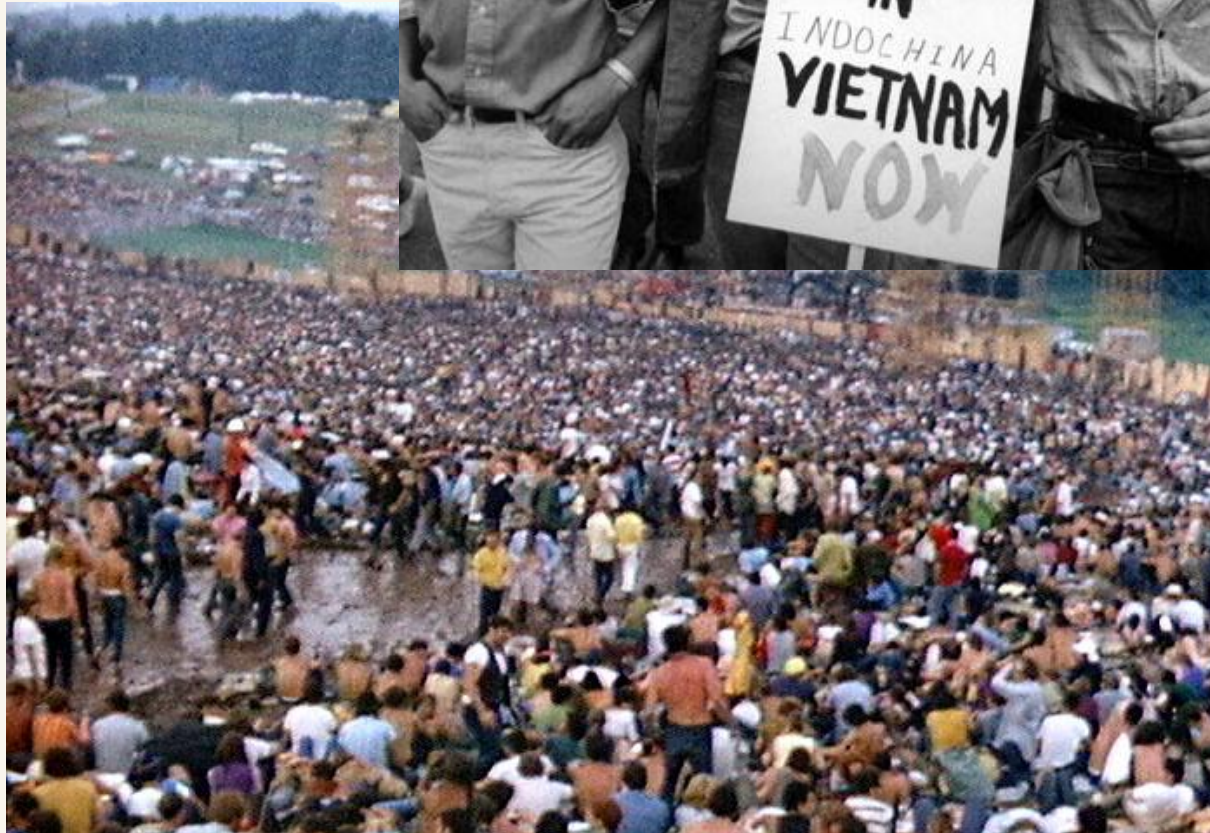
1952- The first thermonuclear bomb



1962 - Cuba missiles crisis



Late 1960's - Movement for peace in the USA

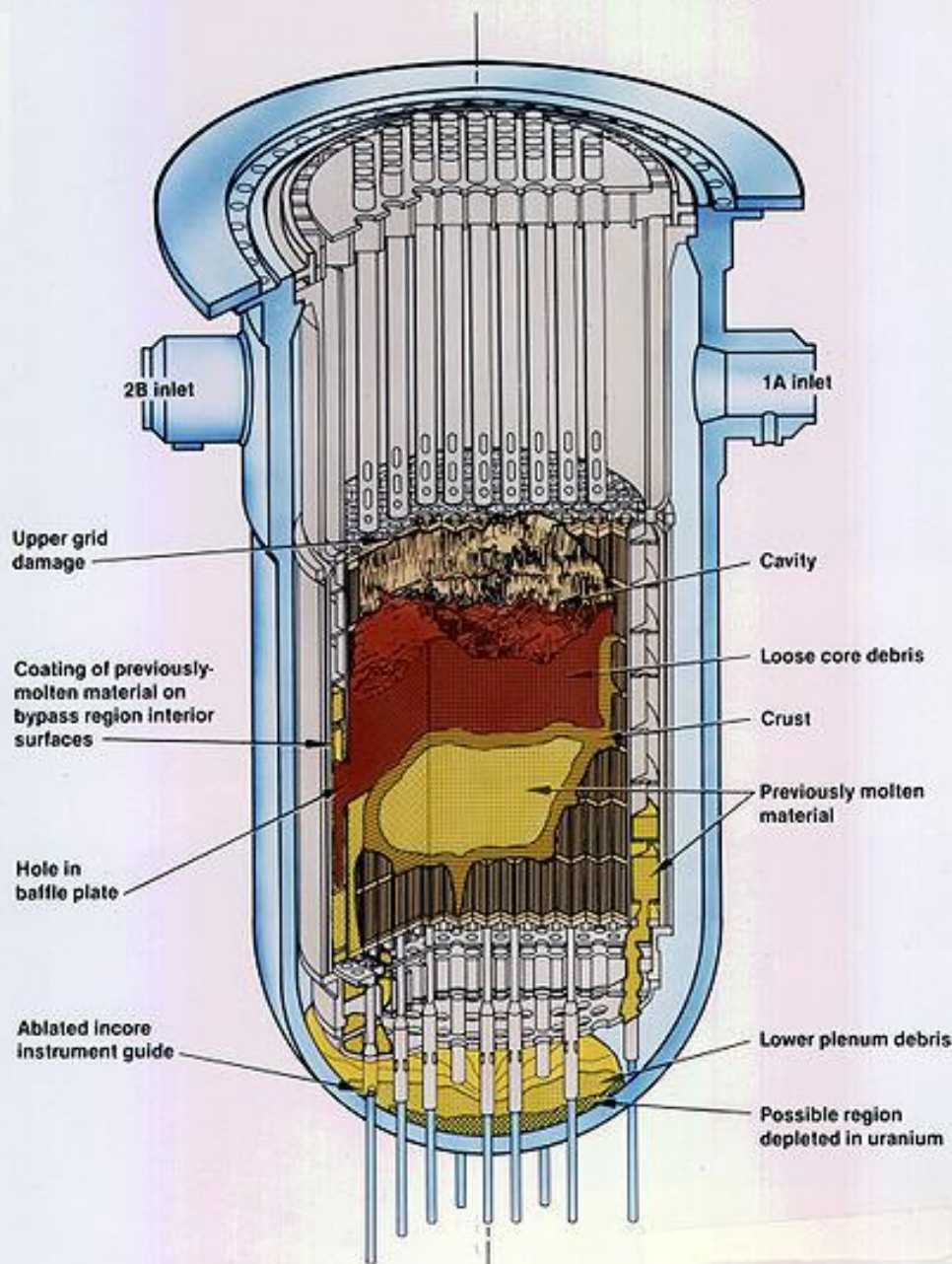


Risk Perception linked to Nuclear and Radiological Accidents

1979: Three Mile Island's Accident



TMI-2 Core End-State Configuration



1979: Three Mile Island's Accident



1986: Chernobyl's accident



1986: Chernobyl's accident



1986: Chernobyl's accident



1986: Chernobyl's accident



1987: Cs-137 Goiania's accident



1986: C-137 Goiania's accident



Decontamination work



2001: September 11th



2011: Fukushima



2011: Fukushima



2011: Fukushima



2011: Fukushima



2011: Fukushima



2011: Fukushima



2011: Fukushima



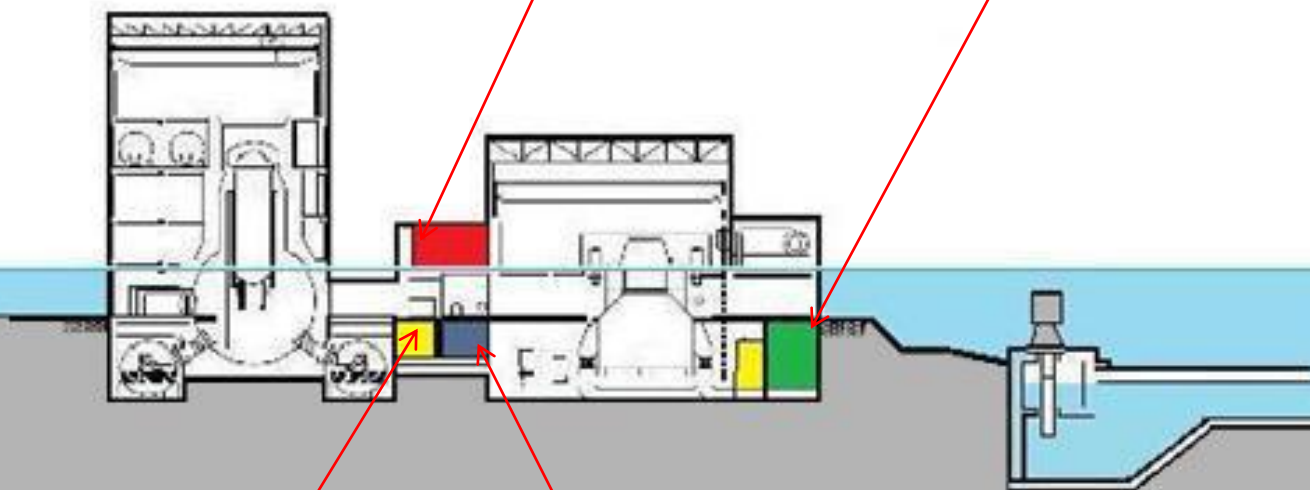
2011: Fukushima



2011: Fukushima

Sala de controle

Geradores diesel



Switchgear

Sala de baterias

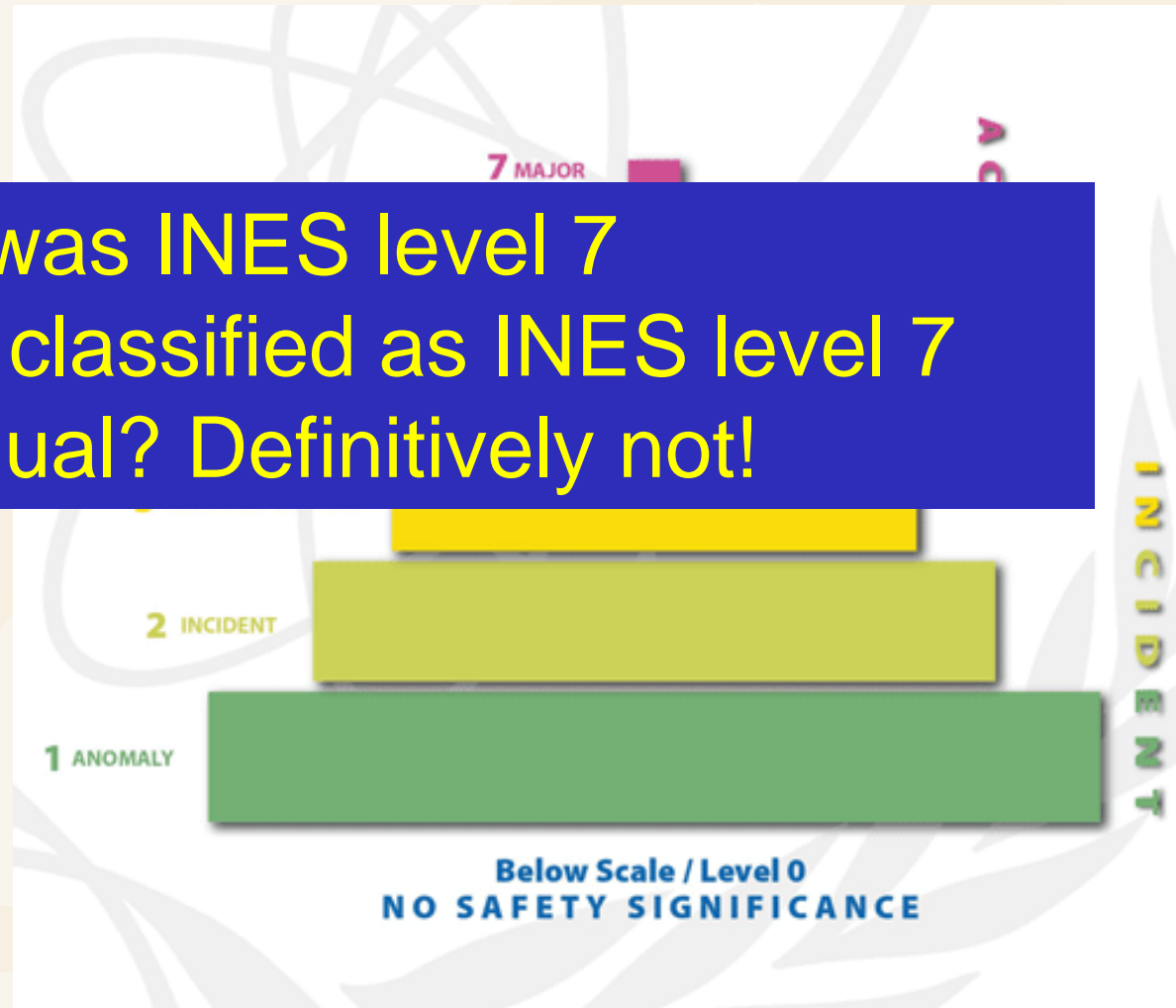
INES Index failure for Fukushima's accident

International Nuclear Event Scale is a tool for promptly communicating the public about the consistency of safety of reported nuclear and radiological incidents and accidents,

Chernobyl was INES level 7

Fukushima classified as INES level 7

Are they equal? Definitely not!



Economical Interests

