

Teacher Workshops

Presentation to SRS CAB

Clint Wolfe, Executive Director

Citizens for Nuclear Technology Awareness

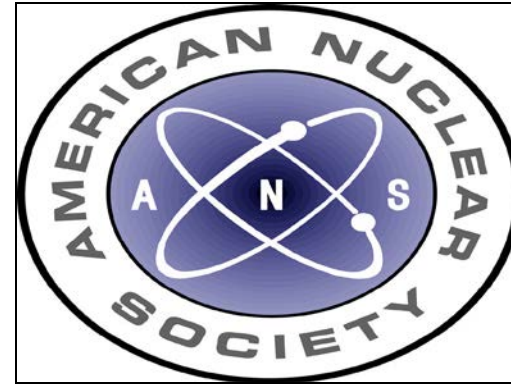
MAY 20, 2013



The CNTA's Mission is Education!

The CNTA provides factual, objective information on nuclear subjects for the public, teachers, students, public officials, and at public hearings. We do this to improve public knowledge on the real benefits and comparative risks of nuclear activities, including nuclear production of electricity, nuclear medicine, food irradiation, nuclear weapons production and nuclear waste management.

Home Page: <http://www.c-n-t-a.com>



The Mission of ANS

Is to promote the awareness and understanding of the application of nuclear science and technology.

National Home Page:

<http://www.ans.org/>

Local Section Home Page:

<http://local.ans.org/savriv/>

Bringing Nuclear into the Classroom

- A workshop for middle school and high school teachers that includes **hands-on styled exercises** for use in the classroom.
- The twofold objective is to
 - Enhance the knowledge and understanding of nuclear technology and applications that are **ubiquitous in modern living**
 - Raise awareness of the wide **variety of job opportunities** in the nuclear business locally (“**Grow Your Own!**”) as well as nationwide.
- While making it **FUN** and **EXCITING!!!!**

Sponsors

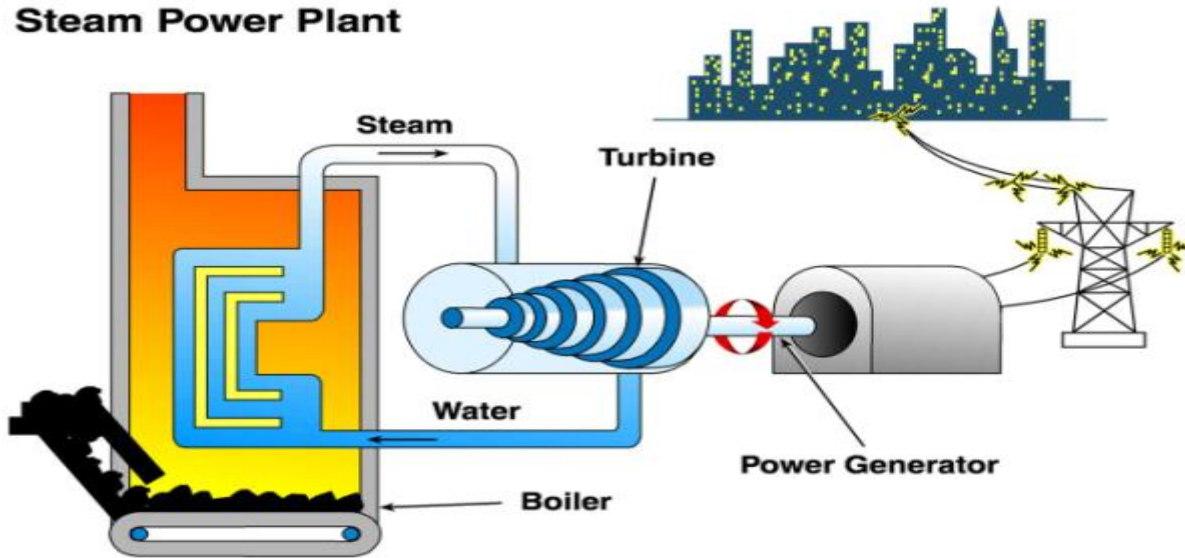
- Citizens for Nuclear Technology Awareness (CNTA)
- American Nuclear Society (ANS) – Savannah River Section
- Energy Solutions
- Savannah River Site Community Reuse Organization (SRSCRO)
- Ruth Patrick Science Education Center USC-Aiken
- Aiken Rotary Club

