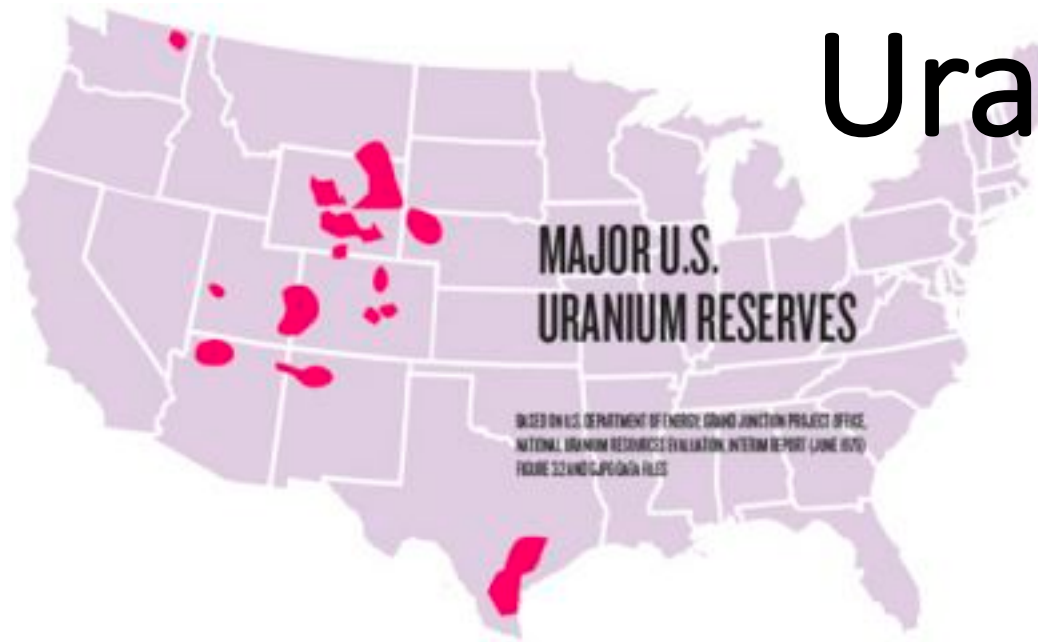



Nuclear Energy

by Imane Khalil


Uranium



How Much **Radiation** Is In
A Chunk of
Uranium Ore?



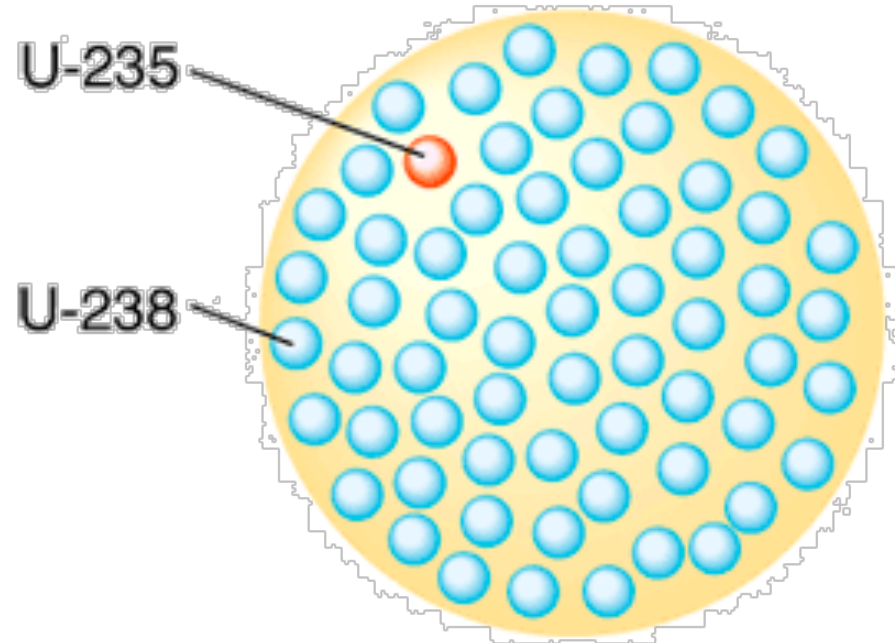
**SAME AS A
BUNCH OF
BANANAS.**



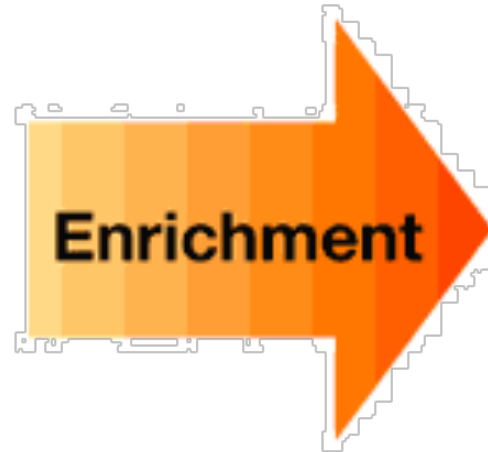
The image is a graphic with a textured, light brown background. It features the text 'How Much Radiation Is In A Chunk of Uranium Ore?' at the top. Below the text is an illustration of a hand holding a small, dark, crystalline rock specimen. At the bottom, there is an illustration of a bunch of yellow bananas. The text 'SAME AS A BUNCH OF BANANAS.' is written in large, bold, red letters.



