Risk Assessment Offshore Power

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Whose risk is it anyway?

Child affected by the Seveso fallout

Hiltrud Schmidt died 1966 aged 16 of leukemia

Caused by atomic bomb testing?

Can leukemia be induced by bomb testing?

shall be construed to limit the Assistant Director's ability to require additional documentation.

Subpart B—Eligibility Criteria for Claims Relating to Leukemia

SOURCE: Order No. 2604–2002, 67 FR 51423, Aug. 7, 2002, unless otherwise noted.

§ 79.10 Scope of subpart.

The regulations in this subpart describe the criteria for eligibility for compensation under section 4(a)(1) of the Act and the evidence that will be accepted as proof of the various criteria. Section 4(a)(1) of the Act provides for a payment of $50,000 to individuals exposed to fallout from the detonation of atmospheric nuclear devices at the Nevada Test Site due to their physical presence in an affected area during a designated time period, and $75,000 to individuals who participated onsite in a test involving the atmospheric detonation of a nuclear device and who later developed leukemia.

But the test side was so far away

Chernobyl fallout pattern

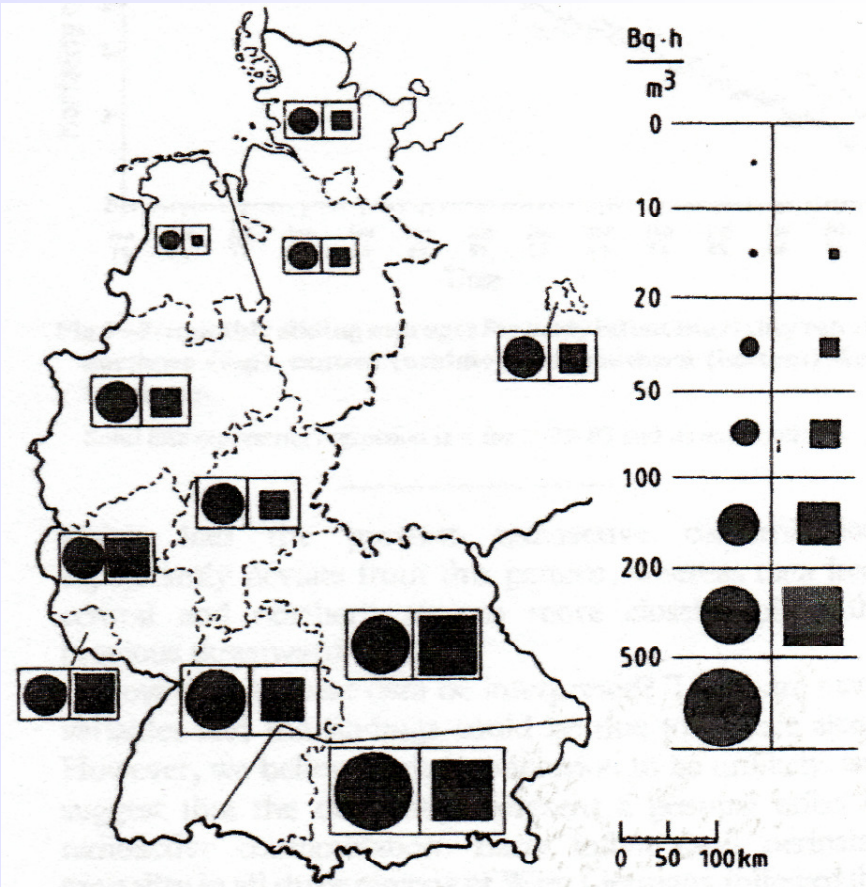


Fig 1—Time-integrated air radioactivity concentrations over West Germany, April 28 to May 8, 1986.

● = ^{131}I; ■ = ^{137}Cs

As published by Zigggel / Schmidt in „The Lancet“

3000 km far away was Chernobyl

Early infant mortality rates in southern Germany.While in the south 19 values where outside the confidence interval, it where only 2 in the north.