Bringing Nuclear into the Classroom

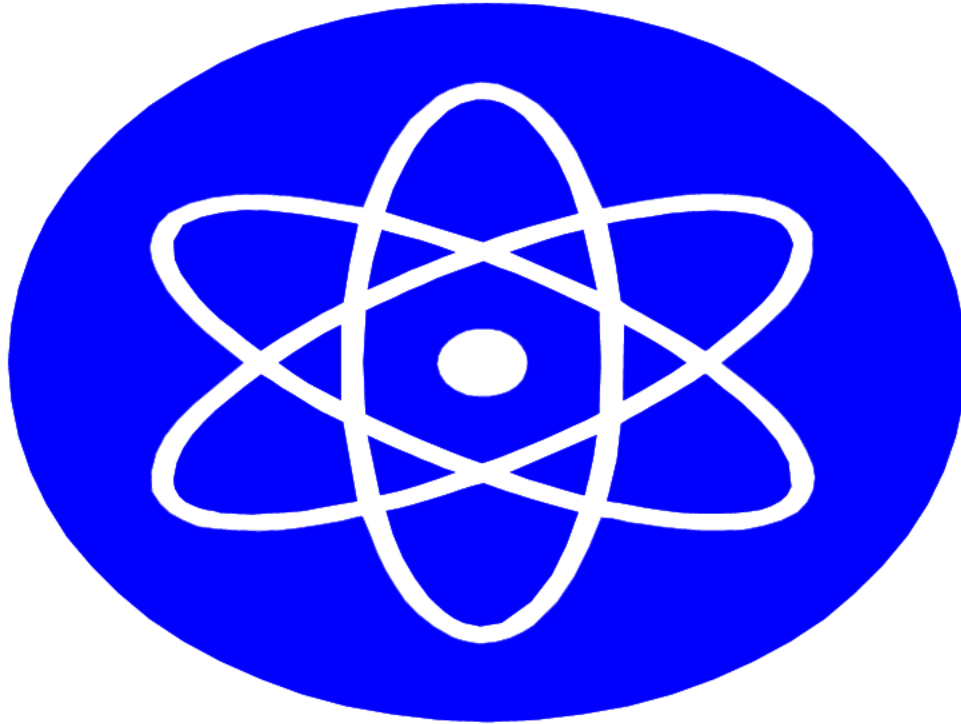
- **Educational resources**
 - DVD including presentations and reference material
 - Chart of Nuclides
 - Radiation and Modern Life (Alan Waltar)
 - Other goodies!
- **Introductions**
- **Quiz**

