



Lessons Learned from Siting Safety and Environmental Reviews for New Nuclear Power Plants in the United States

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Agenda

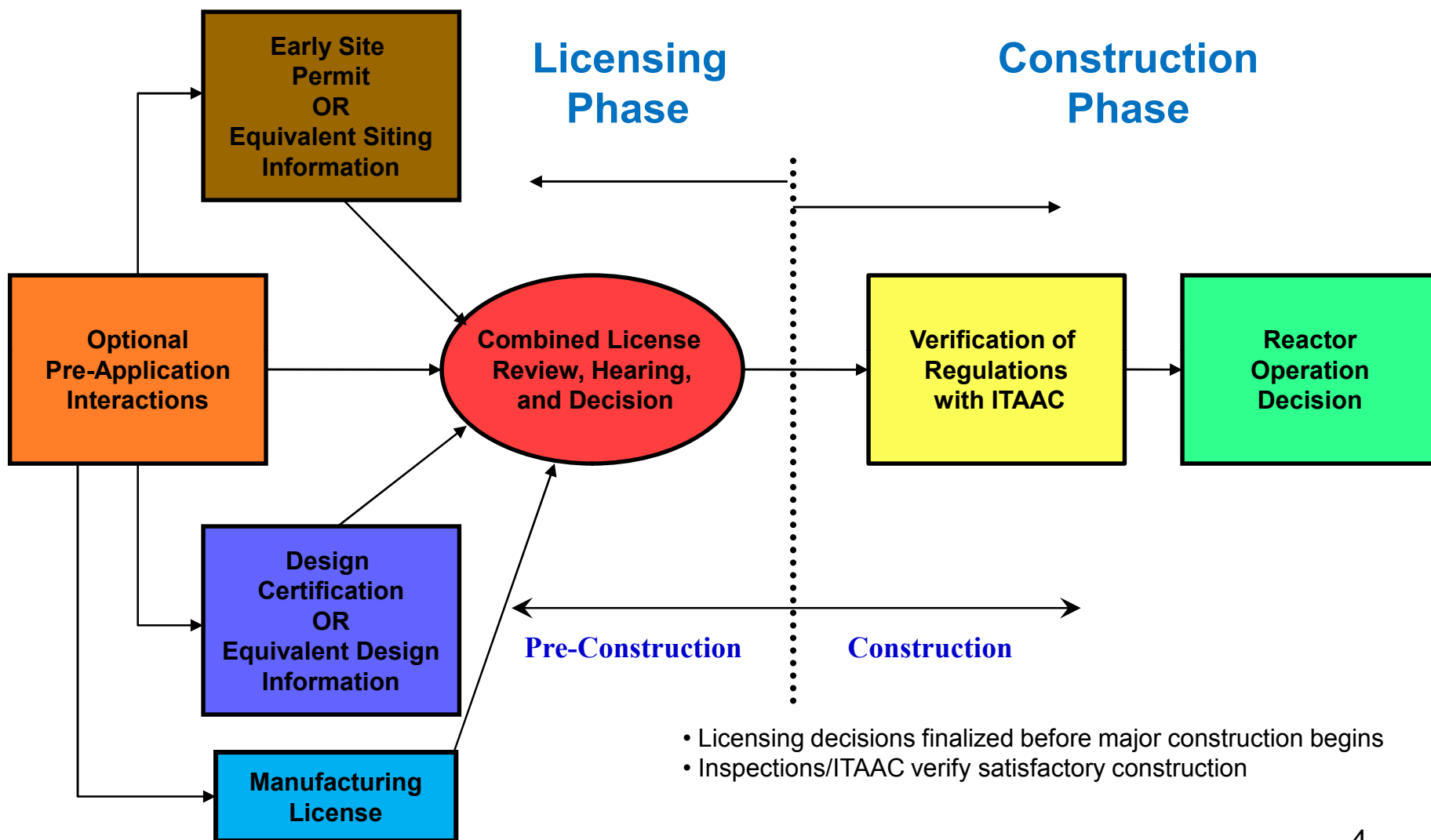
- Overview of U.S. Licensing and Safety Review Process
- Lessons Learned from Safety Review
- Overview of U.S. Environmental Review Process
- Lessons Learned from Environmental Reviews



