



Public Outreach Meeting for the Forthcoming X-energy/Dow Chemical Reactor Construction Permit Application (Project Long Mott)

U.S. Nuclear Regulatory Commission

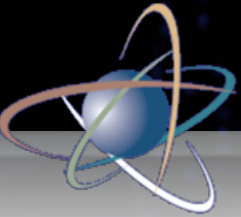
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Adrian Muñiz, Senior Licensing Project Manager

Patricia Vokoun, Environmental Project Manager

February 15, 2024

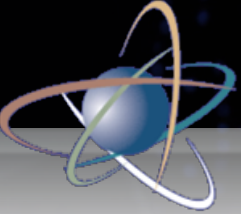
NRC Mission Statement – Protecting People and the Environment



The NRC licenses and regulates the Nation's civilian use of radioactive materials to provide reasonable assurance of adequate protection of public health and safety and to promote the common defense and security and to protect the environment.

www.nrc.gov/about-nrc.html

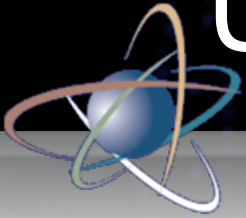
Code of Federal Regulations



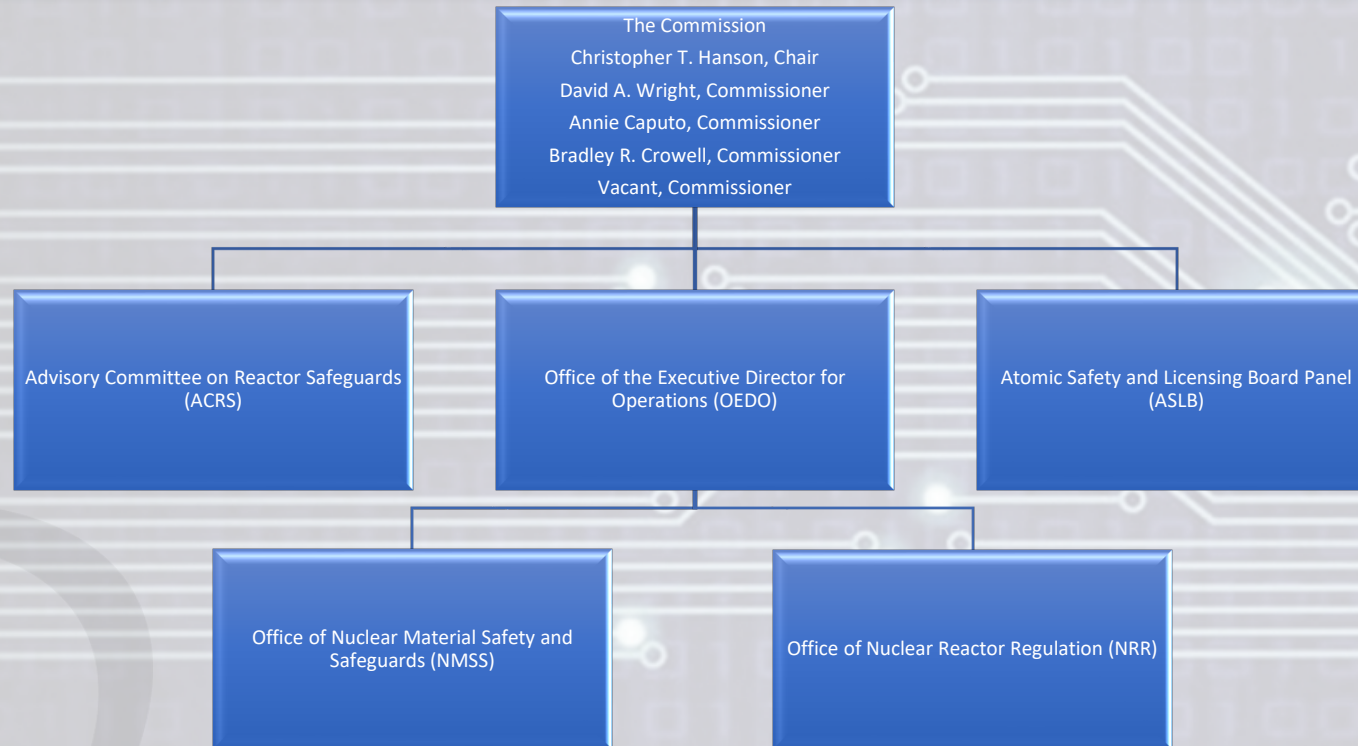
- NRC's regulations (or rules) are contained in Title 10 of the *Code of Federal Regulations*, Parts 1 through 199
- Regulations govern:
 - Transportation and storage of nuclear materials
 - Use of radioactive materials at nuclear power plants, research and test reactors, uranium recovery facilities, fuel cycle facilities, waste repositories, and other nuclear facilities
 - Use of nuclear materials for medical, industrial, and academic purposes