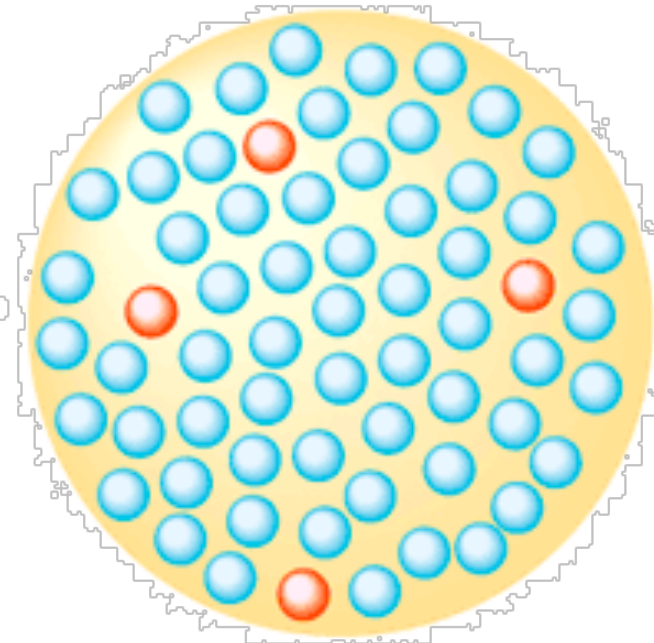
Natural Uranium



U-235
Approximately 0.7%



Enriched Uranium

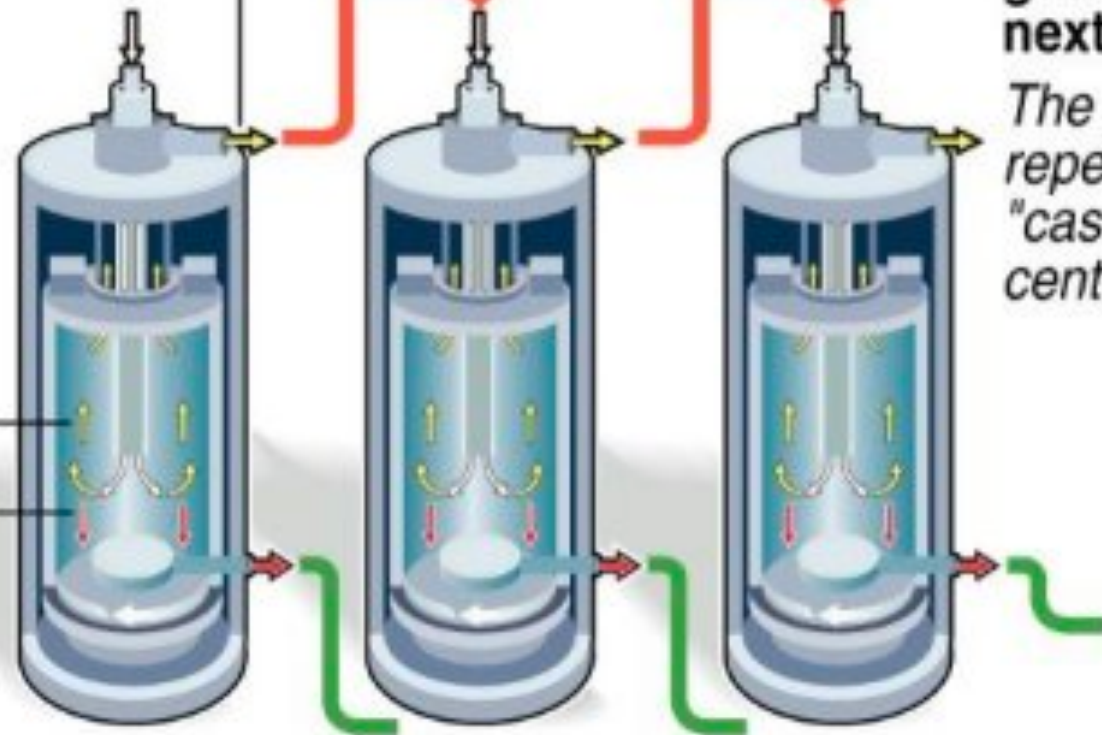


U-235
Approximately 3~5%

Gaseous uranium goes into a **centrifuge**

Lighter **U235** moves upwards

Heavier **U238** descends



U235-enriched gas sent to next centrifuge

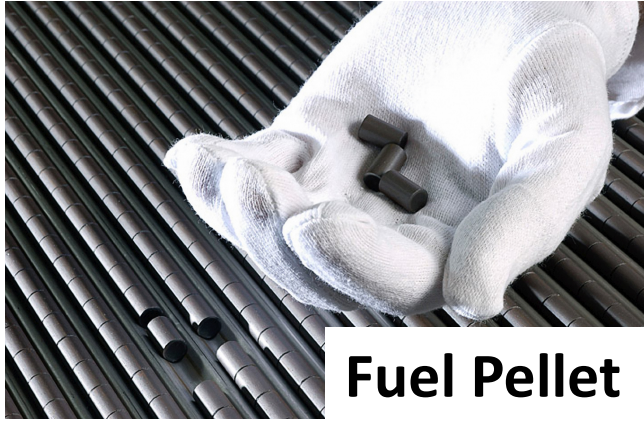
The process is repeated in a "cascade" of centrifuges



Civil use: the proportion of U235 is increased 4-5% to produce fuel for power stations



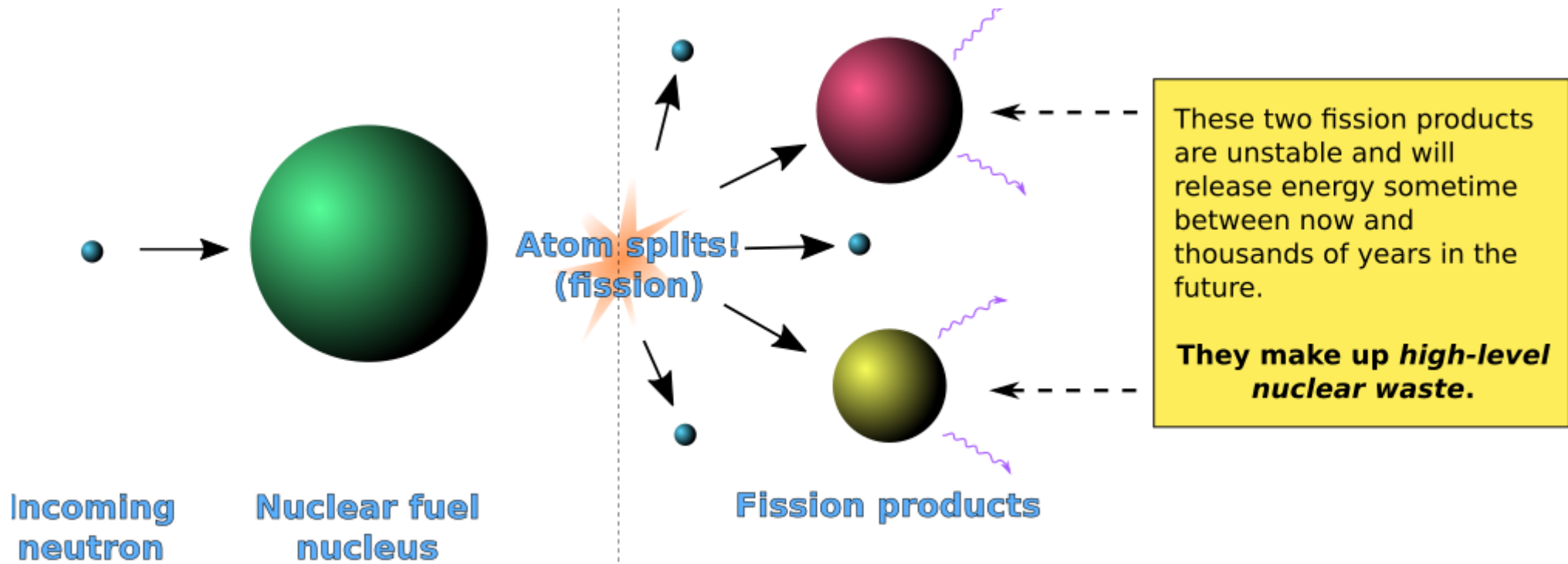
Military use: uranium enriched to at least 90% of U235 to produce nuclear weapons