Solid line (regression curve), dashed lines (95 % confidence interval)

What is Risk?

- The potential for realization of unwanted, adverse consequences to human life, health, property, or the environment; estimation of risk is usually based on the expected value of the conditional probability of the event occurring times the consequence of the event given that it has occurred.

Risk analysis

- A detailed examination including risk assessment, risk evaluation, and risk management alternatives, performed to understand the nature of unwanted, negative consequences to human life, health, property, or the environment; an analytical process to provide information regarding undesirable events; the process of quantification of the probabilities and expected consequences for identified risks.

Risk assessment

- The process of establishing information regarding acceptable levels of a risk and/or levels of risk for an individual, group, society, or the environment.

Annual Risk of Death in the US

Hazard	Number of deaths/million persons
Motor Vehicle Accidents	210.0
Work Accidents	150.0
Homicides	93.0
Drowning	37.0
Poisonings	17.0
Boating	0.6
Tornadoes	0.4
Bites and Stings	0.2

RISK COMPARISONS FOR INVOLUNTARY RISKS

Risk	Risk of Death / Person / Year
Influenza	1 in 5000
Leukemia	1 in 12,500
Struck by Automobile	1 in 20,000
Floods	1 in 455,000
Tornadoes (Midwest)	1 in 455,000
Earthquakes (California)	1 in 588,000
Meteorite	1 in 100 billion

CONCEPT OF *DE MINIMIS* RISK

- *De minimis* risks are those risks judged to be too small to be of social concern, or too small to justify the use of risk management resources for control.

- The *De minimis* risk level frequently used by government agencies (EPA, FDA) is 1 in 1,000,000 or “1 in a million” increased risk of an adverse effect occurring over a 70 year lifetime in a large population.

CONCEPT OF *DE MINIMIS* RISK

The 1 in a million risk level used to regulate some chemicals and other hazards is many times below risks which people face every day.