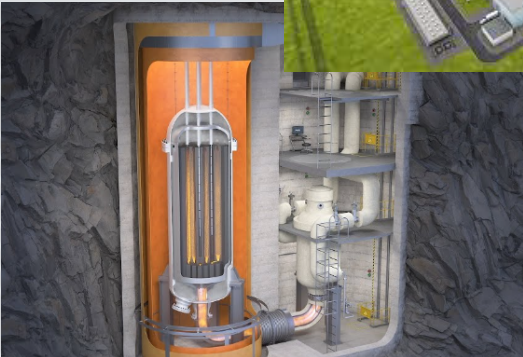
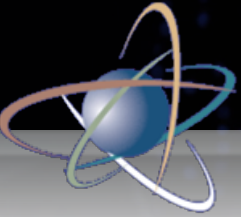
<https://www.ecfr.gov/>



U.S. Nuclear Regulatory Commission



Advanced Reactor Licensing Pathways



10 CFR Part 50

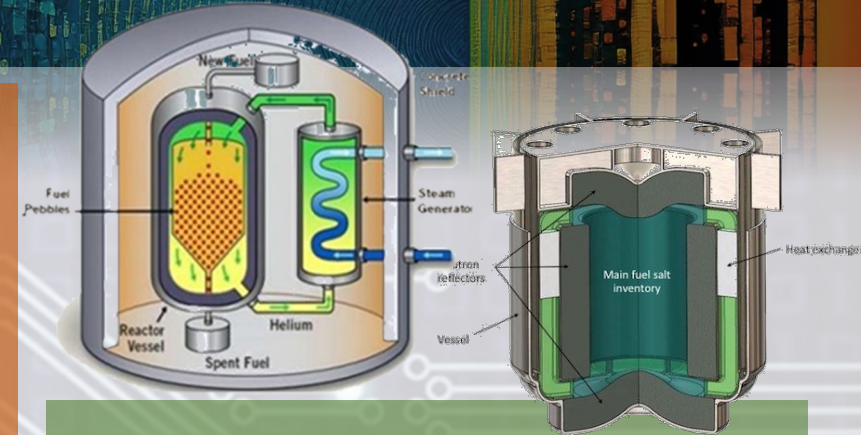
Large majority of operating fleet and NPUFs

