Advanced Reactor Regulatory Landscape: The Present and the Path Forward

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OFFICE OF ADVANCED REACTORS

Historical Context

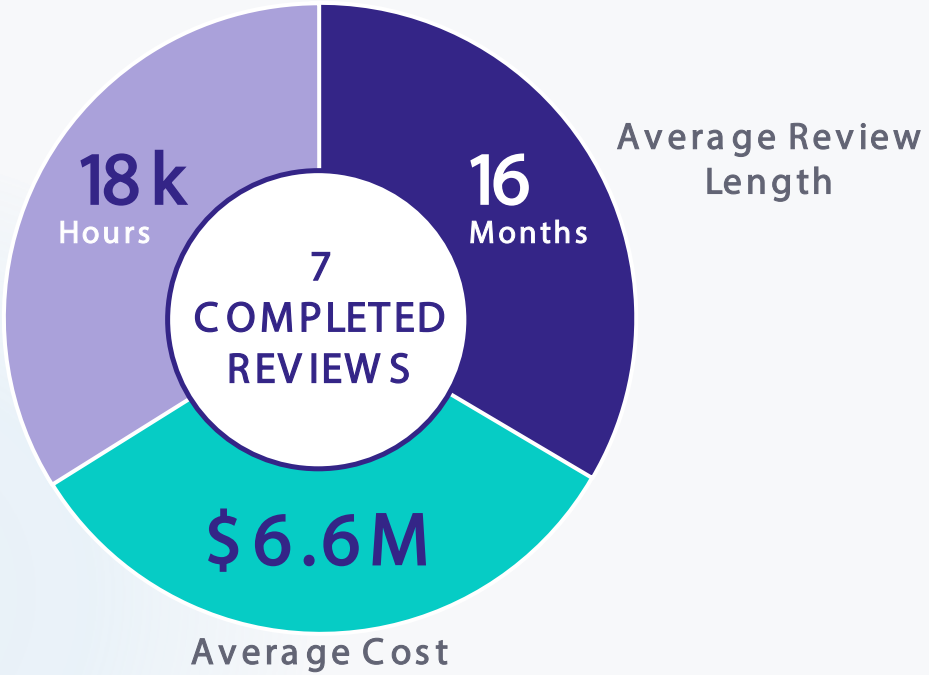
Risk-informed Approaches and Advanced Reactor Readiness

- Three-Mile Island
- 1986 Safety Goal Policy Statement
- Licensing Modernization Project / Regulatory Guide 1.233
- Policy decisions on mechanistic source term, consequence-based EP, physical security, population-based siting, etc.
- Nuclear Energy Innovation and Modernization Act (2019)
- Part 53
- ADVANCE Act & EO 14300