Reality check

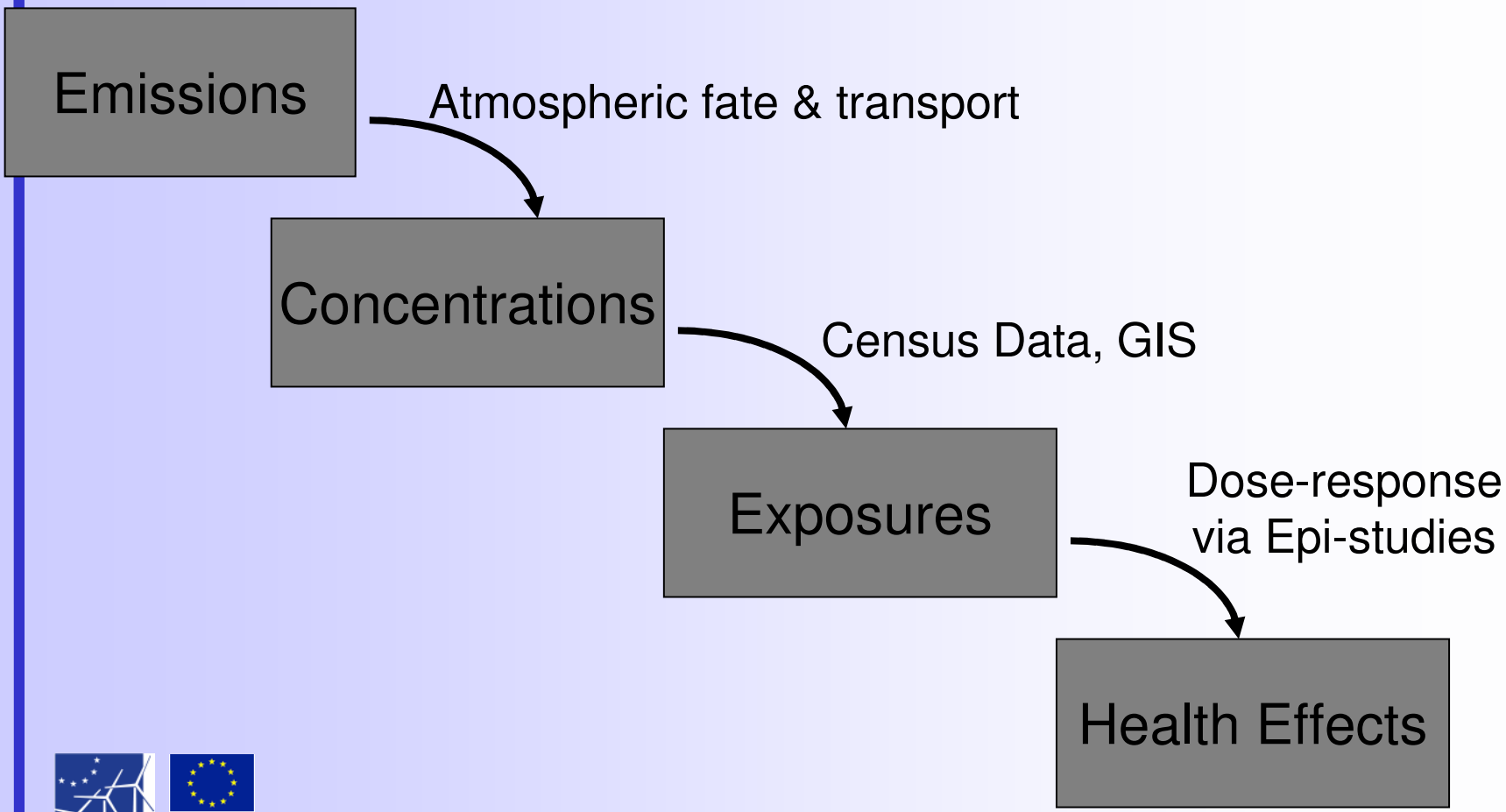
"There is no point in getting into a panic about the risks of life until you have compared the risks which worry you with those that don't, but perhaps should."
(Lord Rothschild, *The Wall Street Journal*, 1979).

Risk is an Equal Function of Toxicity and Exposure

- Paracelsus Understood Risk Assessment

- Exposure = Dose
- Risk = Toxicity X Dose

How do we know, if there is a correlation?



Scientific Dimension of Risk Assessment

- Hazard Identification

  Could this substance pose a health threat and if so,what kind

1. Dose-Response Analysis

   How does the degree of exposure to the substance related to the degree of toxic effect?

   Missing Data problem

   Uncertainties and long time frame of epidemiological studies

   Uncertainties of animal studies

1. Exposure Assessment

   What are the characteristics of the public exposure to this substance?

   Social/cultural „biases“ in exposure

1. Risk Characterization

   Combining dose-response and exposure data, how is public health effected?

Subjective Dimension of Risk Assessment

What is „Sound“ Science?

How much science do we need to make the „right“ decision?