Two-step construction permit and operating license

10 CFR Part 52

Vogtle 3 & 4 AP-1000; NuScale

Combined License; Design Certification; ESP; ML; SDA

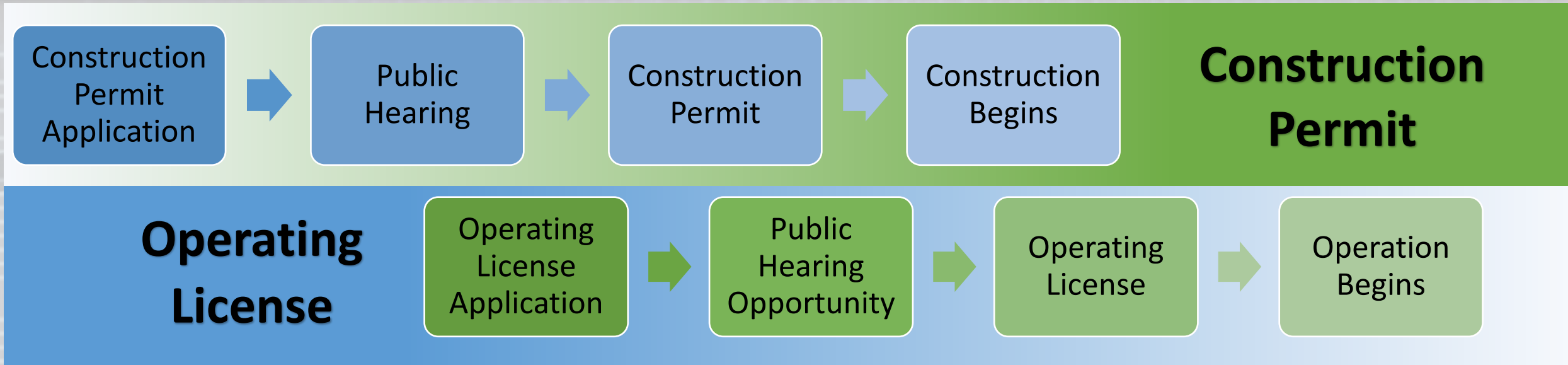
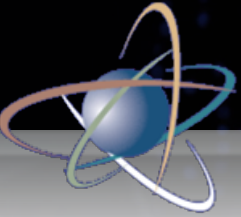


10 CFR Part 53

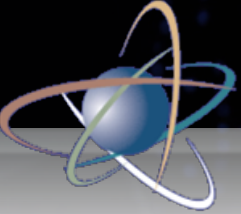
New licensing framework under development

Publish final rule by 2025

10 CFR Part 50: Two-Step Licensing Process

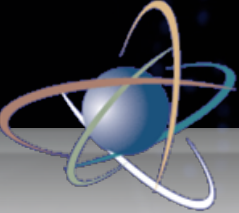


Construction Activities



- Activities constituting construction under NRC regulatory jurisdiction:
 - Driving of piles, subsurface preparation, placement of backfill, concrete, or permanent retaining walls within an excavation, installation of foundation, or in-place assembly, erection, fabrication, or testing, which are for:
 - Safety-related structures, systems, or components (SSCs)
 - SSCs relied upon to mitigate accidents or transients or used in emergency planning procedures
 - SSCs whose failure could prevent safety-related SSCs from fulfilling their safety-related function
 - SSCs whose failure could cause a reactor scram or actuation of a safety-related system
 - SSCs necessary to comply with physical protection of plants and materials
 - SSCs necessary to comply with fire protection
 - Onsite emergency facilities (i.e., technical support and operations support centers)

Construction Activities



- Examples of what are not construction activities under NRC jurisdiction:
 - Site exploration, including necessary borings to determine foundation conditions or other preconstruction monitoring to establish background information related to the suitability of the site, the environmental impacts of construction or operation, or the protection of environmental values
 - Preparation of a site for construction of a facility (e.g., clearing of the site, grading, installation of drainage, erosion and other environmental mitigation measures, and construction of temporary roads and borrow areas
 - Erection of fences and other access control measures
 - Excavation
 - Erection of support buildings (e.g., warehouse, concrete mixing plants, office buildings) for use in connection with the construction of the facility
 - Building of service facilities (e.g., paved roads, parking lots, railroad spurs, exterior utility and lighting systems, potable water systems, sanitary sewerage treatment facilities, and transmission lines)