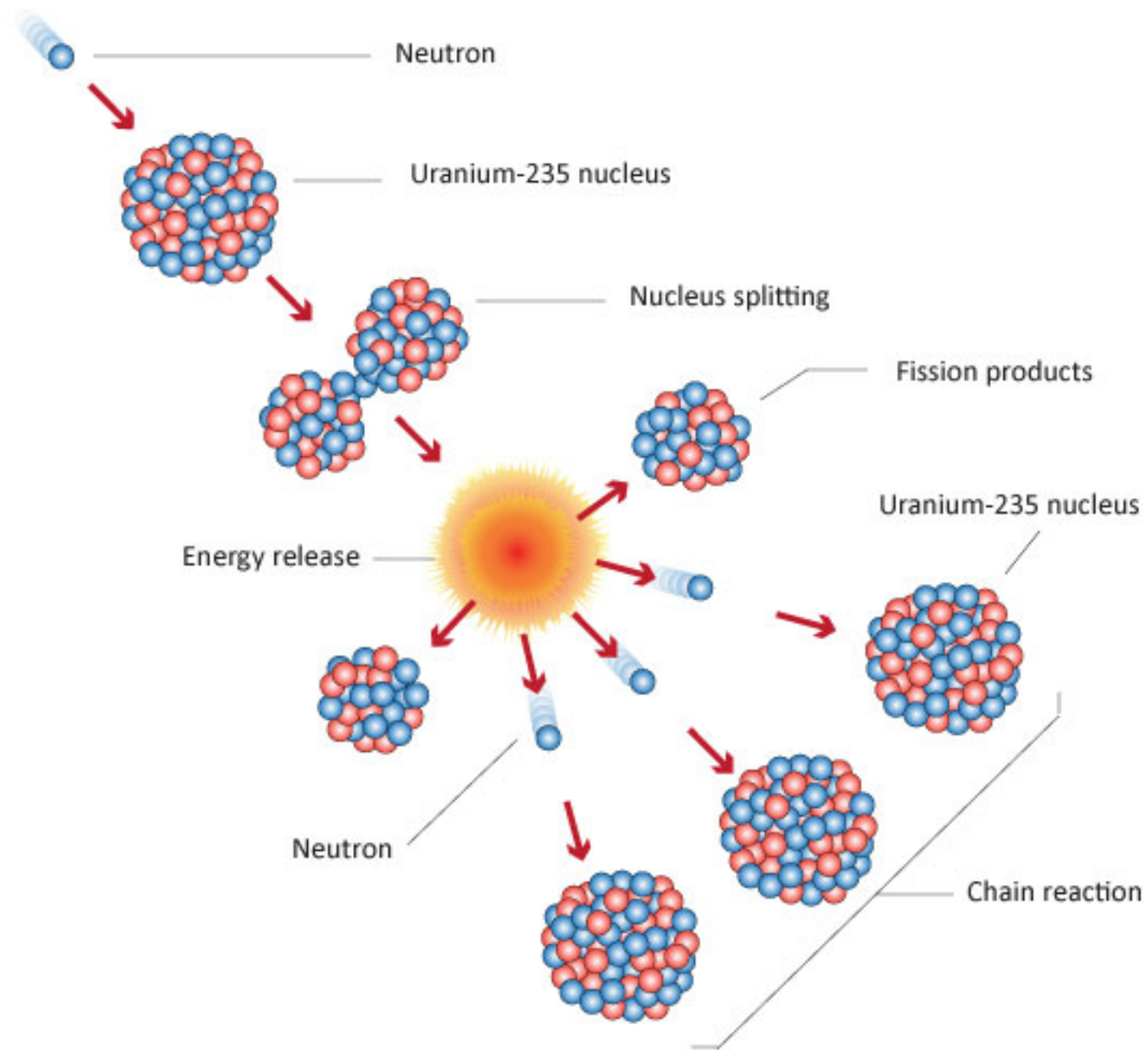


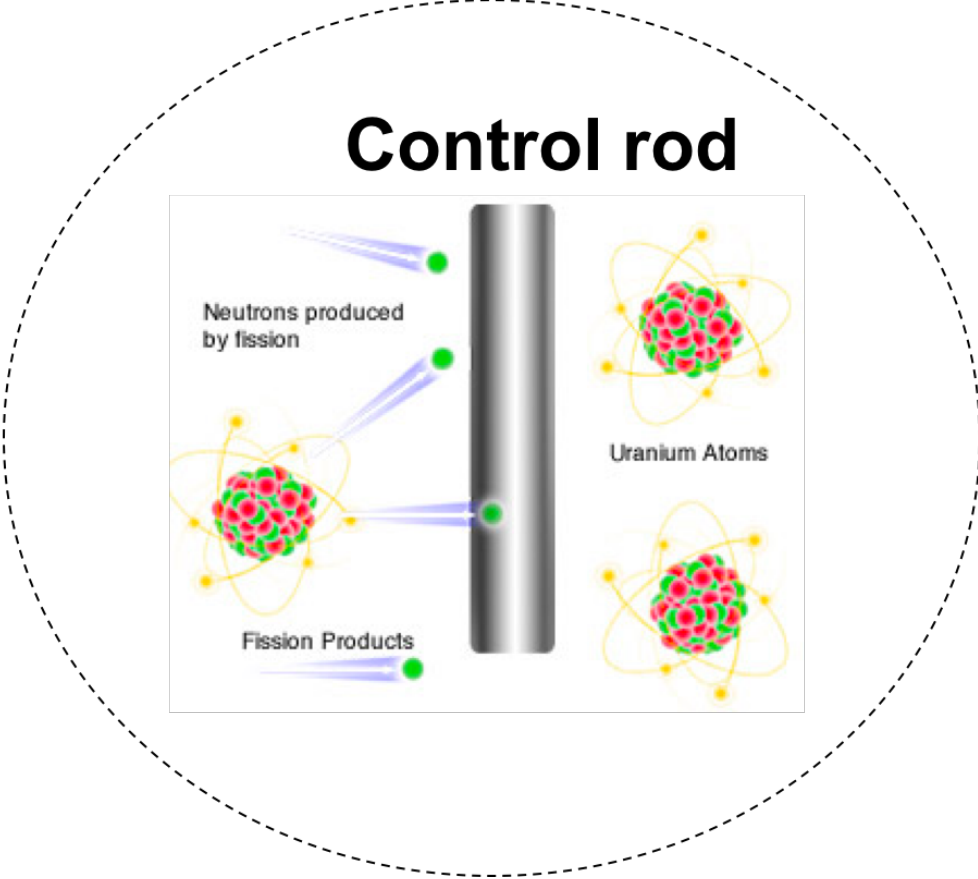
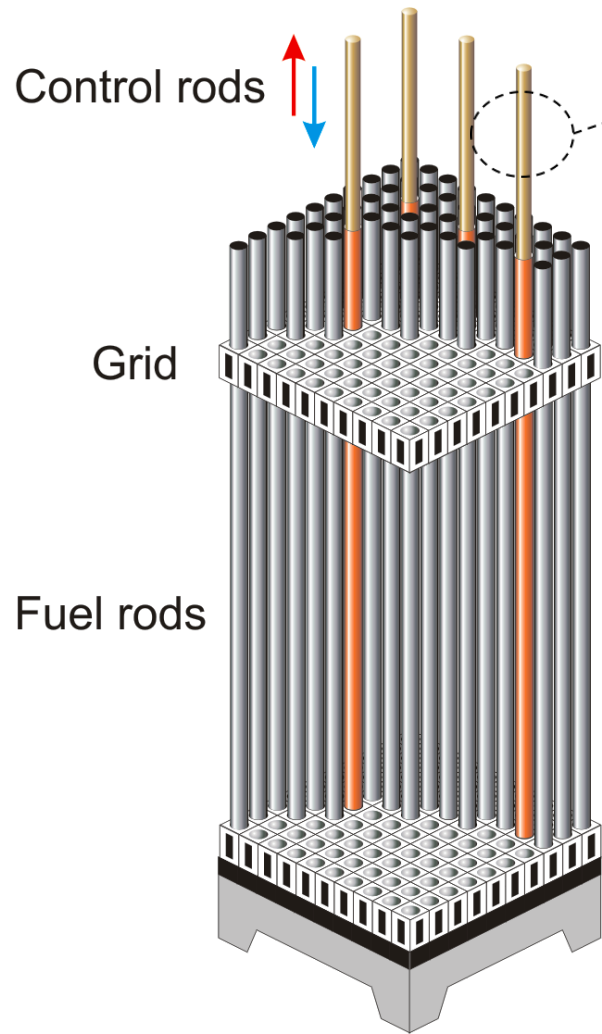
Fuel Pellet

