U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Licensing Processes
10 CFR Part 52

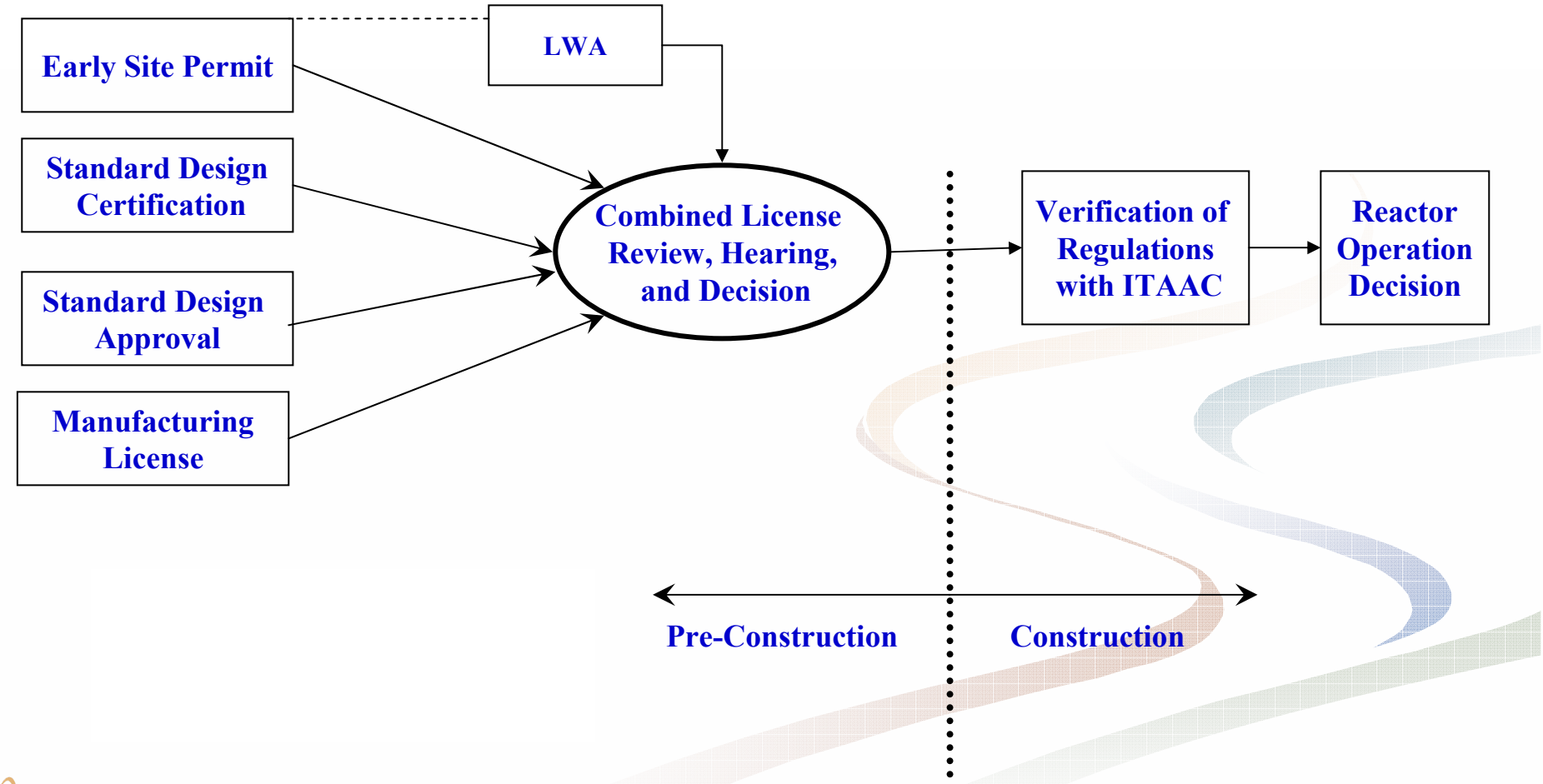
David B. Matthews, Director
Division of New Reactor Licensing
Office of New Reactors

Enclosure 3

Part 52 Licensing Processes

- Licensing Processes:
  - Early Site Permit (ESP)
  - Design Certification (DCR)
  - Combined License (COL)
  - Standard Design Approval
  - Manufacturing License (ML)
- Provide a more 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 licensees