Principal Legislation & Regulations Driving Timely Decisions and Outcomes

Environmental Review

Environmental Impact Statement

- National Environmental Policy Act (1969)
- Impacts **ON** the environment **FROM** licensed activities
- 10 CFR Part 51
- Impact level
- Disclosure document

Safety Review

Safety Evaluation

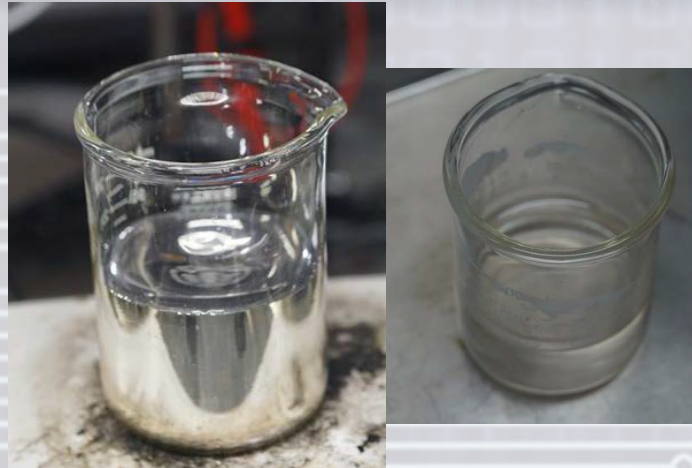
- Atomic Energy Act (1954)
- Energy Reorganization Act (1974)
- Impacts **ON** the facility **FROM** the environment
- 10 CFR Parts 20, 40, 50, 52, 70
- Risk informed
- Reasonable assurance of adequate protection

