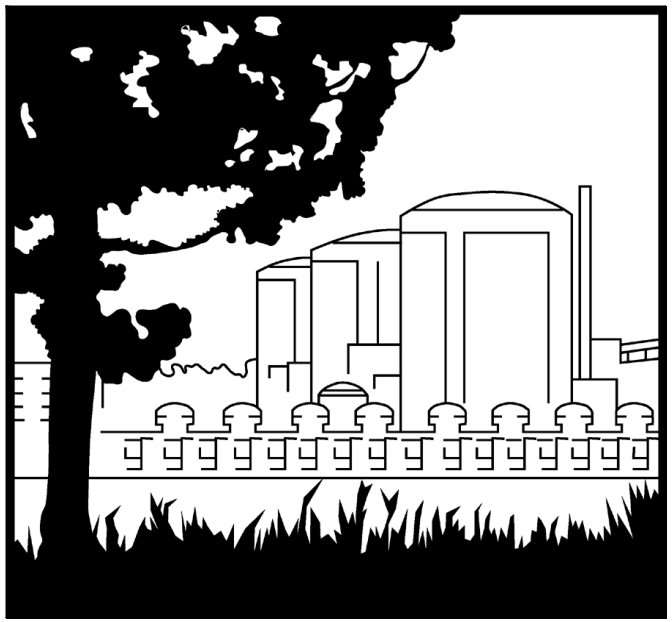
Oconee NFPA-805 Pilot Kickoff



August 11, 2005
NRC Region II Offices
Atlanta, Ga

Duke Participants

- **Harry Barrett** – Duke NFPA-805 Transition Project Technical Lead (ONS)
- **Dennis Henneke** – PRA Engineer (NGO – Severe Accident Analysis Group)
- **Reene' Gambrell** – Regulatory Compliance (ONS)
- **George Mc Aninch** – Design Basis Group Manager (ONS)

Agenda

- NFPA-805 Background – Dennis Henneke
- Appendix R Reconstitution – Harry Barrett
- NFPA-805 Project Plan – Harry Barrett
- NFPA-805 Pilot Process – Harry Barrett
- Fire PRA – Dennis Henneke

NFPA-805 Background

Dennis Henneke
PRA Engineer (NGO Severe Accident Analysis Group)

Background

- Duke Unique Features and Approaches
  - Armored Cable
    - Longer time to damage, lower spurious operation probability, no cable-to-cable interactions
  - Exclusionary Analysis
    - Did not originally trace all cables, only opposite/available train cables for each fire area
  - Oconee Facility Design
    - Class 1E Electrical Distribution located in most significant fire area (Turbine Building)
    - No train separation
    - All trains of EFW in Turbine Building

Background

- Duke Unique Features and Approaches
  - Standby Shutdown Facility
    - Bunkered facility with separate power and control to provide RCP seal cooling and decay heat removal
  - Single Spurious design basis
    - Single, worst case spurious, addressed in design documents but not in SER
  - Three different licensing criteria (Appendix R, post Appendix R and NUREG 0800)
    - Standardization is difficult

Appendix R Reconstitution

Harry Barrett
ONS NFPA-805 Transition
Technical Lead

App R Reconstitution – cont'd

- Main Goals
  - Revalidate Post-Fire Safe Shutdown Strategy
    - Make sure something didn't get missed
    - Bring analysis up to current-day standards
    - Get away from "Exclusionary Analysis" method
  - Improve Documentation
  - Locate components and cables
  - Develop tools necessary to deal with multiple spurious actuations