Economical Interests

Protecting Mining Jobs and Communities



A message from Australia's coal miners

Climate change is real and we need a Government that will tackle it.
Doing nothing is no longer an option.

Voters have a choice at the election:

Labor

- ☒ Support \$1.5 billion investment in Clean Coal Technology
- ☒ No nuclear power station

Coalition

Continue to neglect Clean Coal Technology
Develop nuclear power stations that would replace the coal industry.

It's a simple choice. Vote to protect coal industry jobs and our local communities.

Nuclear Power Will Kill the Coal Industry

If you care about mining industry jobs and local communities don't support the Liberal and National parties' plans to introduce nuclear power stations.

Going nuclear is dangerous and will mean the end of our coal industry. Choose a party that will help clean up the coal industry not destroy it.



Difficulties in Communication

Problems in explaining

Many quantities: dose, absorbed dose, effective dose, equivalent dose, dose equivalent, total dose, activity, etc.

Many units: gray, sievert, becquerel, rad, rem, curie.

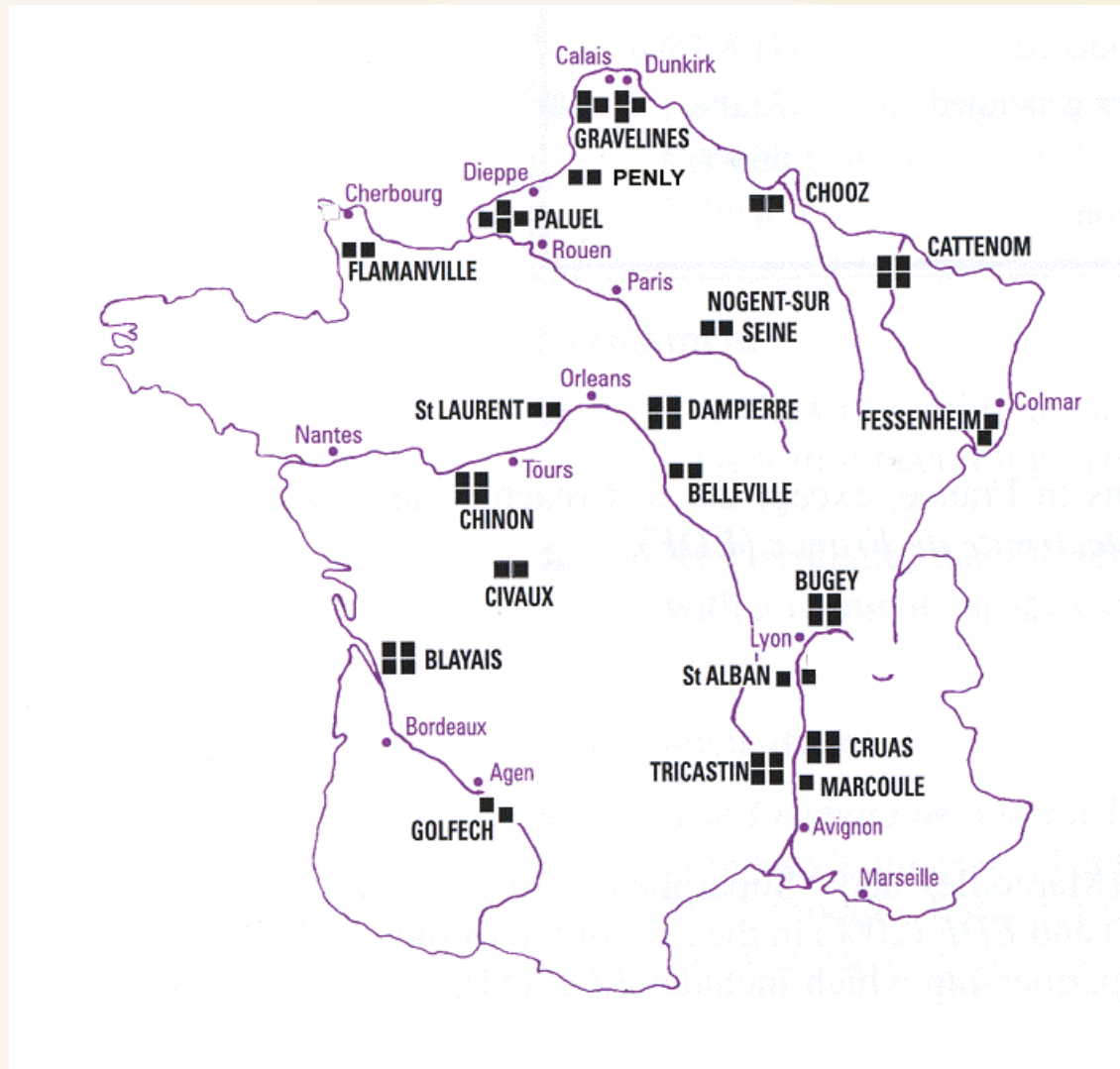
Time relation: /sec, /hour, /month, /year, /life.

Multiples and submultiples: tera, nano, kilo, mili, micro, etc.