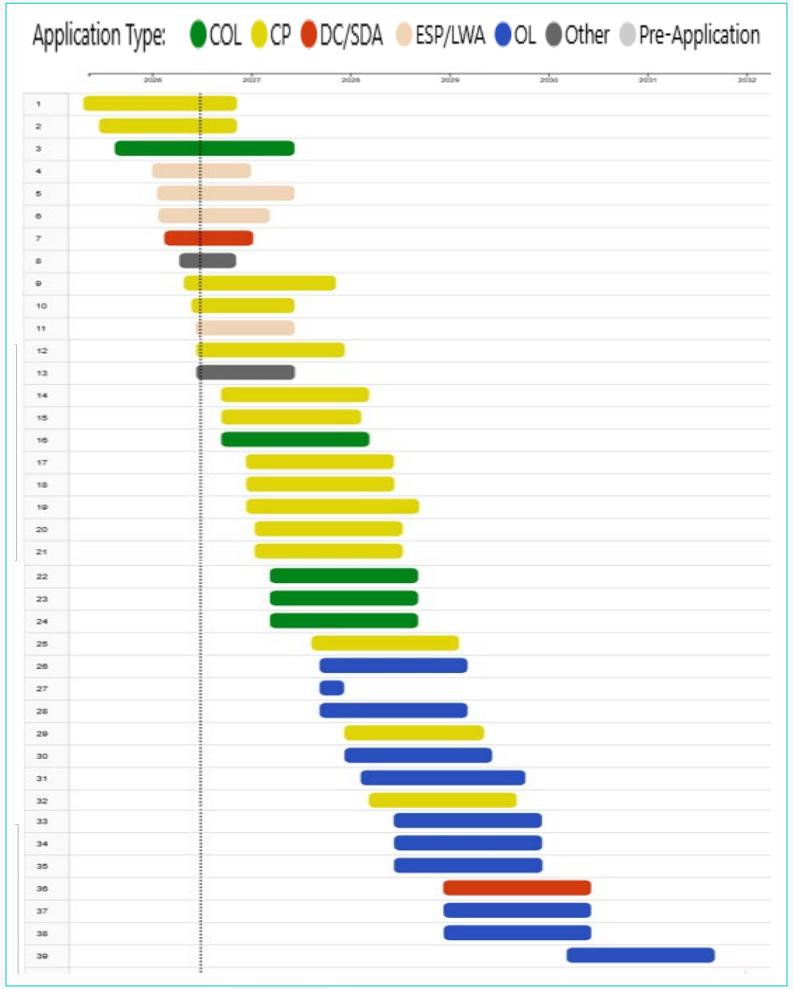
NRC Mission Statement

The NRC protects public health and safety and advances the nation's common defense and security by **enabling the safe and secure** use and deployment of civilian nuclear energy technologies and radioactive materials through **efficient and reliable** licensing, oversight, and regulation for the **benefit** of society and the environment.

Meeting Demand: Safe & Timely Licensing



20+ APPLICATIONS EXPECTED IN THE NEXT 2 YEARS



Lessons Learned From Recent Reviews



Leveraging Pre-Application Engagements

Engagement Opportunities and Issue Finality

Pre-App Tools	NRC Products
Pre-application readiness assessment	Report identifying observations/gaps
Topical reports	Safety evaluation
Technical reports	Letter documenting staff feedback
White papers	Letter documenting staff feedback
Public meetings	Meeting summary
Regulatory engagement plans	Coordination and planning
Drop-in meetings	Dialogue on plans/schedules/status

Ongoing Preapplication Activities

OKLO, Aalo, NANO Nuclear Energy Inc., arc Clean Technology, Last Energy, Terra Innovatum Solo, Radiant, SHINE, FANCO First American Nuclear, GE Hitachi, Deep Fission, Appalachian Power An AEP Company, Apollo Atomics, A&M, Blue Energy, Rolls-Royce, Westinghouse, General Atomics, Dominion Energy, Kairos Power, TerraPower, Deployable.energy, Shepherd Power, Duke Energy, Terrestrial Energy USA, JAEA, Energy Northwest, Natura Resources, Antares

Sample of current pre-applicants

Advanced Reactor Licensing Framework – Clear Pathways, Real Optionality

Pathway	Primary Use	How It Works	Design Maturity	When To Use It	Safety Approach	Environmental
Part 50	First of a Kind and NPUFs	CP → OL 2-Step	Low → High (CP → OL)	Early Design Maturity; Sequential Licensing	Defense-in-Depth and Safety Margins	ER with EA/EIS or Applicant Prepared EA/EIS
Part 52	Standardized Reactors	ESP, COL, ML, DC, SDA Flexible Toolkit	Moderate → High (Varies By Mechanism)	Fleet Deployment; Standardized Design		
Part 53	Advanced Reactors of All Technologies	CP, OL, COL, ML, DC, ESP, SDA Flexible Toolkit	Any	New Designs; Optimization & Scaling	Fully Risk-Informed Performance Based	
Part 57 (Proposed)	Microreactors	CP/OL Simplified 1-Step	High	Factory-Built; Rapid Deployment	Bounding Entry Criteria	Categorical Exclusion Possible

All Deliver

- Consistent Safety Expectations
- Licensing of Various Design Maturities and Business Models
- Deployment at Scale and Speed
- Risk-Informed, Safety-Focused Reviews

CP= Construction Permit
OL=Operating License
COL= Combined Operating License
EIS=Environmental Impact Statement
ESP=Early Site Permit
DC=Design Certification
SDA=Standard Design Approval
ER=Environmental Report
ML=Manufacturing License
EA=Environmental Assessment

Department of Energy (DOE) Participants



Advanced Reactor Licensing Workshops



Prospective Topics:

- NRC frameworks and how they interplay
- DOE authorization and NRC licensing
- Accident analysis approaches
- Siting and hazards analysis
- Systematic risk evaluations
- Early construction and general license

Q & A