



Transitioning From Appendix R to NFPA 805: Overview of Change Evaluation Process

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Office of Nuclear Reactor Regulation
September 19-22, 2004



Fire Protection Program



- 10 CFR Part 50.48(c)(3)(i) [2004]
 - A licensee may maintain a fire protection (FP) program that complies with NFPA 805 as an alternative to [Appendix R or its equivalent].
- NFPA 805 (2001)
 - Performance Based Standard for FP of LWRs
- NEI 04-02 (2004)
 - Guidance for Implementing Risk-informed Performance Based FP Program Under 10 CFR 50.48(c)



NFPA 805



- Section 4.2.4, Performance-Based Approach
 - Two performance-based alternatives to deterministic approach (Section 4.2.3) to specify fire protection systems and features to meet nuclear safety performance criteria (Section 1.5.1)
 - Subsection 4.2.4.1 – Fire Modeling
 - Subsection 4.2.4.2 – Fire Risk Evaluation
 - Probabilistic safety assessment for fire-induced core damage and large early release (Section 2.4.3)



NFPA 805

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- Section 2.4.4, Plant Change Evaluation
 - Plant change evaluation to ensure change to fire protection program element is acceptable
 - Risk acceptance criteria based on core damage and large early release frequencies
 - Evaluation of cumulative changes
 - Maintaining of philosophy of defense-in-depth
 - Deterministic approach satisfactory
 - Maintaining of sufficient safety margins
 - Deterministic approach satisfactory



NEI 04-02



- Section 5.3, Plant Change Process
 - If deterministic criteria (NFPA 805, Section 4.2.3) are met along with defense-in-depth and safety margin requirements, plant change can be completed without further analysis
 - Otherwise, assess plant change via one or both of the following pathways
 - Fire Modeling
 - Risk Assessment



NEI 04-02

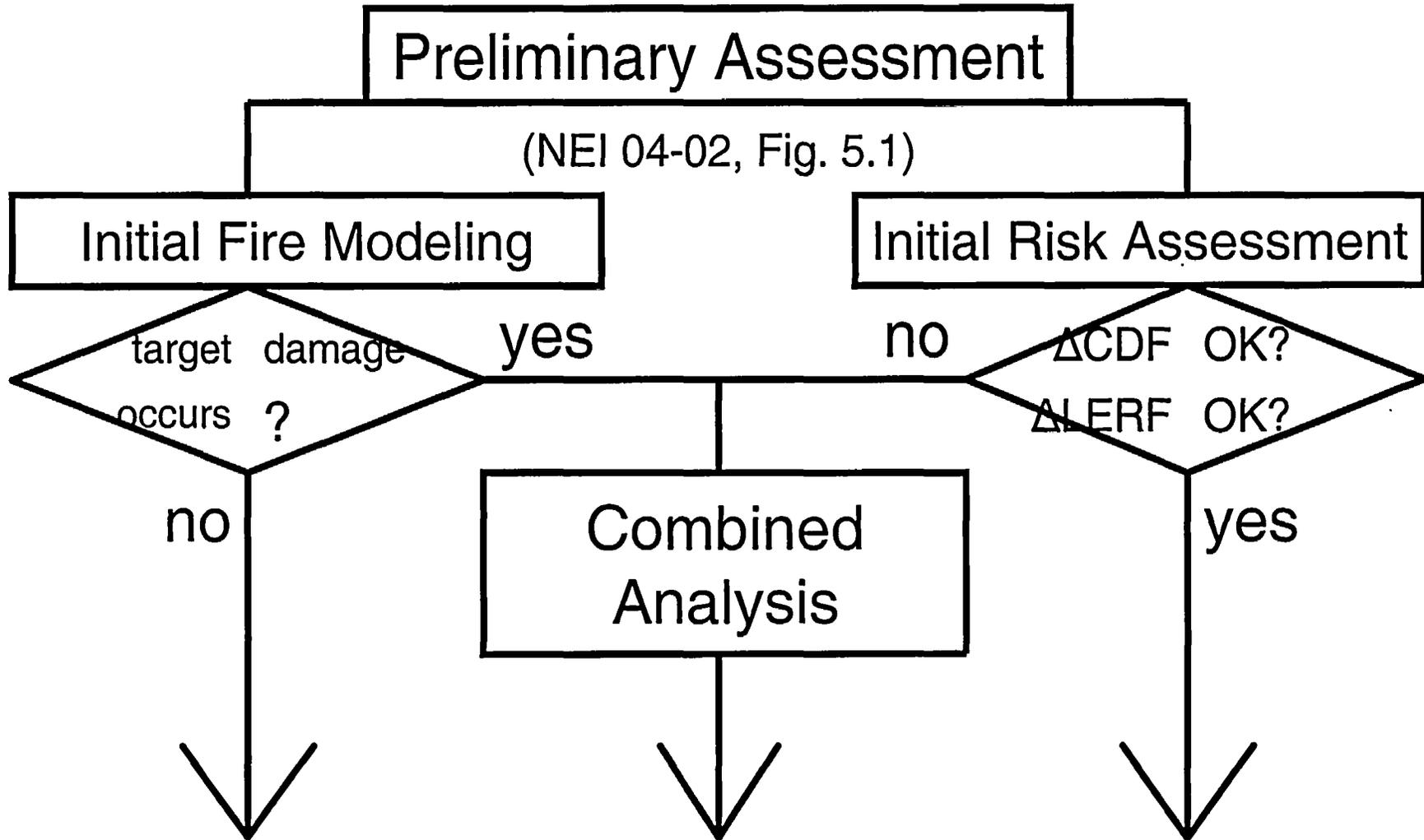
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- Section 5.3
 - 5.3.1, Overall change evaluation process
 - All pathways
 - 5.3.2, Acceptance criteria
 - Quantitative risk, based on RG 1.174
 - Defense in depth, based on NEI 00-01
 - Safety margins
 - Fire modeling, plant system performance, probabilistic safety assessment logic model, and miscellaneous
 - Uncertainties, based on RG 1.174