Nuclear Power Plants in USA



Nuclear Power Plants in France

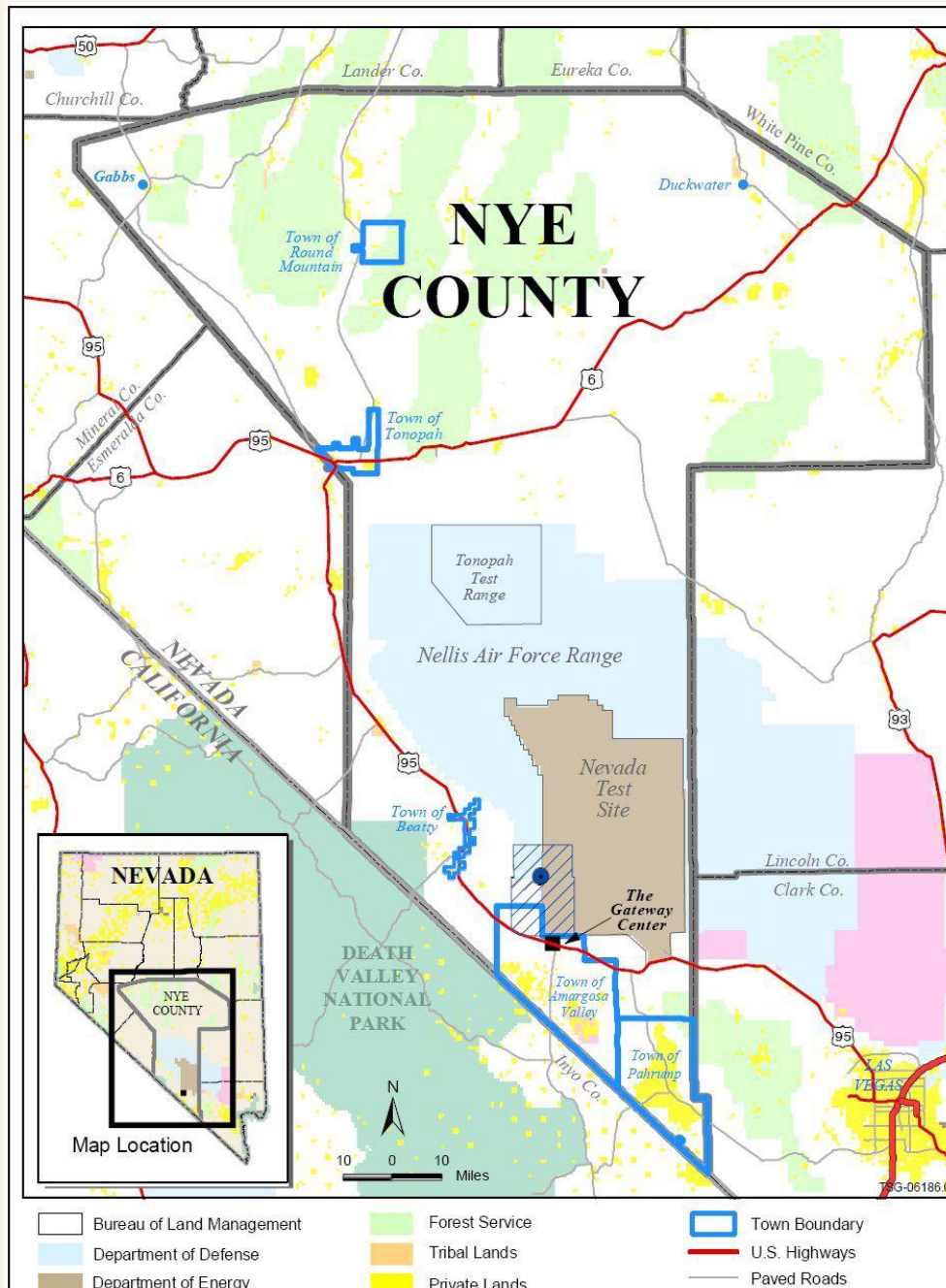


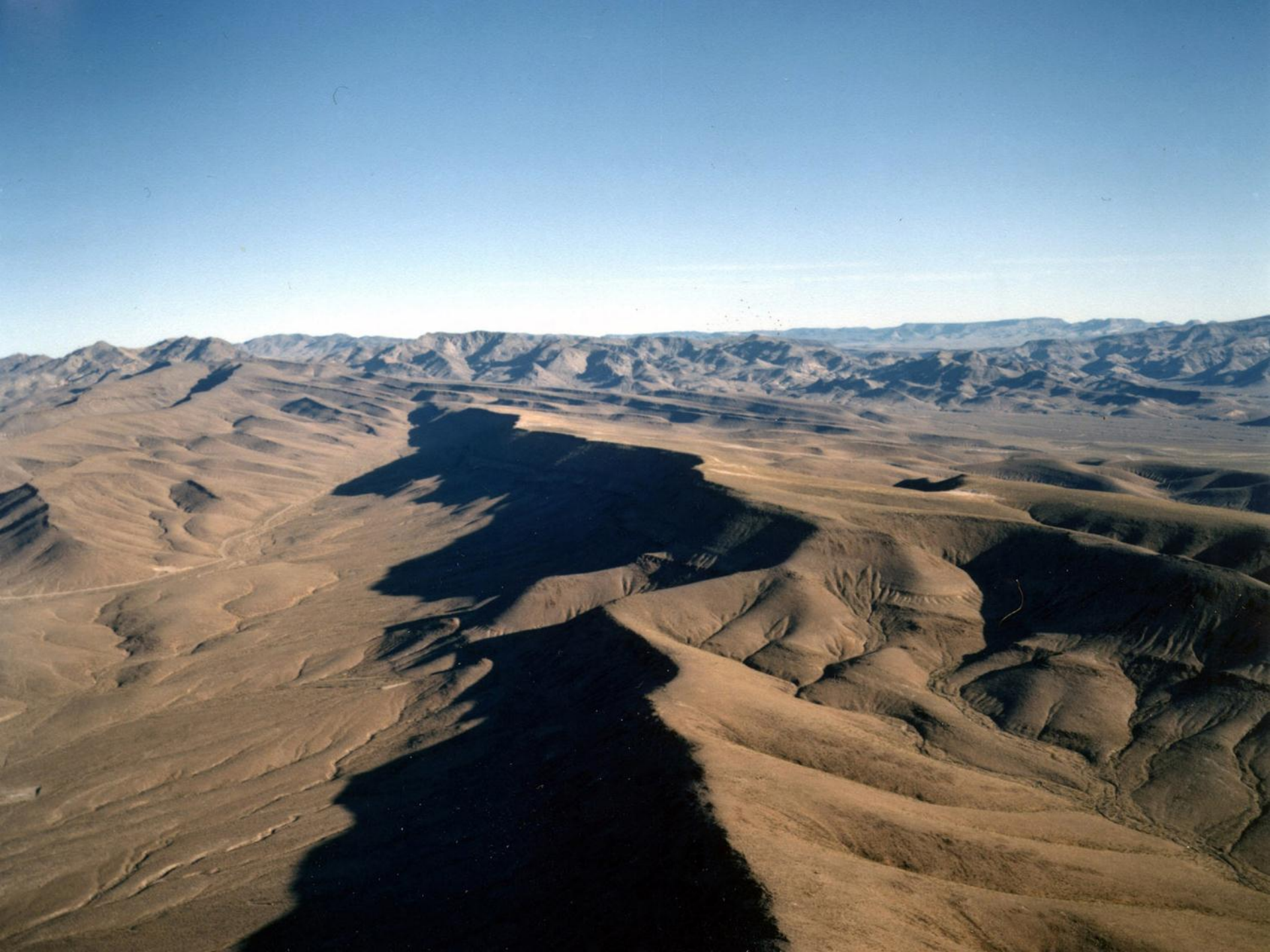
Summary – Reasons of rejection of nuclear energy

- Risk Perception about the nature of radiation
- Risk Perception linked to Bombs and Political Issues
- Risk Perception linked to Nuclear and Radiological Accidents
- Economical Interests
- Difficulties in communication of a complex system to lay persons.