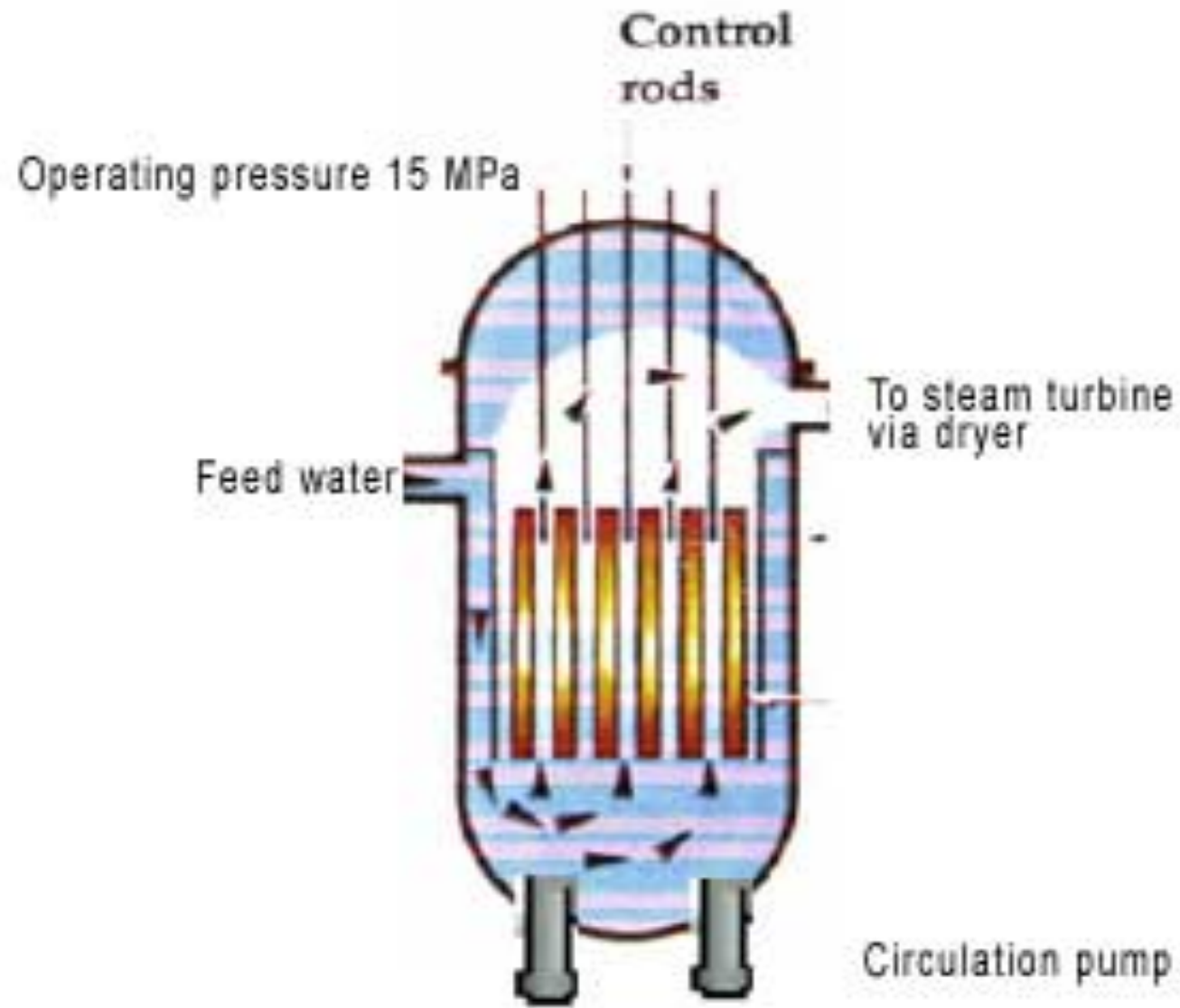


Fuel Assemblies

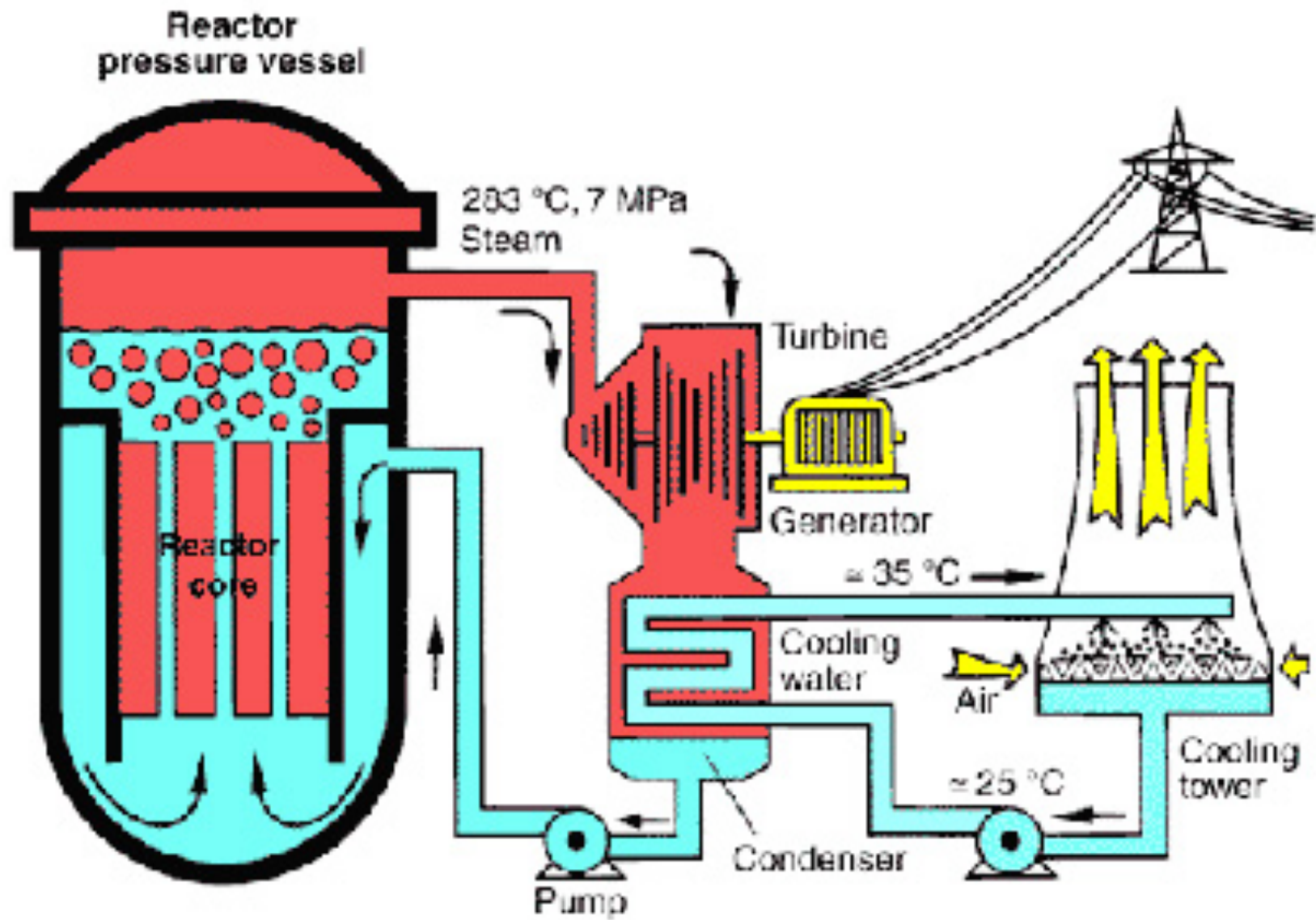








Boiling Water Reactor

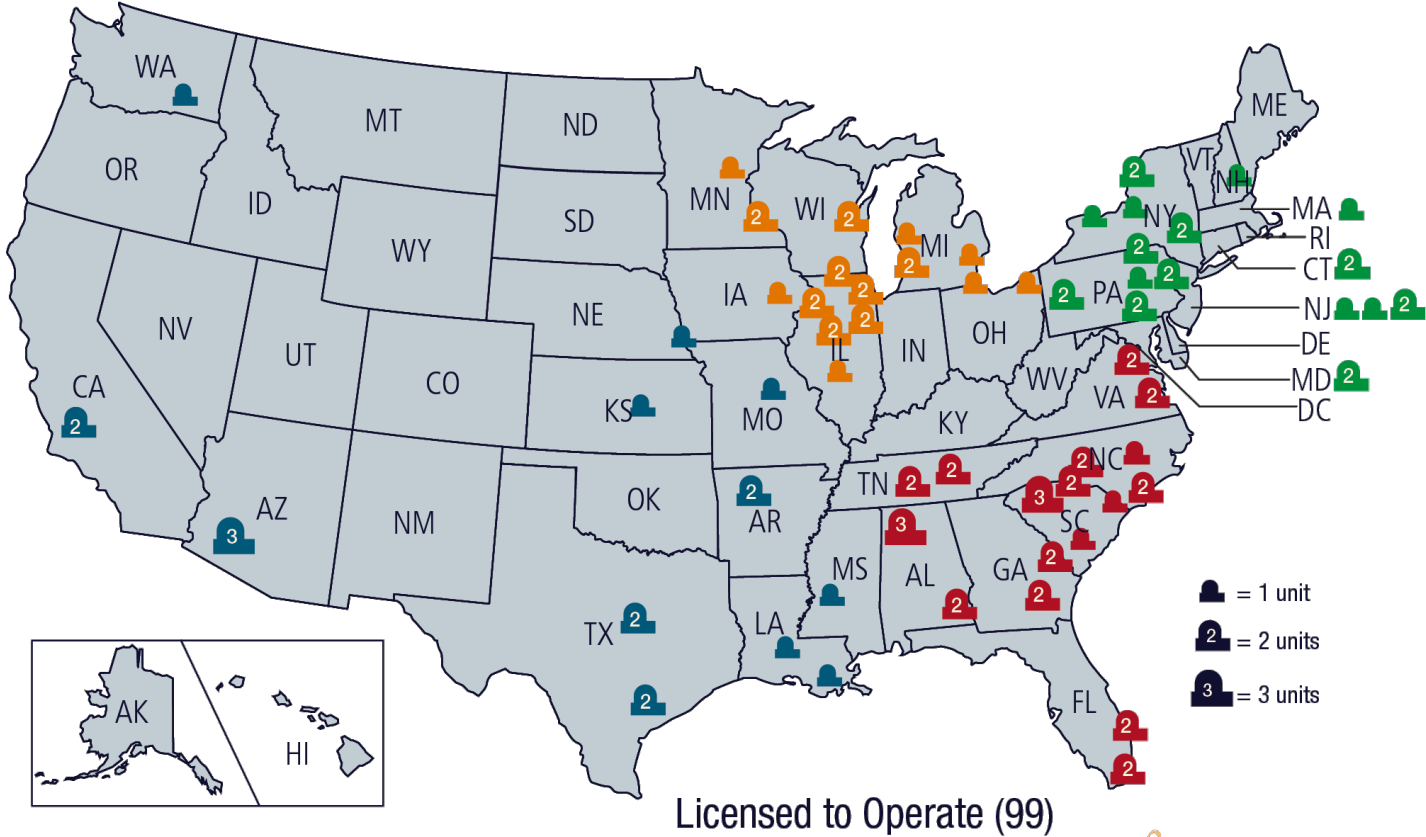




**Argonne National Laboratory
December 1951**