Safety Review – Fundamental Functions

Reactivity and power control

Fuel

Reactivity control systems



Radionuclide retention

Barriers to retain radionuclides within the facility

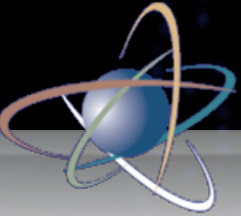
Heat removal

Reactor coolant system

Backup cooling systems

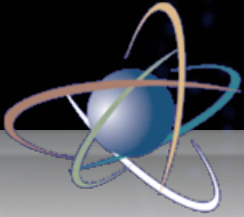


Safety Review – Key Topics



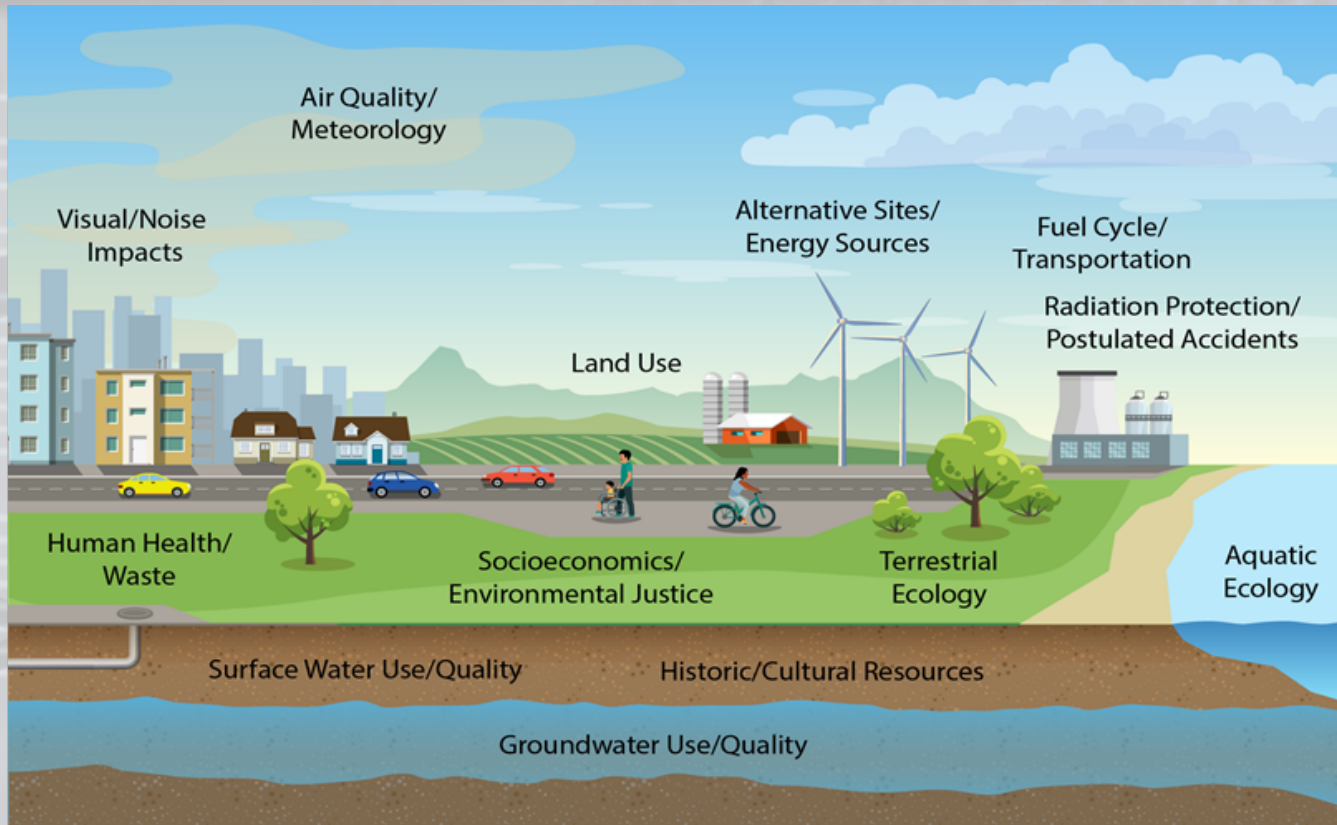
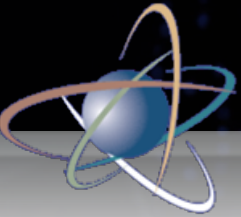
- External hazards (nearby facilities, hydrology, seismology, etc.)
- Reactor fuel
- Reactivity control and reactor shutdown
- Primary coolant and decay heat removal
- Instrumentation and control
- Radiation protection for both workers and the public
- Accident analyses
- Operational programs (emergency plan, security, operator training, etc.)