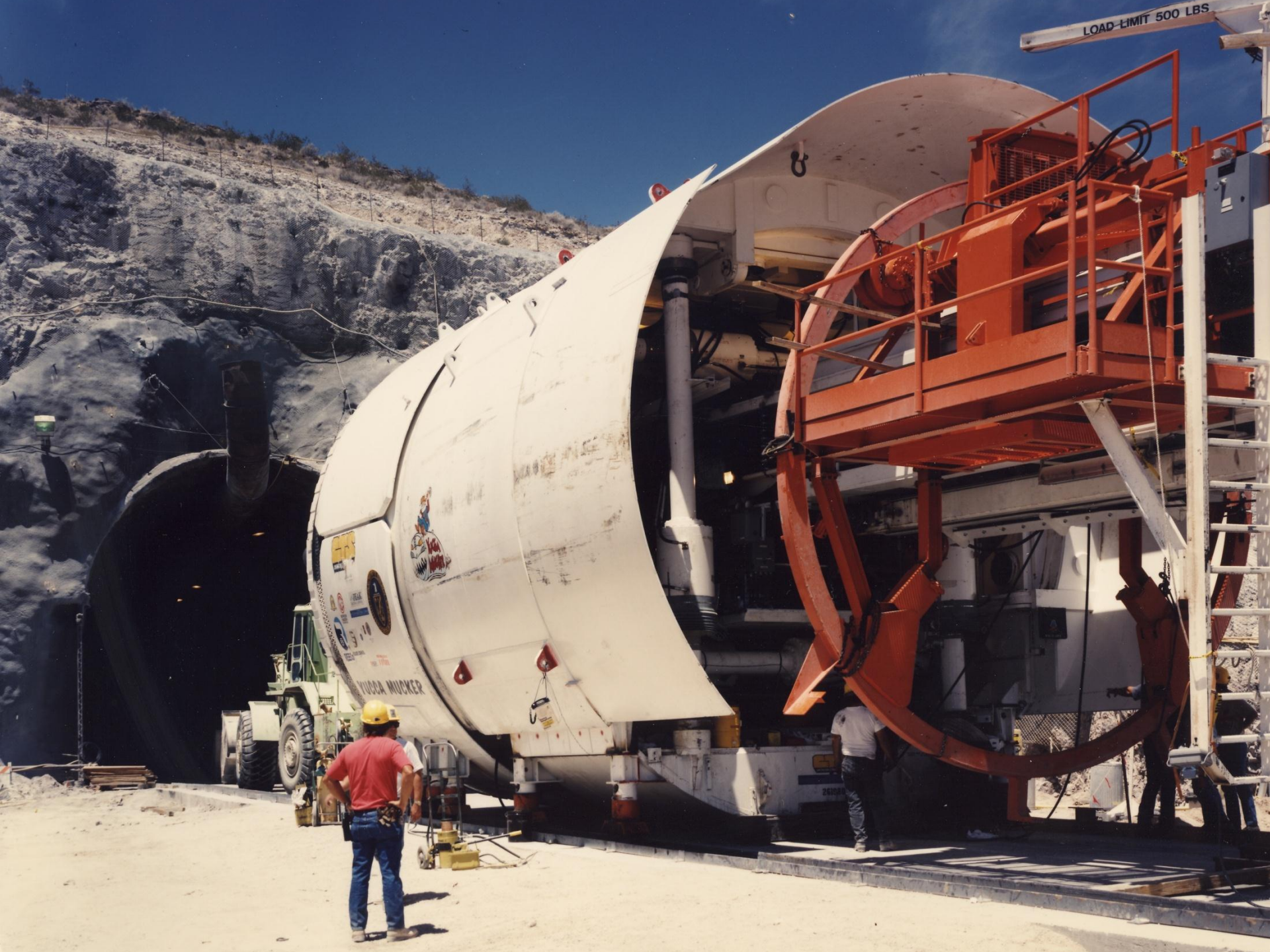
An aerial photograph of a vast, arid desert landscape. The terrain is characterized by numerous small, rounded hills and deep, winding erosion gullies, creating a complex, textured surface. The color palette is dominated by various shades of brown and tan, with some darker areas in the shadows of the gullies. A thin, light-colored line, possibly a road or a dry riverbed, winds through the landscape on the left side. The sky is visible at the top, showing a hazy, light blue color.

Successful and Unsuccessful Cases of Communication in Siting Radioactive Waste Repositories











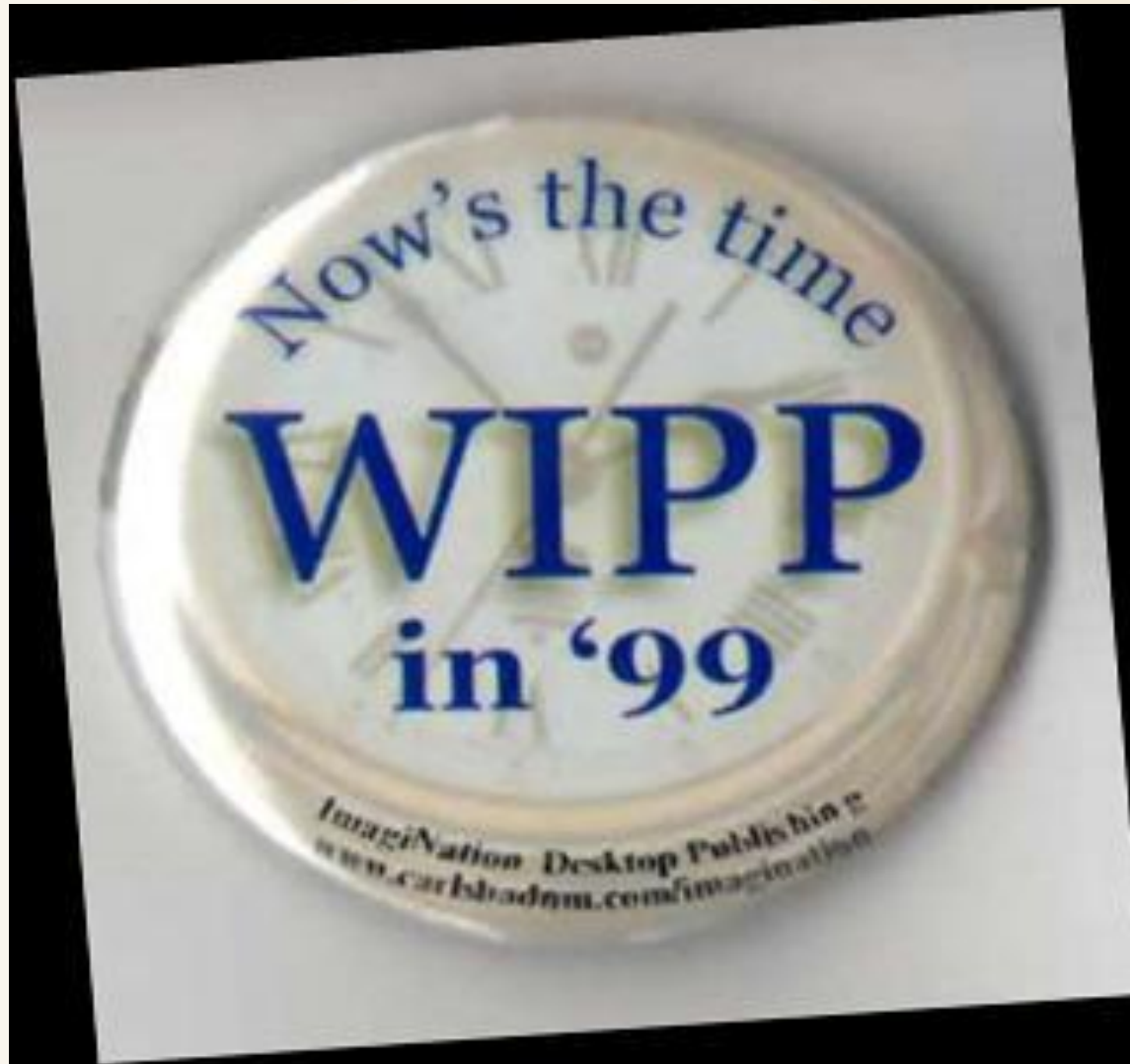


Success ??

(from a NGO anti-Yucca Mountain)

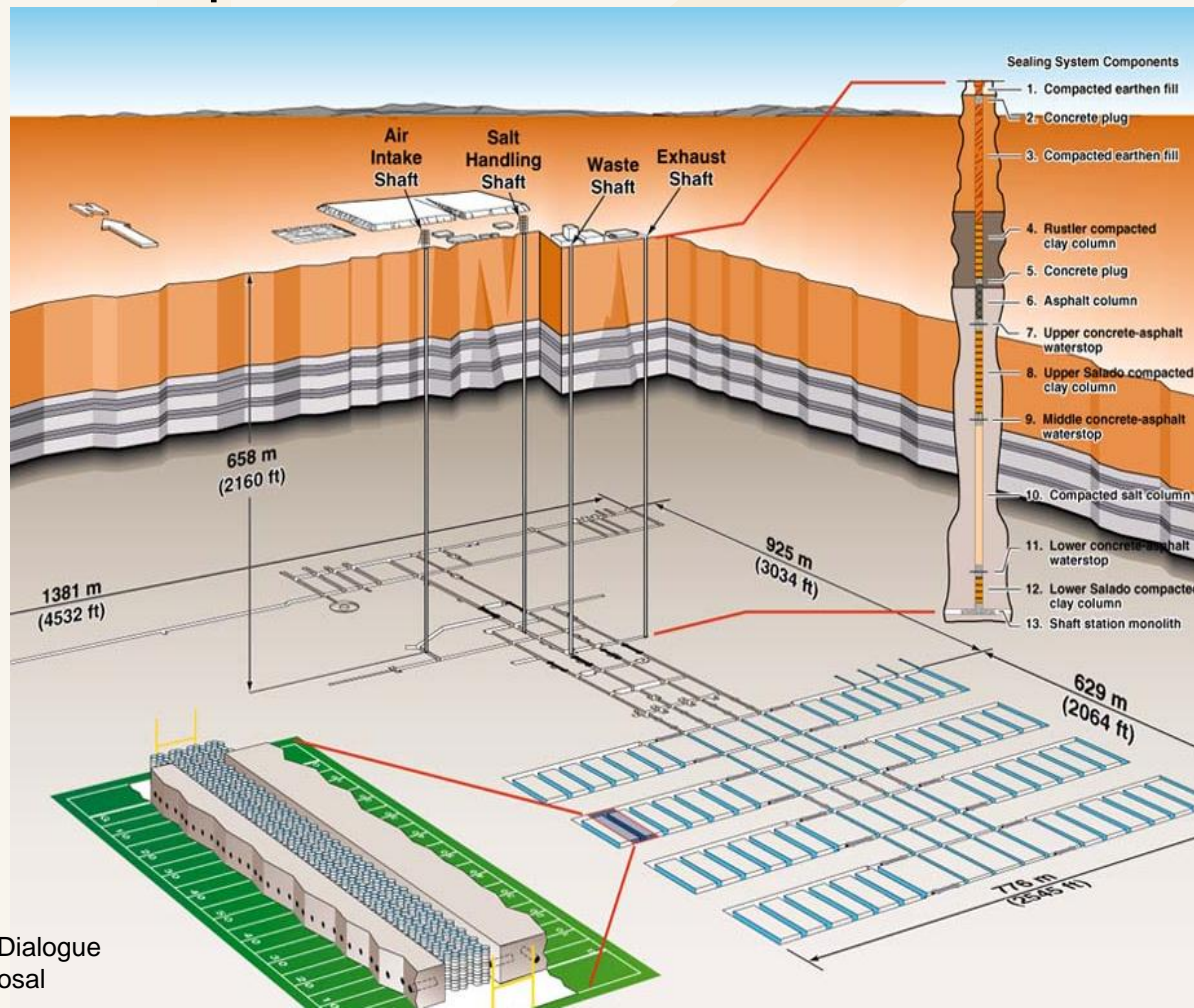
- Yucca Mountain cannot isolate waste.
- The site was chosen undemocratically.
- Independent science was ignored.
- Vast majority of Nevadans opposed it.
- Nevada prevailed.
- **Success** for current and all future residents because an unsafe site was avoided.