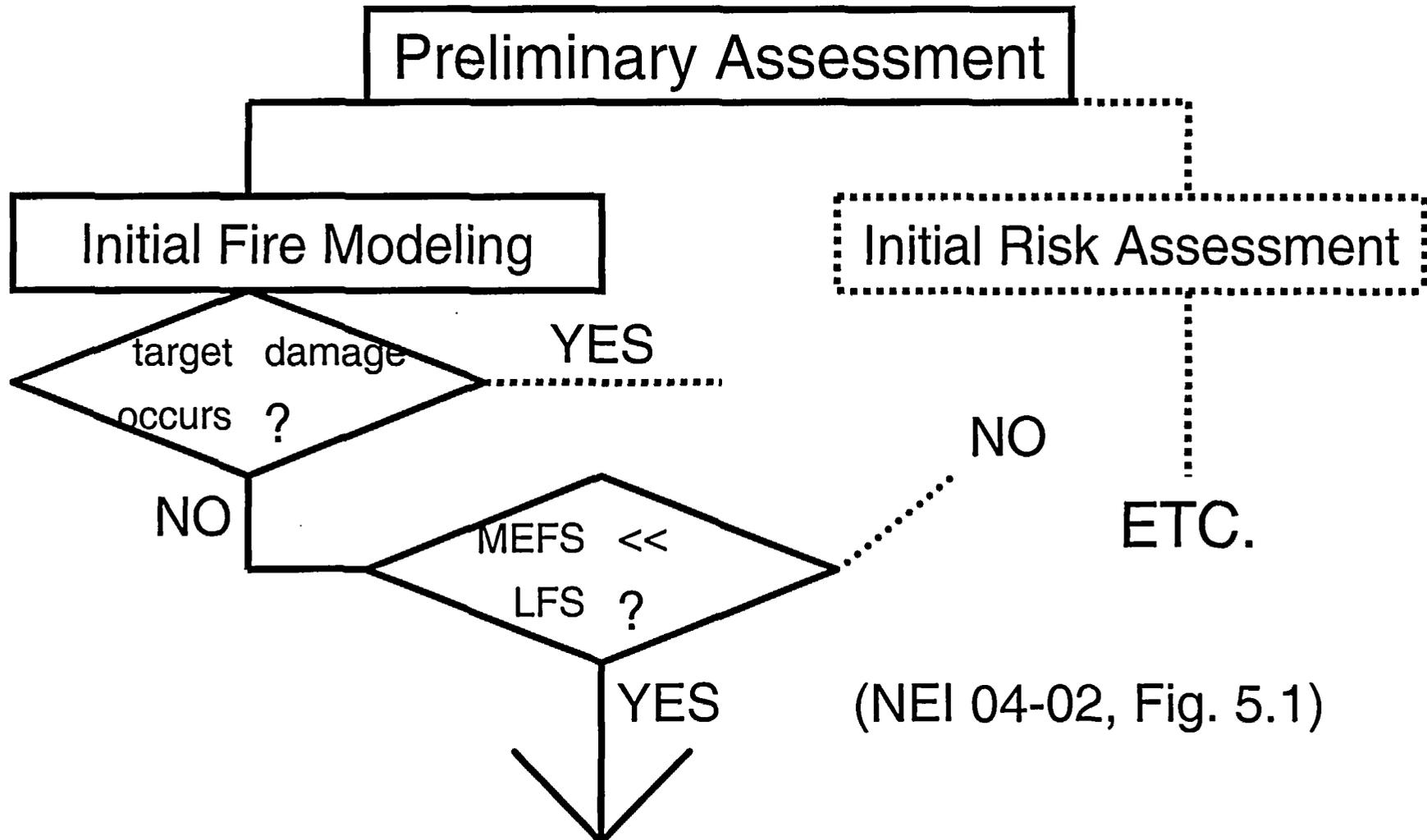


Change Evaluation Process