Licensing Processes

- Provide a predictable licensing process
- Resolve safety and environmental issues before authorizing construction
- Provide for timely & meaningful public participation
- Encourage standardization of nuclear plant designs
- Reduce financial risk to nuclear plant applicants

Combined License Review Process



Process Overview

- Early Site Permit
 - Allows applicant to get early approval of a site
 - Good for 10-20 yrs + renewal
- Design Certification
 - Allows reactor vendor to obtain pre-approval of design
 - Good for 15 yrs + renewal
 - 4 Certified (AP600, AP1000, ABWR, System 80+)
 - 3 in review (ESBWR, EPR, USAPWR)
- Manufacturing License
 - Licenses issued to manufacture nearly complete plant
 - Sites for reactors not identified

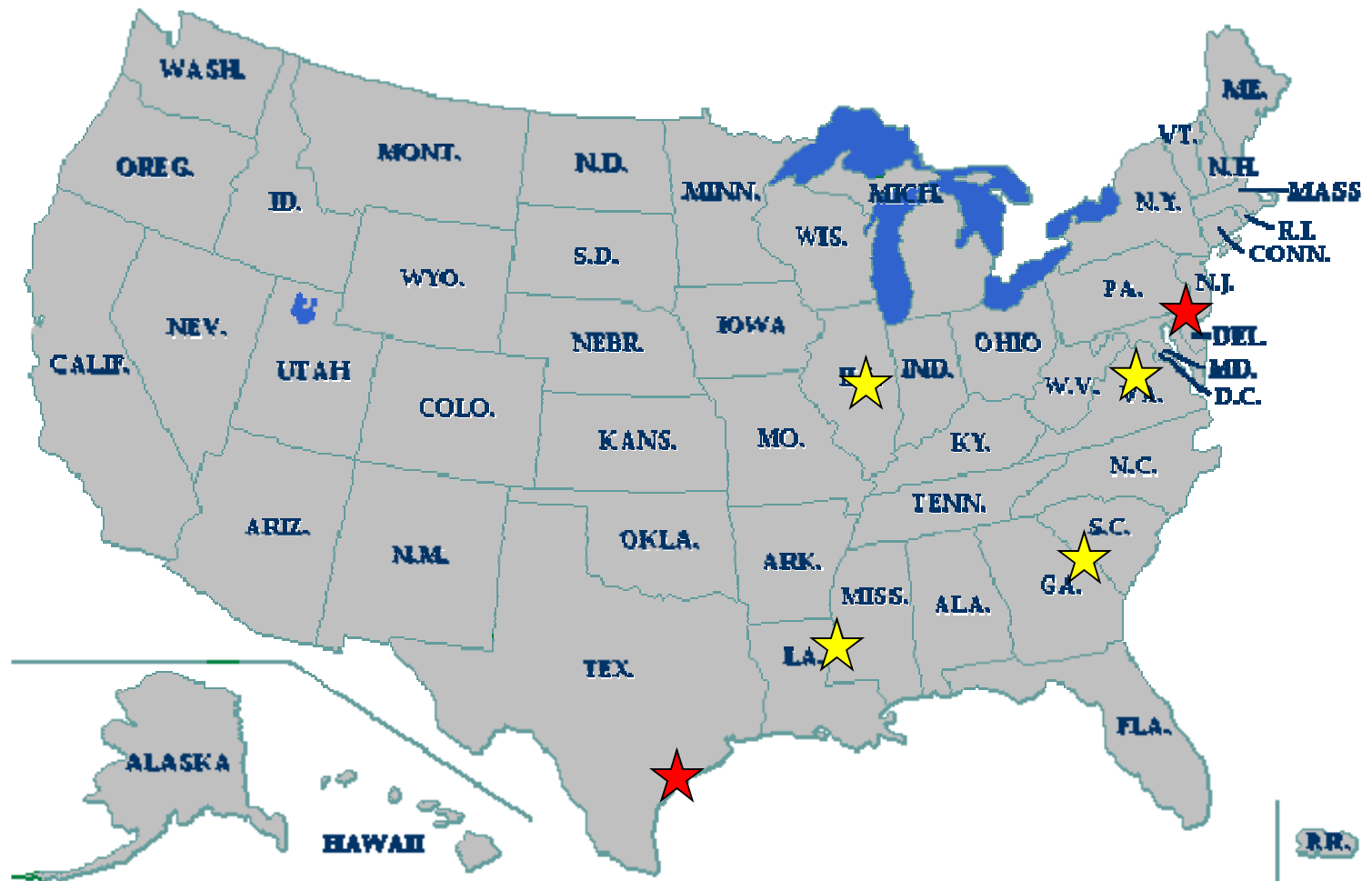
Process Overview

- Limited Work Authorization
 - Request to authorize some portion of construction in advance of a full Combined License being approved
- Combined License
 - Combined construction permit and operating license
 - Can reference Early Site Permit, Certified Design, Manufacturing License, or none
 - Lasts 40 yrs + renewal
- Inspections, Tests, Analyses and Acceptance Criteria (ITAAC)
 - NRC Construction Inspection Program inspects ITAAC completion
 - After ITAAC Completion, NRC informs Applicant of Reactor Operation Decision

