

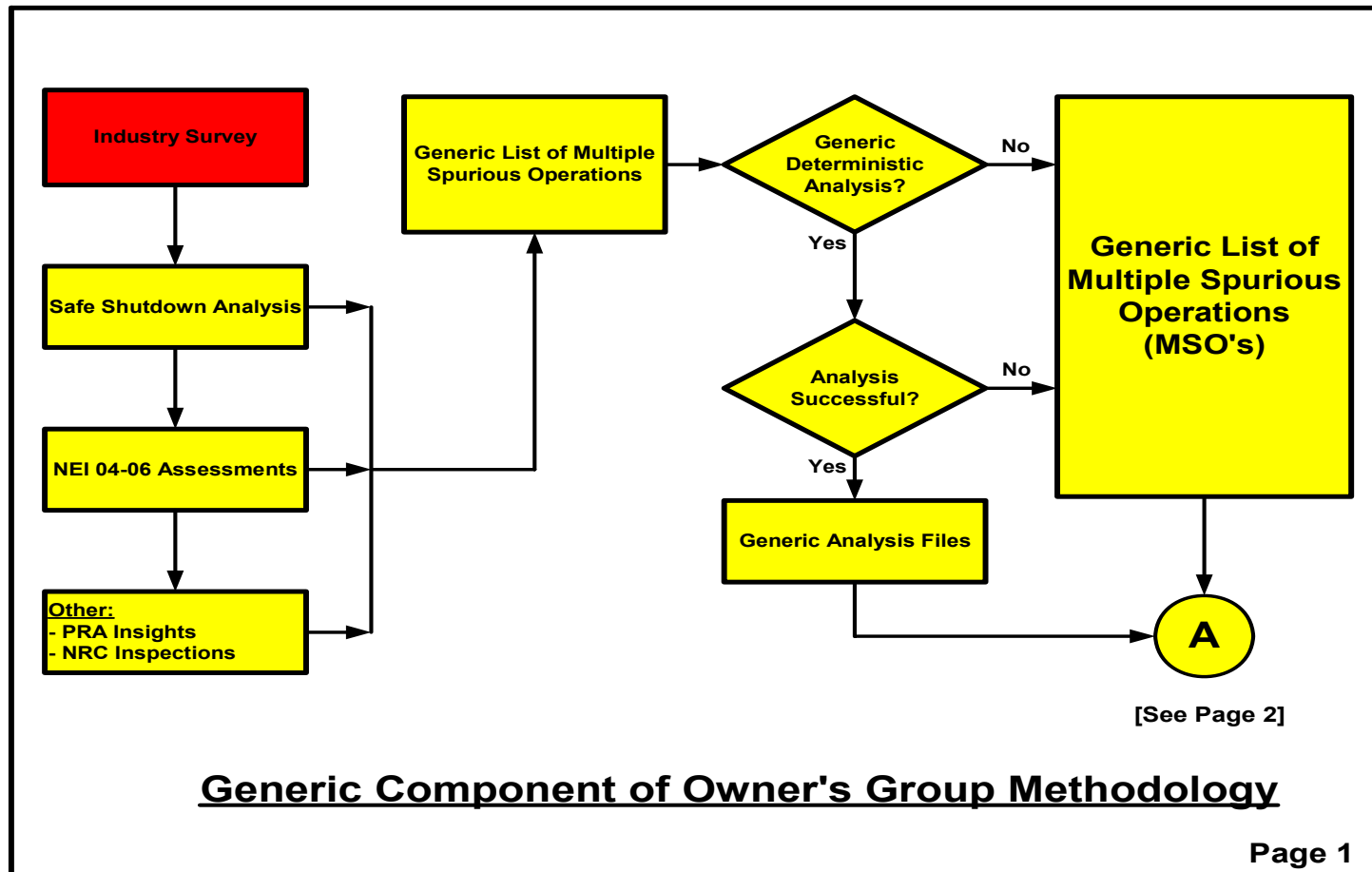
# Meeting with NRC on MSOs 09/06/2007

NEI Circuit Failures Issues Task  
Force

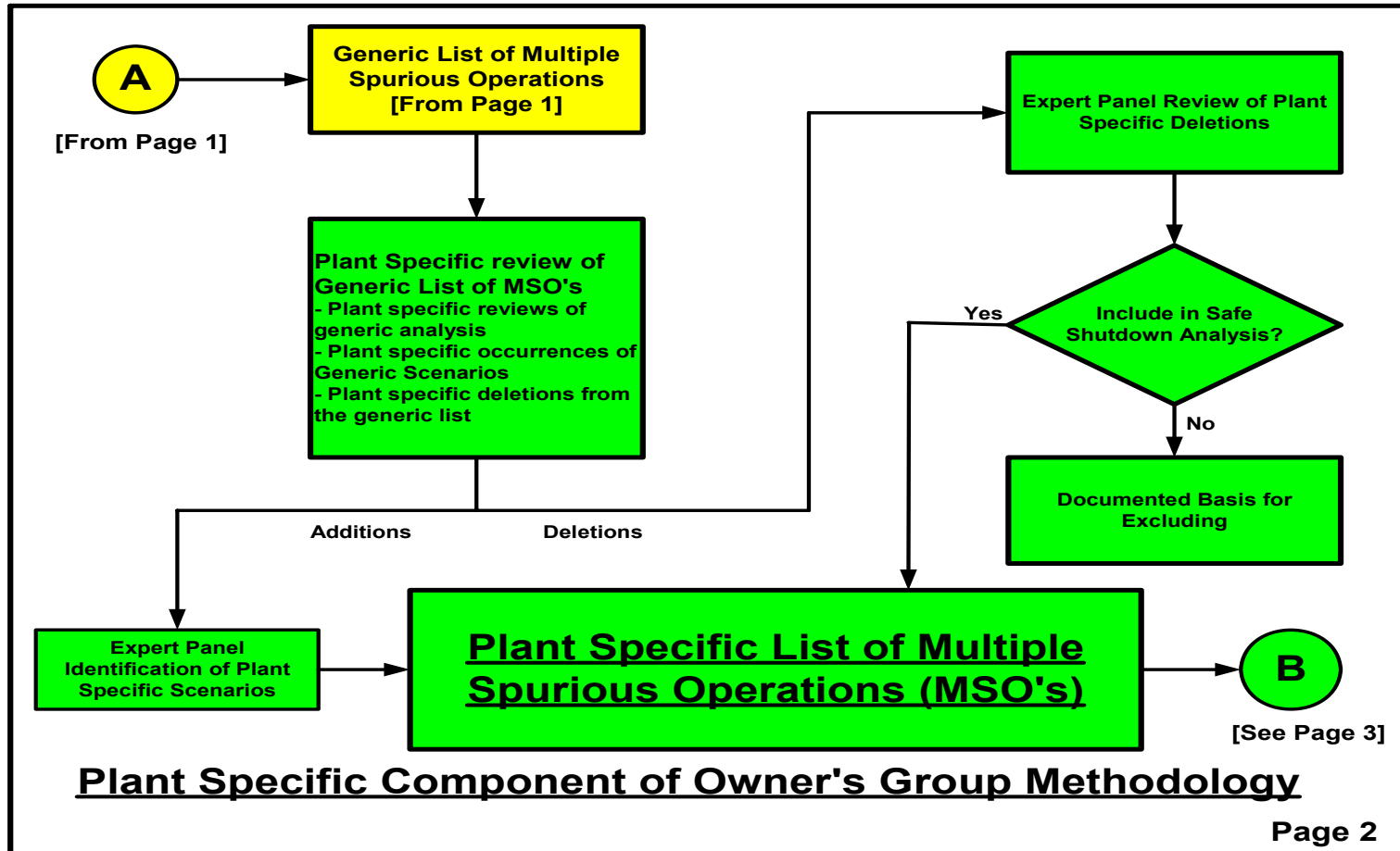
# Agenda

- Proposed Industry Methodology
- NEI 00-01
  - Guidance
  - Goal
  - Changes
- Resolution Methodology
  - Applies to Deterministic and Risk Informed Approaches
  - Detailed application can be somewhat different
- Examples
  - Deterministic Approach
  - Fire PRA

