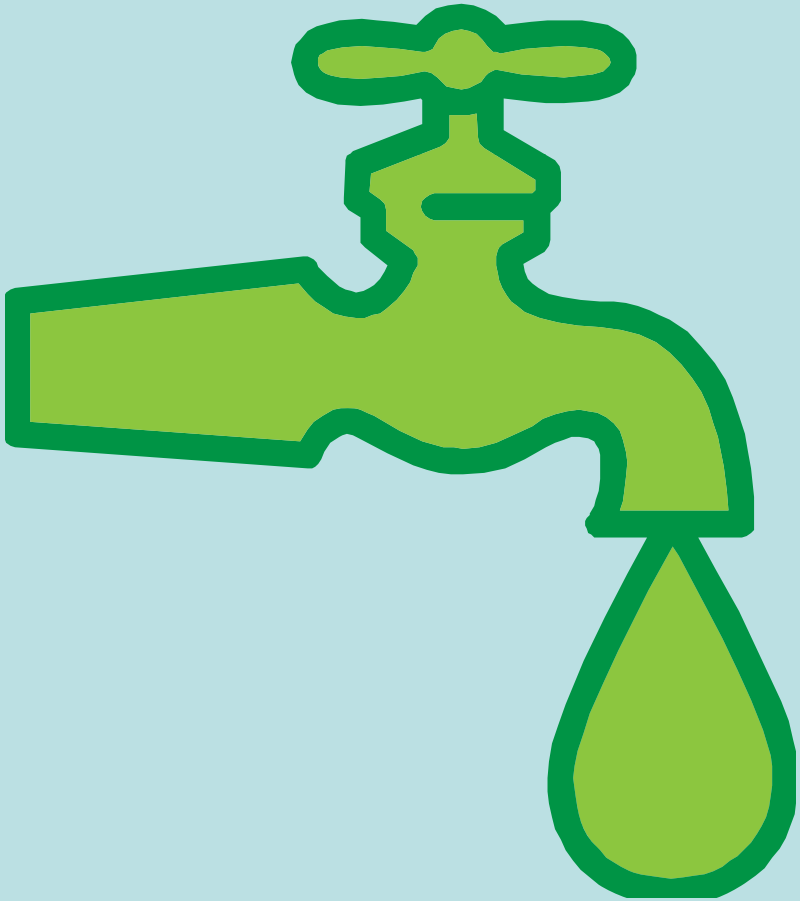
Are We Scaring Ourselves To Death?

by

Robert L. Skinner

Drinking Water

- Can I Drink It?

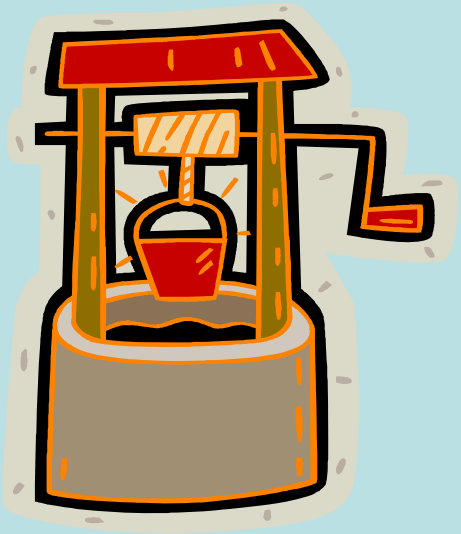


Water well at mountain cabin

- Minimum detectable level for lead
  - ppm (0.0000001) 1950's
  - ppb (0.0000000001) 1965
  - ppt (0.0000000000001) 1975
  - ppq (0.0000000000000001) today

The case of the vanishing zero

0 0 0 0 0 .



One ppq

- One part in 10^{15}
- One drop in

13,000,000,000 gallons

45,000 rail cars

Toxicologists

- Small amounts are not a problem
- Body is made to ward off environmental pollutants
  - Intestinal lining
  - Covering of eye
  - Skin
  - Liver

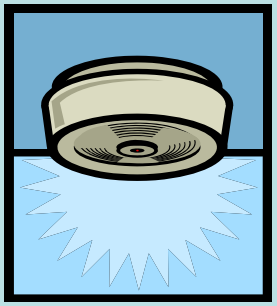
Toxicologists

- Everything is harmful in the right amount
- Most things are not harmful in small amounts
- How much and how often

- Constant warnings make us numb to real dangers

Focus on real hazards

Cigarette smoking
Seat belt usage
Smoke detector use
Diet
Drug/alcohol abuse
Unsafe sexual behavior