CNTA Teacher Workshop

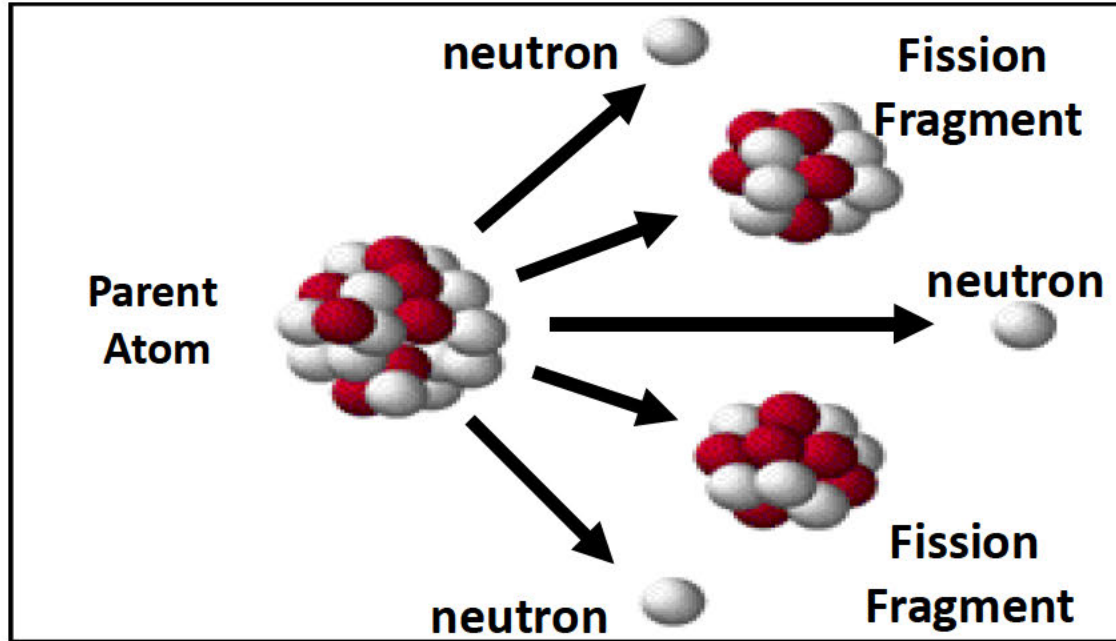
- Power Generation Fundamentals



Nuclear Fundamentals



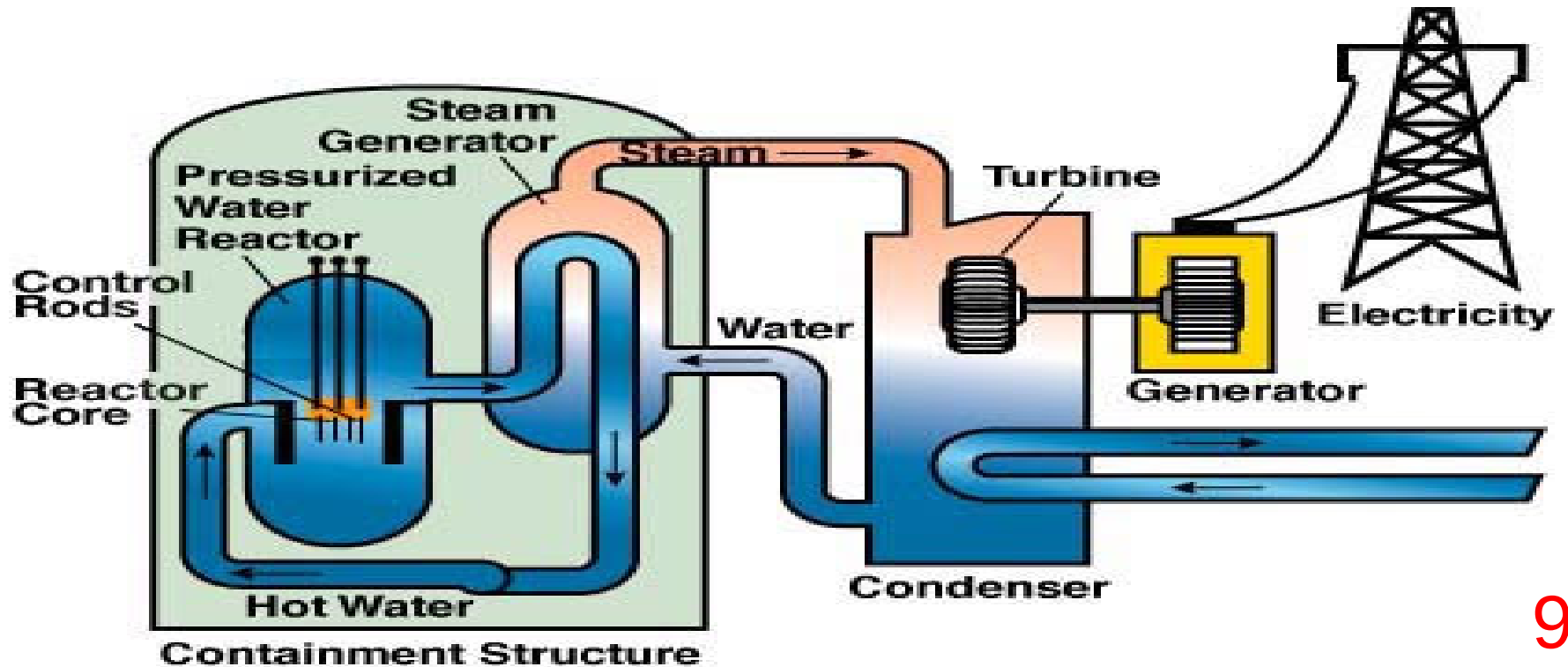
Fission

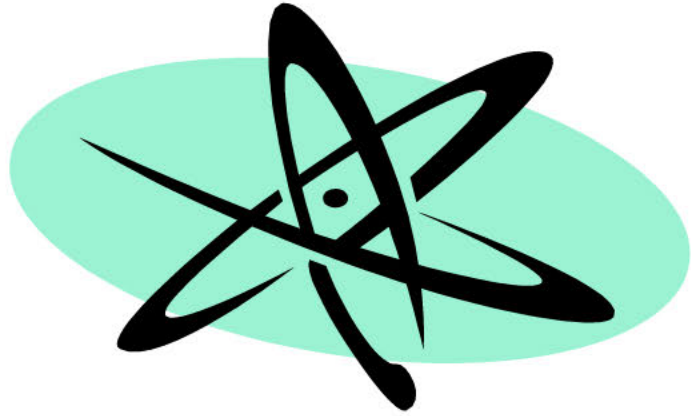


A nuclear reaction in which the nucleus of an atom splits into smaller parts producing free neutrons and gamma rays.

