



## **RIC 2007**

### **Fire Research-Integrating Research into Practical Applications**

***"Fire Model Verification and Validation for  
Nuclear Power Plant Applications"***

Francisco Joglar, Ph.D., P.E.  
SAIC/Electric Power Research Institute  
Tuesday March 13, 2007

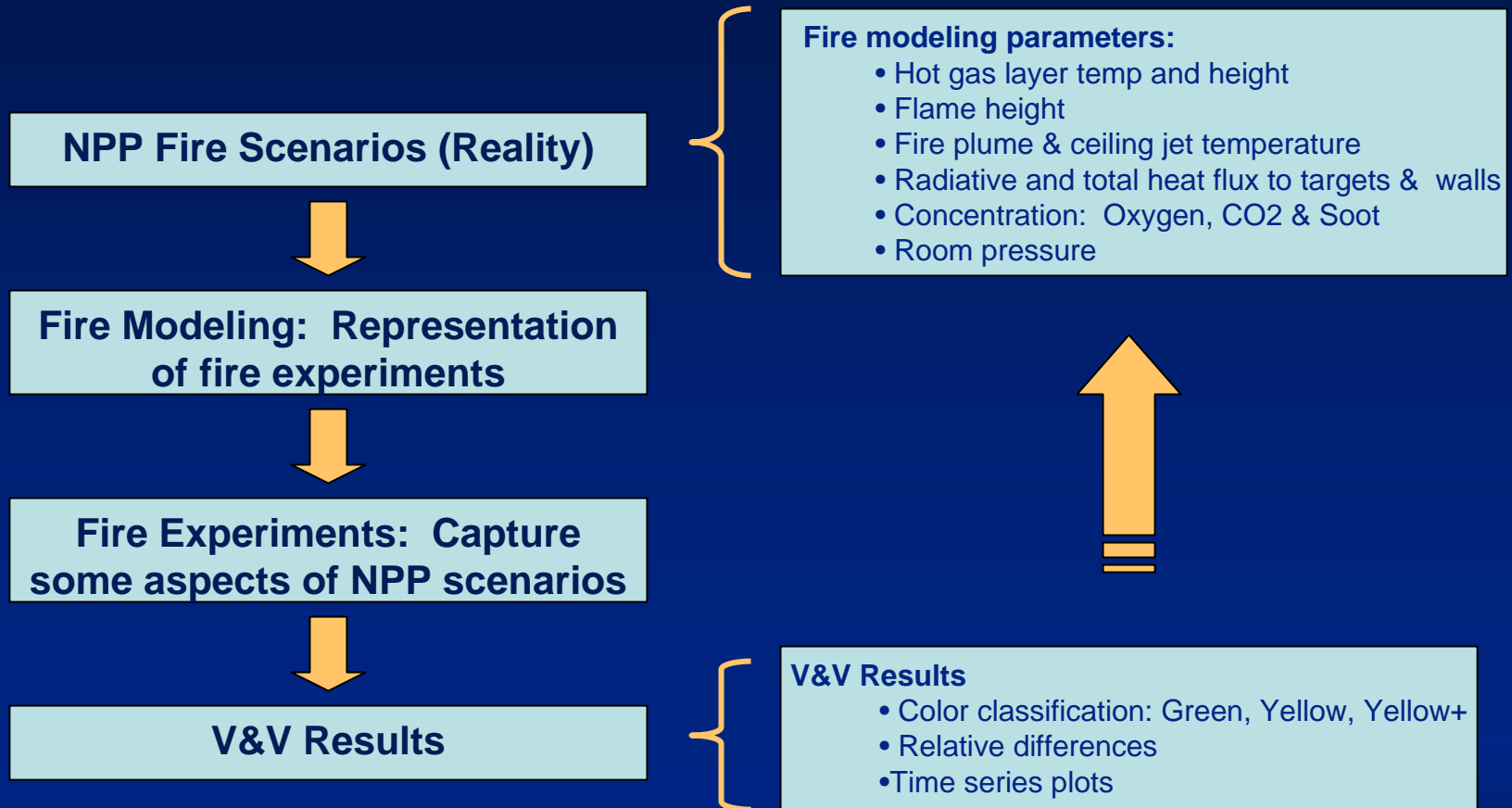
# Project Overview

- Motivation
  - Fire modeling is used in current industry practices (e.g., fire protection SDP)
  - NFPA 805 Section 2.4.1.2.3 *“The fire models shall be verified and validated”*
- Joint project between NRC/RES and EPRI
  - Research team: NRC/RES, NIST, EPRI/SAIC, EDF
- Comments
  - Industry review, Public comments, ACRS
- Product: NUREG 1824/EPRI 1011999 (7 volumes)
- Models: FDTs, FIVE-Rev1, CFAST, MAGIC, FDS
  - Current industry use
  - Level of sophistication (hand calcs, zone models and field models)
  - NOT a code comparison analysis