The WIPP repository at Carlsberg, New Mexico, USA



WIPP repository for nuclear waste from defense activities

- Operating since 1999; recertified in 2004 & 2009
- 655 m depth in bedded salt



Will Senators Bingaman and Domenici protect New Mexicans' health and safety from WIPP?



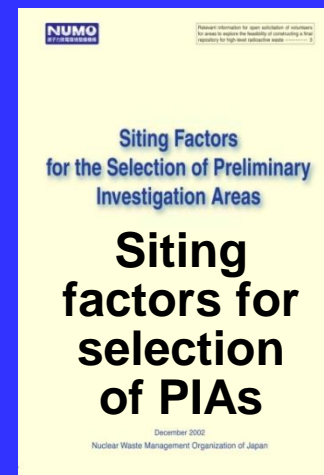
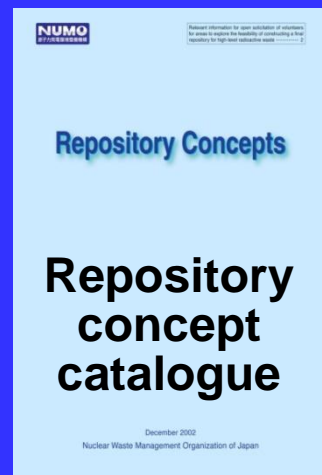
SENATOR PETE DOMENICI



SENATOR JEFF BINGAMAN

Japan

- On 19 December 2002, NUMO officially announced the start of open solicitation to invite volunteer municipalities for Literature Survey
- Information Package distributed to all municipalities in Japan



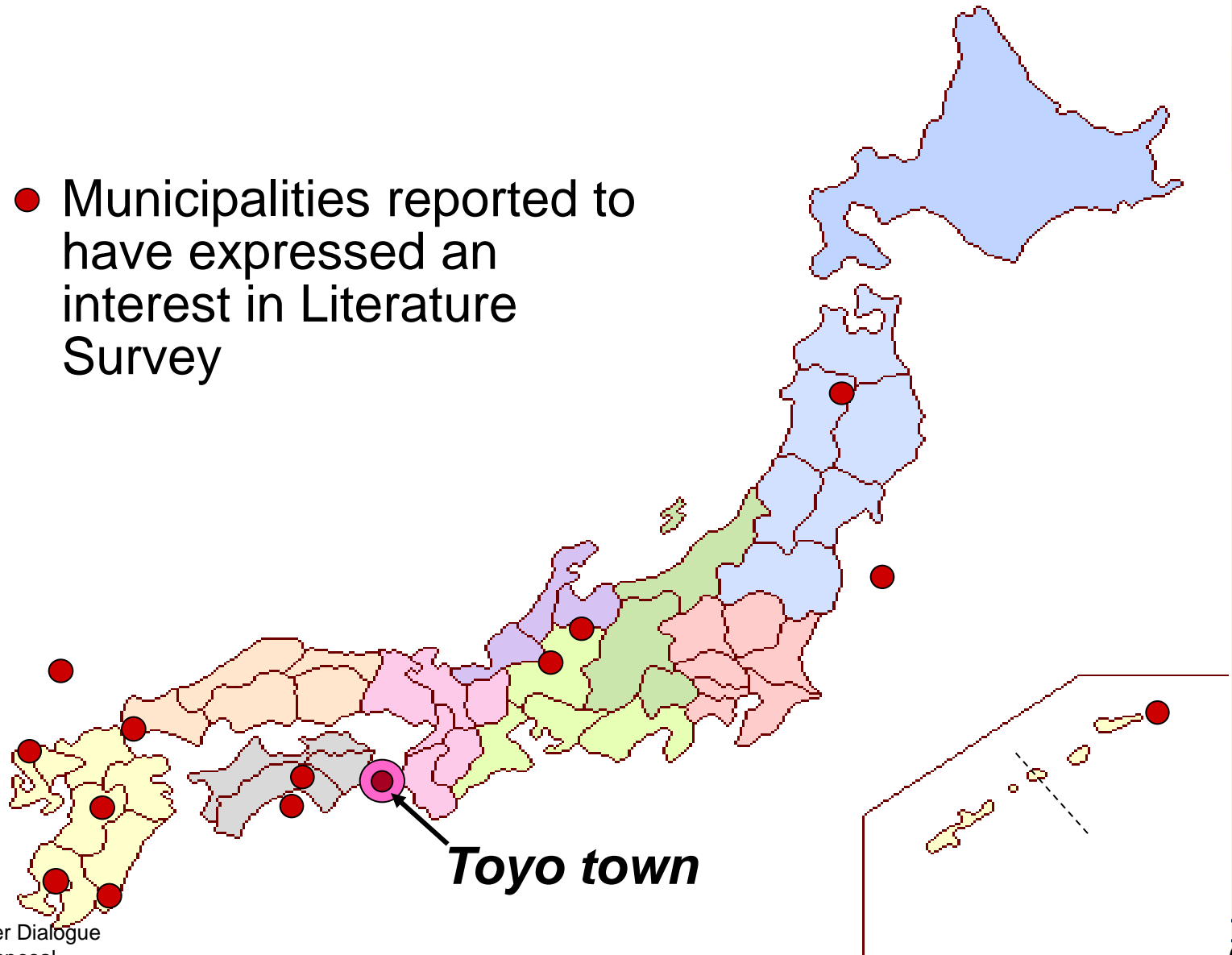
NUMO Information Package

Why Open Solicitation?

1. Project involves complex socio-political concerns.
2. Public support is crucial for the success of the project.
3. Autonomous application by the volunteer municipalities supported by residents forms the basis of politically stable conduct of the project.
4. Long-term project lasting for almost a century provides communities a chance for sustainable development .

Responses from municipalities

- Municipalities reported to have expressed an interest in Literature Survey



Evolution since the announcement

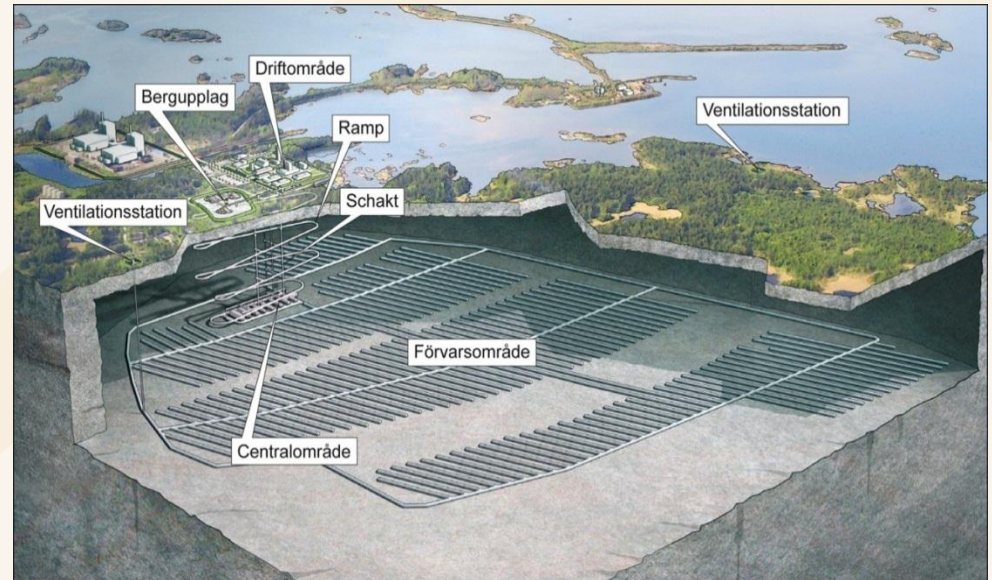
- Ten local municipalities were reported to have expressed an interest in Literature Survey (LS), but none lead to the actual application.
- In January 2007, Toyo town became the first municipality to submit an application for LS.
- The lack of prompt arrangements between Federal Government and Municipality gave time to NGOs anti-nuclear to do a strong movement against the repositories.
- Escalation in opposition activities led to the resignation of the mayor and his loss in the following election.
- A newly elected mayor withdrew the application and the literature survey for the town was abandoned.