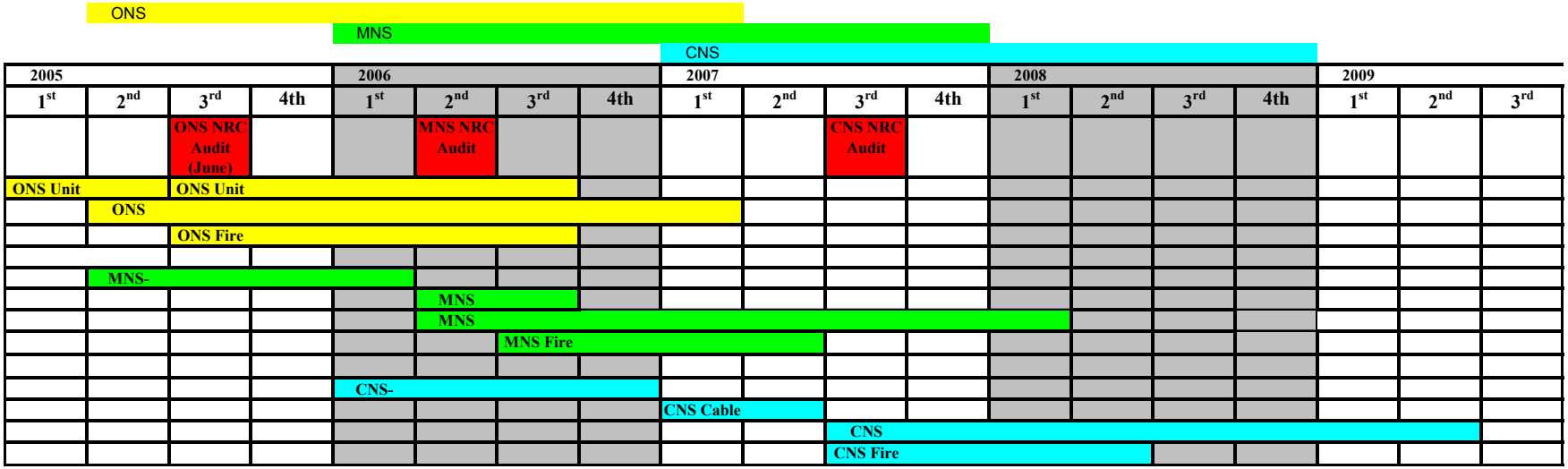
App R Reconstitution – cont'd

- ONS Appendix R Reconstitution Status
  - Unit 2 and common circuit/cable analysis complete, working on compliance assessments – will be used as input to NFPA-805 Project
  - Unit 2 used as model for Unit 1 (very similar routes)
  - Unit 3 analysis started in early July, scheduled complete by Mid-2006

App R Reconstitution – cont'd

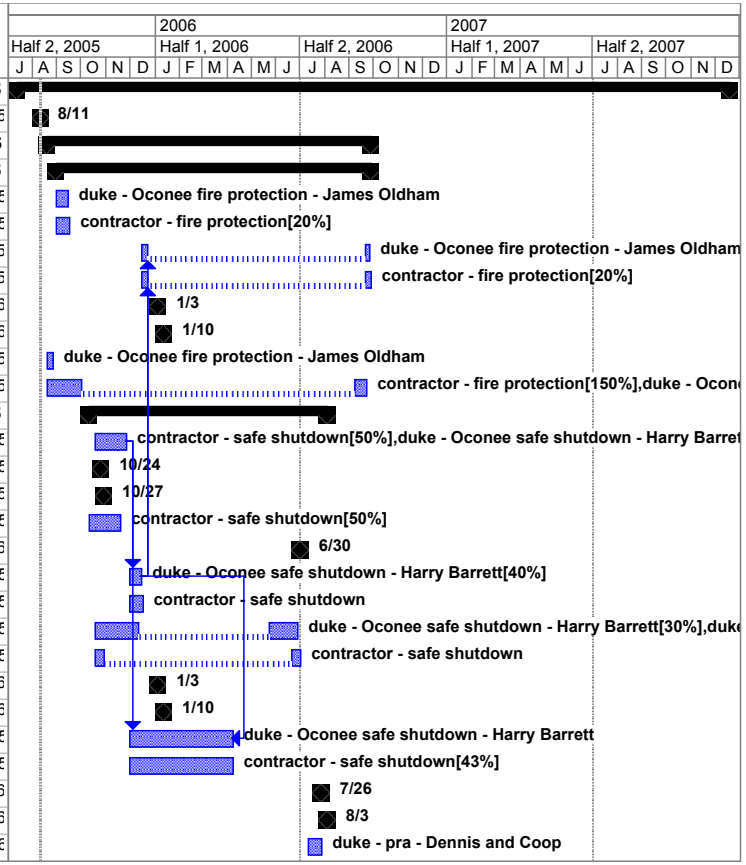
- MNS Appendix R Reconstitution Status
  - Analysis started 2/14/05, complete by 7/31/06
- CNS NUREG 0800 Reconstitution Status
  - Start 4th qtr 2005, complete by 2nd qtr 2007
- Both MNS and CNS reconstitution scope includes electrical circuit coordination study
- Reconstitution is considered a necessary prerequisite for NFPA-805 Transition