Who should bear the regulatory burden until we have „enough information?“

Risk Philosophy

Precautionary Principle: Assume toxic until proven safe

If in doubt, then regulate

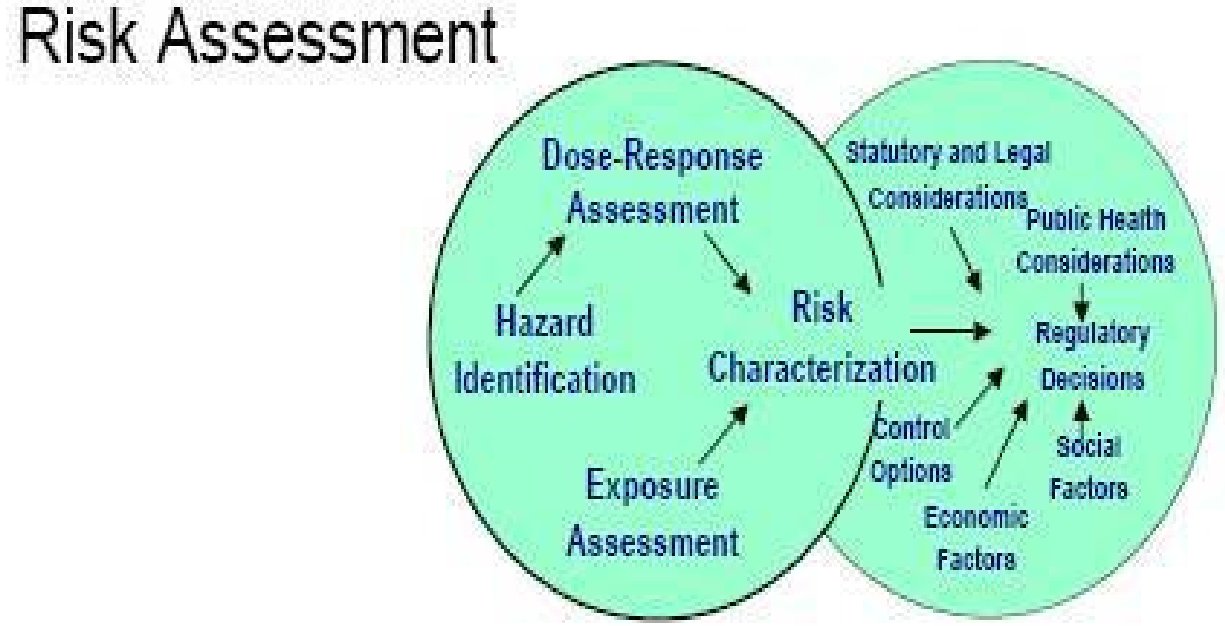
Business bears the burden

Free market Priciple: Assume it safe until a hazard is identified

If in doubt, do not regulate

Public bears the burden

Scheme of Risk Management



Organize for the Assessment

- Individual
- Individuals
- Group or team of individuals
- Groups

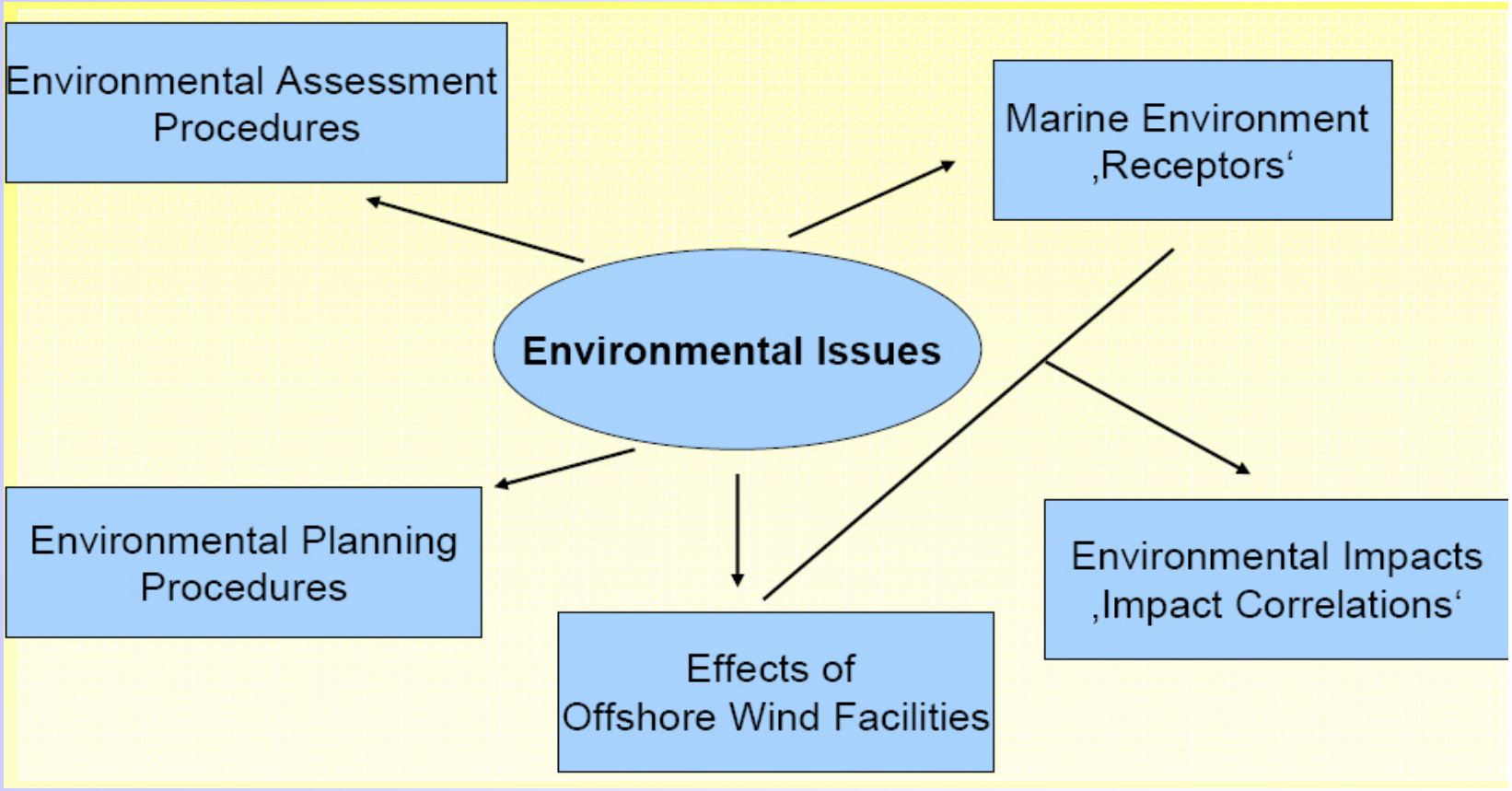
Define Relationships

- How will individuals, groups, etc., work together performing the tasks of:
  - data collection
  - analysis
  - synthesis
  - conclusions
  - recommendations

What do Analysts do?

- Identify threats and their characteristics
- Gather and exchange information
- Postulate potential consequences
- Estimate risk parameters

Environmental Assessment Offshore



Components of marine ecosystem

(potential receptors)

- birds (sea birds, resting birds, migrating birds)
- marine mammals
- fish
- benthos
- soil/seabed
- hydrology

- visual landscape
- men

Observations:

→ similar interpretation of national EIA-regulations on the marine environment

→ different levels of investigation needs

→ harmonisation of investigation methods desirable