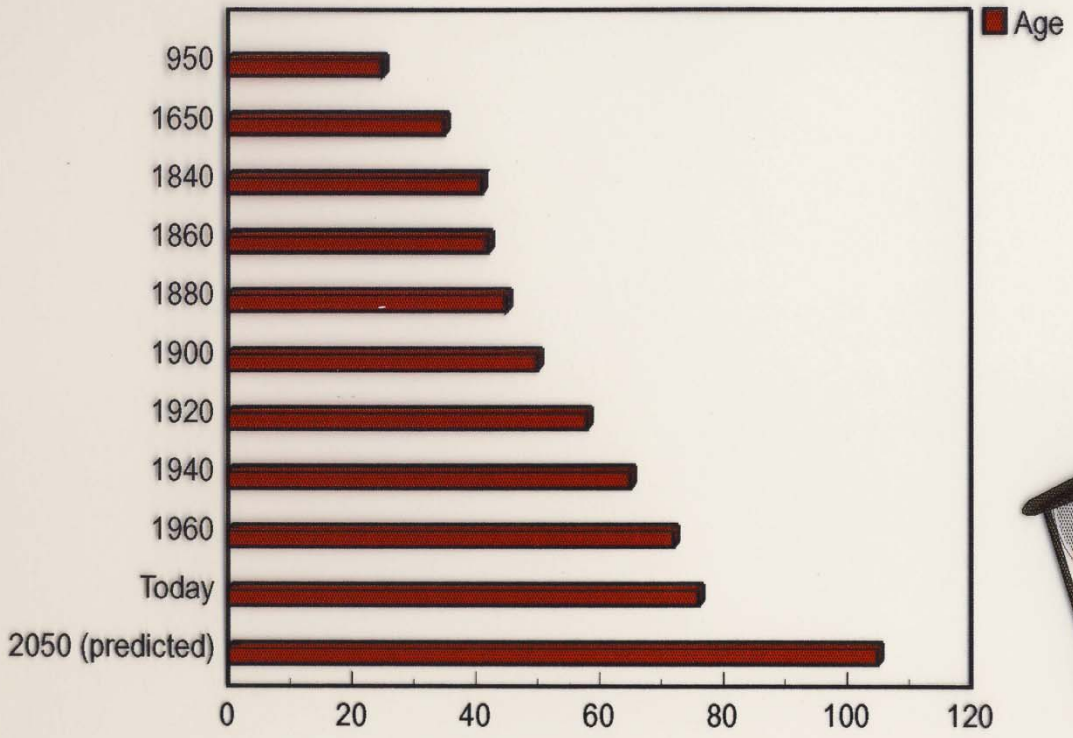


We are the healthiest we have ever been – increasing life expectancy

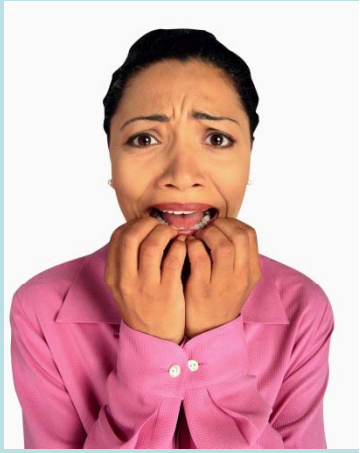
Tanning Booths

- Teenagers call them “Fake and Bake”
- Increase melanoma incidences in women aged 20-40 by two (based on one visit per month)
- See dermatologist regularly if used

Life Expectancy in Years



Big Fear – Little Risk



- Carcinogens and mutagens are everywhere
- Plants make them to ward off insects
- High dose – problems
  Low dose – no known problem
- Irradiation of food/canning of food

Cleanup at Landfill

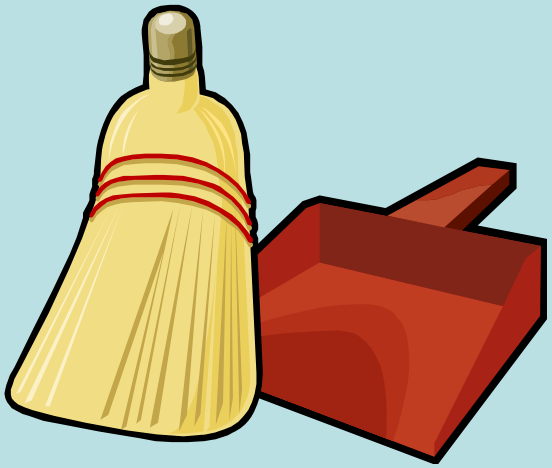
- HF spill
- Cleanup of contaminated soil
- To what level do you clean?