Duke Power Transition Overview Schedule



Duke Power Transition Detailed Schedule

ID	Task Name	Work	Start
1	**OCONEE: NFPA 805 TRANSITION**	**25,698 hrs**	**Mon 7/11/05**
2	**NRC PILOT OBSERVATION KICKOFF**	0 hrs	Thu 8/11/05
3	**OCONEE: Phase 2 - Task 1 Fundamental Fire Protection Prog**	**820 hrs**	**Thu 8/18/05**
4	**Sub-Task 1.1 NFPA Chapter 3 Fundamental Fire Protectio**	**220 hrs**	**Mon 8/29/05**
5	Non-Fire Area Specific Element Transition - Duke	90 hrs	Mon 8/29/05
6	Non-Fire Area Specific Element Transition - Contractor	20 hrs	Mon 8/29/05
7	Fire-Area Specific Element Transition - Duke	90 hrs	Wed 12/14/05
8	Fire-Area Specific Element Transition - Contractor	20 hrs	Wed 12/14/05
9	**NRC REVIEW OF CHAPTER 3 TRANSITION**	0 hrs	Tue 1/3/06
10	**DUKE DECISION POINT**	0 hrs	Tue 1/10/06
11	Sub-Task 1.2 Equivalency Evaluations - Duke	50 hrs	Thu 8/18/05
12	Sub-Task 1.2 Equivalency Evaluations- Contractor	550 hrs	Thu 8/18/05
13	**OCONEE: Phase 2 – Task 2 Nuclear Safety Performance Crite**	**2,252 hrs**	**Mon 10/10/05**
14	Sub-Task 2.1 Methodology Review and MSO Expert Panel	240 hrs	Mon 10/17/05
15	**NRC REVIEW OF NUCLEAR SAFETY METHOD TRANSITIC**	0 hrs	Mon 10/24/05
16	**DUKE DECISION POINT**	0 hrs	Thu 10/27/05
17	Sub-Task 2.2 CAFTA Fault Tree Development Pilot	120 hrs	Mon 10/10/05
18	**INPUT FROM SSA RECONSTITUTION**	0 hrs	Fri 6/30/06
19	Sub-Task 2.3 Fire Area by Fire Area Transition - Duke	40 hrs	Mon 11/28/05
20	Sub-Task 2.3 Fire Area by Fire Area Transition - Contractor	120 hrs	Mon 11/28/05
21	Sub-Task 2.4 Transient Analysis Review and Calcs - Duke	500 hrs	Mon 10/17/05
22	Sub-Task 2.4 Transient Analysis Review and Calcs - Contract	152 hrs	Mon 10/17/05
23	**NRC REVIEW OF TRANSIENT ANALYSIS**	0 hrs	Tue 1/3/06
24	**DUKE DECISION POINT**	0 hrs	Tue 1/10/06
25	Sub-Task 2.5 Recovery Action Transition - Duke	760 hrs	Mon 11/28/05
26	Sub-Task 2.5 Recovery Action Transition - Contractor	320 hrs	Mon 11/28/05
27	**NRC REVIEW OF RECOVERY ACTION TRANSITION**	0 hrs	Wed 7/26/06
28	**DUKE DECISION POINT**	0 hrs	Thu 8/3/06
29	OCONEE: Phase 2 – Task 3 Non-Power Operational Modes Trans	100 hrs	Mon 7/10/06