Early Site Permits

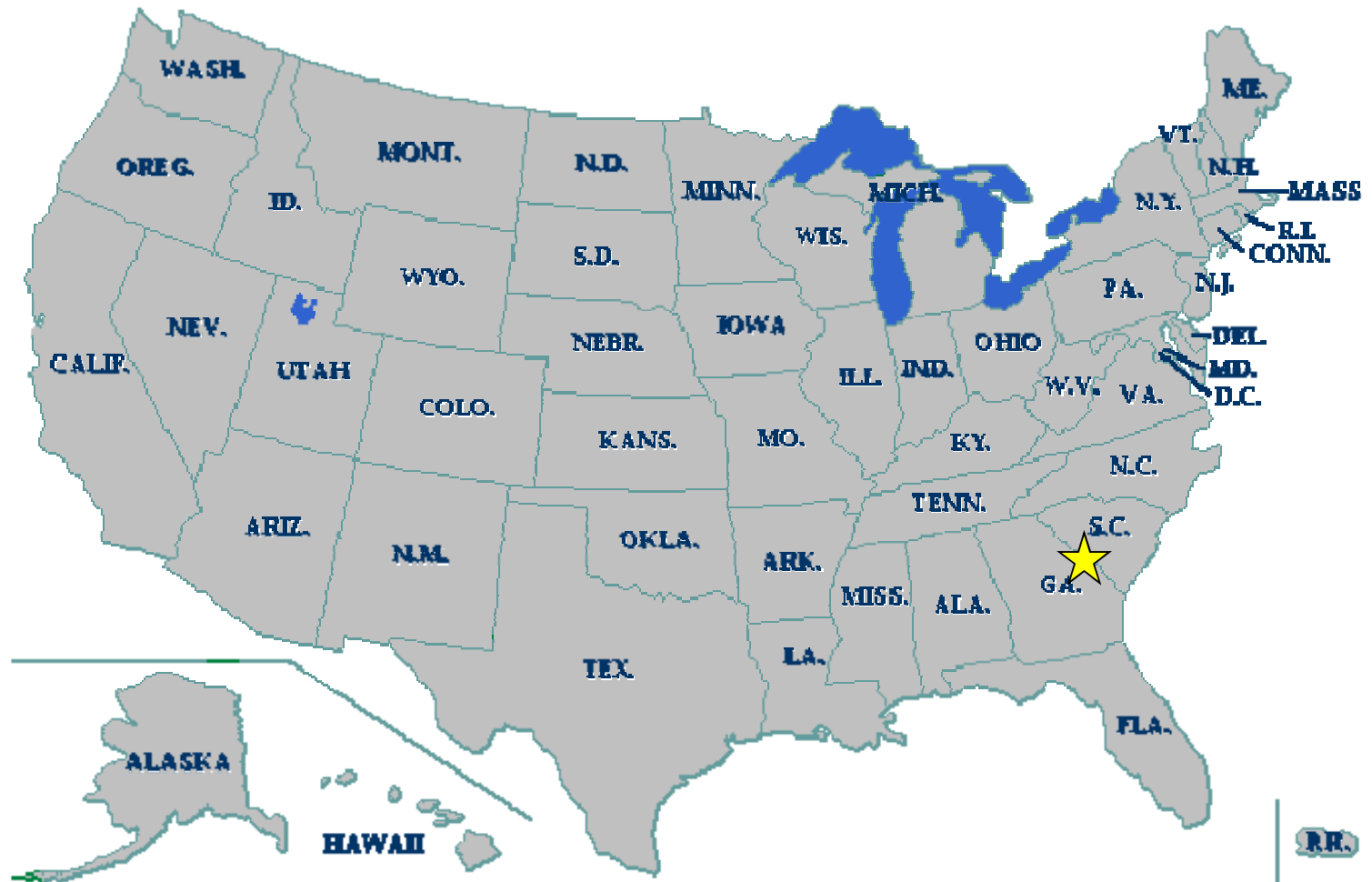
★ Issued

★ Under Active Review



Limited Work Authorizations

★ Issued
★ Under Active Review





 Under Active Review



Safety Review Process

- Pre-application interactions
- Acceptance Review
- Schedule Development
- Staff review
- Site Audits
- Public meetings
- Safety Evaluation Report
- Advisory Committee on Reactor Safeguards review
- Public Hearings (ESP, COL, LWA, Manufacturing License) or Public Rulemaking (DC)



Lessons Learned from Safety Reviews

- Interactions before application submitted are important
 - Especially sites with unique hydrological, geotechnical or seismic aspects
 - Facilitates regulatory authority's scheduling of resources to complete review
- Executing a review as planned
 - Complete, technically sufficient information provided on the site and design from the beginning
 - Few design or siting changes during safety review
 - Utility and designer responsive to requests from regulatory authority

Insights: Siting Reviews

- Geology, Seismology, Geotechnical Engineering
 - Evaluate recent literature for site area and region
 - Documentation of site field studies
 - Complete subsurface characterization
 - Potential updates to seismic models need to be considered
 - Carefully monitor status of specific “pre-construction” activities allowed to occur prior to regulatory approval (excavation, erection of non-safety structures)
- Hydrology
 - Complete Groundwater flow and transport analyses
 - Complete site characterization
 - Key assumptions of ground water flow, especially post-construction, may require detailed analysis