14% of the world's electricity comes from nuclear power

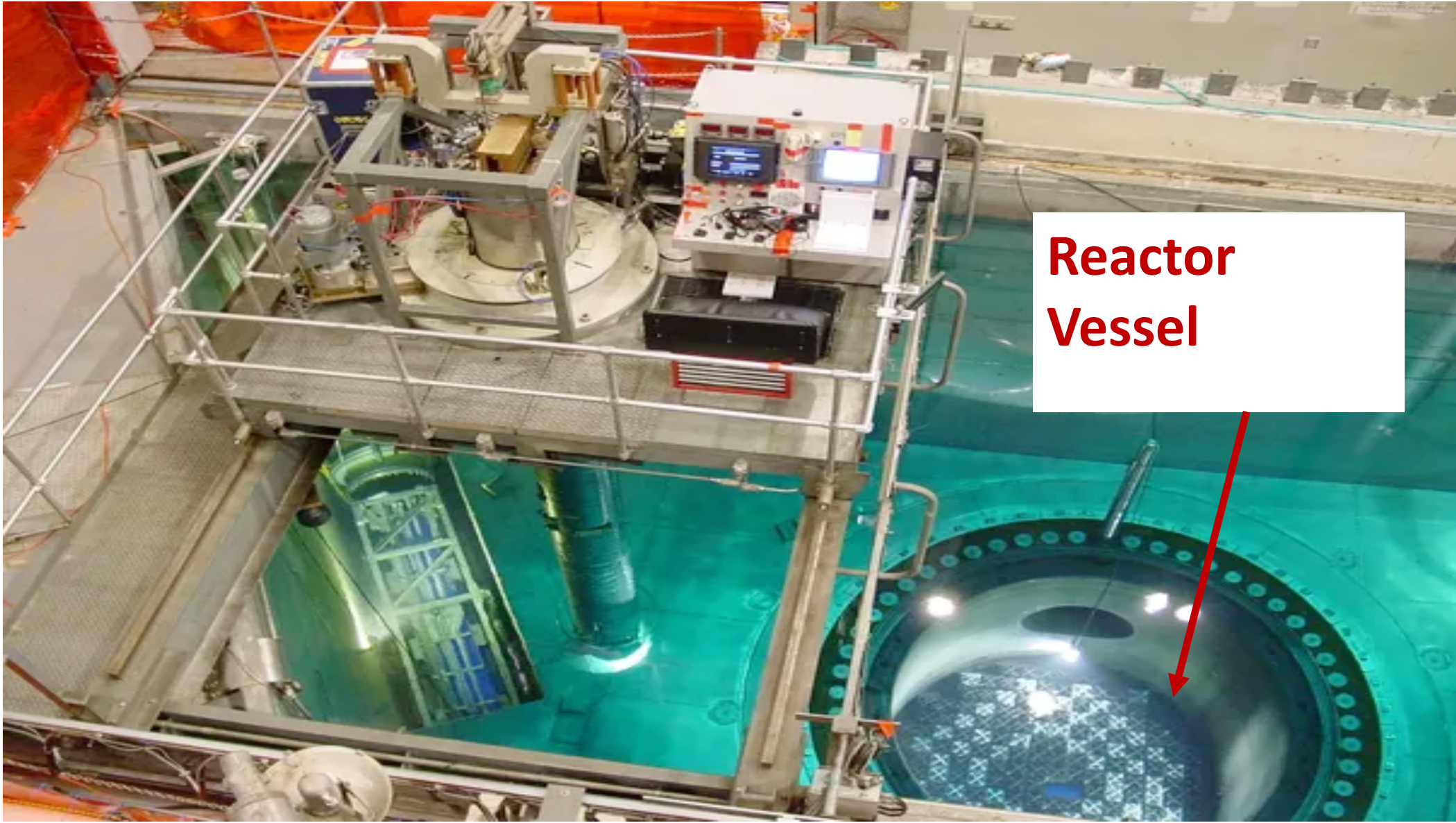
U.S. Operating Commercial Nuclear Power Reactors



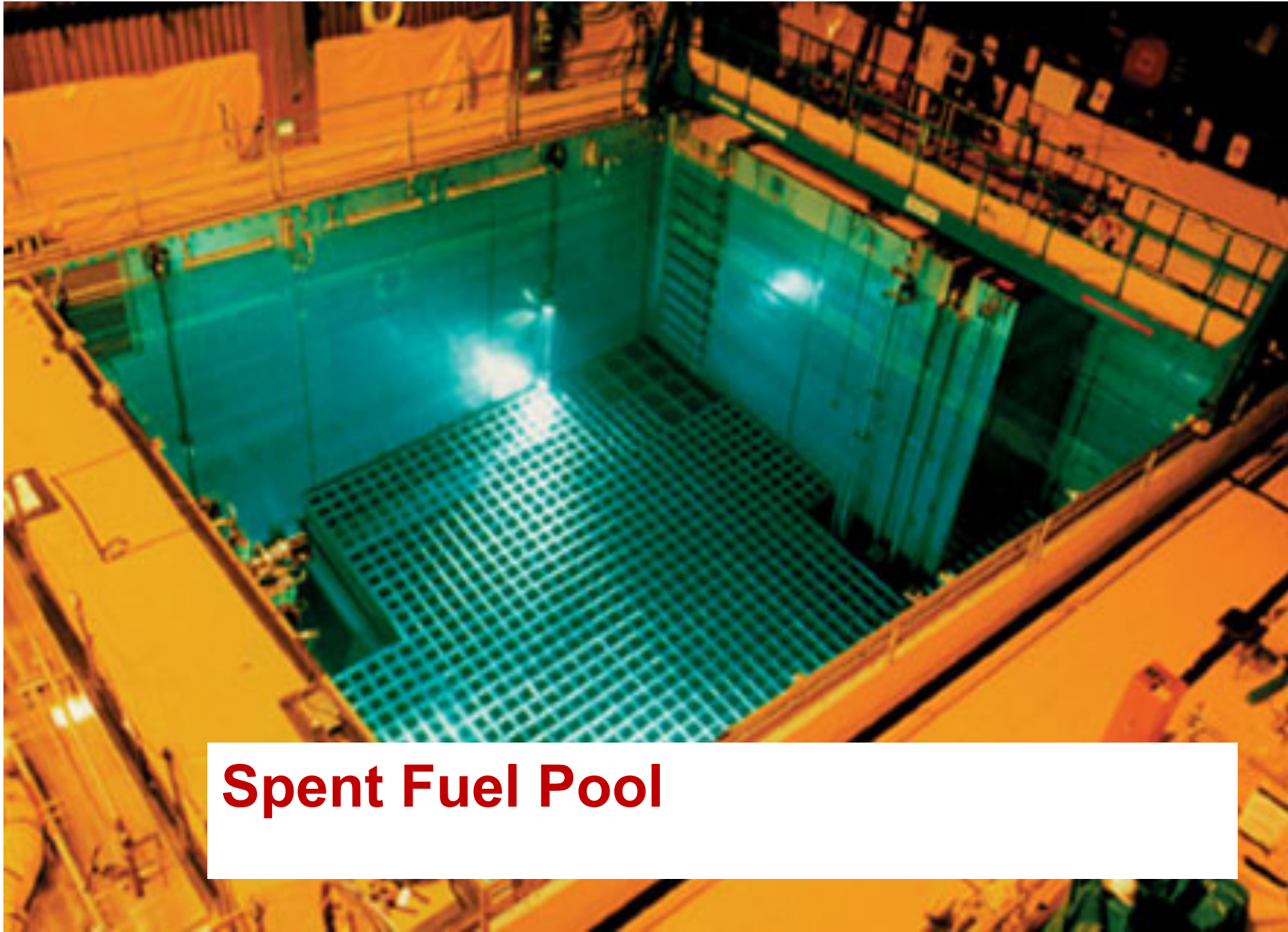
20% of the US electricity comes from nuclear power