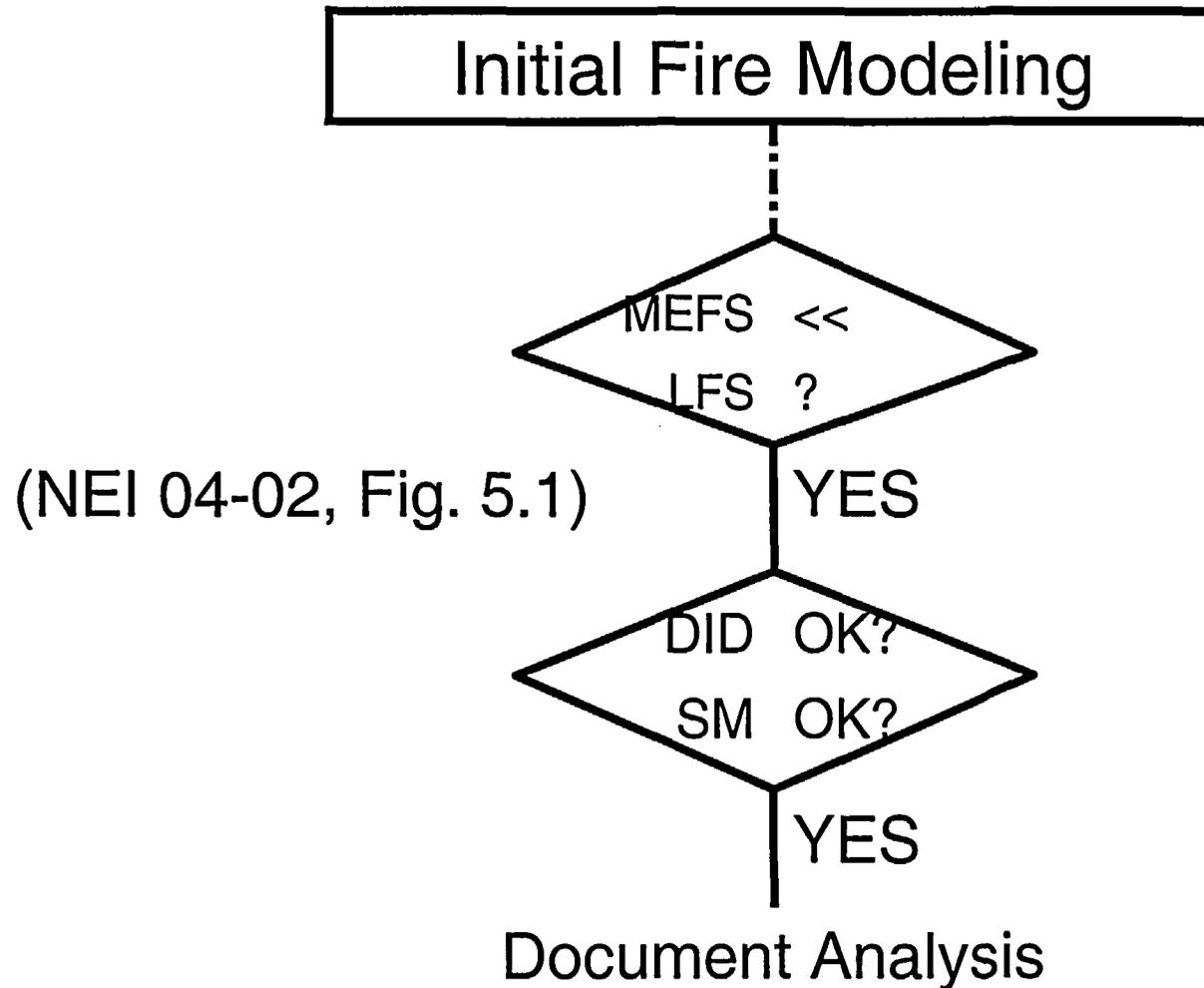


Fire Modeling Path