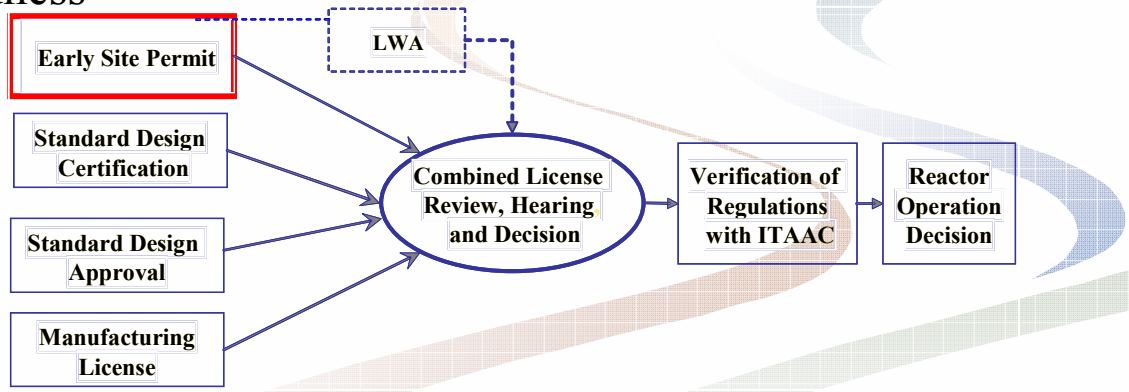
Part 52 - Fitting the Pieces Together



U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

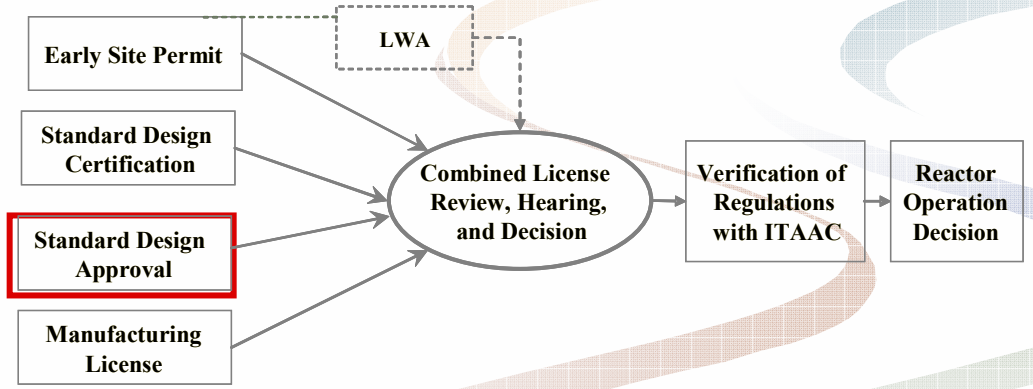
Early Site Permits (Subpart A)

- Allows applicant to "bank" a site
- Are licenses (partial construction permits)
- Good for 10-20 yrs [52.27] + renewal
- Review Scope [52.18] :
  - Site Safety
    - What the environment can do to the design
  - Environmental Impact
    - What the design can do to the environment
  - Emergency Preparedness



Standard Design Approvals (Subpart E)

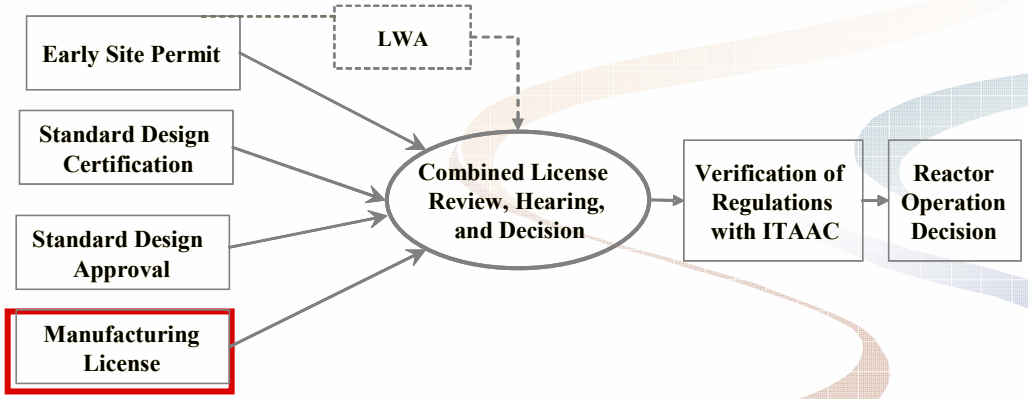
- Supplier/applicant can request a final design approval [52.135]
- Can cover entire facility or major portion
- Can be referenced in a combined license
- No hearing/Commission review, but ACRS reviews/reports [52.141]
  - Design approval is staff-level review – not a rule [52.143]