As of May 2017



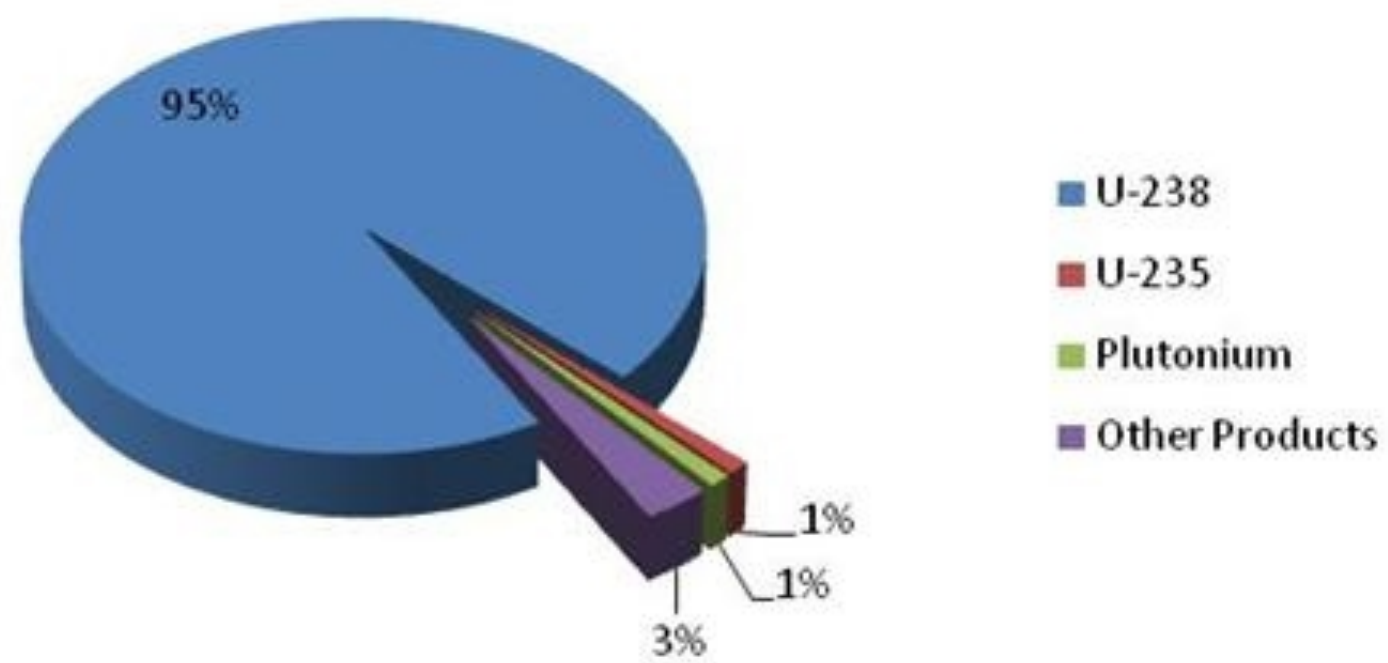


**Reactor
Vessel**



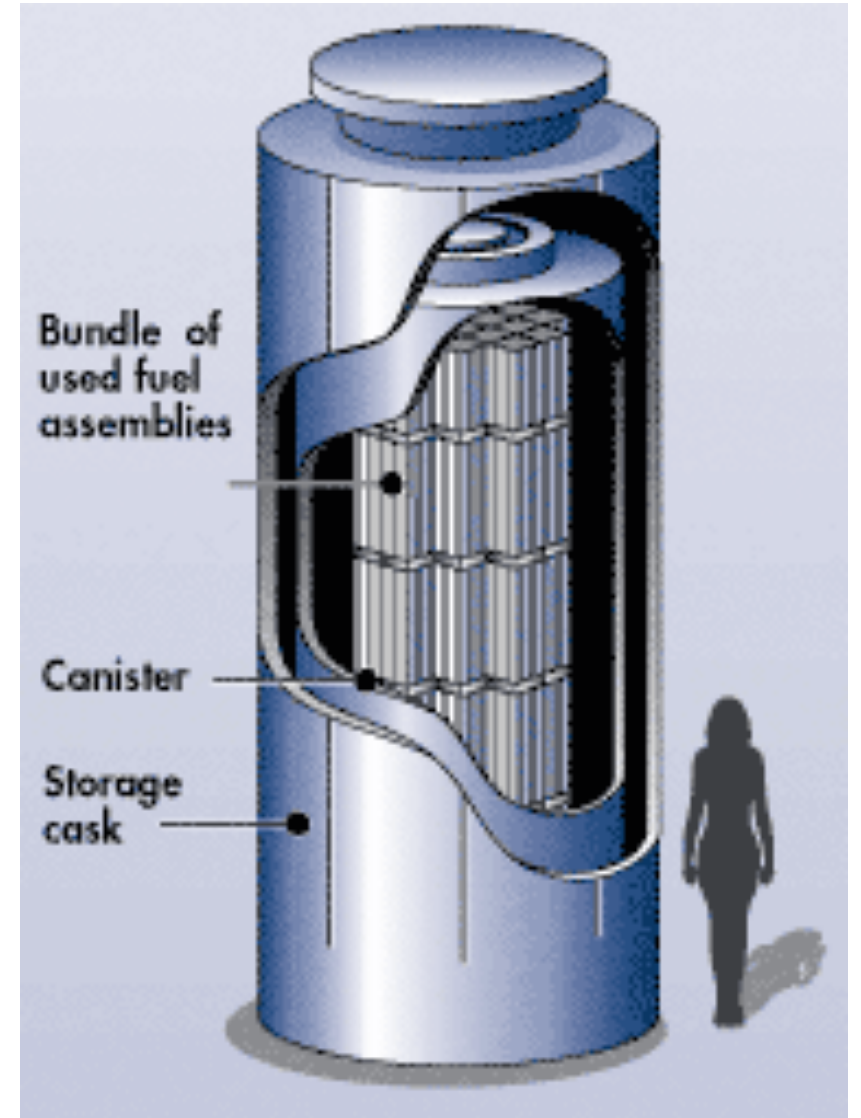
Spent Fuel Pool

Spent Fuel Rod Components



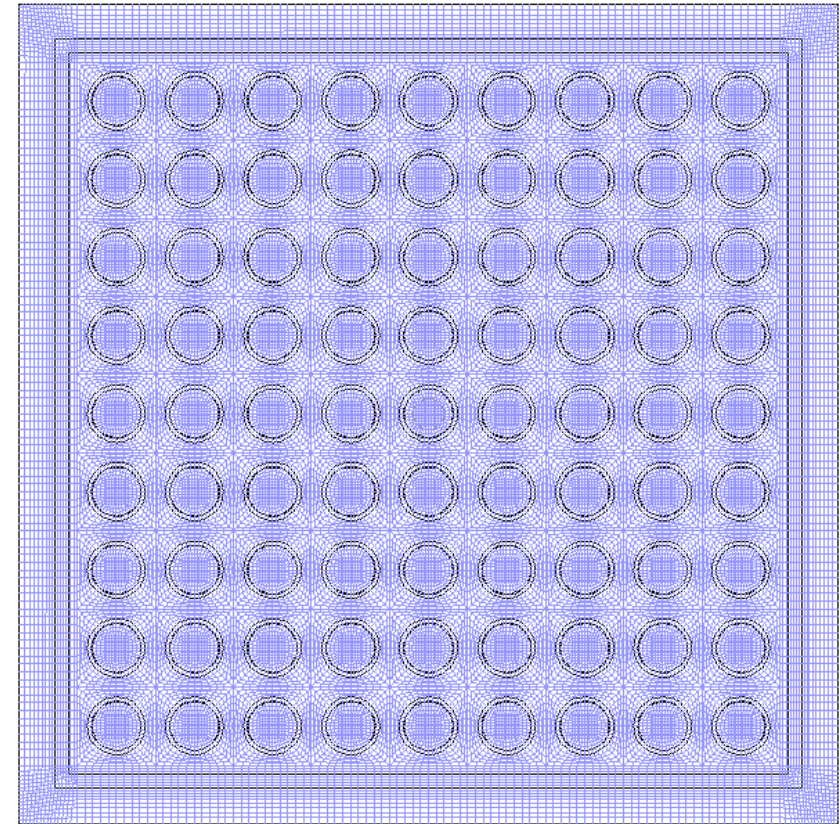
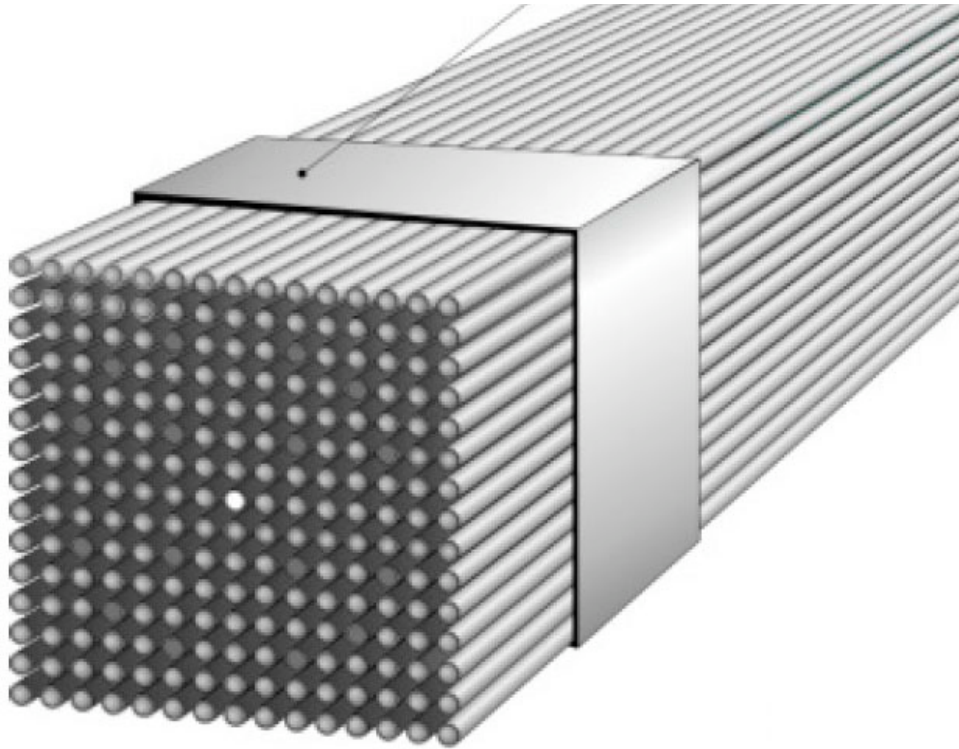