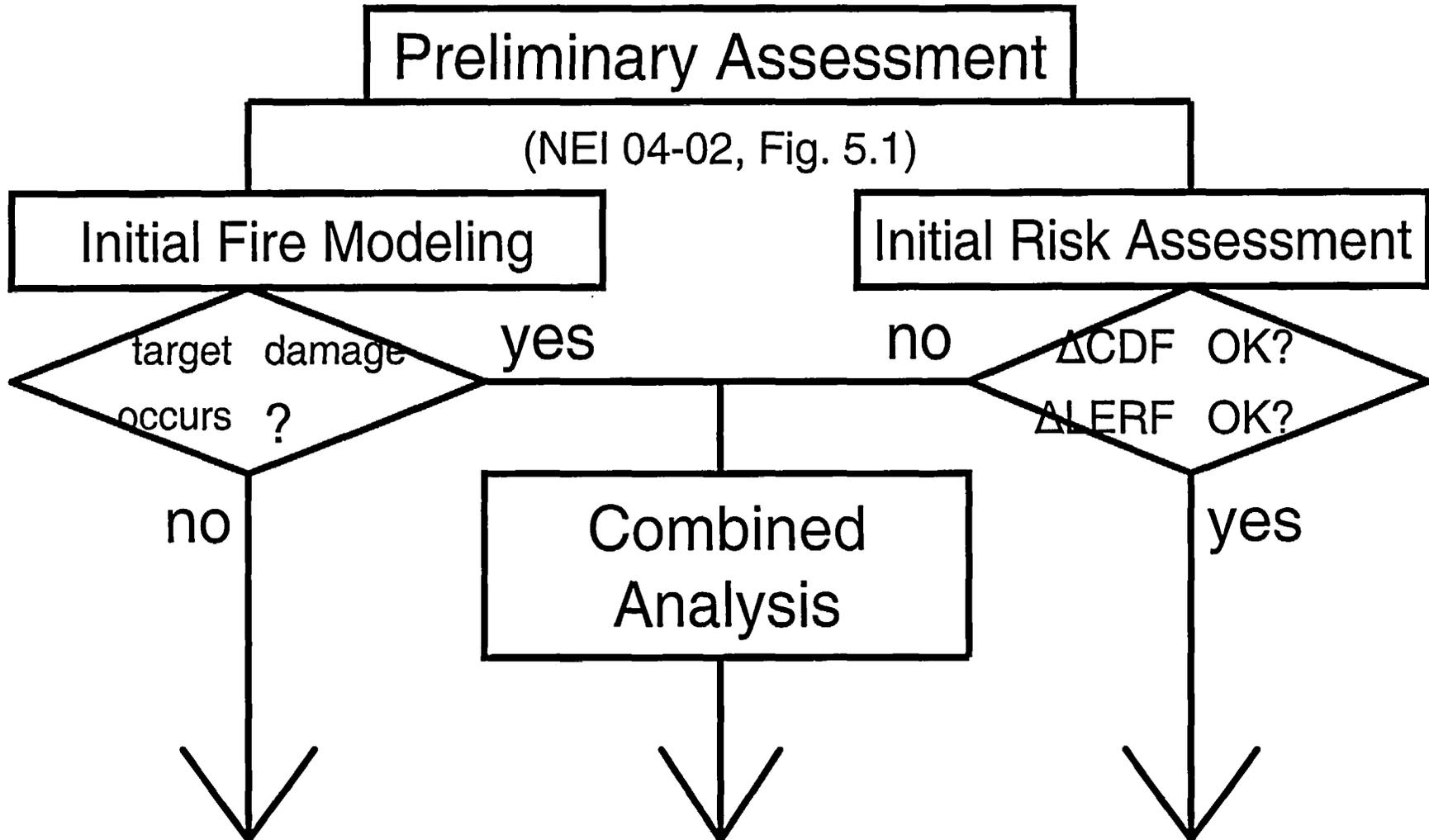


Fire Modeling Path (Continued)