U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

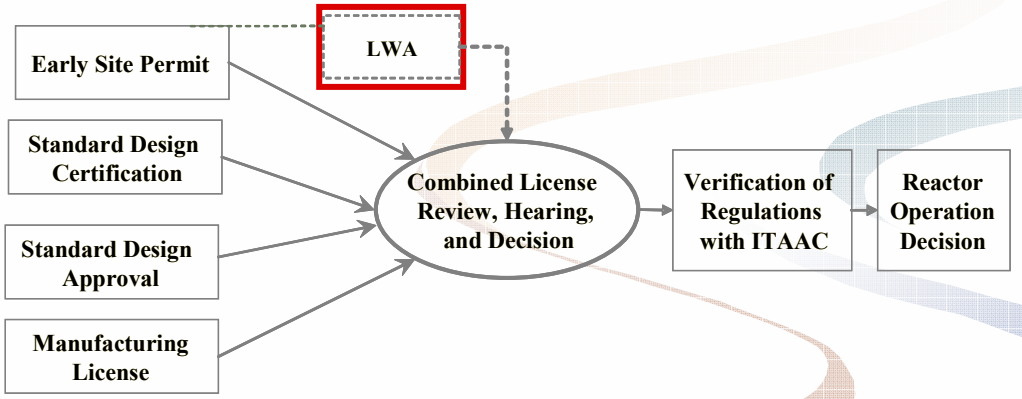
Manufacturing License (Subpart F)

- Licenses issued to manufacture nearly complete plant
- Sites for reactors not identified [52.151]
- License does not authorize transport & installation of the manufactured reactor [52.167]



Limited Work Authorization (LWA)

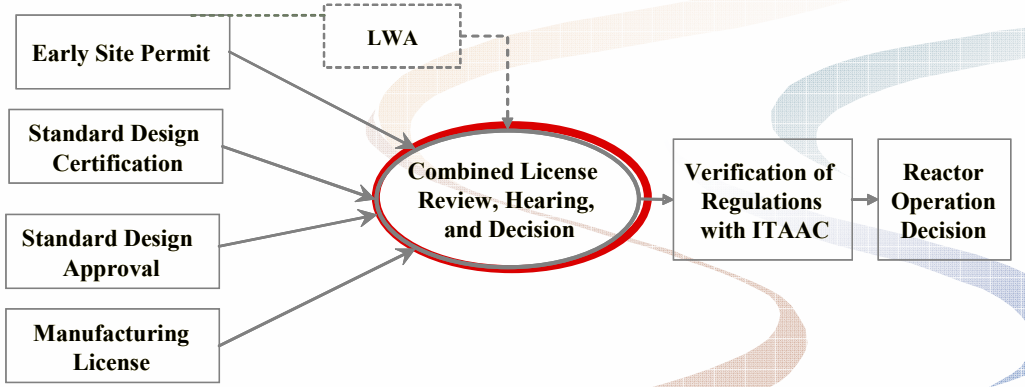
- May request LWA in advance of COL
- Safety review of requested activities
- EIS for requested activities
- Site Redress Plan
- Bifurcated hearing on LWA activities