NFPA-805 Transition Project Plan

Harry Barrett
ONS NFPA-805 Transition
Technical Lead

805 Transition Project Plan – continued

- Heavily based on NEI 04-02
  - Detailed task breakdown to perform transition
    - Split into 3 Phases
      - Preliminary Assessment
      - Analytical
      - Implementation
    - Preliminary Phase complete (ended with our Letter of Intent)

805 Transition Project Plan – continued

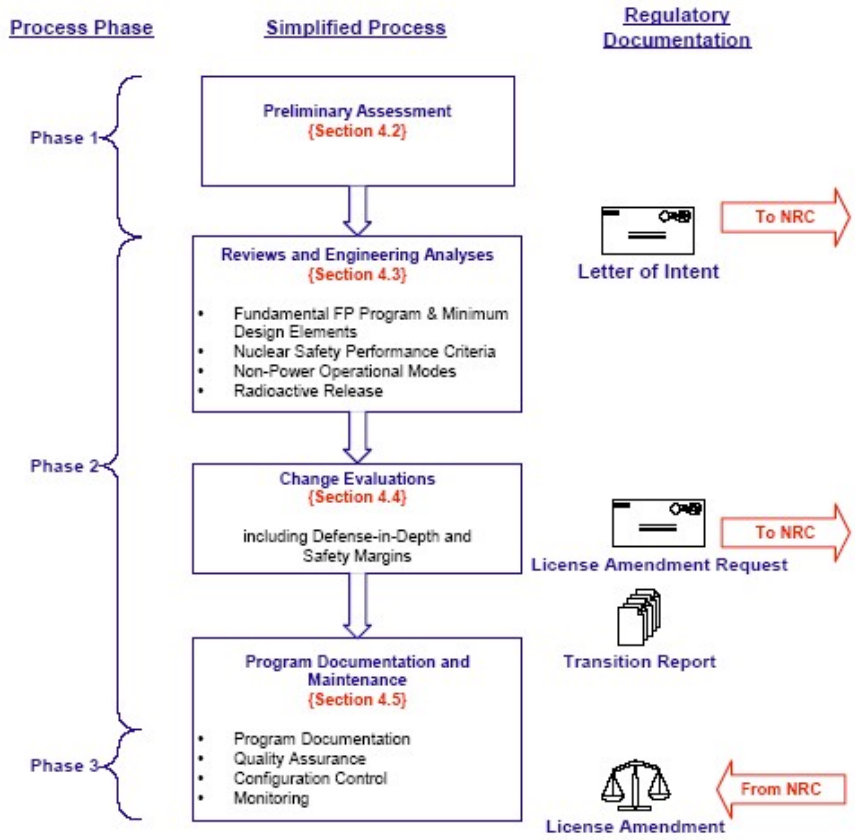


Figure 3-2 Implementing the New Licensing Basis

805 Transition Project Plan – continued

- Transition Process includes developing and implementing a new design basis for fire induced spurious actuations
  - **The Safe Shutdown Analysis shall address all single spurious and all potentially risk-significant multiple spurious**
    - Risk is above Reg. Guide 1.174 criteria (CDF 1E-06, LERF > 1E-07), prior to operator response.
    - DID or Safety Margins are inadequate per NEI Implementation Guide, prior to operator response