Cleanup of Uranium Mill Tailings

- Radioactivity
- Grand Junction, Colorado
- Moab, Utah to begin

Cleanup of Nuclear Facilities

- How clean is clean?
- No detectable activity
- Half life of contaminant
- Leave in place
- Remove to another site
- Public relations



Perception

- Some hazards are perceptions by people
- Which is the most hazardous
  - Airline travel
  - Automobile travel
  - Train travel

Fatalities for 2005

- 22 - Commercial aircraft
- 887 – Trains (includes crossings)
- 43,443 - Automobiles

Fatalities per 100M miles

Type	fatalities	injuries	m/miles
Planes	2.7	1.6	8,166
Trains	18	993	90
Autos	14.7	941	2,989,807

Source: DOT Transportation Statistics

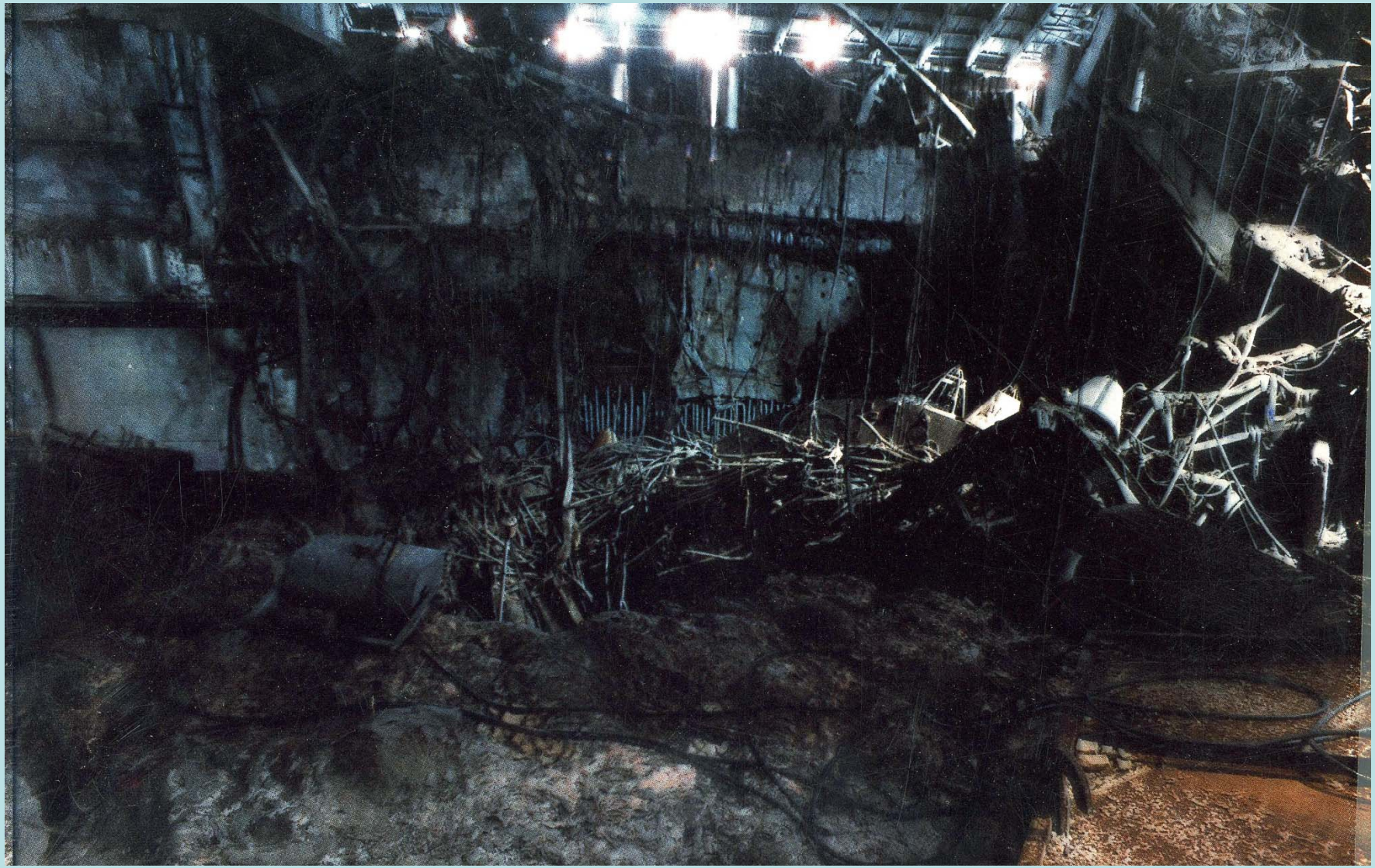
Perspective

- Cars have 6.2 million accidents/year
- 2.7 million injured/year
- 4.3 million crashes with other cars/year