Fission is usually an energetic nuclear reaction induced by a neutron

Nuclear Power Plant





**We are afraid of
the unknown**



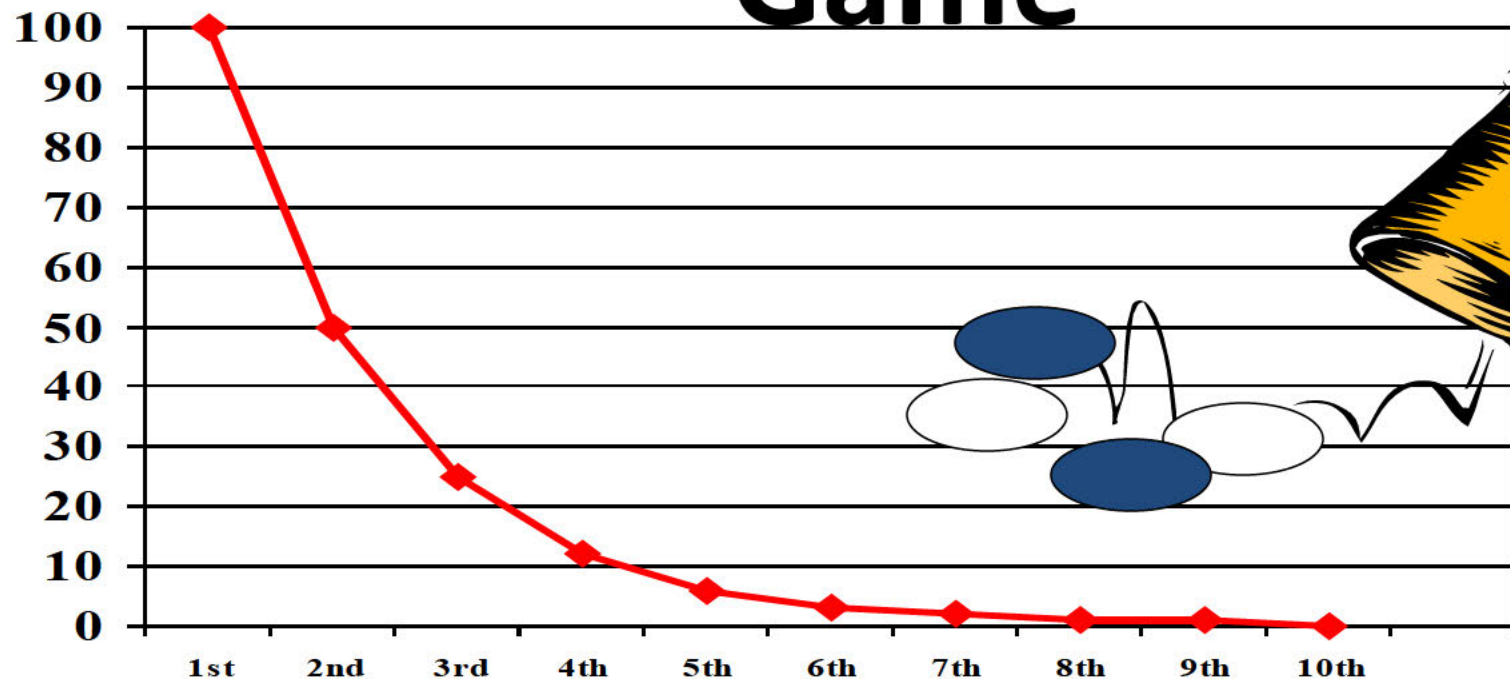


Radiation



Half-life

Half-Life Game





Radiation Protection

Radiation Protection Principles

As Low As Reasonably Achievable (ALARA)

Three Basic Concepts

Time - Minimize the Time near a radioactive source

Distance - Maximize the Distance away from a radioactive source

Shielding - Maximize the Shielding for a radioactive source



ALARA Activity

Risk

(Real versus Perceived)



First – a short quiz ...

- #1 What is a **Hazard**?
- #2 Define **Risk**?
- #3 How do you know when something is **Safe**?
- #4 What aspect of your life is **Safe**?