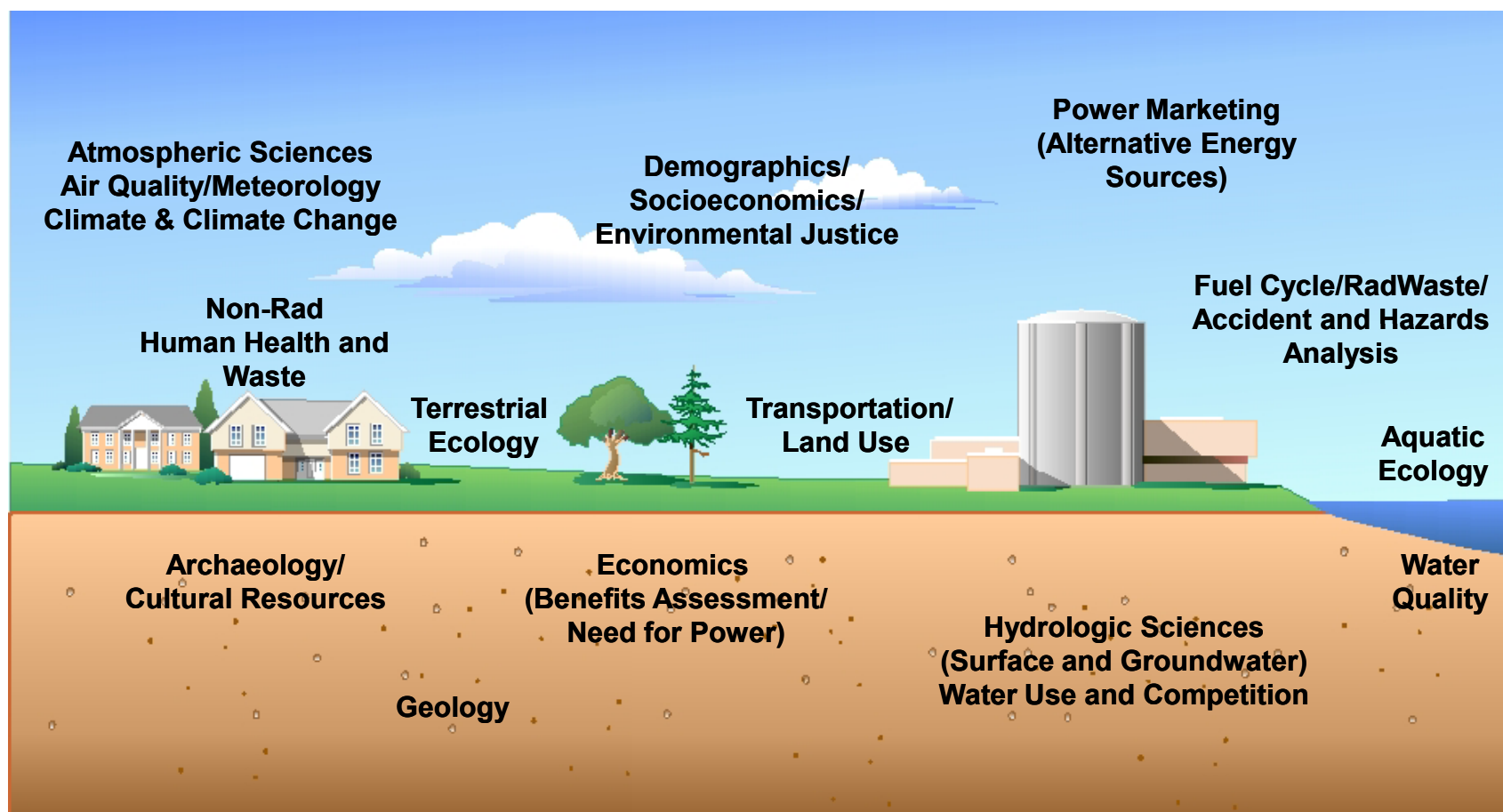
Insights: Siting Reviews

- Design Basis Accident Dose Analysis
 - Carefully consider passive or unusual design features or novel analysis methods
- Meteorology
 - Important to include complete meteorological data
- On-site and Near Site Hazards
 - Important to include complete information on transported and stored chemicals as well as dispersion model assumptions and inputs