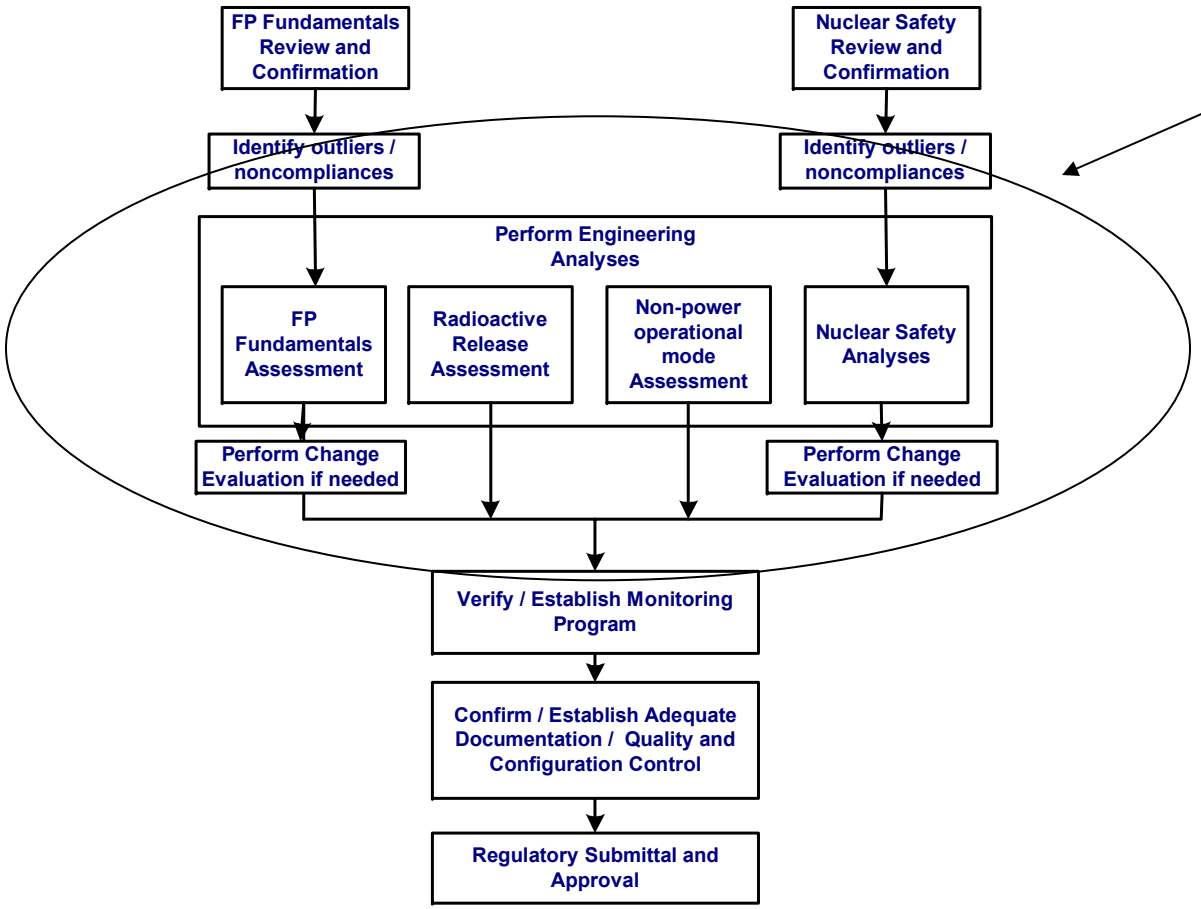
805 Transition Project Plan – continued

- Analytical Phase includes 5 major parts
  - Fundamental Fire Protection Program & Design Elements (Task 1)
  - Nuclear Safety Performance Criteria (Task 2)
  - Non-Power Operational Modes (Task 3)
  - Radioactive Release (Task 4)
  - Fire PRA (Task 5)

805 Transition Project Plan – continued

- Task 1 is divided into two subtasks:
  - Fundamental Fire Protection Program Transition
  - Equivalency Evaluations
- Task 2 is divided into five subtasks:
  - Methodology Review and Multiple spurious expert panel
  - CAFTA Fault Tree Development
  - Fire Area-by-Fire Area Transition
  - Transient Analysis Review
  - Recovery Action Transition

805 Transition Project Plan – continued



805 Transition Project Plan – continued

- Any areas of non-compliance with NFPA-805 rules will require a Performance-Based Change Evaluation
  - Can include Fire Modeling
  - Always includes Fire Risk Assessment
- All of the transition process will be documented in the Transition Report
  - Transition Report will be submitted to NRC for review (ONS is Pilot)