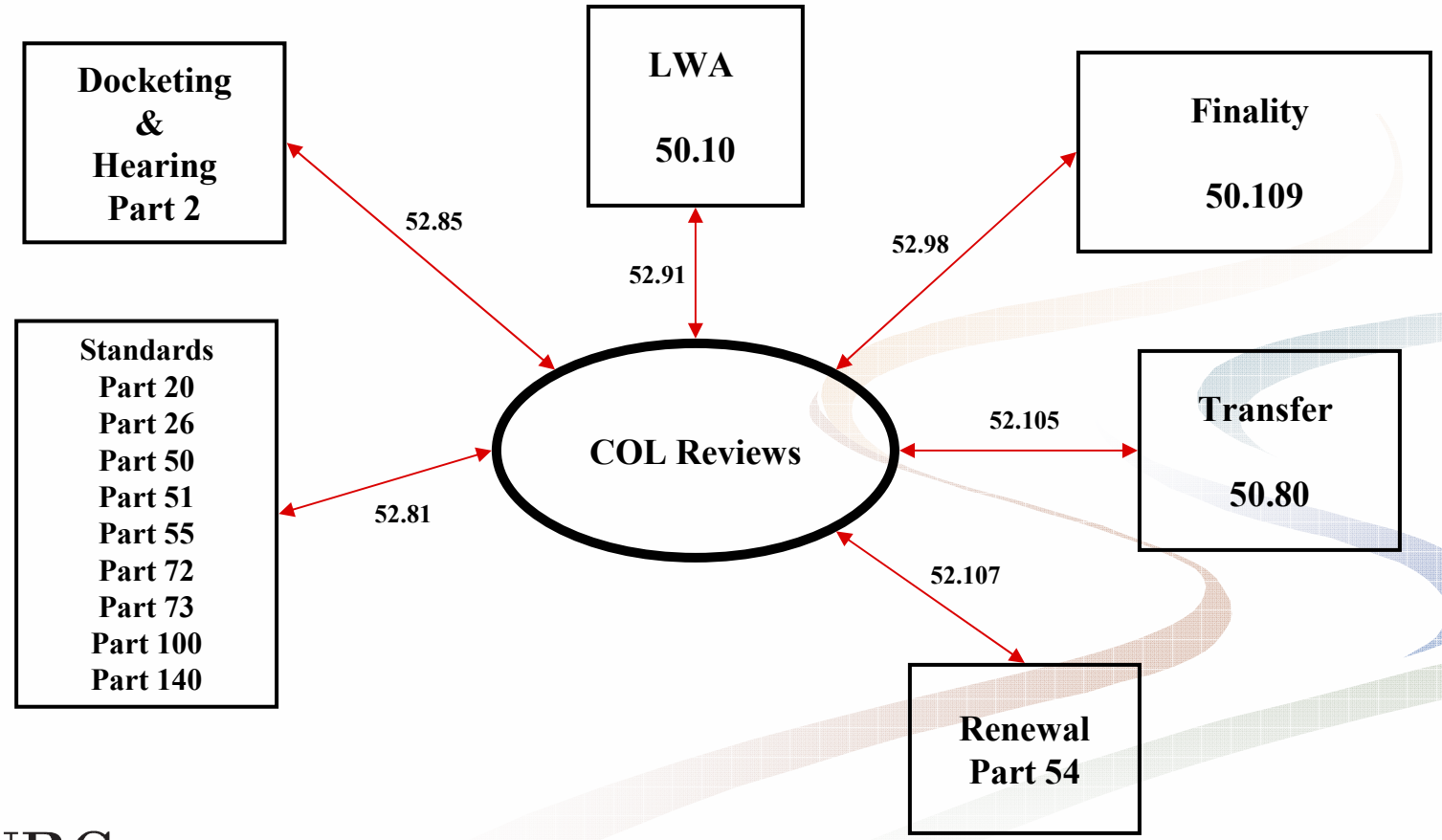
U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Combined License (Subpart C)

- Combined construction permit and operating license with conditions [52.1(a)]
- Fundamental licensing process in Part 52 for reducing financial risk of applicants/licensees
- Can reference ESP, Certified Design, Design Approval, Manufacturing License, or none
- Lasts 40 yrs [52.104] + renewal



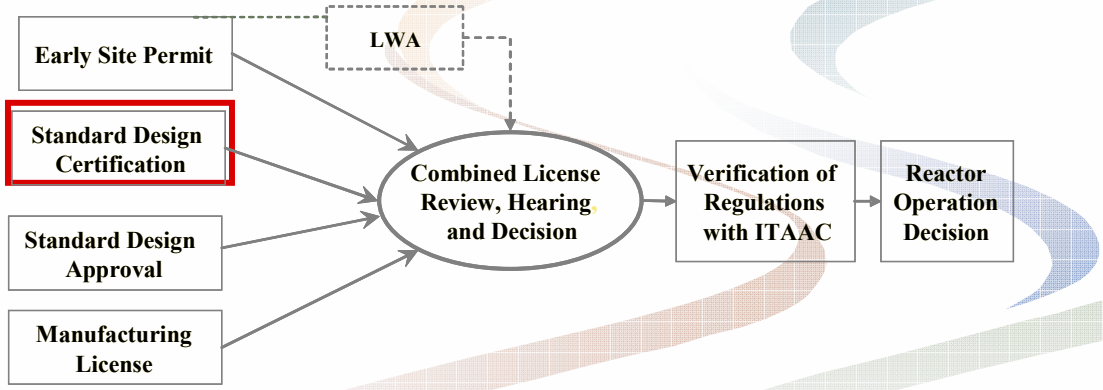
Part 52 Uses other Regulations



U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Standard Design Certifications (Subpart B)

