Uranium & the Environment

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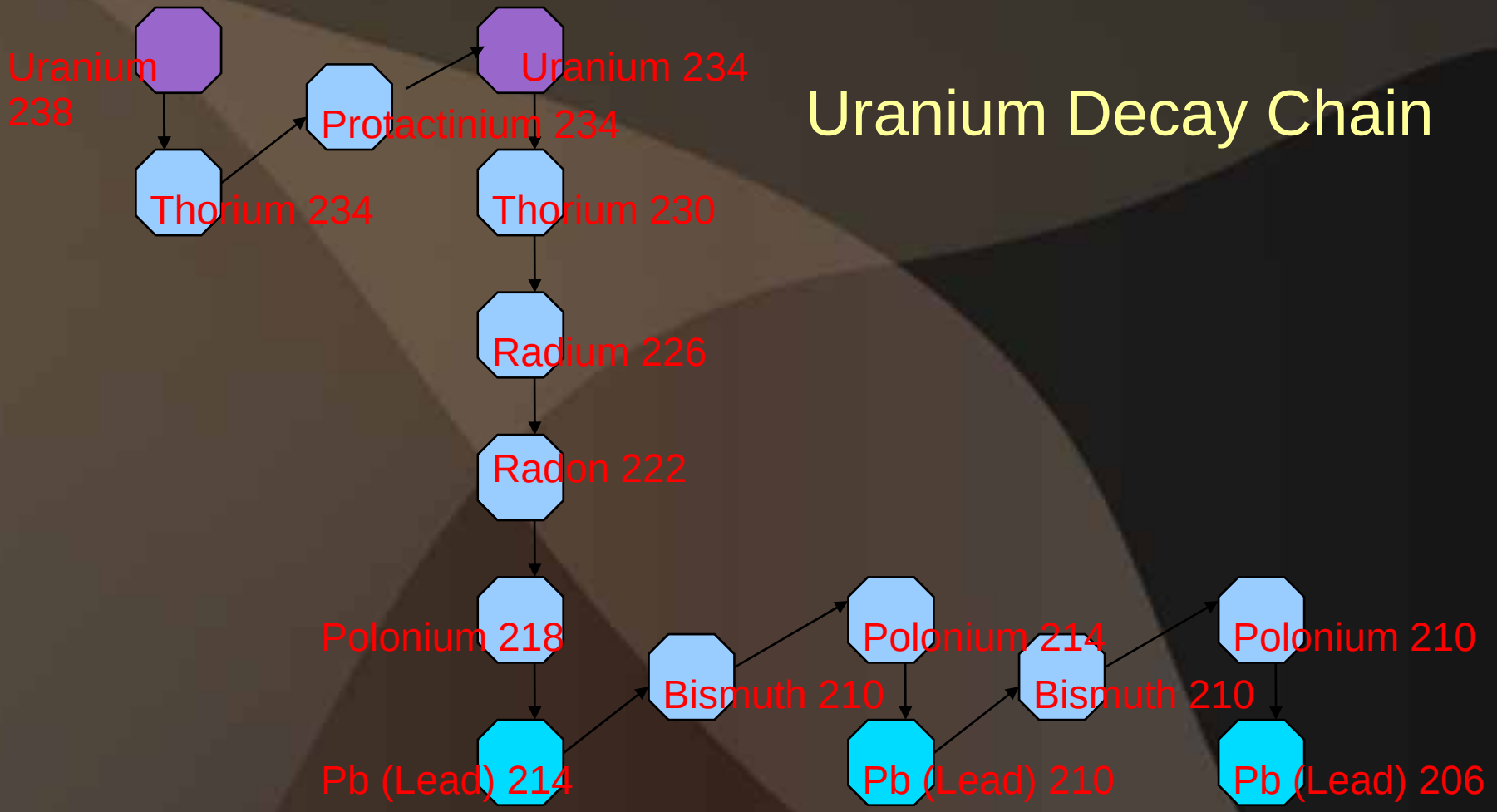
Uranium 238
92