Dry Storage Casks



San Onofre

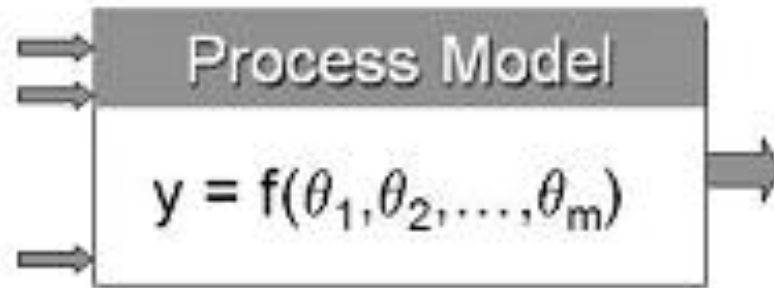
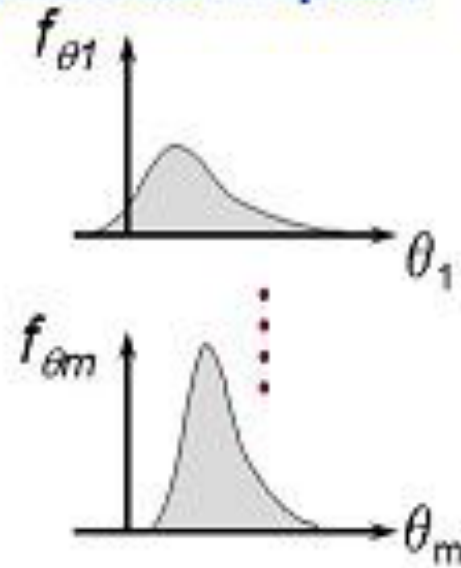




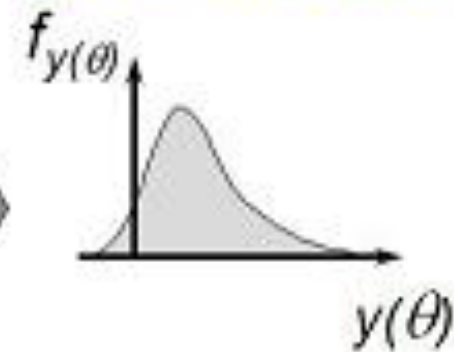
**Two-Dimensional Model
of Spent Fuel Assembly**