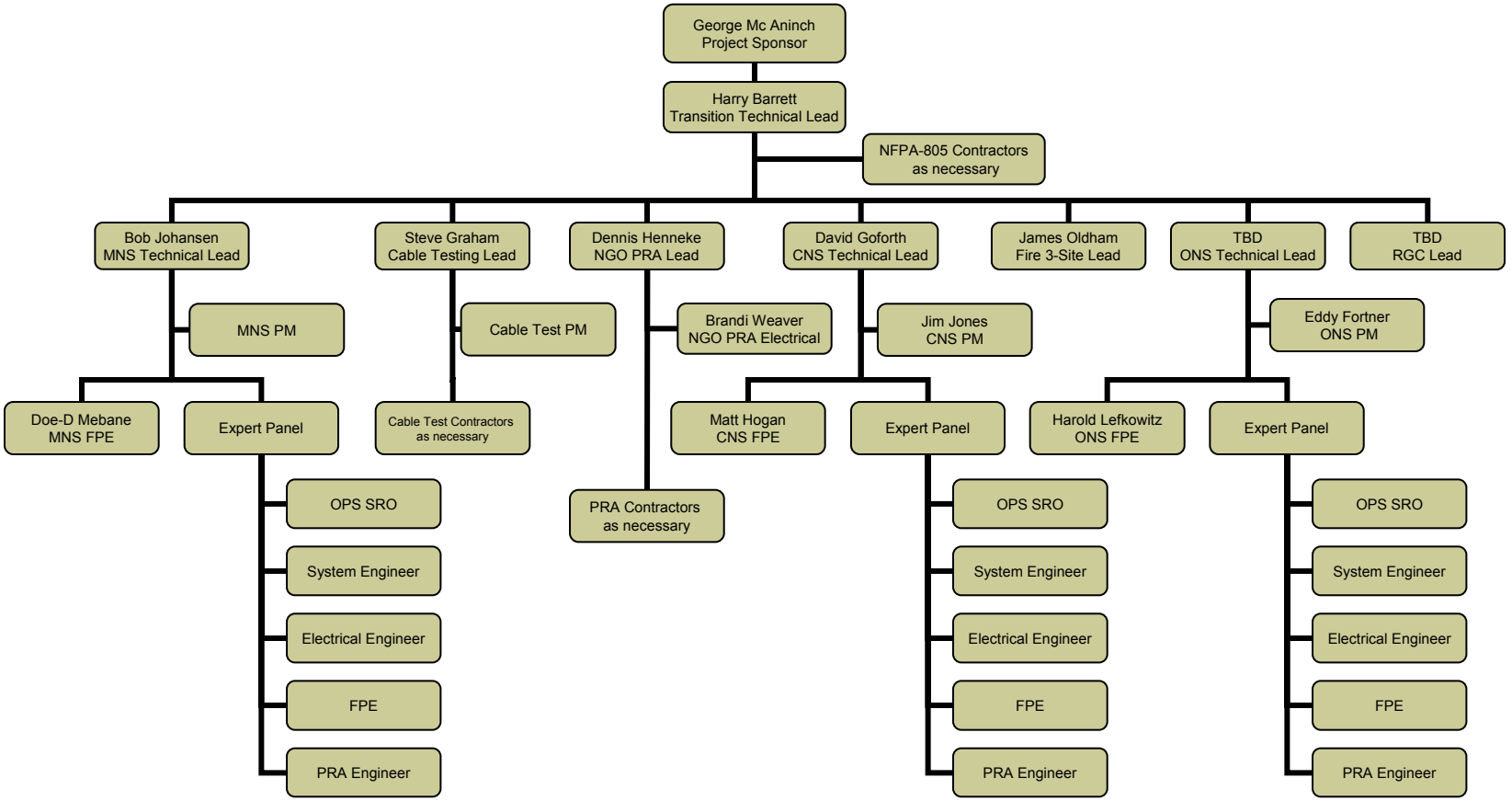
805 Transition Project Plan – continued

- All Recovery Actions will transition as "Performance-Based" actions
  - All must meet feasibility
  - All must be achievable prior to non-recoverable plant conditions
  - All recovery actions that were not previously approved must be handled through the Change Evaluation process and receive a Risk Review