Environmental Review – Regulations



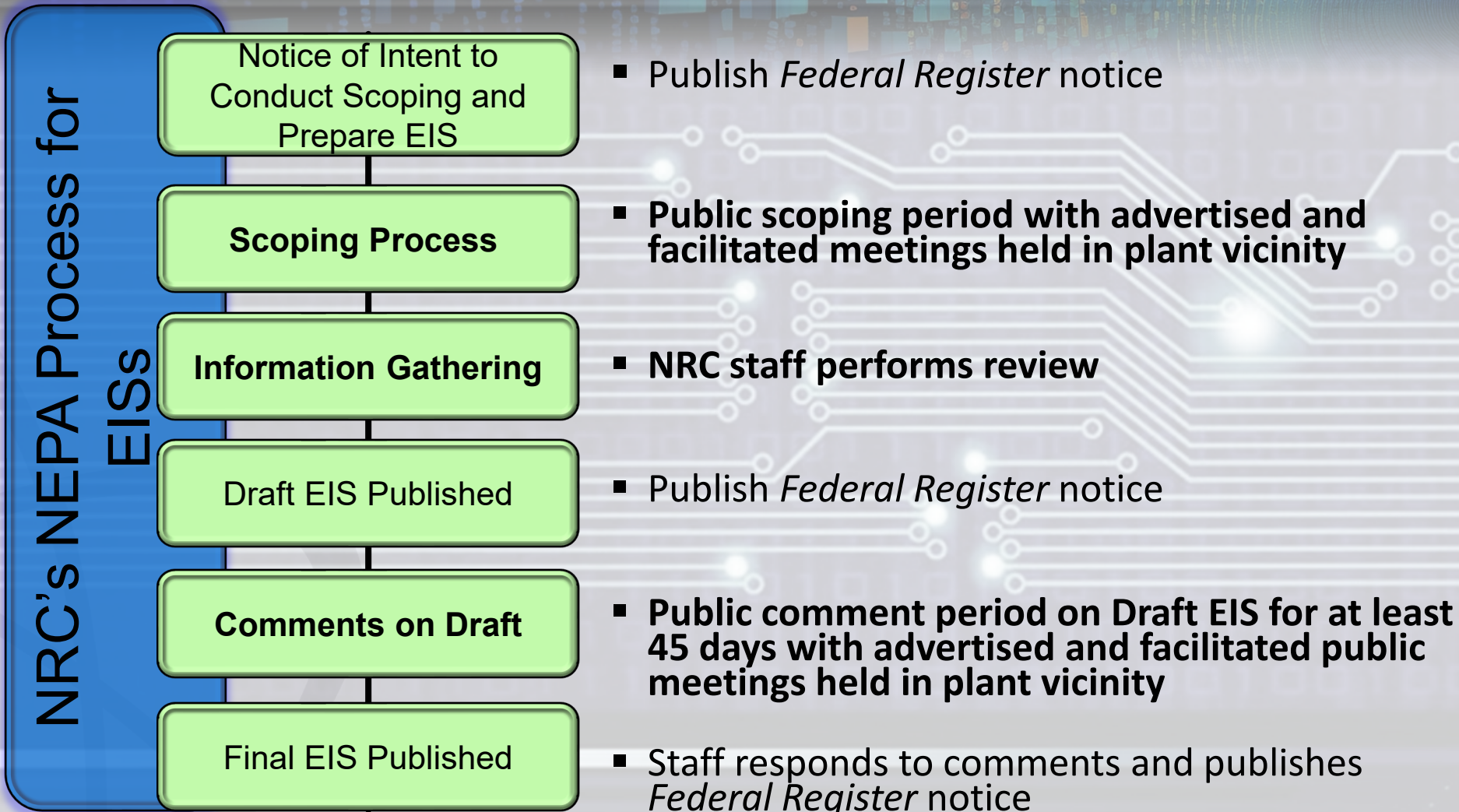
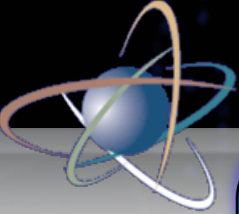
- National Environmental Policy Act (NEPA)(1969)
- National Historic Preservation Act (NHPA), Endangered Species Act (ESA), others
- 10 CFR Part 51 – NRC environmental protection regulations for domestic licensing and related regulatory functions
- The NRC NEPA document addresses impacts **on** the environment **from** the facility and informs the NRC licensing decision
- For a power reactor an Environmental Impact Statement (EIS) is required – *Federal Register* Notice