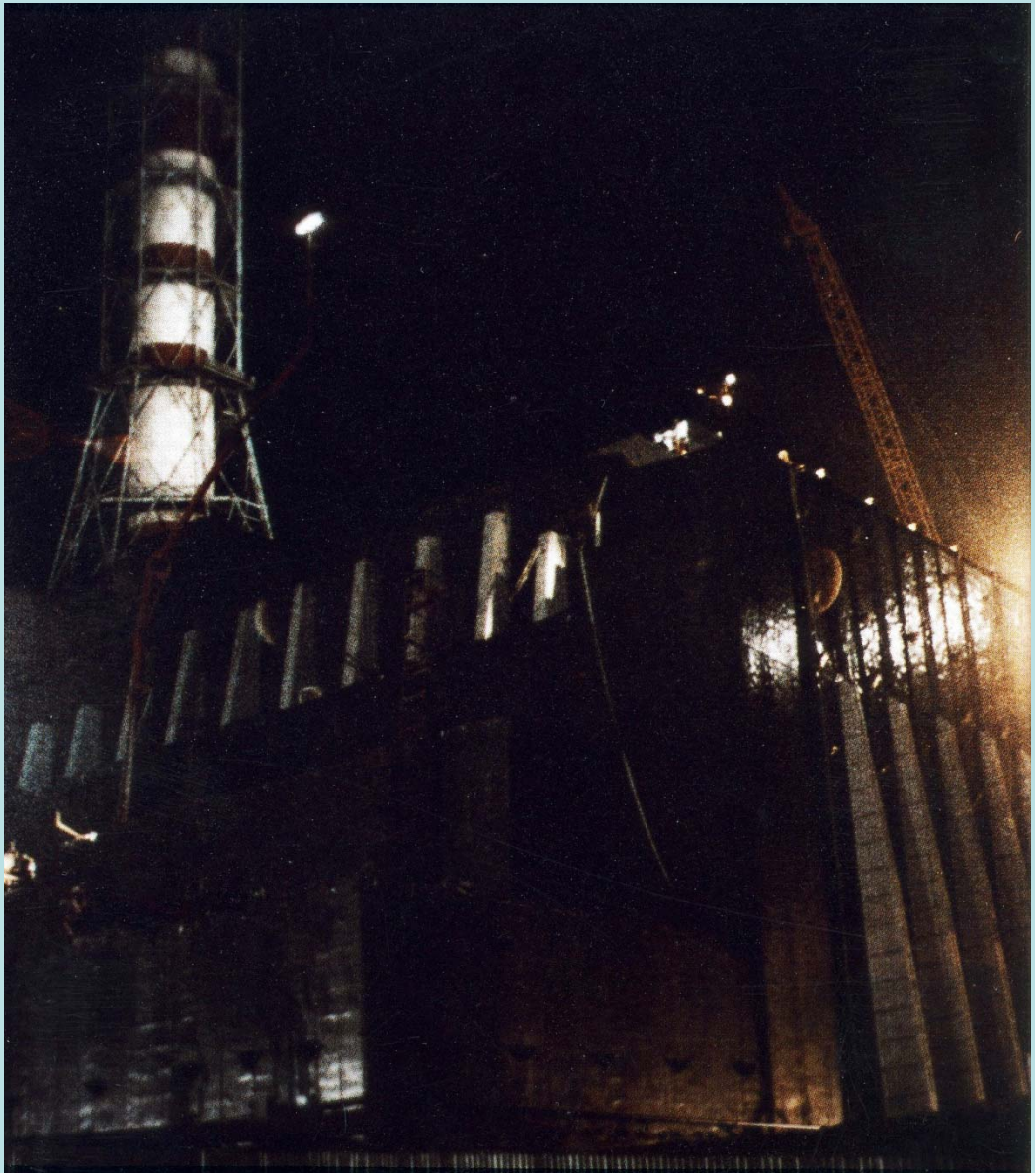
Hazardous Activities/Technology

- Pick the top five – in order
  - Surgery
  - Motorcycles
  - Nuclear power
  - Mountain climbing
  - Alcoholic beverages
  - Police work
  - Large construction
  - Handguns
  - Food preservatives
  - Fire fighting
  - Swimming
  - Motor vehicles
  - Smoking
  - Railroads
  - School football
  - Pesticides
  - Hunting
  - Contraceptive use

Chernobyl Reactor Accident



Chernobyl Sarcophagus



Chernobyl

- Worst reactor accident in history
- Radioactive material dispersed throughout the entire world
- 33 people died
- Many cases of thyroid cancer
  - Primarily children
  - Could have been prevented
  - Thyroid cancer is operable

Child Safety Seats

- Millions $ spent on compliance
- Police setup checks on installation
- Major news media coverage
- Many emails
- Warning labels

Child Seat Fatalities

- Less than 10 nationwide

Other Concerns

- E-coli
- Salmonella
- Lead paint
- Bird flu
- Taxes
- Guns in classrooms
- Transportation of hazardous materials
- Others