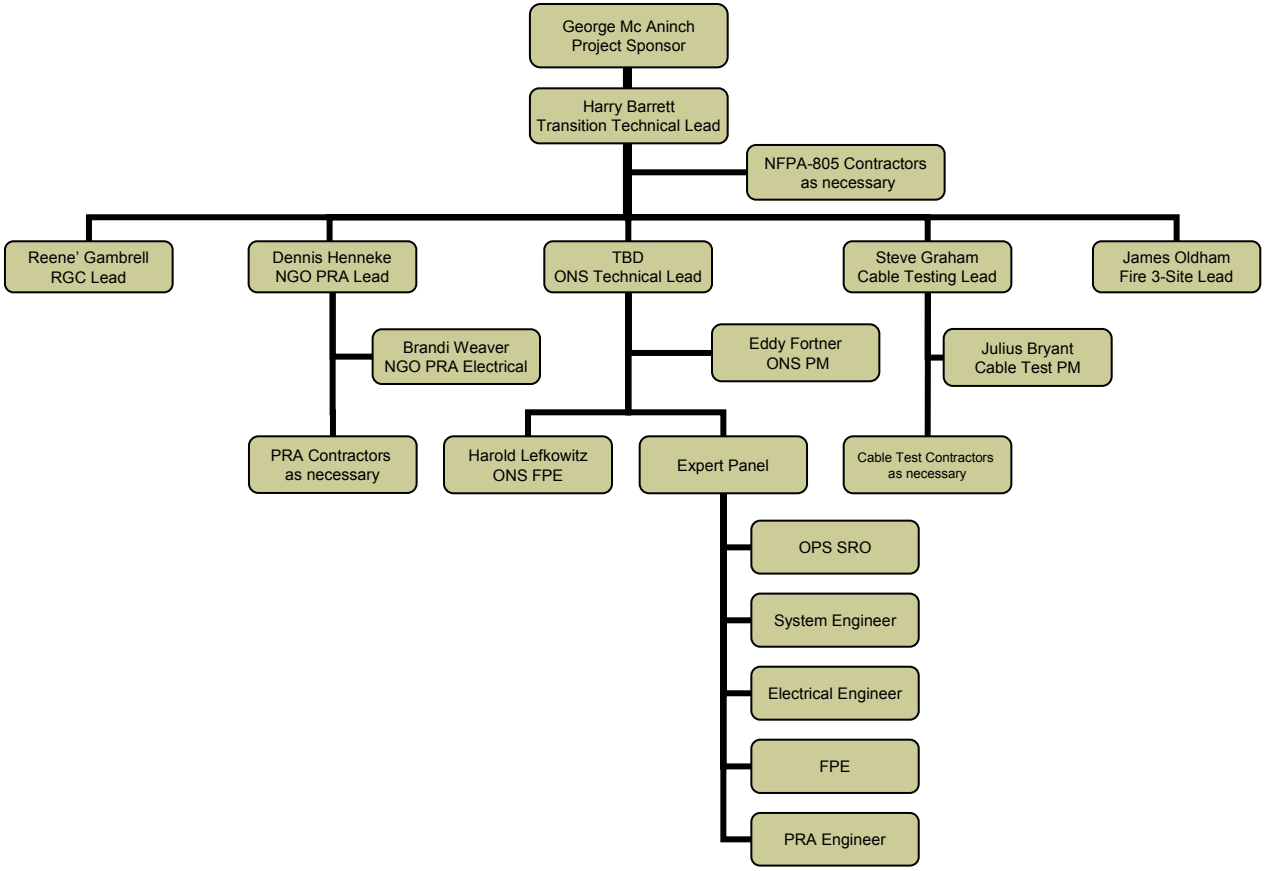
805 Transition Project Plan – continued

- Upon completion of transition activities, we will submit a License Amendment to NRC;
  - We may have some program/plant attributes that require prior NRC approval
  - These issues can not be closed (accepted within the licensing basis) until we receive the approved License Amendment from NRC
  - May result in the need to maintain required actions/compensatory measures until receipt of License Amendment