Lessons learnt from the failure of Toyo-town case

- Lack of fundamental knowledge on nuclear energy and radiation
- Failure to gain proper understandings on the scheme of site selection process
- Failure to gain enough support from local residents and bodies
- Failure to take proper and timely countermeasures to remove or ease irrational anxiety and distrust among people raised by negative propagandas by opponent activists
- Insufficient preparation for facilitating communication with the prefecture and surrounding municipalities
- Inefficient cooperation among NUMO, government and utilities

Sweden - SKB has selected Forsmark

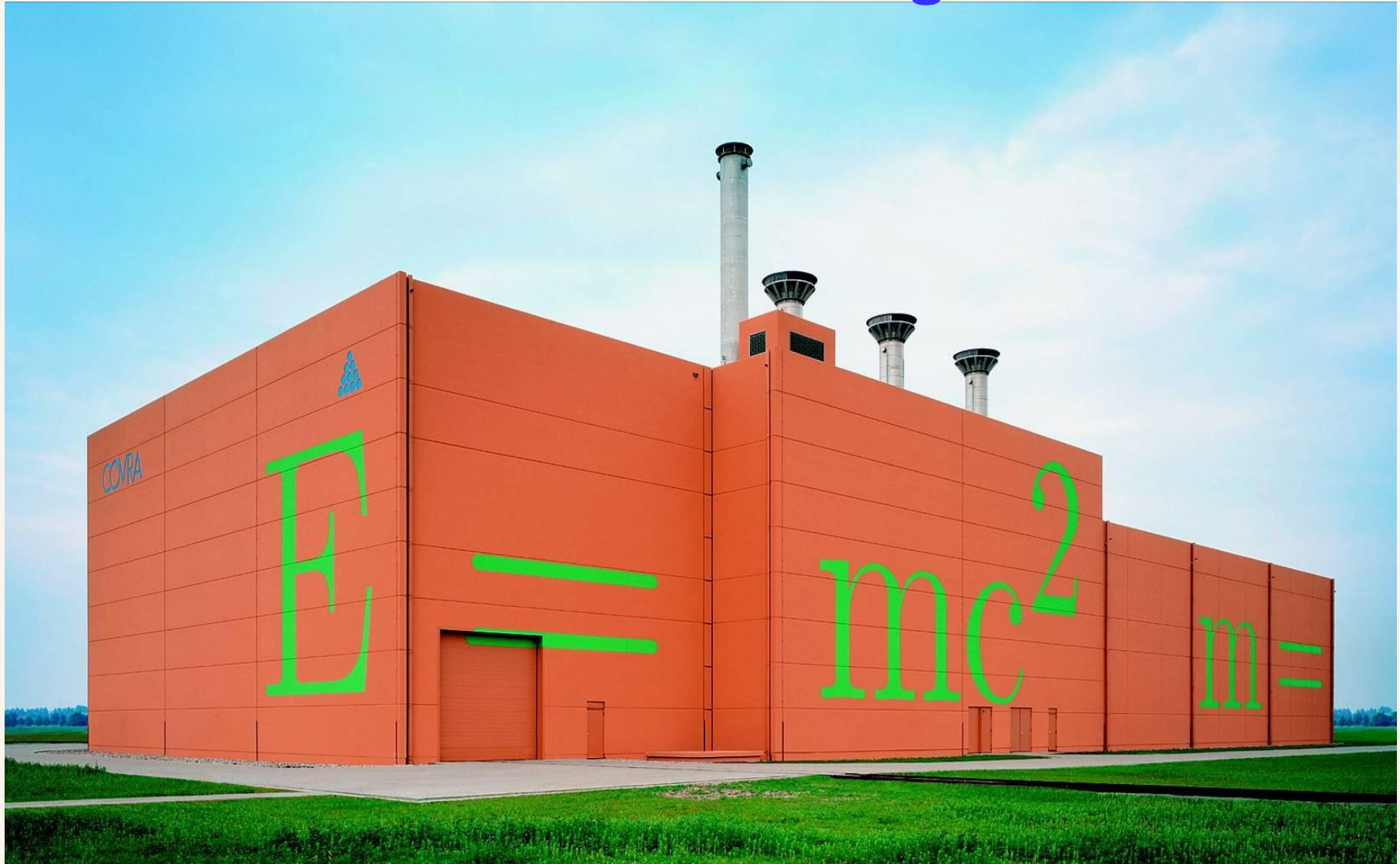
- The Forsmark site offers a bedrock at the repository level which is dry and has few fractures. These properties are of a major significance for long-term safety.
- A repository in Forsmark requires less space compared to a repository in Laxemar, which is advantageous.
- Surface facilities will be constructed in the existing industrial area, which reduces the environmental impact.



Sweden HLW Repository



Nederland - Storage of radioactive material at COVRA in Vlissingen.



Nederland - Storage of radioactive material at COVRA in Vlissingen.



Lessons learned from waste repositories siting – stakeholders involvement

Community

- Begins with a accountable authorities in an area expressing interest in learning more.
- This could be a city, town, village, municipality, region or other municipal structure, minorities groups – or combination of these.
- Through the steps of the process, others who would be affected by locating the project in this community are identified and drawn in to decision-making.

Informed and willing

- Only communities that are interested in the project will be considered.
- Community proceeds from one step to the next only if it chooses.
- Community explores their interest in the project in the way they see fit, with support of the responsible organization.
- Although accountable authorities will initially speak for communities, ultimately a compelling demonstration of willingness involving residents will be required.
- Concerns and expectations of surrounding communities, region, transportation communities will be identified and addressed in decision-making.

Stakeholders categories

- **Political and economic**
Government, customers, local community.
- **Environmental**
Environmental regulators, local community, NGO's.
- **Social**
Workforce, local suppliers, local community.
- **Technical**
Nuclear regulator, R&D institutions, universities.

Issues in Stakeholder Involvement

- “Shareholders” represent a spectrum of views and you may encounter a number changes in the views expressed by stakeholders over time.
- Shareholders balance issues – identification of potential benefits (with assurances about eventual delivery) may draw in neutral Shareholders and reduce opposition.
- Negative views are often based on emotional feelings – this needs to be addressed by emotional approaches, not just technical ones. However....
- Converting discussion from emotional to a more technical level can significantly affect the chances for success – This will be easier with some stakeholder groups compared to others.

Issues in Stakeholder Involvement

- Involving stakeholders enhances “ownership”
- Credibility is based on confidence in the responsible institutions. Confidence in institutions is dependant on their long-term behaviour. Credibility is enhanced by:
Competence – Openness - Trust
- It is very difficult, if not impossible, to heal early mistakes affecting credibility or trust. The only way to rectify this is to go back to a point before the mistake was done.

Informed and willing

- Time is required for people to learn about the project, to ask questions and to assess their interest in it.

Communication.

People need clear, simple, straightforward, and easy to understand explanations, which give them an overall impression or an image.

They do not want to become experts, they simply want to know if something is safe and what the regulatory authority is doing in concrete terms to protect public health and safety.

Communication.

The public often asks about safety.

Technical experts often respond using relative risk comparisons.

These comparisons make many people afraid of the other topic with which they are comparing, and because comparisons are relative, members of the public and other non-technical audiences have no way to judge what is being said.

Therefore, people think the expert is trying to hide something or is not being direct. People often need to be reminded of the most simple aspects about nuclear technology, because usually they know very little, if anything at all.

If you have the opportunity to communicate:

- The types of sources of radiation, the interaction of radiation with matter.
- Most of the ionizing radiation that people are exposed to comes from natural, rather than manmade, sources.
- The trefoil sign indicating the presence of radiation.
- Biological effects of irradiation, making a clear distinction between whole body exposure and partial body radiation and high/low dose exposure,
- Difference between external exposure and external/internal contamination.

If you have the opportunity to communicate:

- The quantity 'dose', the unit sievert and its sub-multiples, comparing the dose received from various types of exposure (e.g. radon, intercontinental flights, medical applications, accidental doses, etc.).
- Principles of radiation protection and how the limits of dose were defined.
- Contact point in the regulatory authority for more information about radiation issues.

Issues in Stakeholder Involvement

- A sound “contract” between the national community and a local community is fundamental to success
- The most difficult group does not want to communicate. Consider them in your strategies and plan accordingly
- Do not rely only on foreign experience; communication with stakeholders is country and culture specific !

Lessons Learned

- Independent research, analysis, monitoring and reporting increases public confidence.
- Peer-reviewed technical studies completed by competent, respected experts engender the highest level of confidence.
- “Translating” technical studies for diverse lay audiences fosters public support and confidence.
- Stakeholder engagement must be inclusive and consistent.

Final Repository



Final Repository



- **Regional Center for Nuclear Sciences Information Building**

Crisis communication

Crisis communication

Crisis communication: the design, planning and implementation of communicative actions in order to satisfy the obligations and demands regarding public information and transparency in a situation of media pressure and reputational risk for the Regulatory Body.

Crisis demand a quick response and an established reaction plan, which is designed to deliver accurate information and to ensure transparency under high pressure and public scrutiny.

Crisis communication

Crisis communication is not only “public information” or “information for the public”, but also communication between authorities in order to guarantee that public information is consistent.

The challenges in crisis communication is to ensure all messages from all sources are saying the same thing and are coordinated.

Crisis communication

Timely correction of misinformation and unconfirmed rumors by the Regulatory Body helps the public understand the true situation and reduce confusion, which in turn helps preserve the credibility of the Regulatory Body.

Identifying and training spokespersons is an important aspects.

New channels of communication, like social media, are extremely quick to provide information that may not always be accurate. Regulatory Bodies therefore need to respond quickly and accurately to avoid misinterpretation or misinformation.

Crisis communication

Crisis communication are expedited and potentially more effective if national regulators (or other organizations involved in it) have a series of pre-written, pre-approved templates ready to be launched during the first critical hours of any emergency.

As a front line communication tool, they all try to include at least the who, what, when and where of the situation (details of the why and of the regulatory consequences can come later).

Information shared with the public has to be accurate, timely and structured.

Crisis communication

There is a lack of common agreement among scholars about the nature, meaning and definition of a crisis. But no matter how crises are described (isolated incidents, unfortunate accidents, etc.), they exist and some of them might be unpredictable, although not totally unexpected.