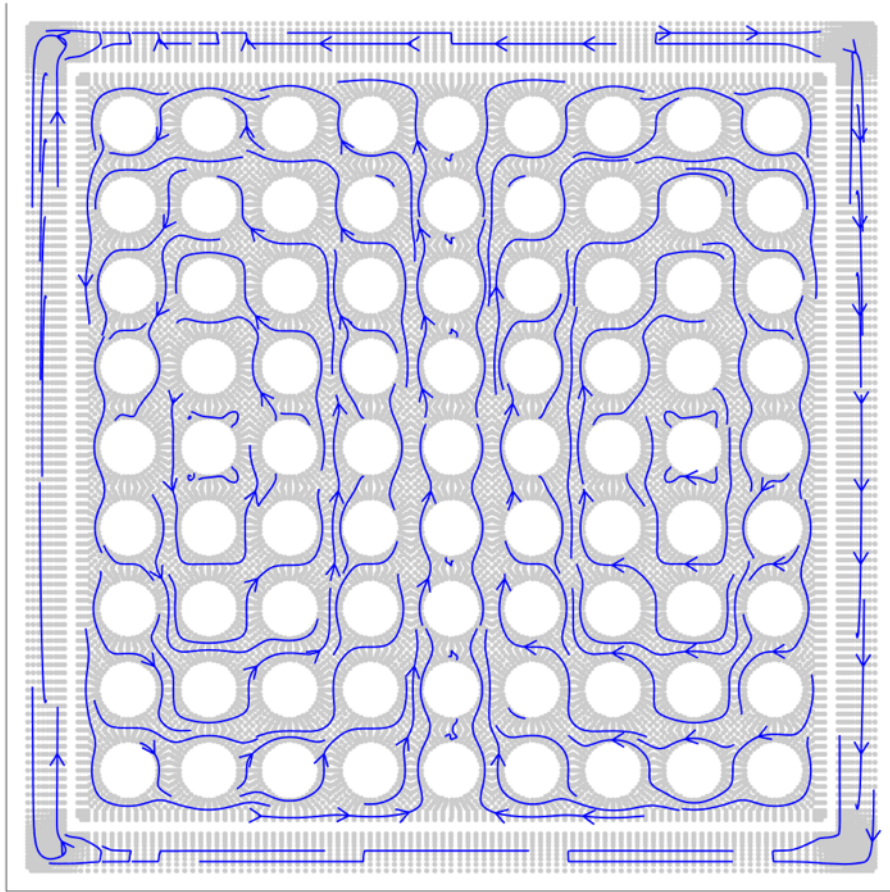
Uncertainty Quantification

Uncertain Inputs

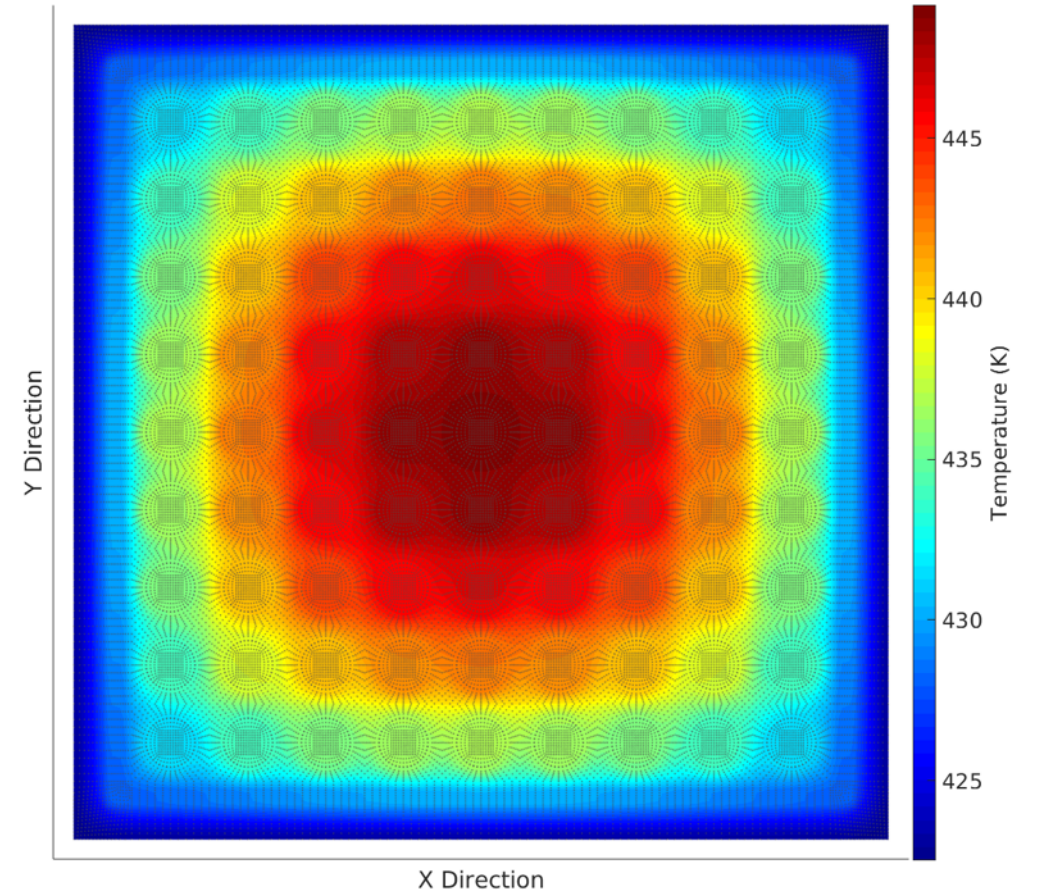


Uncertain Output



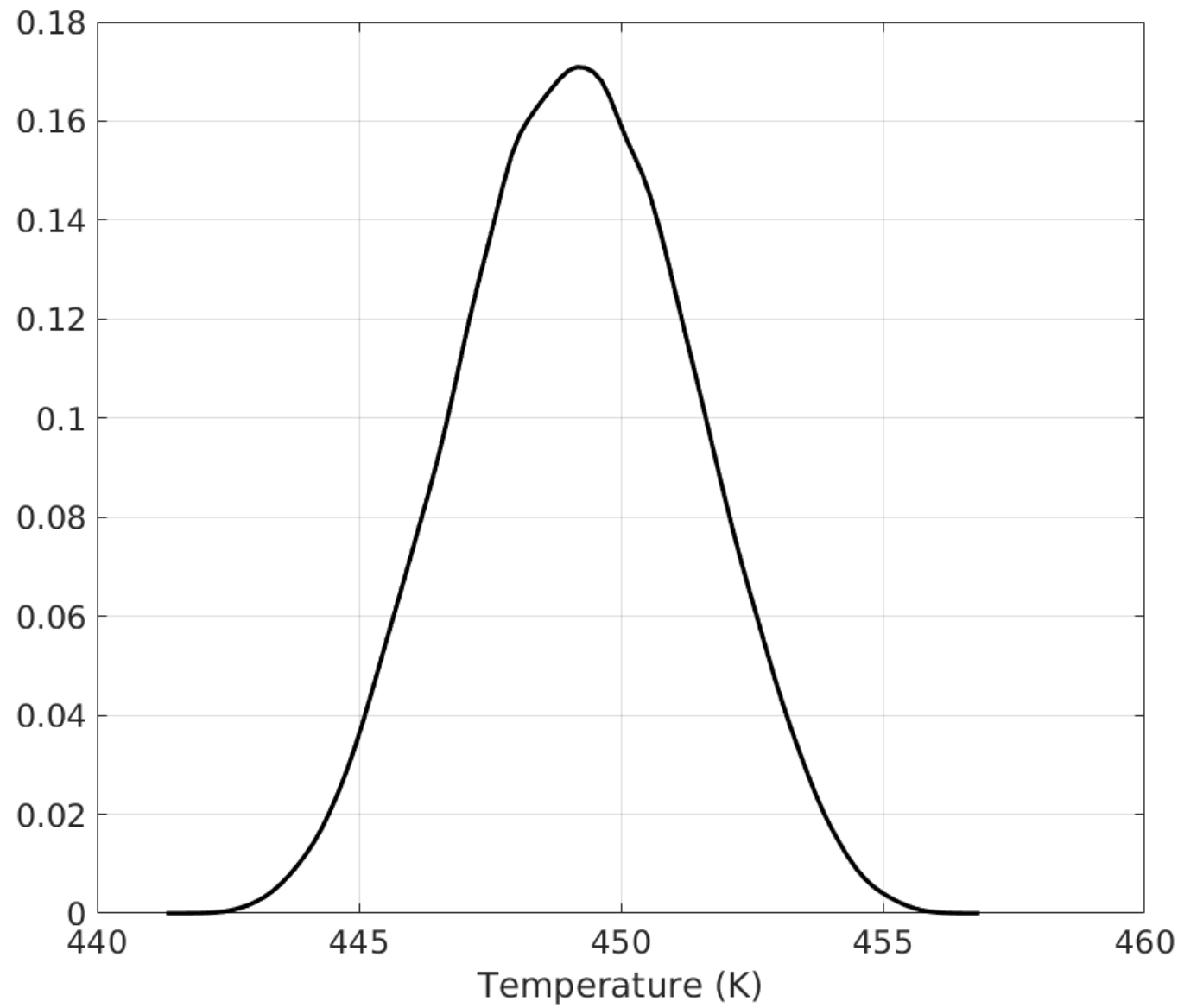


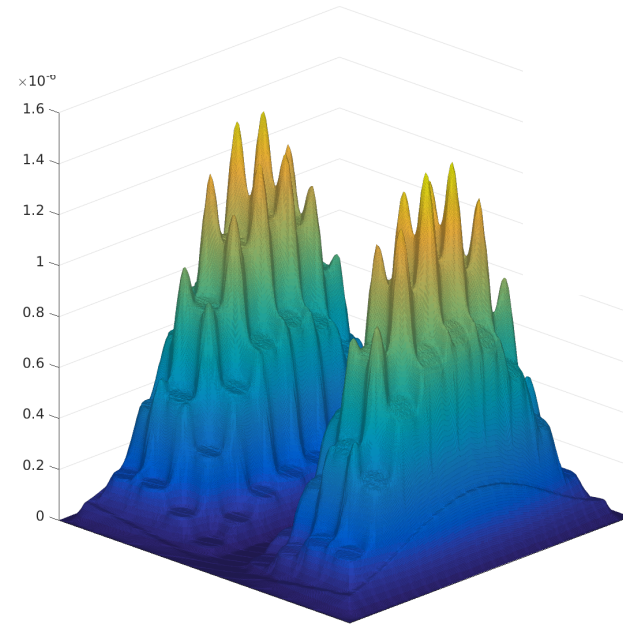
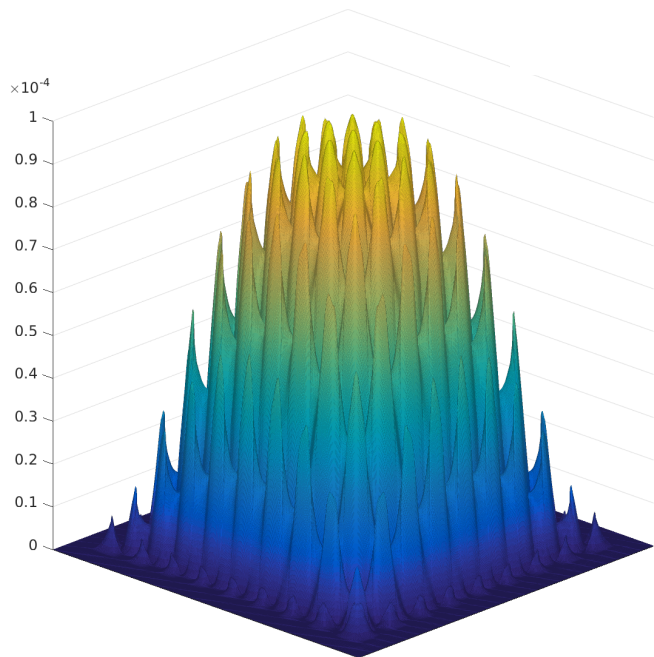
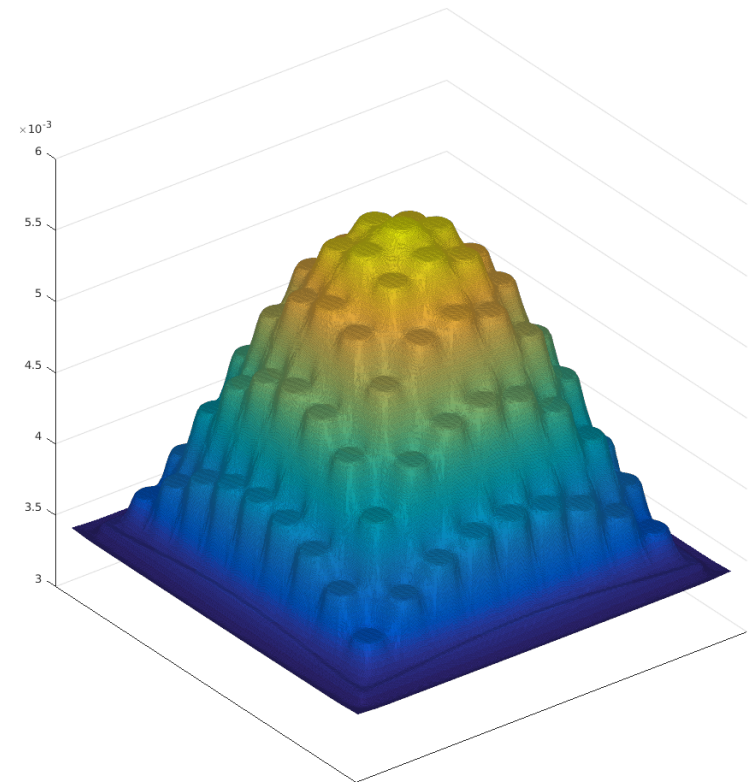
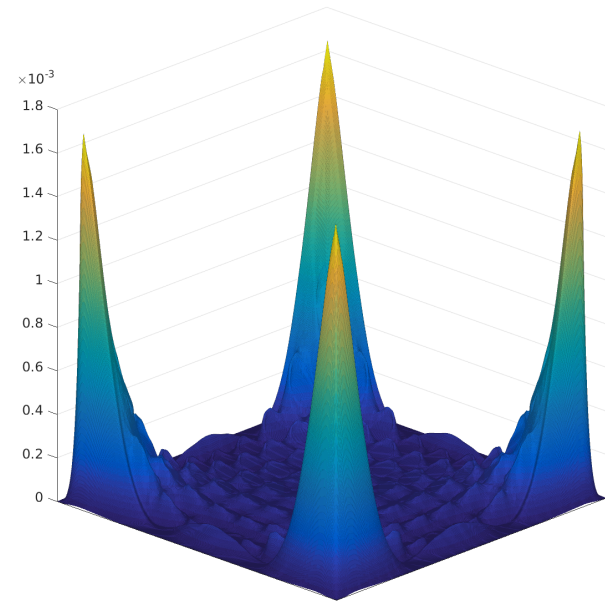
Average Velocity Distribution



Mean Temperature Distribution

Probability Density Function





Yellow Cake U_3O_8