Risk versus Hazard

- A Hazard is:
 - A potentially harmful situation, although not usually the event itself
- Risk is:
$$\text{Risk} = (\text{Probability of an Accident}) \times (\text{Associated Hazard})$$

What is Safe?

- The Probability of an accident is never zero, therefore the risk of an accident is never zero.
- The definition of “Safe” is relative.
 - “Free from Risk”? - Technically not possible
 - “Below a defined level of Risk” – More Accurate

There are fields of study and entire companies dedicated to understanding and defining risk for many industries

Nuclear Power Risk

Safety Objectives as defined by the Nuclear Regulatory Commission

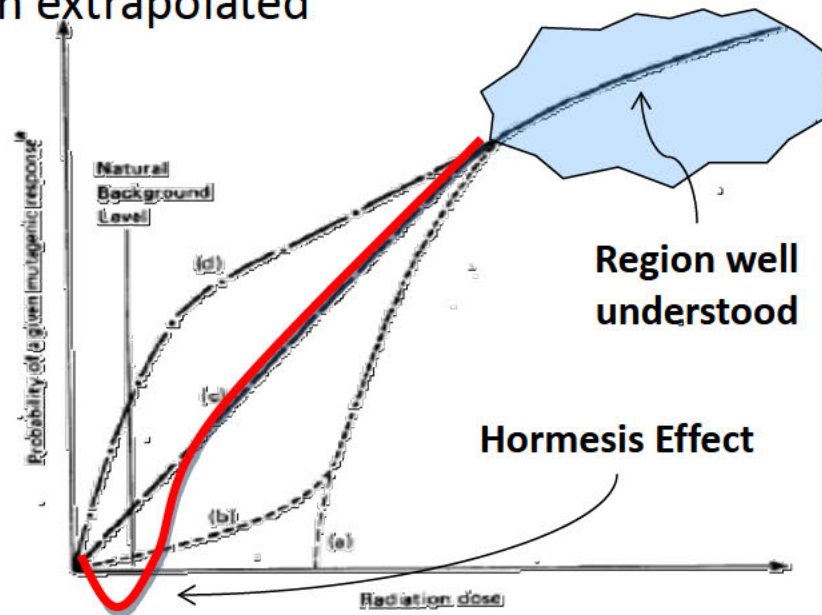
- Qualitative
 - Acceptable Risk – No significant added risk from nuclear plants
- Quantitative
 - Quantitative Health Objectives (QHO)
 - 1/1000 risk from other causes applied to both early and latent health effects

General Radiation Risk

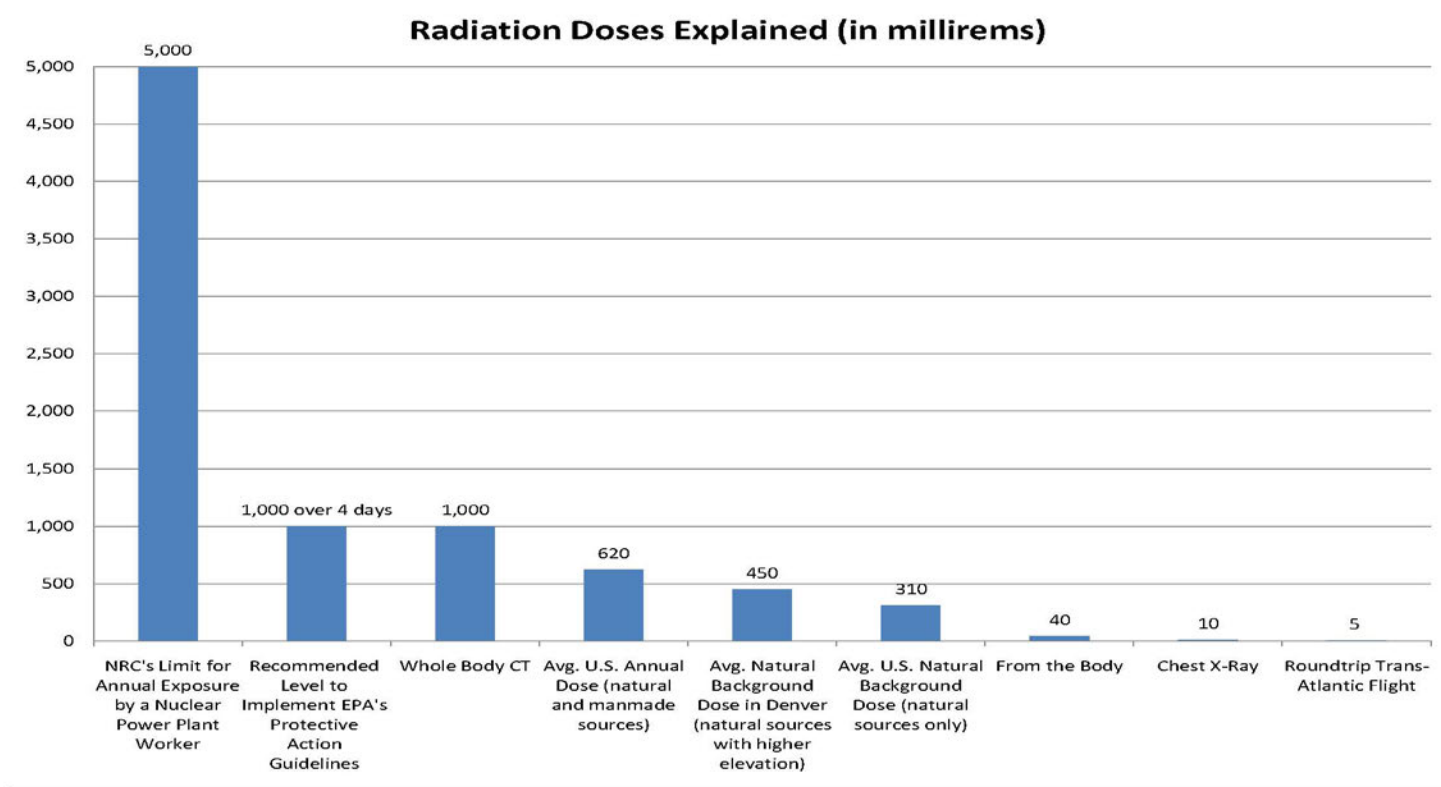
- The risks due to radiation exposure are well understood at very high doses.
- Risks at lower levels have been extrapolated
- Debate related to