Crisis communication

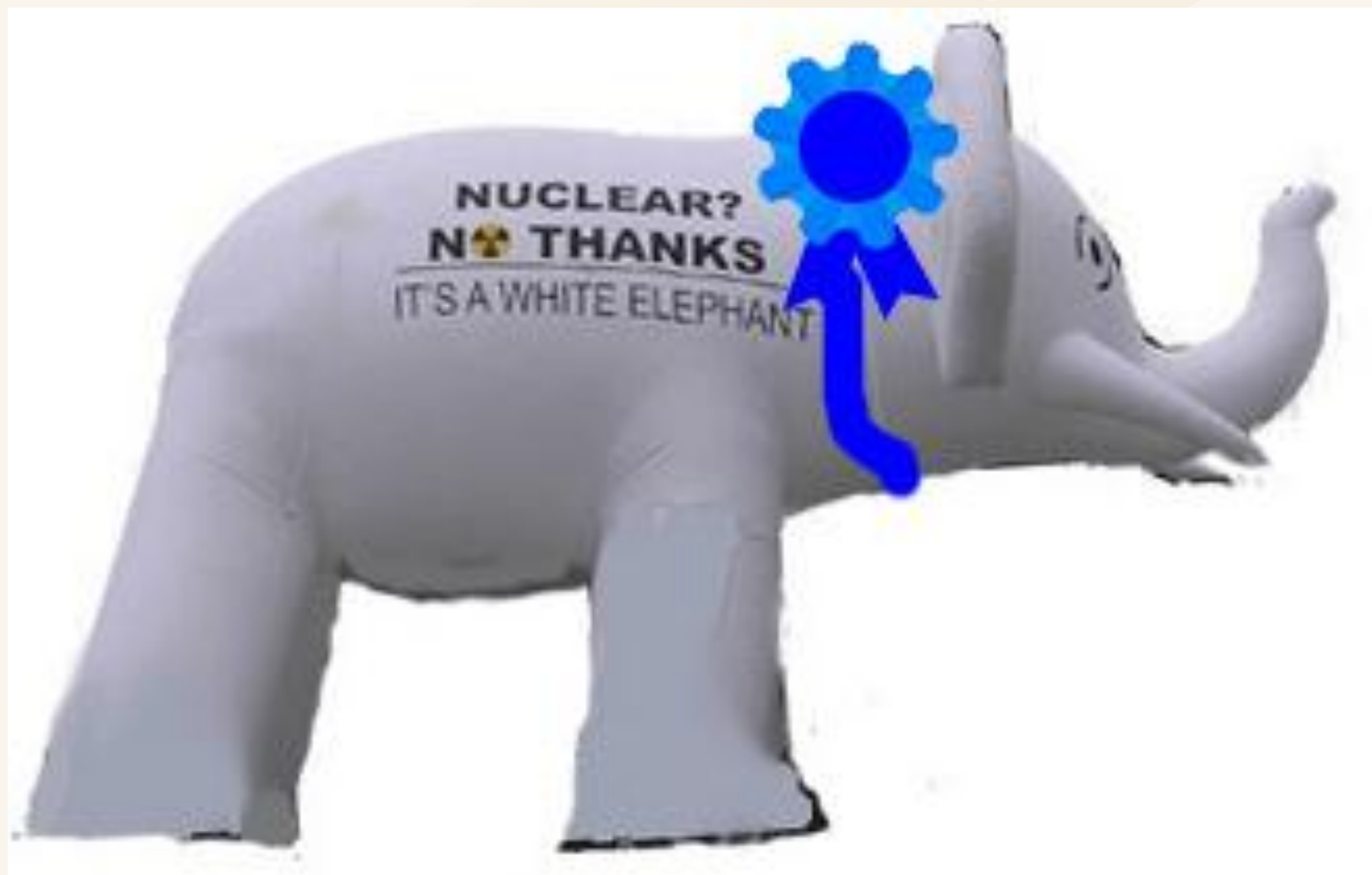
Media needs information quickly. If the Regulatory Body doesn't answer, they will look for anybody that can give it.

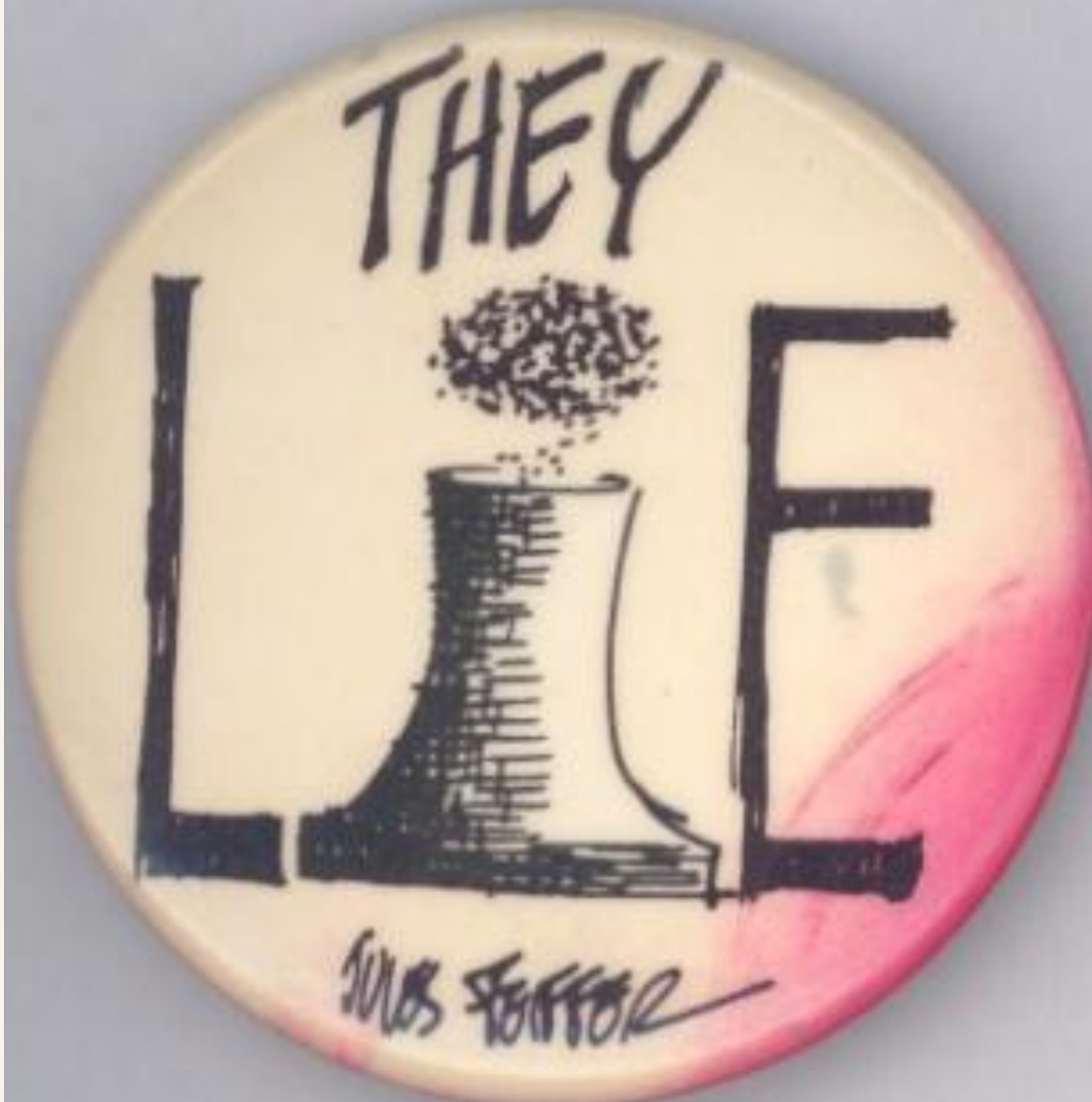
If we respond as quickly as possible even we don't have all the facts, we always are able to quickly issue information on the website saying that the emergency group is gathered, trying to analyse the problem, and that we will back with more information as soon as there is some.

The media has at times reacted and/or reported on relatively incidents in a somewhat “sensational” manner. It is important to respond quickly to such report to correct misinformation and ensure that the facts are explained clearly.