- Allows NSSS vendor/applicant to obtain pre-approval of design (certified design becomes an Appendix to Part 52)
  - Reduces licensing uncertainty by resolving design issues early
  - Facilitates standardization
  - Facilitates regulatory finality through rulemaking
- Certification good for 15 yrs [52.55] + renewal



What IS reviewed

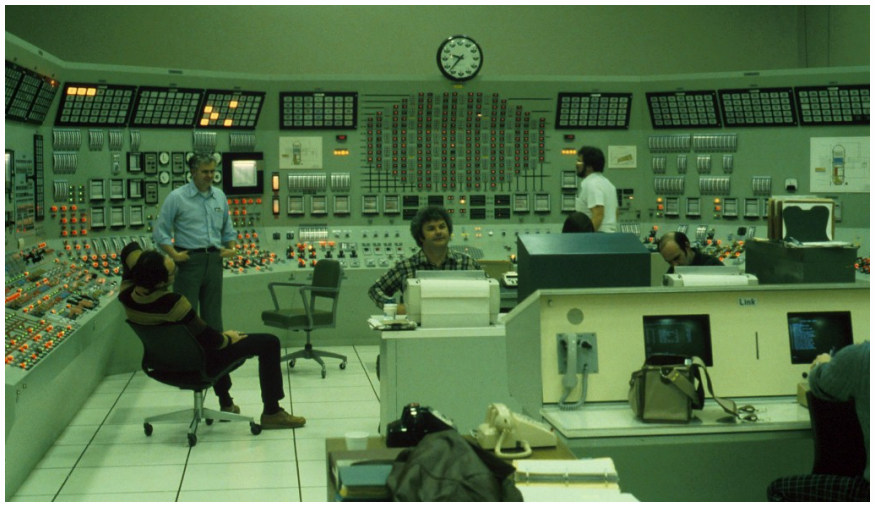
- Final Design Information [52.47]
- Postulated Site Parameters [52.47(a)(1)]
- Interface Requirements [52.47(a)(25)]
- Proposed technical resolutions of unresolved safety issues [52.47(a)(21)]
- Resolution of Severe Accident Issues [52.47(a)(23)]
- Inspections, Tests, Analysis, and Acceptance Criteria (ITAAC) [52.47(b)(1)]
- Advanced Reactor Analysis and Testing Requirements [52.47(c)(2)]

What is NOT reviewed

- Site safety
- Environmental impact
- Operational programs
- Site-specific design features
- Selected design details
  - Rapidly changing technology (e.g., digital I&C, human factors)
    - Design Acceptance Criteria (DAC) fills the void

Aside – A Reason for Design Acceptance Criteria (DAC)

Changes in Instrumentation and Control technology and Human Factors practices over time



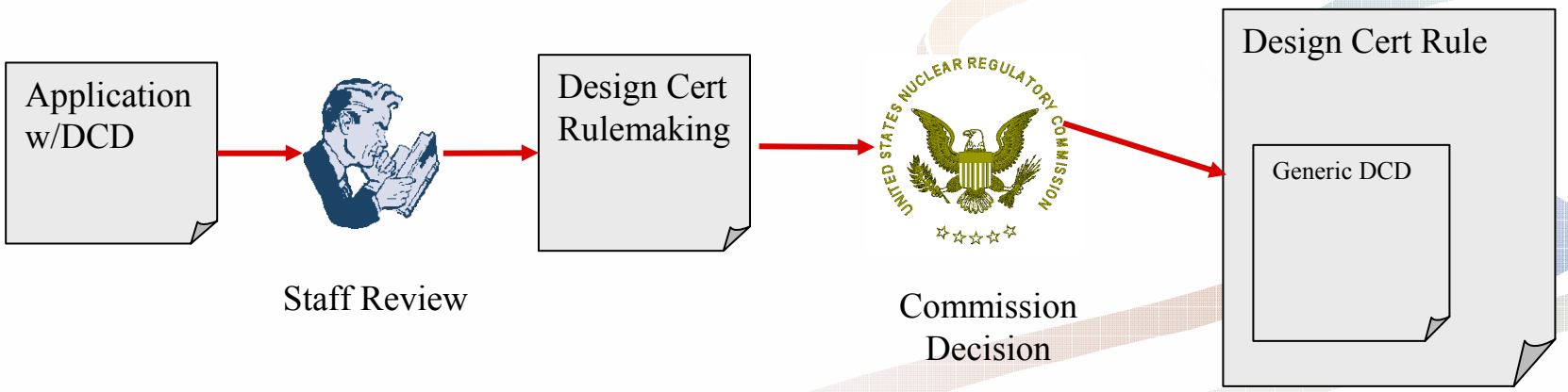
Browns Ferry Control Room ca. 1980

Conceptual Design – AP1000 Control Room

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Design Control Document (DCD)

- DCD is the application (FSAR level of information)
- When design is certified, DCD becomes the generic DCD referenced by the appendix containing the certification rule
- Definition:
  - "Generic design control document (generic DCD) means the document containing the Tier 1 and Tier 2 information and generic technical specifications that is incorporated by reference into this appendix."