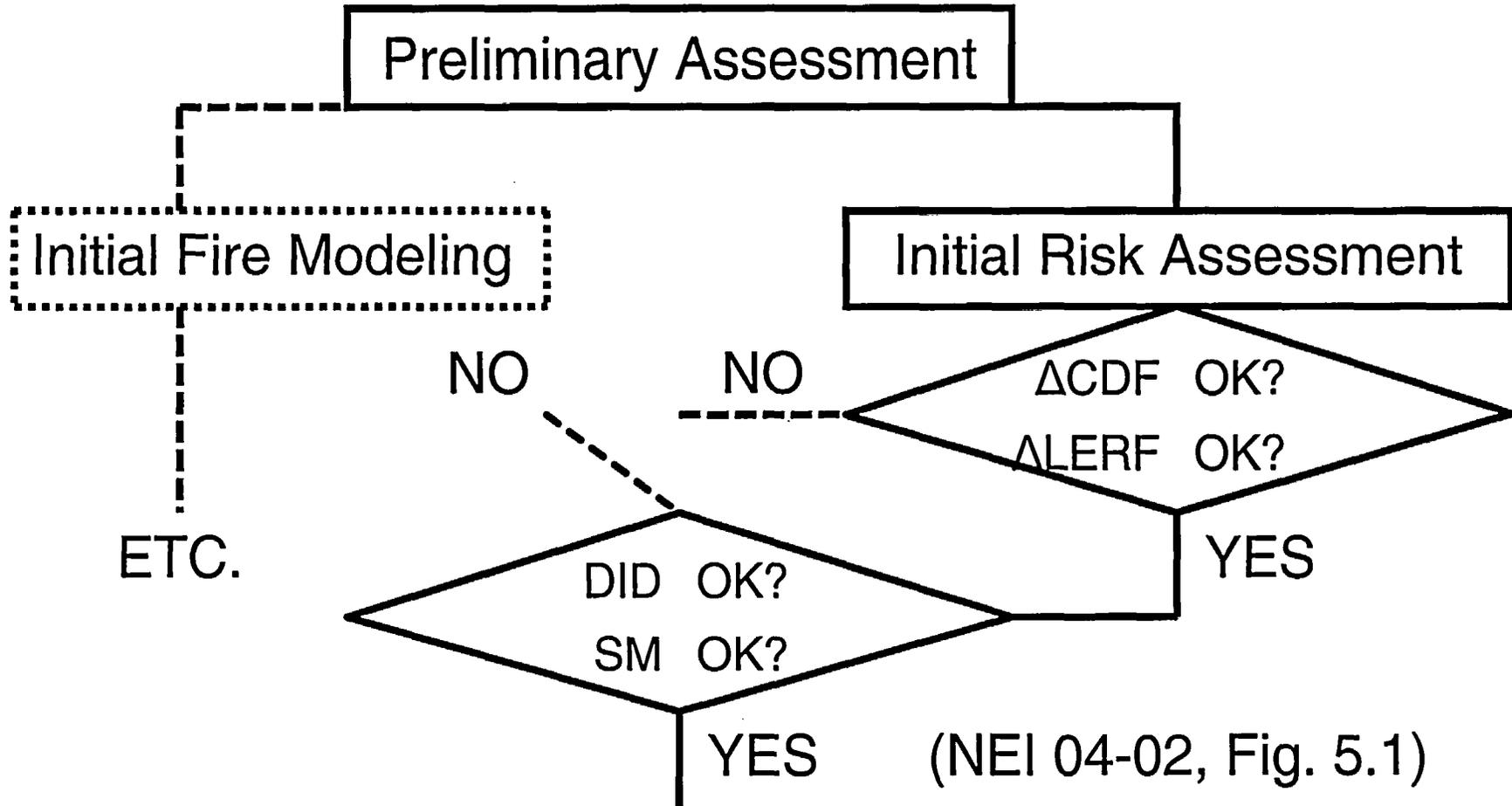


Change Evaluation Process





