

# *US Nuclear Regulatory Commission*



# *NRC Mission*

The NRC's mission is to regulate civilian uses of nuclear material

- Protect public health and safety
- Promote common defense and security
- Protect the environment



# Major Activities

- Licensing
- Oversight
- Research
- Rulemaking
- Incident Response



# *Nuclear Materials*

- Special Nuclear Material - Uranium-233 Or Uranium-235, Enriched Uranium, or Plutonium
- Source Material - Natural Uranium or Thorium or Depleted Uranium not Suitable for Use as Reactor Fuel
- Byproduct Material - nuclear material produced or made radioactive in a nuclear reactor or tailings and waste produced by extracting or concentrating uranium or thorium

# *Nuclear Materials*

## Regulated Activities

- Medical, Industrial, and Academic Uses
- Source Material Facilities
- Uranium Recovery Facilities
- Fuel Cycle Facilities
- Materials Transportation





# Reactors

## *Licensing New Reactors*



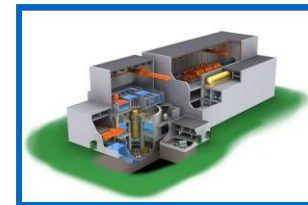
**Vogtle**



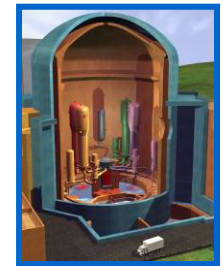
**North Anna**



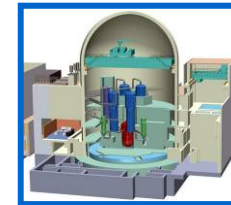
**ABWR**



**ESBWR**



**U.S. EPR**



**US-APWR**



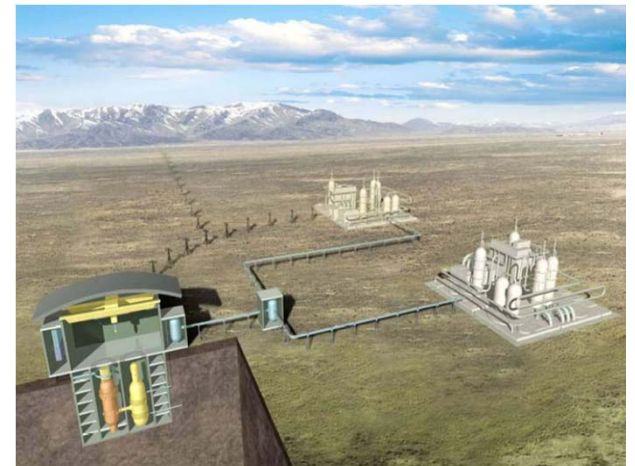
**AP1000**

The NRC is enabling a new generation of safe, secure nuclear reactors by reviewing applications for design certifications, early site permits, and combined licenses.

# Reactors

## *Licensing Advanced Reactors*

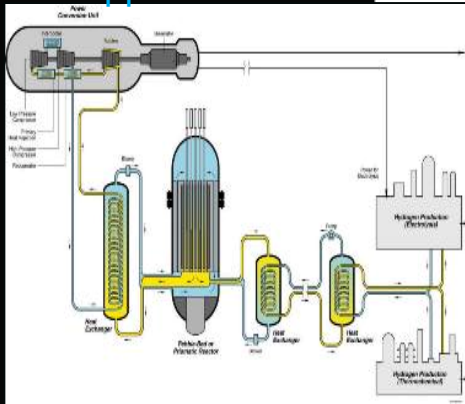
- Several technologies have emerged over the last decade that may be submitted to the NRC for licensing.
- The NRC's Advanced Reactor Program is in charge of licensing the next fleet of new and innovative reactor technologies.



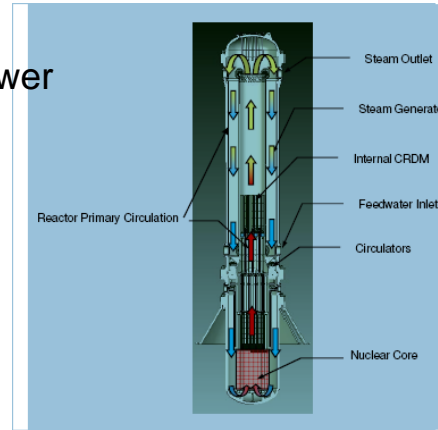
# On the Horizon

Next Generation  
Nuclear Plant / Very High  
Temperature Gas  
Cooled Reactors

•NGNP  
Approach



•mPower



Integral Pressurized  
Water Reactors

Advanced Reactor  
Program



Liquid Metal Reactors

**Nuclear power for rural villages**

Toshiba is proposing a small modular nuclear reactor to supply power for Galena, a Yukon River town of 713. It has yet to be constructed, but would likely consist of a 70-foot tube with a garbage-can-sized uranium core at the bottom and a liquid metal heat exchanger in the upper section. The assembly would be buried in a concrete silo. The slow-burning uranium would last 30 years, powering steam turbines to create electricity. Conceptual drawings of the plant are below.