NFPA-805 3-Site Transition Organization



NFPA-805 ONS Transition Organization



ONS Pilot Plant Process

Harry Barrett
ONS NFPA-805 Transition
Technical Lead

ONS Pilot Plant Status

- ONS has been designated as a “Pilot Plant” for NFPA-805 Transition
  - NRC will perform “observations” of the transition process
  - Some of those observation meetings will be in Atlanta, some at Oconee and some may be in White Flint (Rockville, Md)

ONS Pilot Plant Issues

- We propose that Pilot Observations be grouped in two categories
  - Milestone Observations
  - Status Updates
- Milestone Observations are special meetings intended to discuss/review specific issues
  - Methodology/Concept approval for major project processes
  - Major decision points

ONS Pilot Plant Issues

- Examples of Milestone topics include:
  - Multiple Spurious Licensing Basis (Oct 05)
  - Nuclear Safety Performance Criteria Transition (Oct 05)
  - Chapter 3 Compliance Issue Disposition (Jan 06)
  - Enforcement Discretion (Jan 06)
  - Transient Analysis (Jan 06)
  - Radioactivity Release (April 06)
  - Recovery Actions (July 06)
  - Non-Power Operations (July 06)
  - Change Evaluations (Nov 06)
  - Transition Report (Nov 06)

ONS Pilot Plant Issues

- Status Updates are meetings to review ongoing processes, analyses, activities
- A general meeting frequency of Quarterly is being considered, more frequently if major milestones dictate the need for more

ONS Pilot Plant Considerations

- First implementation of EPRI/NRC Fire Risk Requantification Process
  - What special emphasis is needed for this?
  - Will you need a different team makeup?
  - Is there a need for additional communication avenues (telephone conferences, status reports, etc.)?
- What impact does Pilot Plant Status have on Security?
  - How will Security impact the conduct of Pilot Plant Public Meetings?

Fire PRA in Support of NFPA-805

Dennis Henneke
PRA Engineer (NGO Severe Accident Analysis Group)

Changes in Fire PRA Methodology

- EPRI and the NRC have recently developed a new Fire PRA method that will support Fire PRA applications (like NFPA-805):
  - EPRI TR-1008239, NUREG/CR-6850.
    - Will be on the Fire PRA web site, once issued.
- American Nuclear Society (ANS) is developing a Fire PRA Standard which is expected to be used for important NFPA-805 change calculations.

What Is planned for Fire PRA?

- ONS Fire PRA work has started, following the new EPRI/NRC method.
  - Bidding for contract work soon.
  - Total project 5000-7000 hours. 1/3 of work by Duke folks:
  - Mostly complete by late 2006 (other than the paperwork).
- MNS Fire PRA expected to start mid-2006.
- CNS Fire PRA expected to start mid-2007.

Fire PRA Task Definitions

- Sub-Task 5.1 - Plant Boundary Definition and Partitioning
- Sub-Task 5.2 - Fire Ignition Frequencies
- Sub-Task 5.3 - Fire PRA Component Selection
- Sub-Task 5.4 - Fire PRA Cable Selection
- Sub-Task 5.5 - Qualitative Screening (None)
- Sub-Task 5.6 - Fire Induced Risk Model
- Sub-Task 5.7 - Quantitative Screening
- Sub-Task 5.8 - Scoping Fire Modeling
- Sub-Task 5.9 - Detailed Circuit Failure Analysis

Fire PRA Task Definitions

- Sub-Task 5.10 – Circuit Failure Mode Likelihood Analysis
- Sub-Task 5.11 – Detailed Fire Modeling
- Sub-Task 5.12 – Post-Fire Human Reliability Analysis
- Sub-Task 5.13 – Seismic-Fire Interactions Assessment
- Sub-Task 5.14 – Fire Risk Quantification
- Sub-Task 5.15 – Uncertainty and Sensitivity Analysis
- Sub-Task 5.16 – Fire PRA Documentation