Risk Assessment Path

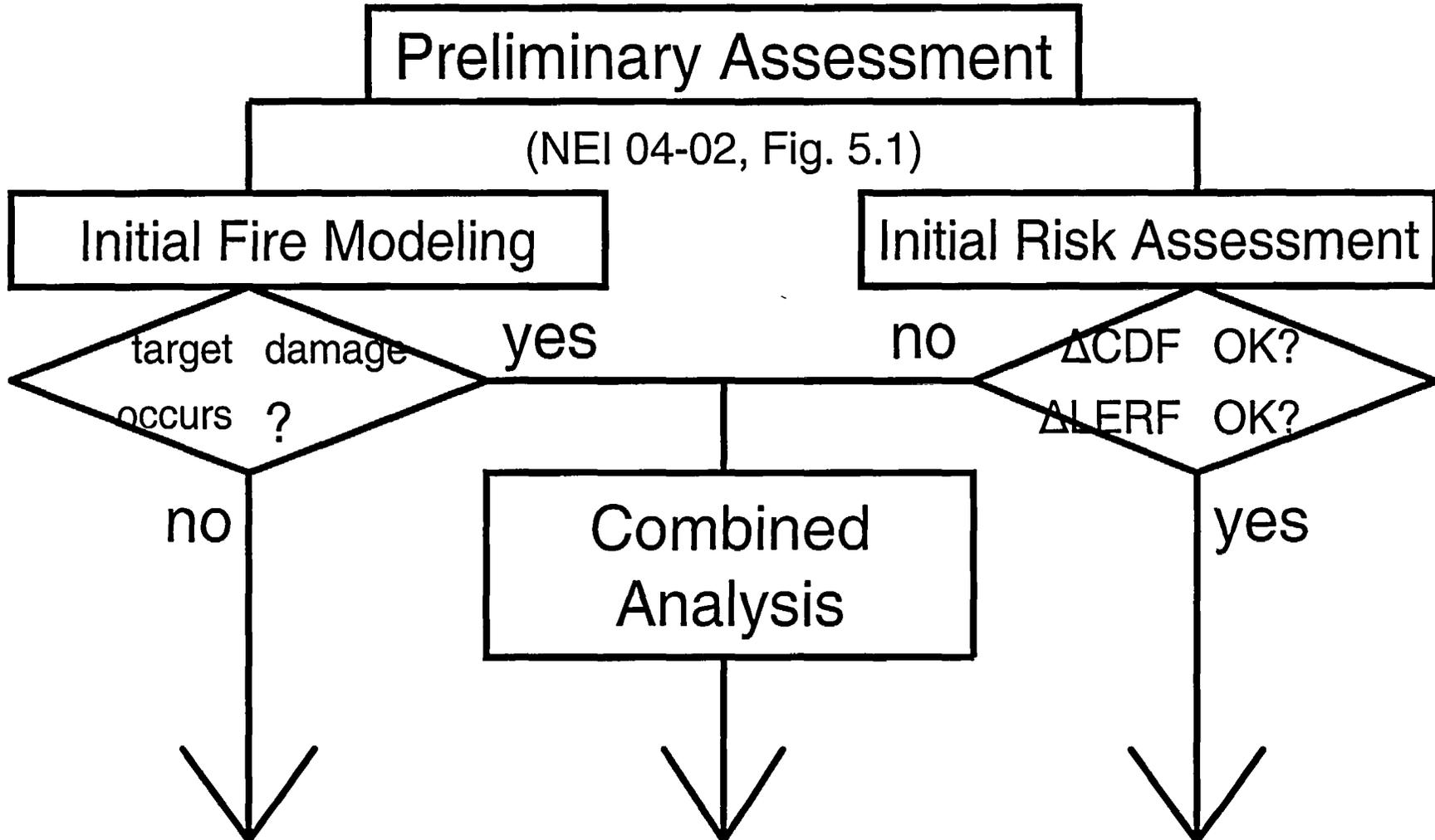


(NEI 04-02, Fig. 5.1)