Design Control Document

- Tier 2 Information
  - Approved but NOT certified
  - FSAR-equivalent information
  - ITAAC support information
  - COL Action Items
  - Compliance is required, but information is changeable

Design Control Document

- Tier 1 Information
  - Approved and Certified
  - Compliance required
  - High-Level, difficult to change
  - Design Commitments
  - ITAAC
  - Significant Site Parameters
  - Significant Interface Requirements

Design Control Document

- Tier 2* Information
  - That portion of Tier 2 information subject to special change process in Section VIII.B.6 of a Design Certification Rule (DCR).
  - Some Tier 2* information remains so designated for the duration of the COL, requiring a license amendment for change. Examples:
    - Fuel rod burn-up
    - Fuel design requirements
  - Some Tier 2* reverts to Tier 2 status after full power is achieved, allowing for 50.59 changes. Examples:
    - Equipment seismic qualification methods
    - ASME Code commitments

New Construction

- Nuclear plants will be built more rapidly than their predecessors
- Detailed engineering essentially complete by start of construction
- Modular construction techniques may be used
- Fabrication of components may begin before COL issuance
- Components and modules may be fabricated in other countries
- Site preparation work may be performed

Key Terms in Part 52

(a) *Early site permit* means a Commission approval, issued under subpart A of this part, for a site or sites for one or more nuclear power facilities.

(b) *Standard design certification or design certification* means a Commission approval, issued under subpart B of this part, of a final standard design for a nuclear power facility. A design so approved may be referred to as a certified standard design.

(c) *Combined license* means a combined construction permit and operating license with conditions for a nuclear power facility issued under subpart C of this part.

Key Terms in Part 52 (cont.)

(e) *Standard design approval or design approval* means an NRC staff approval, issued under subpart E of this part, of a final standard design for an entire nuclear power facility or a major portion thereof.

(f) *Manufacturing license* means a license, issued under subpart F of this part, authorizing the manufacture of nuclear power reactors but not their construction, installation, or operation at the sites on which the reactors are to be operated.

ITAAC – the inspections, tests, and analyses that the licensee shall perform, and the acceptance criteria that, if met, are necessary and sufficient to provide reasonable assurance that the facility has been constructed and will be operated in conformity with the license, the provisions of the Act, and the Commission's regulations.

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Regulatory Perspectives on New Plant Construction