The aims of this course

Compare the risks for power production offshore with those of other power production devices

- **Coal**
- **Nuclear**
- **Solar**

Course Programme

- The core of this course consist of self-directed learning elements at three different levels
  - Introductory Level
    - Assessment of Health Risks due to Car Accidents
    - A Step by Step Guide to a Healthier Workplace
  - Intermediate Level
    - Health Hazards due to Household Protection Agains Woodworm
    - Health hazards due to Radioactive Releases in the Vicinity of Nuclear Power Plants
  - Advanced level
    - Environmental Impact Assessment of Offshore Windpower
    - Life Cycle Assessments of Wind Energy and Other Renewables

Course Aids

- Introductiory Lectures
- The Course Handbook
- The Reader
- Task List

Sources

- INSAG 5, The Safety of Nuclear Power, International Atomic Agency, 1992
- Regions of Risk,*Kenneth Hewitt*, Longman,1997
- Environmental and Health Risk Assessment and Management: Principles and Practices, Von Paolo F. Ricci, 2006, Springer Verlag

- Life Cycle Assessments of Wind Energy and Other Renewables, *Gregory A. Norris,* KSU,2006
- labsafety.tamu.edu
- www.safety.ed.ac.uk/training

P·O·W·E·R
Pushing Offshore Wind Energy Regions

Interreg North Sea Region