Resources Addressed in NRC Environmental Reviews

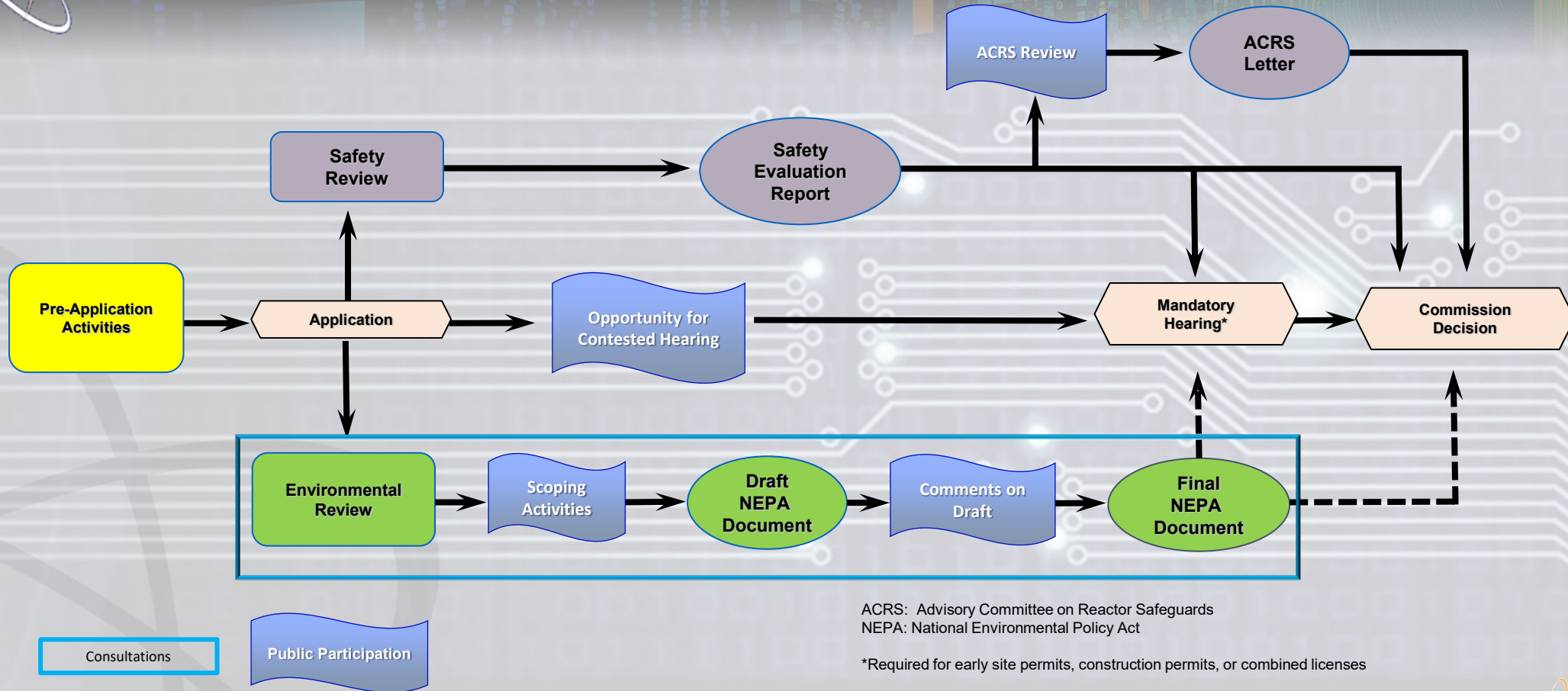
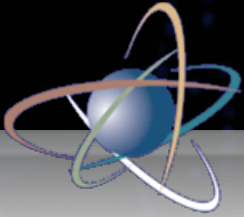


- Analyst will describe the “affected environment” (baseline conditions) for each resource area and then describe the consequences of the action (impact level) and compare those to the reasonable alternatives.
- Analyst will also describe “cumulative impacts” from any known past, present, or reasonably foreseeable future actions.

Environmental Review Process



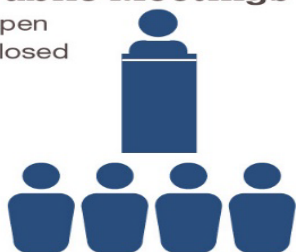
Licensing is a Multi-Step Process, with Opportunities for Public Engagement