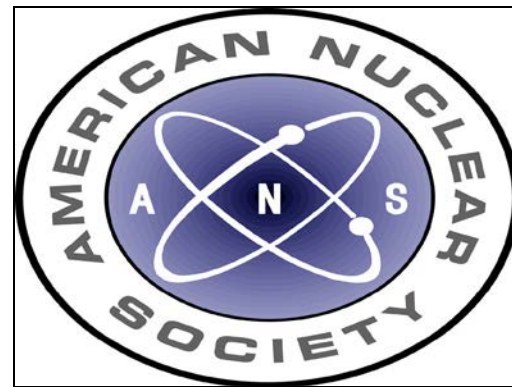
Hormesis Effect

- Positive Benefit for receiving small doses of radiation by engaging the body's defense mechanisms and exercising the immune system (cell rebuilding).



Radiation Dose





To learn more about this subject visit:

ANS National Home Page: <http://www.ans.org/>

Local Section Home Page: <http://local.ans.org/savriv/>

CNTA Home Page: www.c-n-t-a.com

SRS Issues

- Cleanup at SRS is progressing nicely but the budget situation must be managed carefully such that high risk activities are permitted to continue as a matter of priority.
- The CAB should continue to emphasize the importance of H-Canyon in dealing with cleanup such as processing Spent Nuclear Fuel and processing Pu for disposition at WIPP and for use in MOX.

- Timely completion of the SWPF is essential to an efficient and effective cleanup of SRS. This is the “long pole in the tent” and unless that high risk matter is addressed at an early date the Site credibility will be at stake. Every extra year that Site operations are extended will cost the taxpayer hundreds of millions of dollars, not to mention the risk involved.

- DOE should be encouraged to make a decision to process all of the SNF for disposition in SRS waste system while the H-Canyon option is still viable. Recent decisions by DOE to process a portion of the SNF are laudable but all the AI-Based SNF should be processed and decisions not delayed indefinitely.

DOE should be encouraged to make some movement on the disposition of DWPF canisters to an off-site location such as WIPP. Any activity supporting this action will certainly be well-received by the community.

- I would encourage the CAB to not make a premature judgment on the acceptability of commercial SNF coming to the Site.
 - That issue is at a very early stage and much information will have to developed, analyzed, and presented before that process is even started.
 - That process will be a consent based process where local governments and the States of SC and GA will be involved.

- The BRC has promised much in the way of incentives, flexibility, etc.
 - A decision too early in the process would be short-sighted.
 - Keep an open mind until the facts are developed.
- The CAB should be encouraged to support and endorse use of SRS EM facilities for new missions once the cleanup mission is completed.