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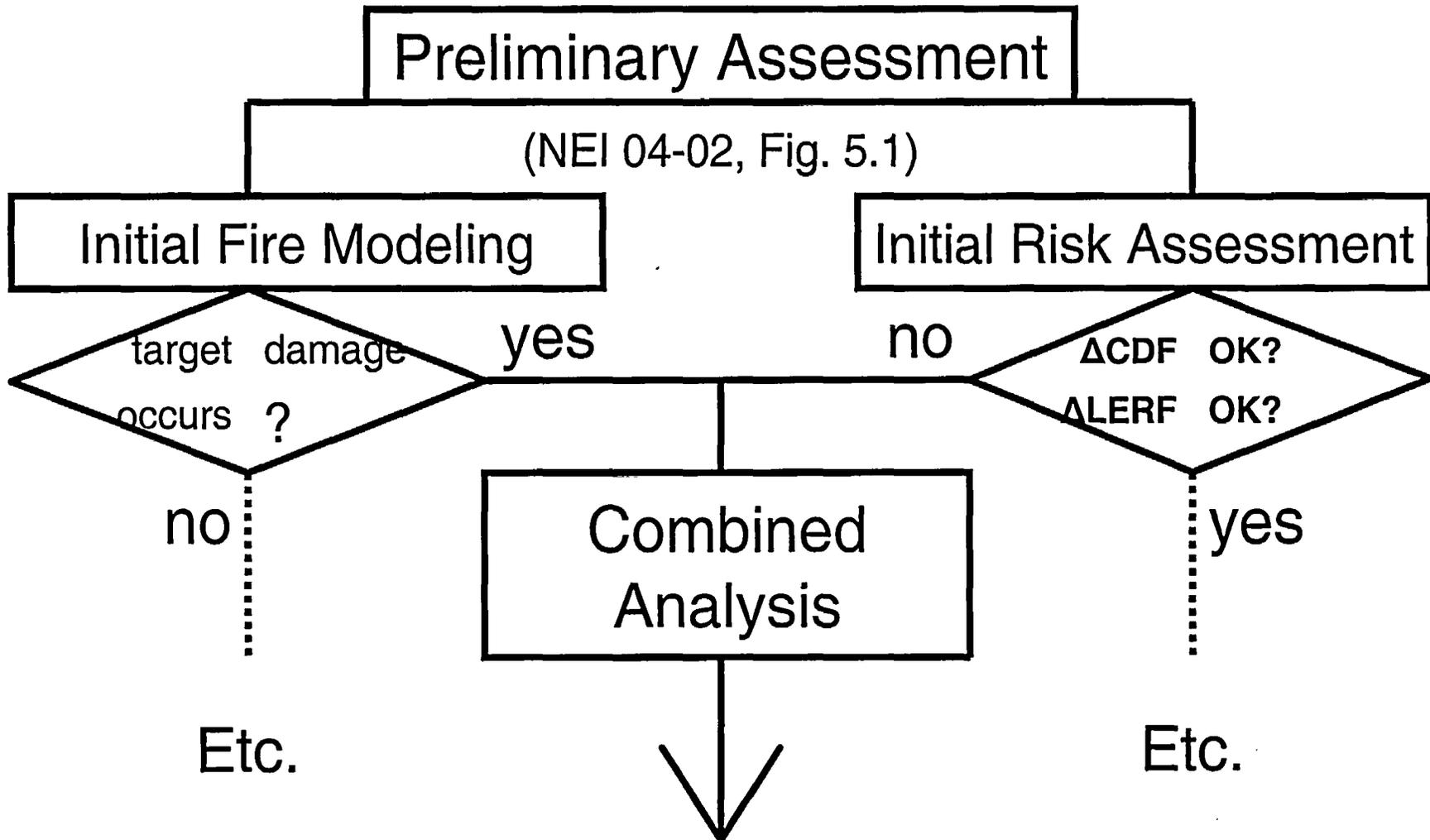