NRC Public Participation and Interaction

Public Meetings

Open
Closed



General Inquiries

Phone
Mail
E-mail
In Person



Information Meetings

Scoping
Preliminary
Counterpart
Information
Exchanges



Education and Business Outreach

Minorities Groups
Small Business
Vendors/Contracts
Recruitment



Media Outreach

Press Conferences
Press Releases
Editorial Boards
Interviews



Public Comments

Regulations.gov
Mail
E-mail
Fax
Verbally at
Public Meetings



Resident Inspectors in the Community



10 CFR 2.206 Petition

Electronic or Hard Copy



Web Site

www.nrc.gov



Adjudicatory Hearings



Advisory Committee Meetings



Public Document Room

Phone
E-mail
In Person



Conferences

International
Trade
Industry



Emergency Preparedness

Federal
State
Local



Social Media

Blog
Twitter
YouTube
Flickr
Facebook



Visitors to the Agency



Open Houses



Congressional Hearings



Allegations



Petitions for Rulemaking

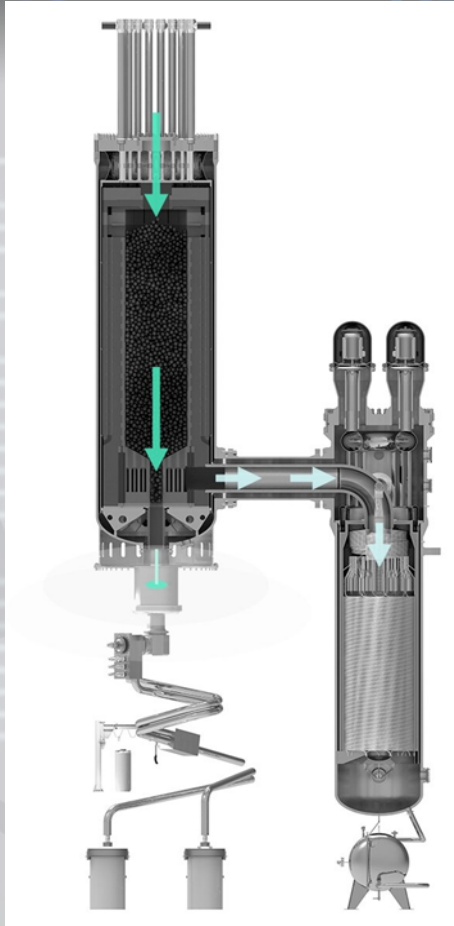
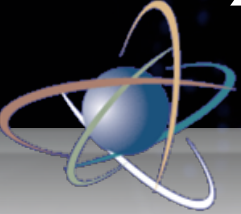


Federal Register Notices



www.nrc.gov/public-involve

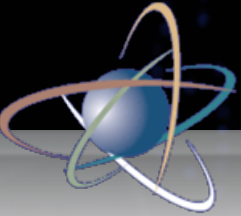
X-energy Xe-100 Technology



- Pebble Bed High Temperature Gas-Cooled Reactor (HTGR) technology
- Xe-100 Reactor is rated for 200 MWt (80 MWe)
 - Basic plant layout includes a Xe-100 "four-pack" plant that generates approximately 320 MWe
- Fuel pebbles are gravity-fed and continuously rotated through the core
- Helium is used as the primary heat transport medium circulating through the pebble bed
- Steam generator transfers heat from the helium to the water-steam cycle to provide for generation of electricity and process steam
- X-energy and Dow Chemical announced in 2023 that the Xe-100 plant would be sited at the Dow facility in Calhoun County, TX

<https://x-energy.com/reactors/xe-100>

Timely NRC Review Schedules

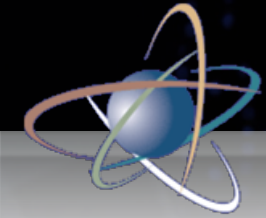


The NRC established generic schedules for completing final safety evaluations for various licensing actions

Activity	Reactor Type	Milestone*
Part 50 - Construction Permit (includes Environmental Impact Statement**)	All	36 months
Part 50 - Operating License (includes Environmental Impact Statement**)	Non-Light-Water Reactor	36 months

*Actual schedules may be shorter or longer than the generic milestone schedule based on the specific needs of the licensee or applicant and the staff's resources.

**Environmental Impact Statement completed within 24 months



Thank You
Questions?