April 9, 2008

Glenn M. Tracy, Director

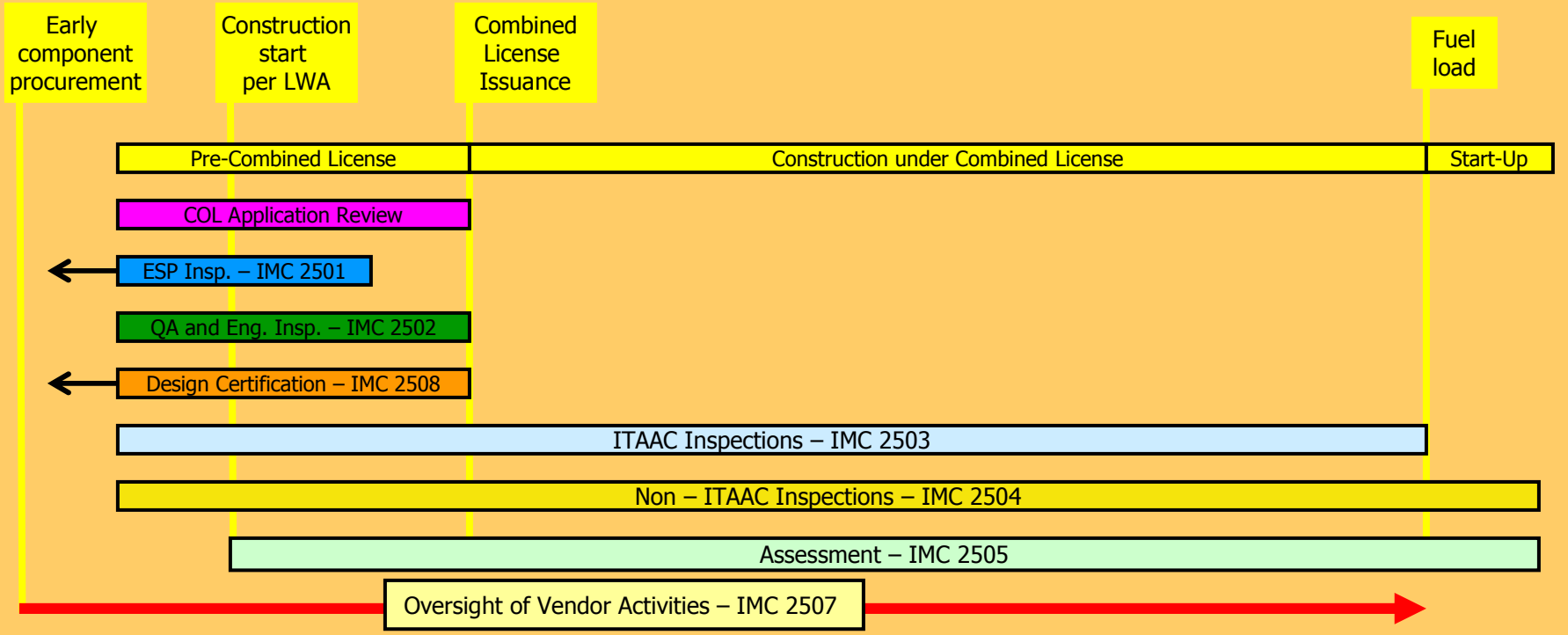
Division of Construction Inspection and Operational Programs

Construction Inspection Program Objectives

- Ensure that plants are constructed in accordance with approved designs and safety regulations
- Determine operational readiness
- Communicate results to all stakeholders
- Ensure effective transition to Reactor Oversight Program

NRC CONSTRUCTION OVERSIGHT HAS MULTIPLE COMPONENTS

Oversight will assure plants are constructed as designed.



Abbreviations

ESP – Early Site Permit
IMC – Inspection Manual Chapter
ITAAC – Inspections, Tests, Analyses, and Acceptance Criteria
LWA – Limited Work Authorization

IMC 2501

-ESP QA controls on integrity & reliability of data collected for site characterization.
-ESP controls for application preparation

IMC 2502

-QA for design, procurement, & construction
-Translation of certified design into design details
-COL controls for application preparation

IMC 2503

Verification of successful performance of ITAAC-related activities

IMC 2504

-QA for construction & operations
-Problem identification, reporting, & corrective action
-Work planning/control over work & contractors
-Translation of certified design into design details
-Design change process
-Pre-operational & startup testing
-Operational programs & operational readiness

IMC 2505

-Guides inspection planning

IMC 2507

- Verification of QA program implementation, compliance, reporting and corrective action

IMC 2508

- Verification of QA program implementation for the preparation of a Certified Design.

Key Areas of Current Program Development

- ITAAC Closure Verification
- Assessment and Enforcement Process
- Construction and Operational Experience Program
- Vendor and Quality Assurance Activities

