What is a Licensing Project Manager?

What I Do:

• Lead, manage, and facilitate advanced reactor licensing through:
  • Project management of application reviews.
  • Pre-application engagement with prospective applicants.
  • Developing and maintaining guidance and infrastructure.
  • Interacting with stakeholders, such as applicants, the public, industry groups, Congress, the Commission, the Advisory Committee on Reactor Safeguards, Tribes, and other government agencies.
Outline

• Licensing under Title 10 of the Code of Federal Regulations (10 CFR)
  – Part 50, “Domestic Licensing of Production and Utilization Facilities”
  – Part 52, “Licenses, Certifications, and Approvals for Nuclear Power Plants

• Licensing & Pre-application Review Status

• Required NRC Licensing Documents

• Review Duration
NRC New Reactor Licensing

- The NRC licenses new reactors under 10 CFR Part 50 or Part 52
- All currently operating reactors have Part 50 licenses
- All of the recent new reactor applications were filed using Part 52
- Several advanced reactor developers plan to use Part 50, while others plan to use Part 52
- The NRC staff is currently evaluating a Part 50 construction permit application for the “Hermes” test reactor
Part 50 Licensing Process

• 10 CFR Part 50 licensing process is a two-step licensing process:
  1. Construction Permit
  2. Operating License
• Requires two reviews: one for the construction permit and then another for the operating license
• Final design information and plans for operation are developed during the construction of the plant
Part 50 Licensing Process

Pre-Application → CP Application (PSAR & ER) → NRC Review (SRP) → CP Issued (FSER, FEIS, & Mandatory Hearing) → OL Application (FSAR & ER) → Construction Begins

Full Power Operation → Power Ascension Testing → OL Issued (FSER & FEIS) → NRC Review (SRP) → Construction Continues during the OL Review
Part 52 Licensing Process

Part 52 provides several options for various approvals

- Early Site Permit
- Standard Design Certification
- Combined License
- Standard Design Approval
- Manufacturing License
NRC Licensing Documents

• Final Safety Evaluation Report
  – Documents the NRC staff’s safety assessment of design and operation

• Final Environmental Impact Statement
  – Documents National Environmental Policy Act (NEPA) requirements for impact assessment of licensing
What is the Purpose of the Final Safety Evaluation Report?

• Document the bases for the NRC staff’s safety decisions
• Provides the standards and regulations to which the review was conducted
• Describes how and why the application meets the standards and regulations
• Summarizes the NRC’s safety findings
Areas of Review - Safety

- Site Characteristics and Site Parameters
- Reactor Internals
- Reactor Coolant and Connected Systems
- Engineered Safety Features
- Digital Instrumentation and Controls/Electrical Power
- Auxiliary Systems
- Steam and Power Conversion Systems
- Radioactive Waste Management and Radiation Protection
- Conduct of Operations
- Initial Test Program and Integrated Testing, Analysis, and Acceptance
- Transient and Accident Analysis
- Technical Specifications
- Quality Assurance Program
- Human Factors Engineering
- Severe Accidents
- Criteria
What is the Purpose of a Final Environmental Impact Statement?

- An Environmental Impact Statement is required for major Federal actions that may significantly affect the quality of the human environment.
- Provides public disclosure of potential environmental impacts.
- Identifies alternative actions and appropriate mitigation of potential environmental effects.
- Involves all stakeholders in government’s decisions.
Areas of Review - Environmental

- Seismology
- Geology
- Hydrology
- Meteorology
- Geography
- Demography (population distribution)
- Site Hazards Evaluation
- Radiological Effluent Releases
- Radiological Dose Consequences
- Emergency Preparedness (with FEMA)
- Security Plan Feasibility
Environmental Impact Statement – Resource Areas
Other Approvals & Licenses

• **Standard Design Approvals**
  - May cover an entire facility or a portion of it
  - May be referenced in a combined license
  - No hearing or Commission review
  - Design approval is NRC staff-level review

• **Manufacturing License**
  - License to manufacture nearly complete plant
  - Does not include review of specific reactor sites
  - License does not authorize transport & installation of the manufactured reactor
10 CFR Part 53
Pathway to New Regulatory Framework

“Part 53” Rulemaking by July 2025

- Nuclear Energy Innovation and Modernization Act (NEIMA) requirement
- Technology-inclusive, risk-informed and performance based regulatory framework
- Commission direction SRM-SECY-20-0032
- Builds on current activities, including the Licensing Modernization Project
- Significant stakeholder engagement
Preapplication Engagement Activities

• NRC Draft white paper on pre-application engagement (ML21145A106)
• Industry guidelines for a regulatory engagement plan (ML18122A293)
• Formal NRC staff evaluation of topical reports
• Informal NRC staff feedback on white papers
• Public meetings to discuss additional topics, including new and novel design features
• Pre-application audits to support a high-quality application.
TerraPower - Natrium Power Reactor

- TerraPower and GE Hitachi Natrium design is a pool type sodium fast reactor with metal fuel.
- Each reactor generates ~345 MWe
- Recipient of DOE ARDP Award.
- Tribal Outreach conducted by TerraPower
- 12 Tribes Identified
- Letters sent to Tribal Nations December 2021
- Cultural Resources Survey, Spring 2022
- Tribal Summit following completion of the Cultural Resources Survey
X-energy’s Xe-100 design is a pebble-bed, high-temperature gas-cooled reactor using TRISO-X fuel.

- Each reactor generates ~80 MWe and a standard four-unit plant generates ~320MWe.
- Recipient of DOE ARDP Award.
Utah Associated Municipal Power Systems (UAMPS) is an interlocal agency representing 50 members.

UAMPS’ Carbon Free Power Project (CFPP) is a small modular reactor (SMR) nuclear plant to be located at the Idaho National Laboratory.

The plant is expected to include 6 of NuScale’s 77 MWe nuclear power reactors.

Beginning preapplication engagement based on a letter of intent received in January 2022.

Tribal outreach planned prior to submission of the licensing application.

License application anticipated for submission to the NRC in early calendar year 2024.
The Kairos Hermes Testing Facility

• Non-power test reactor (35 megawatts-thermal) to demonstrate key technologies of Kairos Power Fluoride Salt-Cooled, High Temperature Reactor design
• Tri-structural isotropic (TRISO) fuel in pebbles containing high assay low-enriched uranium (HALEU)
• Low pressure, large thermal inertia, slow transient response, TRISO and Flibe retention of radionuclides, and other features to ensure safety
Generic Schedules

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

<table>
<thead>
<tr>
<th>Activity</th>
<th>Type</th>
<th>Milestone*</th>
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<tbody>
<tr>
<td>Part 50-Construction Permit</td>
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<tr>
<td>Part 50-Operating License</td>
<td>Light Water SMR</td>
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<td>Part 52 Early Site Permit</td>
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<td>Part 52-Design Certification and Standard Design Approval</td>
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<tr>
<td>Topical Reports</td>
<td>All</td>
<td>24 months</td>
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*Actual schedule is informed by application completeness and could be longer/shorter
Licensing Advanced Reactors
is a Multi-Year, Public Process

• Staff review of applicant-provided information
  – Safety Analysis Report
  – Environmental Report

• Public outreach
  – Publication of review findings
  – Public meetings

• Review by the Advisory Committee on Reactor Safeguards

• Hearings
  – Legal requirement
  – Opportunity for public to intervene

• Commission decision
Questions?