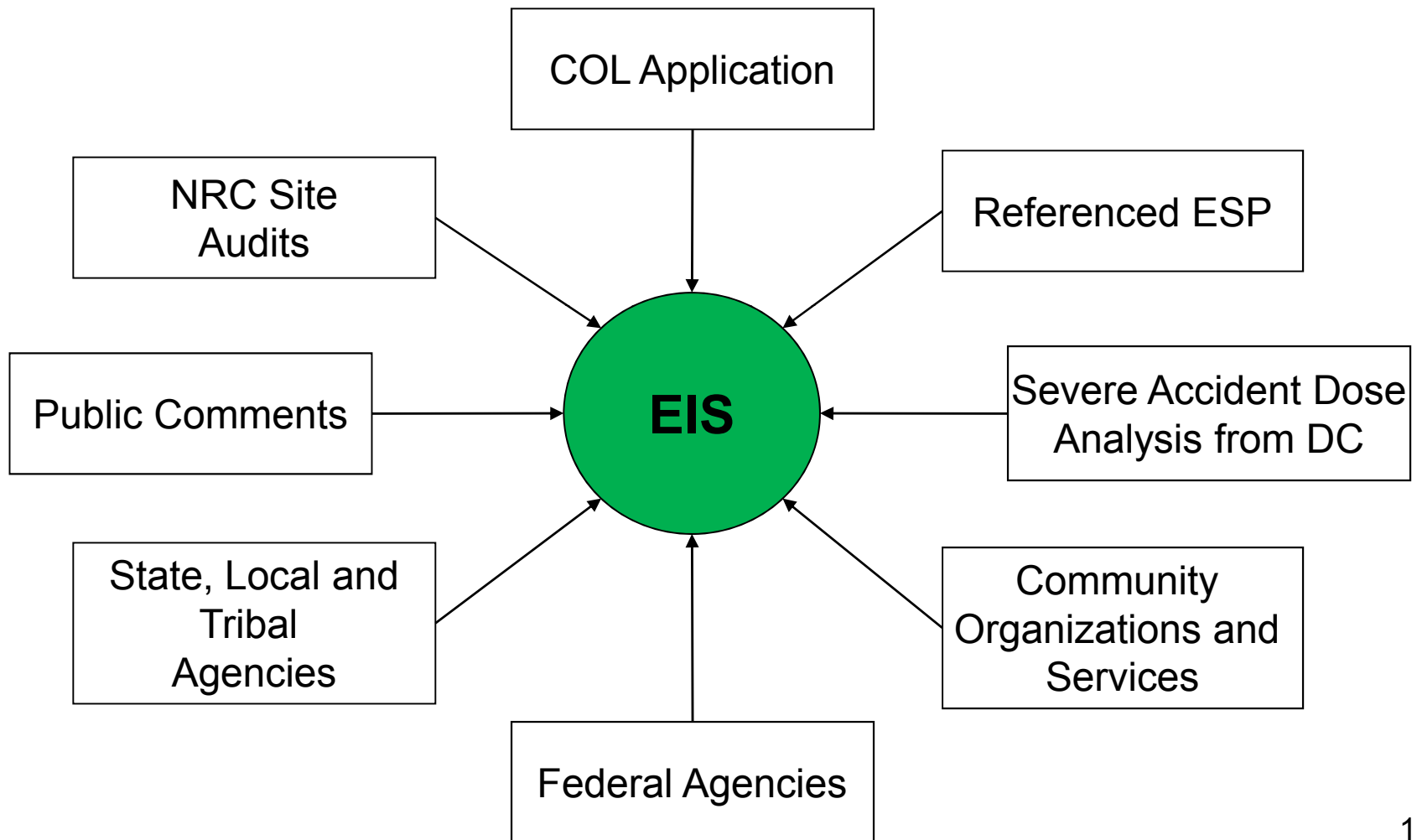
Environmental Review

- National Environmental Policy Act requires environmental review – separate from safety review
- Environmental review proceeds in parallel with safety review
- Environmental Impact Statement (EIS)
- Environmental review includes many siting issues

Environmental Siting Issues



Environmental Impact Statement (EIS)



Principal Milestones

- Public Notice of Intent to prepare EIS and Notice of Public Scoping meeting
- Public Notice of opportunity to participate in hearing
- Issue Draft EIS for public comment and send to Environmental Protection Agency (EPA)
- Conduct public meetings on draft EIS
- Consider and disposition public comments
- Issue final EIS to public and file with EPA
- Participate in public hearing

Lessons Learned from Environmental Reviews

- Provide detailed guidance to industry on information needed in applications
 - Age and sources of data
 - Identify what impacts are from “pre-construction” vs. construction requiring NRC approval
- Coordination with other agencies and permitting authorities
 - Coordination between regulatory agencies
 - Coordination between industry and other agencies
- Importance of pre-application interactions

Lessons Learned from Environmental Reviews

- Today's public groups:
 - Are informed
 - Are organized
 - Communicate instantly
 - Expect more from their Government agencies
- Agencies must:
 - Find better ways to communicate
 - Plan for higher levels of public involvement

Summary

- New licensing process is being successfully implemented
- Issues and challenges have emerged in both safety and environmental
- Challenges addressed through careful planning and communications