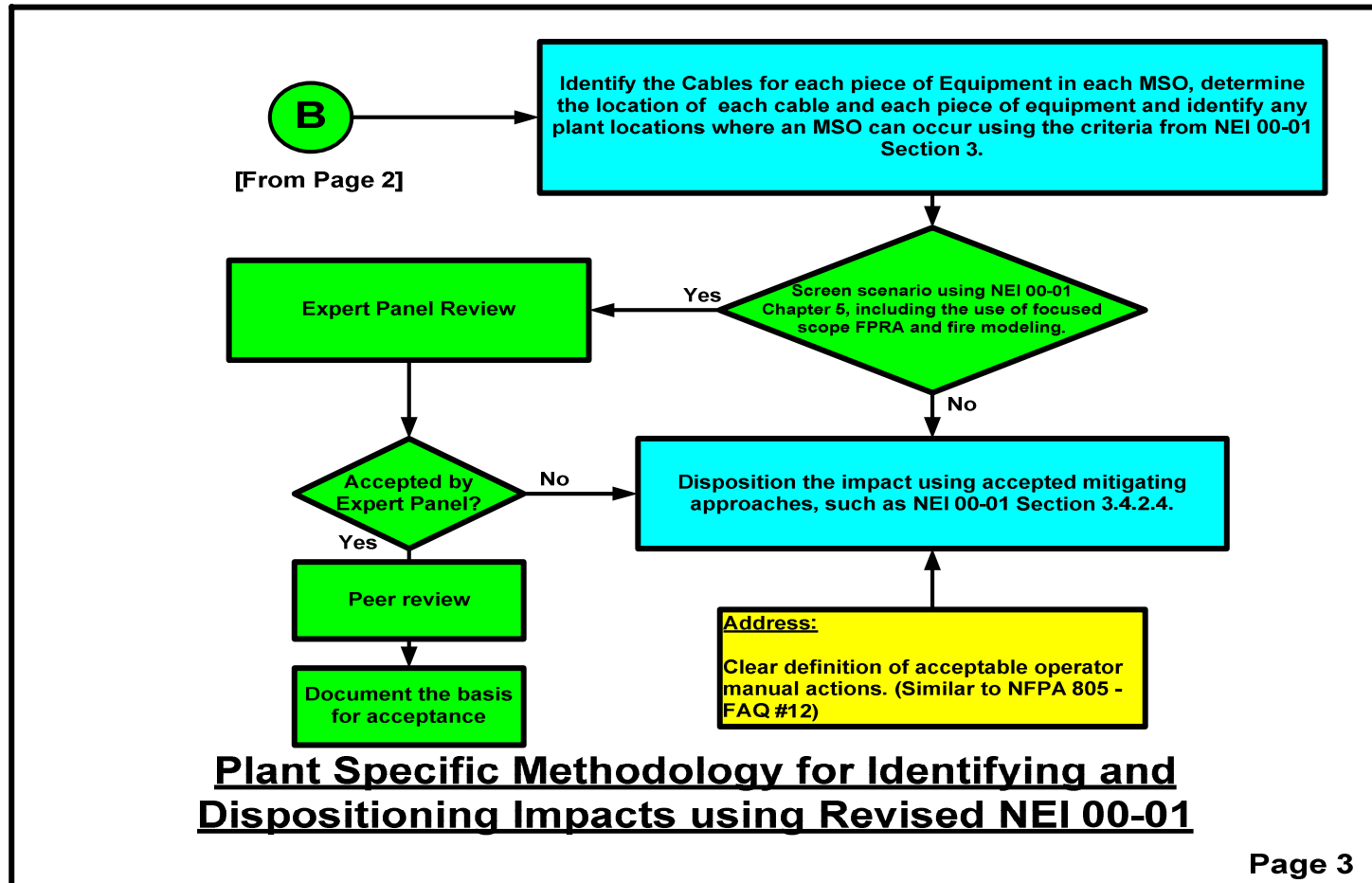
# Proposed Industry Methodology



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# Proposed Industry Methodology



# NEI 00-01

- Guidance
  - Safe Shutdown Path to achieve and maintain hot shutdown for each Fire Areas
  - 10CFR50.48
  - Appendix R Section III.G and III.L
  - NRC Guidance on Post-Fire Safe Shutdown

# NEI 00-01

- Goal [SRM for SECY 06-196]
  - “...ensure the resolution of this licensing issue has a technically sound and traceable regulatory footprint that will provide permanent closure for this issue”

# NEI 00-01

- Changes
  - Minor adjustments in Chapters 1, 2 and 3
  - Revision of Appendix B to provide the list of circuit failures of concern beyond the traditional single hot short, single short-to-ground or single open circuit.
  - Development of a new Chapter 4 to include the Resolution Methodology and a detailed discussion on use of the methodology
  - Move old Chapter 4 information to Chapter 5



# Resolution Methodology

- NEI 00-01 Chapter 3 Deterministic Approach
  - Based on Regulatory Requirements from 1980
  - Provides Reasonable Assurance
  - Relies heavily upon traditional Fire Protection Defense-in-Depth Principles
    - Prevent fires from starting
    - Rapidly detect and suppress any fires that do start
    - Protect a Safe Shutdown Path