再処理を止めるために・・・

Anti 

presented by
PEACE LAND

sponsored by
NO NUCLEAR ENERGY
STOP NUKEMO

CINEMA : 東京原発

Nuclear

Part.2

Live

2008

2/17Sun

AOMORI

7オ-ター

OPEN 14:00
TALK & LIVE 15:00~21:00



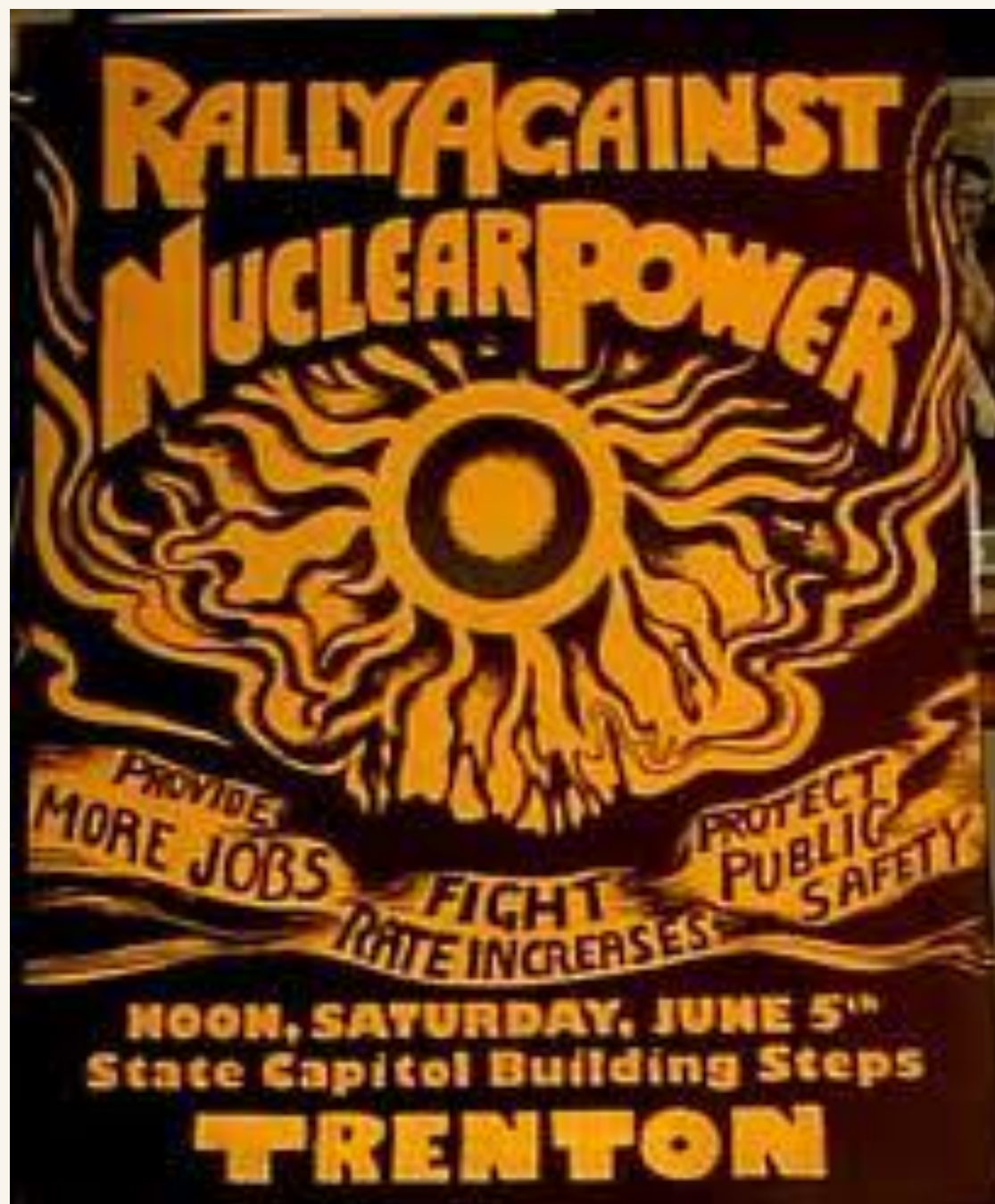
反核LIVE
& TALK

LIVE : Nort Hemisphere
codiae nova, pop-machine & contemporary system
大地球 会場提供

反核は21世紀エコロジーの原点だ！

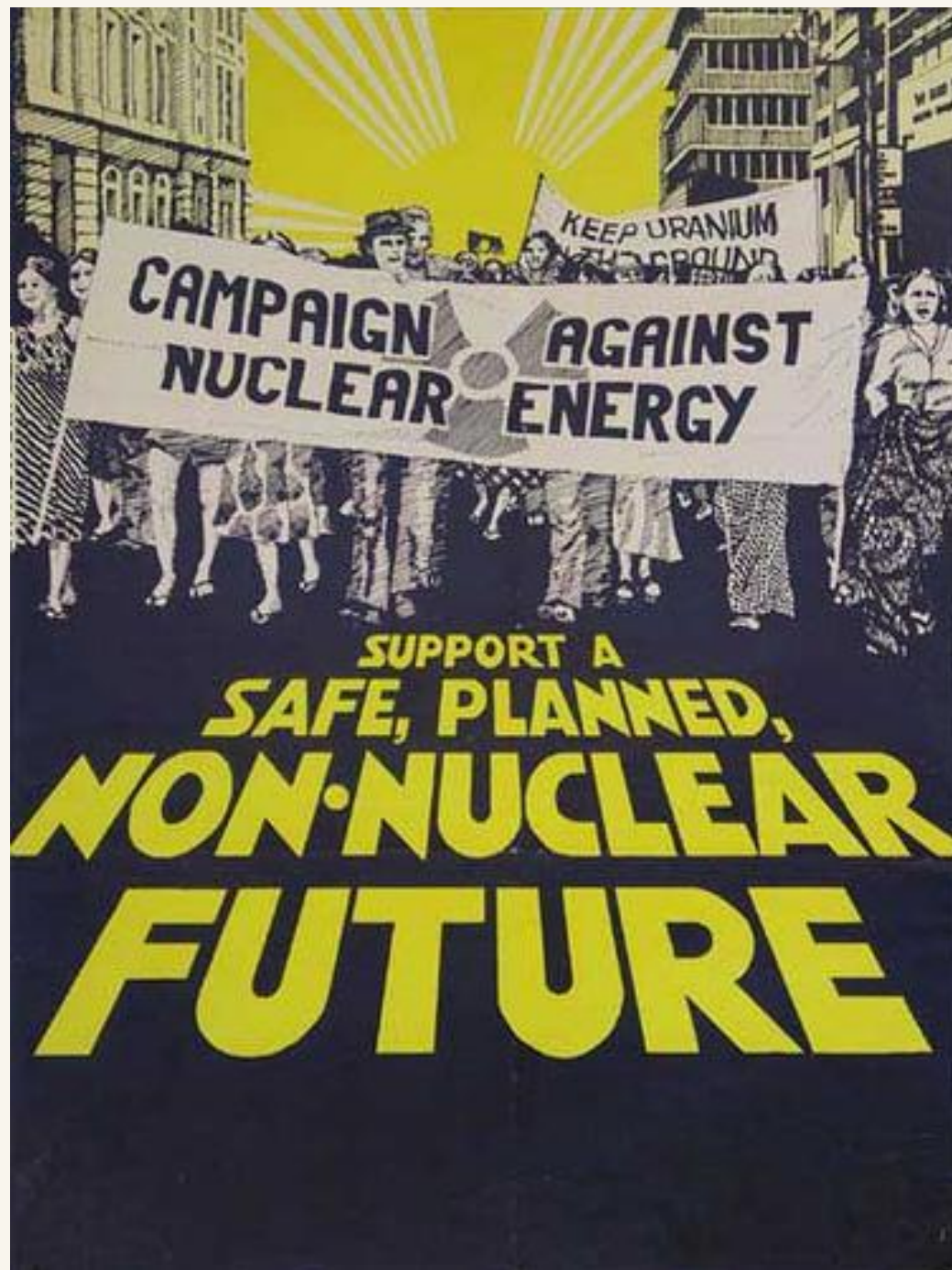
<http://peaceland.jp>

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Nuclear

Power
is not
healthy
children
for
and
other
living things















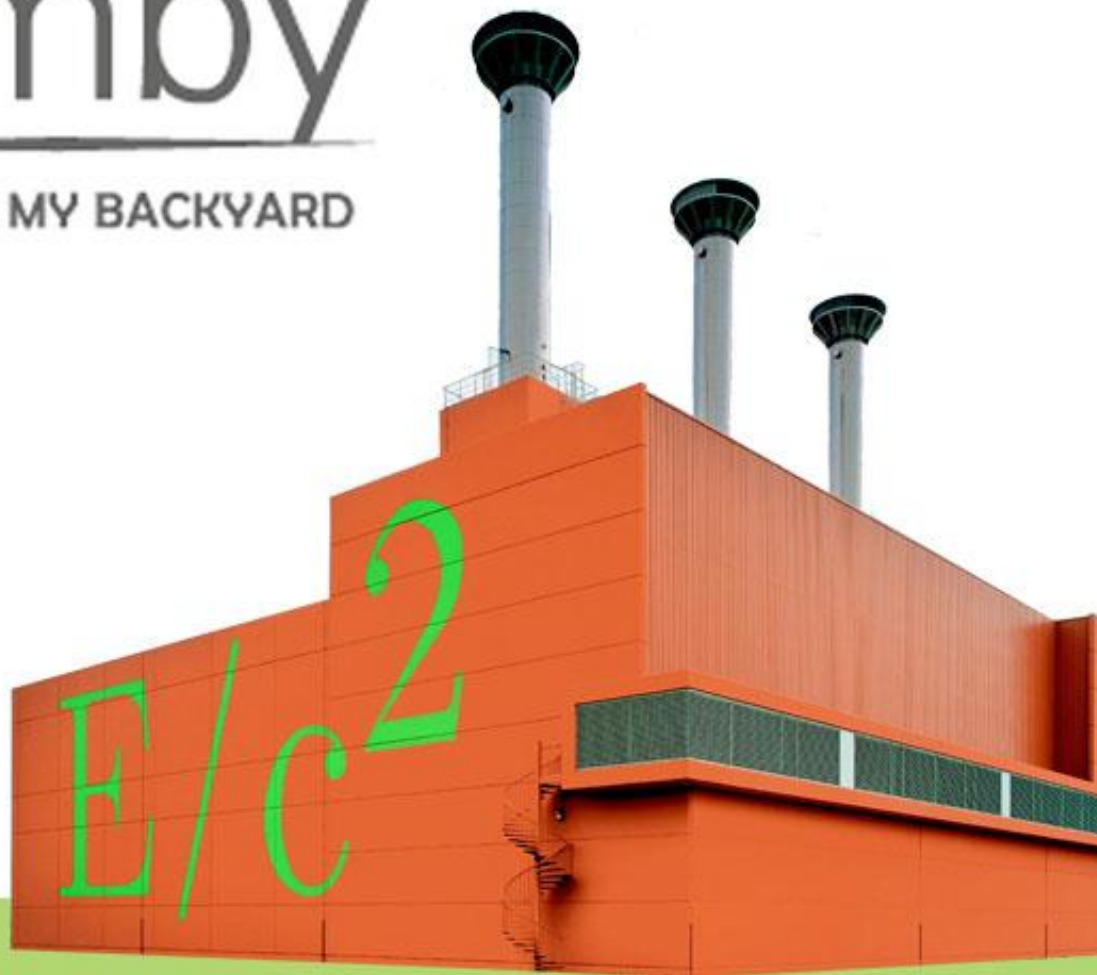
GREEN

It's the new stupid.



Pimby

PLEASE IN MY BACKYARD





Obrigado