Change Evaluation Process



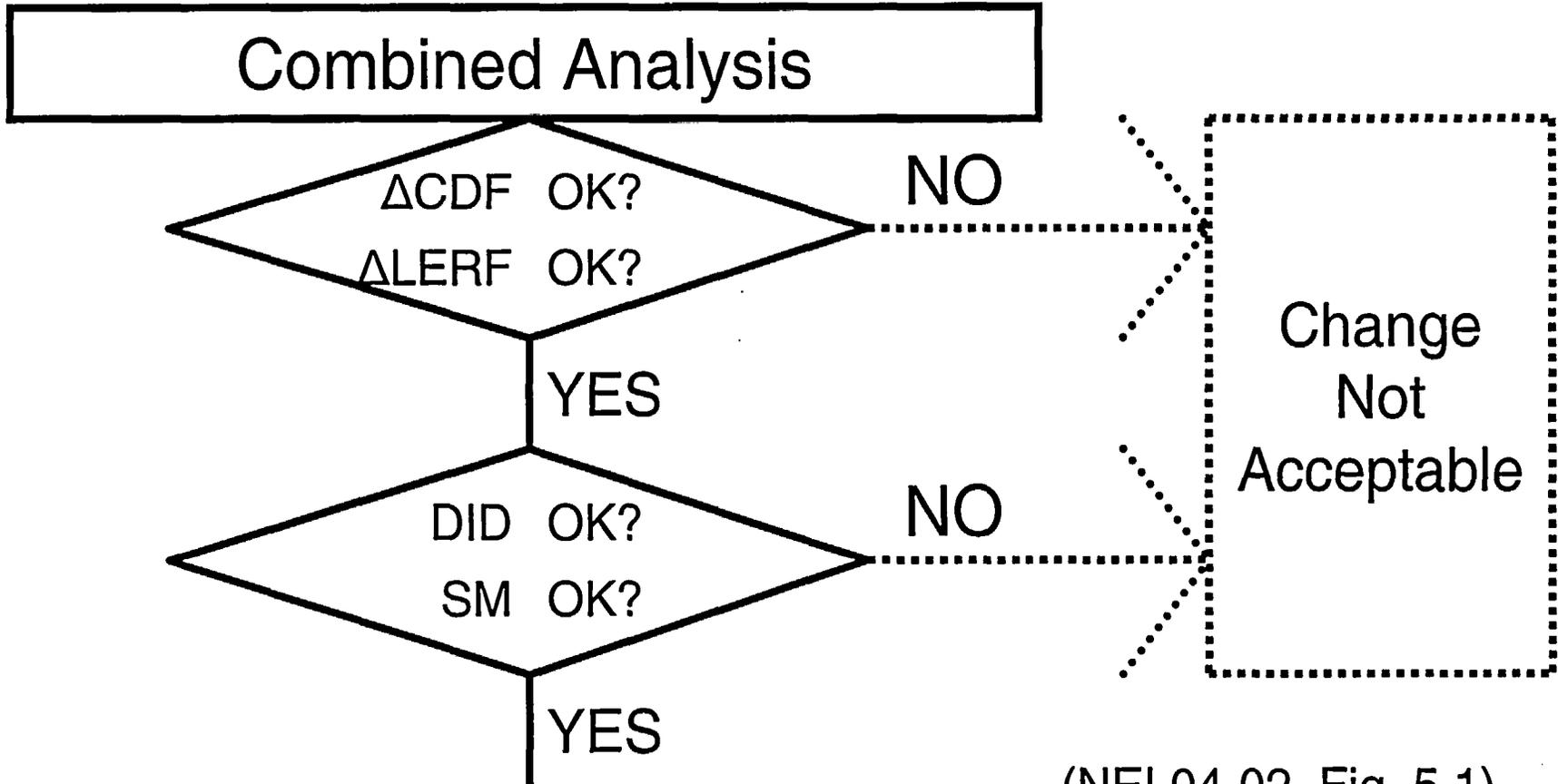


Combined Analysis Path





Combined Analysis Path (Continued)



(NEI 04-02, Fig. 5.1)

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Plant Change Evaluation Examples



- Three artificial examples, solely to illustrate plant change evaluation process
 - Fire Modeling Pathway
 - Transient combustibles
 - Risk Assessment Pathway
 - Manual suppression
 - Combined Analysis Pathway
 - Train free of fire damage