# Resolution Methodology

- Use of Risk Insights
  - Qualitatively, on the front end, as a part of the sound engineering judgments made to identify and assess specific scenarios
  - Focused-scope fire PRA - on the back end consistent with Regulatory Guide 1.174 to provide risk insights on the significance of specifically identified impacts and the need for mitigation

# Examples

- Potential Scenarios
  - Spurious SRV Opening, Flow Diversion Valve Opening or Injection Valve Closure
  - Two Valves in Series for flow diversion or Two valves in parallel for RPV injection

# Examples

- Spurious SRV Opening, Flow Diversion Valve Opening or Injection Valve Closure
  - These types of fire induced failures are currently addressed in the Post-Fire SSDA. These types of failures will continue to be addressed under NEI 00-01 Chapters 1, 2 and 3.

# Examples

- Two Valves in Series for flow diversion or Two valves in parallel for RPV injection
  - Place into SSDA and determine if cable impacts co-exist
  - Address using fire modeling or risk insights related to the duration of a hot short based on Industry and NRC cable fire testing
  - If necessary, address using either a operator manual action or a traditional disposition

# NEI 00-01 Modifications for FPRA

- Basic Changes
  - Old Chapter 4 moved to Chapter 5 (new Chapter 4 is the MSO Screening Method)
  - FPRA Screening becomes a focused-scope FPRA.
  - New documentation guidance (FPRA becomes part of SSA)
  - New Discussion on Peer Review and the FPRA Standard.

# Focused-Scope FPRA Method

- MSOs analyzed in the Focused Scope FPRA are determined by the new MSO Process.
- Focused-scoped FPRA includes:
  - Screening : similar to NEI 00-01, Revision 1, Chapter 4 including the screening criteria,
  - Detailed FPRA of the MSO scenario for the applicable areas/compartments
    - Adding discussion on NUREG/CR-6850 and the NFPA 805 FAQs on Fire PRA
  - Defense-in-Depth and Safety Margin Review for screening or detailed FPRA.
- Provides an input to the expert panel for their disposition of MSOs

# Focused-Scope FPRA Peer Review

- A peer review of the resulting MSO Focused-Scope FPRA is included
- Identify which FPRA standard supporting requirements (SRs) are applicable to the focused scope FPRA
- Peer Review will be performed against the applicable SRs using the NEI FPRA peer review process



# Focused-Scope FPRA Requirements

- Since the FPRA is a “focused-scope”, not all requirements of the standard need to be met.
  - Applied methods should be reviewed against the standard for the analyzed scenario.
  - General requirements will need to be met.
- Let’s look at some examples.

# Focused-Scope FPRA Example 1

- A scenario involving MSOs is determined to occur in an electrical penetration room
  - Scenario screens using the generic tables in NEI 00-01, revision 1 chapter 4
  - Safety Margins and Defense-in-depth OK.
  - Document the analysis in the SSA
  - No Fire PRA Standard Requirements need to be met
    - No Peer Review required

# Focused-Scope FPRA Example 2

- MSO scenario requires a detailed FPRA evaluation
  - Use of NUREG/CR-6850 for CDF/LERF for MSO
    - Similar to phase 3 SDP
  - Would require meeting applicable parts of the standard
    - Ignition source analysis would require performing component counts for the entire plant [i.e., most or all of IGN Supporting Requirements (SRs)]
    - Cable tracing, circuit analysis, etc., for the components in the scenario need to consider the standard requirements
      - Conservative component failure assumptions may limit applicability
    - If fire modeling not performed, then standard requirements are N/A.
    - General PRA requirements supporting baseline evaluation is N/A
    - Capability Category would depend on final risk of the MSO
      - Near 1E-06/year CDF – CC II
      - Below 1E-07 to 1E-08 CDF – CC I

# Summary

- Significant progress in developing a singular methodology for resolution of MSO issue
  - Deterministic
  - Deterministic with fire modeling
  - Combination of fire modeling and use of risk insights
    - Focused-scope FPRA that uses
      - Applicable portions of FPRA quality standard
      - Peer review

# Next Actions

- Develop NEI 00-01 revision this year
  - NRC general agreement with approach
- Consider a pilot plant application in 2008
- Formal NRC approval of NEI 00-01 on technical merits
- Resolution of licensing aspects
- Evaluate applicability of methodology to III.G.3 areas