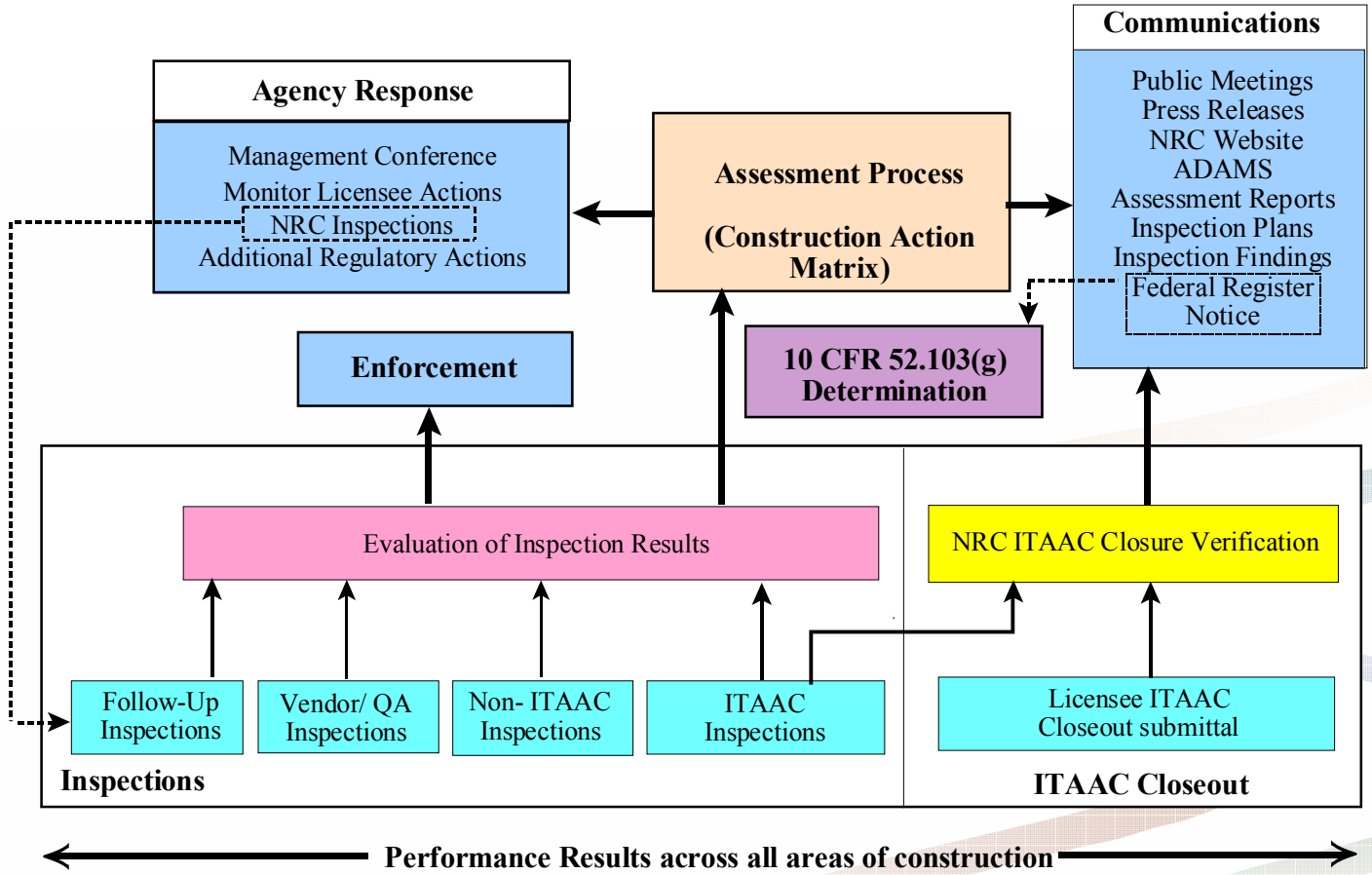
ITAAC Closure Verification

- NRC inspection program provides oversight for the construction of structures, systems and components
- Licensees perform ITAAC activities
- NRC directly inspects a sample of ITAAC
- Licensees complete ITAAC and submit a closure letter to the NRC
- NRC verifies the closure of all ITAAC through a review of licensee documentation and the inspection record
- NRC documents ITAAC closure verification
- Commission ensures inspections, tests, and analyses are performed and that the acceptance criteria are met prior to operation

Assessment and Enforcement

- Guiding Principles
  - Well defined
  - Designed for a construction environment
  - Timely communication and resolution of identified issues
  - Transparency, predictability, scrutability
  - Public availability of inspection information

Construction Oversight Process



Construction and Operational Experience Program

- Program Goals
  - Utilize construction experience gained from both international and domestic projects
  - Provide insights in support of NRC reviews and inspections
  - Improve safety and security

U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Historical Lessons Learned

- Significant quality-related concerns identified in Information Notice 2007-04:
  - Inability of utility management to adequately control all aspects of the construction project
  - Inexperience with nuclear plant construction
  - False sense of security based on prior successes
  - Failure to encourage problem reporting and resolution
  - Failure to appropriately delegate authority
  - Failure to have clear communication pathways

Current Construction Insights

- Causal factors related to construction problems described in IN 2007-04:
  - Poor communication between design and construction organizations
  - Overconfidence in personnel
  - Ineffective problem ID, reporting and corrective action
  - Unrealistic and aggressive schedules
  - Inadequate assignment of responsibilities and authority
  - Vendor shortcomings
  - Subcontractor issues

Vendor Inspection Program

- Build on existing vendor inspection program
- Increase inspection frequency and scope
- Support ITAAC closure verification
- Develop international cooperation in vendor oversight
- Provide oversight of third party audits by industry
- Participation in Codes & Standards development