**Turbine building**

**Reactor**

**Reactor specs**

- **HEIGHT:** About 70 feet
- **WEIGHT:** About 60 tons
- **ELECTRICAL PRODUCTION:** About 10 megawatts. A typical lower 48 nuclear plant is 1,000 megawatts or more. When the fuel is spent, the core can be removed and recycled.
- **ELECTRICAL COST:** The plant could generate electricity at 1.0 cents a kilowatt hour, which is slightly more than in Anchorage or Fairbanks, but a half to two-thirds the current cost in Galena.
- **CONSTRUCTION:** The modular plant is constructed in a factory and could be delivered by barge to the site. Components are small enough to be delivered by truck or helicopter.
- **PROJECT COST:** \$20 million. Toshiba says it will install the Galena reactor free, as a demonstration project.
- **NUMBER OF EMPLOYEES:** The reactor has no operator or maintenance personnel; the steam generator would probably require the same number of people as the diesel-powered plants.

Source: Toshiba

•4S

•NuScale

Other Conceptual  
Innovative Designs



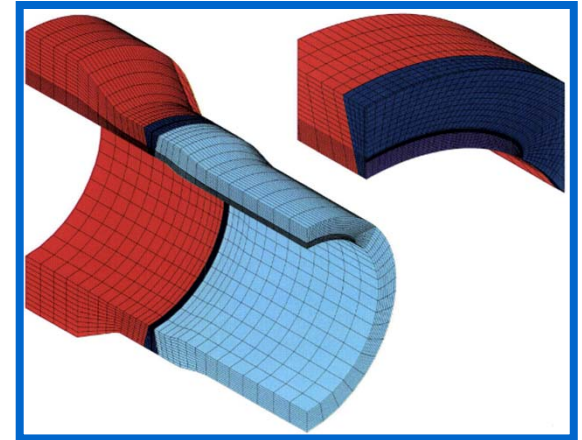
# Oversight

## *Inspecting Power Plants*



# *Researching New Issues*

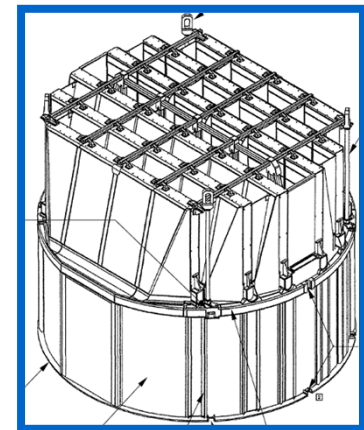
The NRC works with industry to identify safety issues early and resolve them quickly.