Uranium 235
92

Uranium 234
92

Uranium Decay Chain

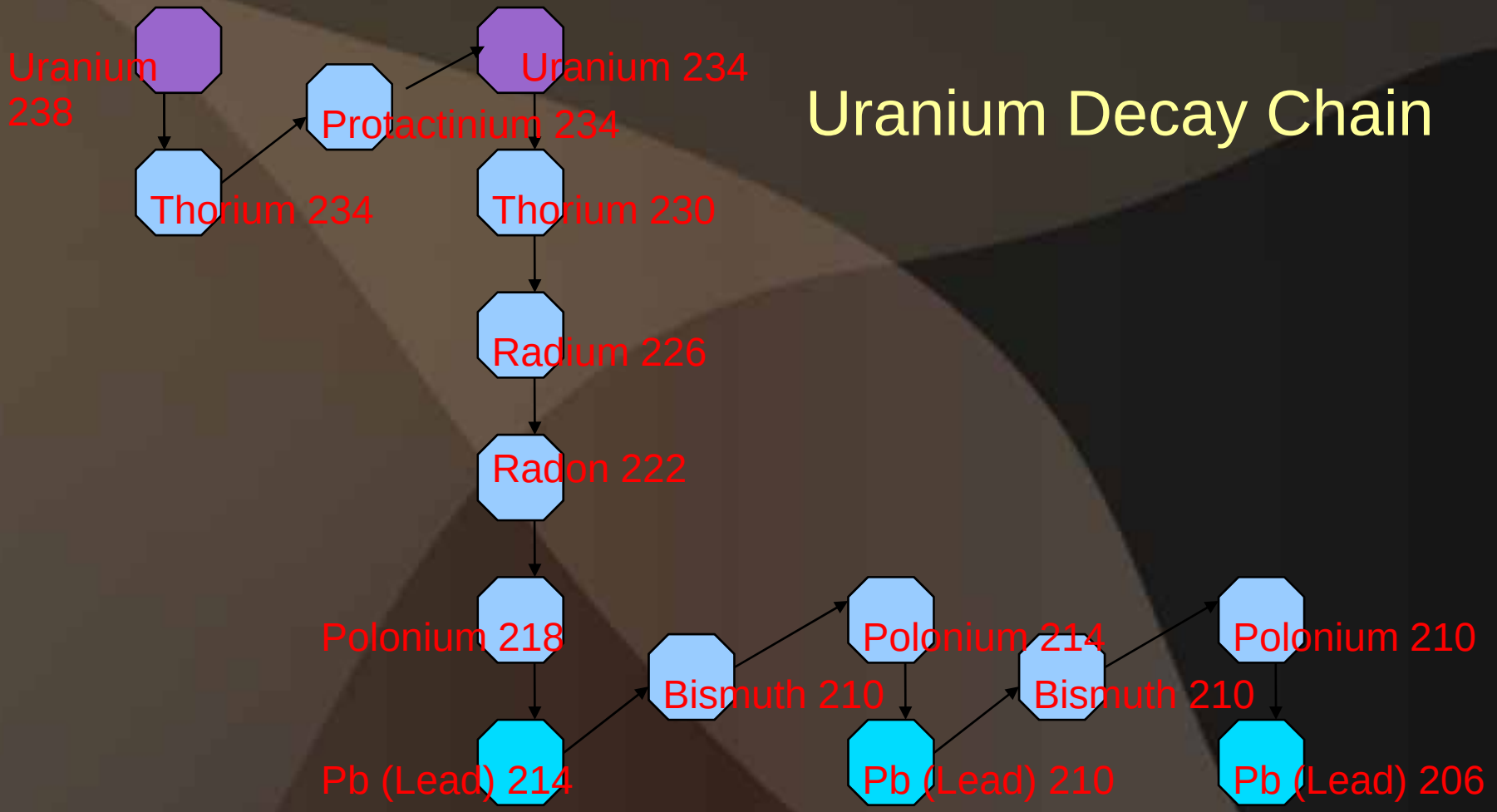


α Alpha radiation = helium nuclei

β Beta radiation = electrons

γ Gamma radiation = photons

Uranium Decay Chain



Point # 1

From the health perspective:

Mining is messy

Heavy metal mining is messier

Radioactive heavy metal mining is messiest

Heavy metals cause:

Encephalopathies
Renal Failure

Increased chance of illness during pregnancy.
Harm to a fetus, including brain damage or death.
Fertility problems (in men and women).
High blood pressure.
Digestive problems.
Nerve disorders.
Memory and concentration problems.
Muscle and joint pain.
Skin rashes and dermatitis; mood swings;memory loss; mental disturbances; and muscle weakness.

In children:
Nervous system and kidney damage.
Learning disabilities, attention deficit disorder, and decreased intelligence.
Speech, language, and behavior problems.
Poor muscle coordination.
Decreased muscle and bone growth.
Hearing damage.
Seizures, unconsciousness, and death.

Fluorides:

Uranyl fluoride UO_2F_2

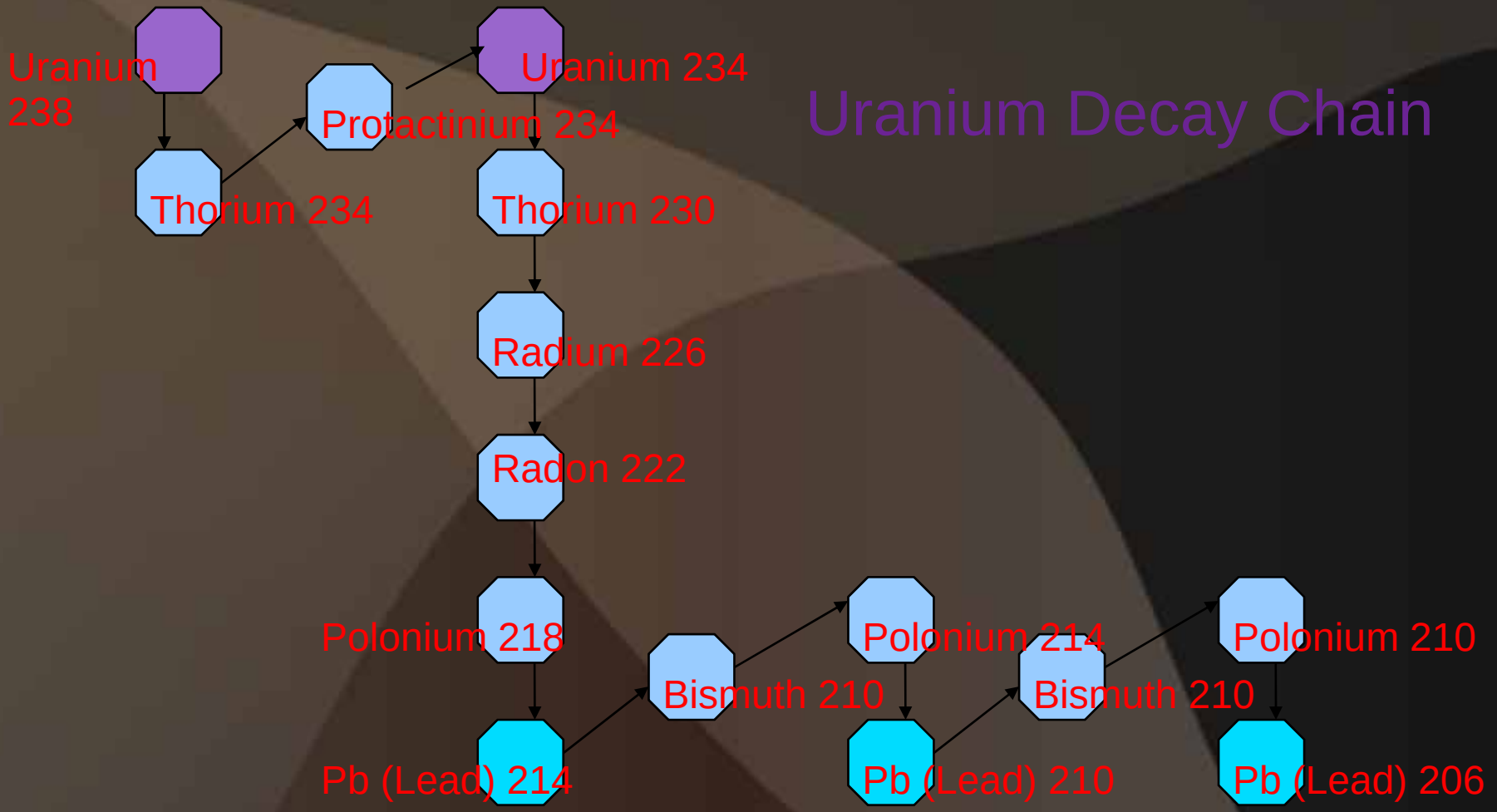
Uranium tetrafluoride UF_4

Oxides:

Uranium dioxide UO_2

Triuranium octaoxide U_3O_8

Uranium Decay Chain



Point # 2

The fox is minding the chicken coop.

Decisions about the safety of radioactive elements are made by producers and suppliers

Radiation Effects Research Foundation (RERF)

Convened by the US Atomic Energy Commission

International Committee on Radiation Protection (ICRP)

Members: 13 countries which produce or depend upon the uranium market

ALARA Principle: “As Low As Reasonably Achieveable”

International Atomic Energy Agency (IAEA)

Mandate: "to accelerate and enlarge the contribution of atomic energy to peace, health and prosperity

Members: Countries which produce radioactive substances

Point #3

Research on the effects of uranium mining is notable by its absence

Updated Analysis of the Eldorado Uranium Miners' cohort: Part I of the Saskatchewan Miners' Cohort study, 2006

Dr. Geoffrey R. Howe

Flaws in research:

1. Exposure to ionizing radiation is dependent upon industry self-reporting

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Germany - KiKK Studies: released in 2007, 2008

UK - COMARE studies: 1984 and 2005

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1. Exposure to ionizing radiation is dependent upon industry self-reporting

2. Latency periods for the effects of radiation in producing cancer or chronic disease is very long

3. Populations too small to show statistical significance of rare diseases

4. Omission of vital pieces of information – still births, abortions

5. Inclusion of data which dilutes the result
6. Exclusion of key geographic areas

Teratogenic effects:

Dr. Alice Stewart – UK, 1950's

Dr. Rosalie Bertell – USA, 1960's

Their combined efforts changed the ways in which x-ray exposures were permitted during pregnancy and the ways in which we shelter the gonads during radiation exposure.

Human Health Implications of Uranium Mining and Nuclear Power Generation

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http://pgs.ca/wp-content/uploads/2008/03/human-health-im_ation2009-21.pdf

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