**Materials Degradation Issues**

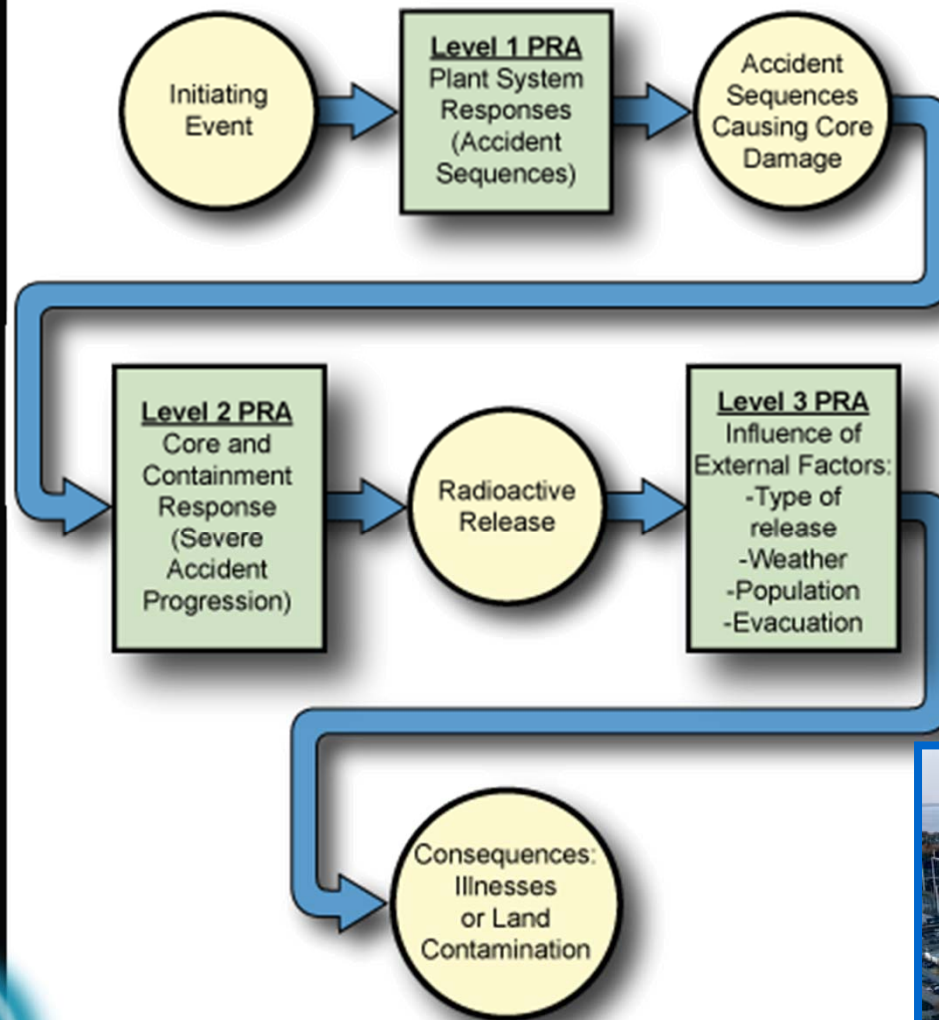


**Containment Sump Performance**



**Power Uprate Effects**

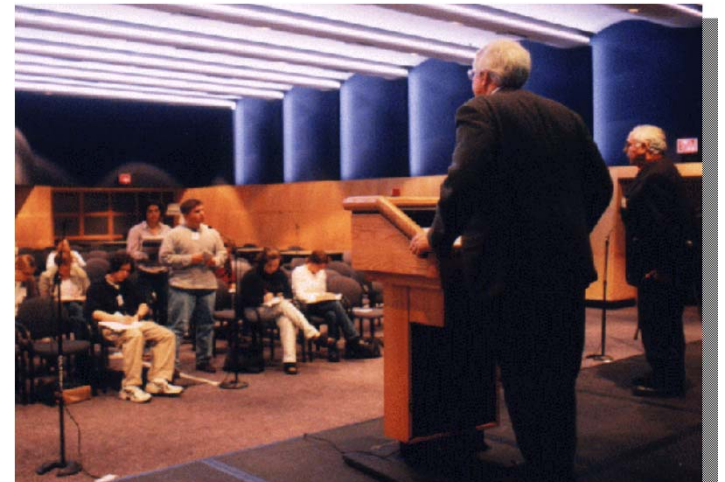
# Risk Assessment





# *Emergency Response and the NRC*

- Assess plant conditions
- Evaluate protective action recommendations
- Support off-site officials
- Keep other agencies informed
- Keep news media informed



# *NRC's Response Organization*



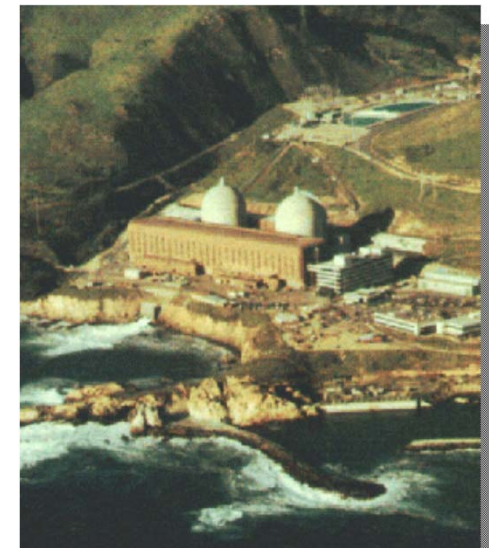
HQ Operations  
Officer (HOO)

Executive Team



HQ and Regional  
Assessment Teams

Site Team





# Coordination With Other Agencies

- Department of Homeland Security
- Department of Defense
- Federal Aviation Administration
- Department of Energy
- Environmental Protection Agency
- Department of Justice
- Federal Emergency Management Agency
- States
- Locals



# *NRC Office Locations*

## Headquarters Office Rockville, MD



Region I  
King of Prussia, PA



Region II  
Atlanta, GA



Region III  
Lisle, IL



Region IV  
Arlington, TX

# *Licensing Power Plants*