# Technical Approach

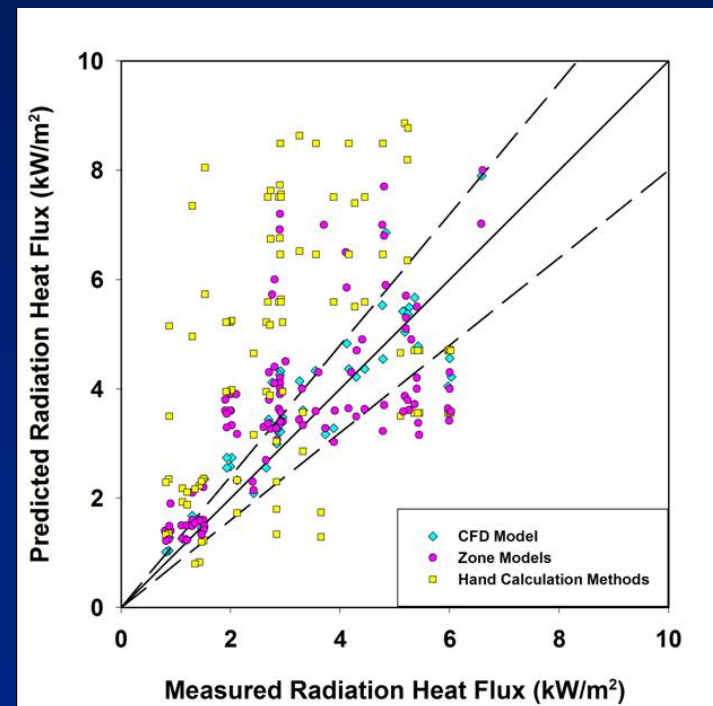
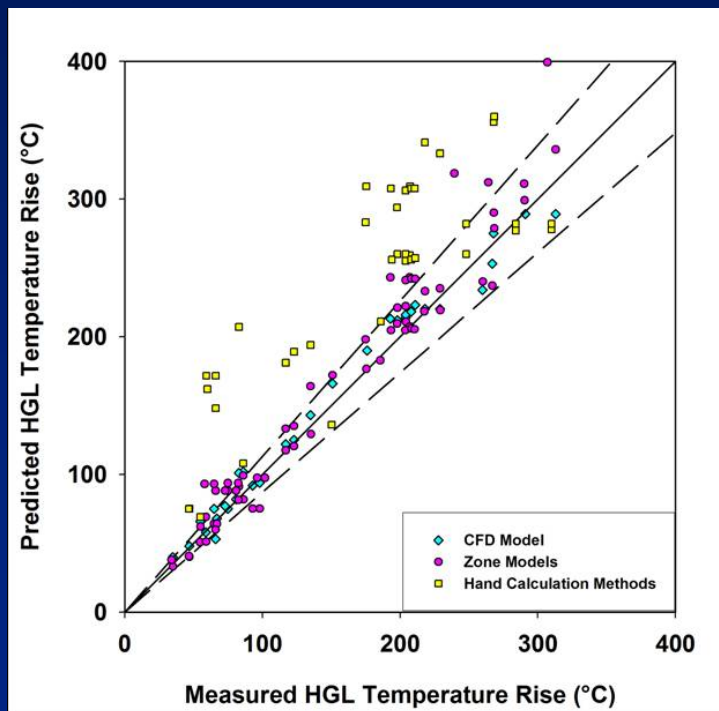
- ASTM 1355
  - *Standard Guide for Evaluating the Predictive Capabilities of Deterministic Fire Models*
- Verification & Validation Study
- Use of V&V Results

# Technical Approach



# V&V Results

- Results are grouped in colors: Green, Yellow, Yellow+



## Use of V&V Results

- Select a fire scenario
- Identify relevant fire modeling parameters
- Select appropriate fire modeling tool
- Check for applicability of V&V results
  - Dimensionless groups
- Assign a color classification

## Closing Remarks

- Developed a “Standard” process for V&V
  - Reproducible
  - Updatable
- V&V Study for 5 fire modeling tools currently used in the nuclear industry
- Recommended a methodology for using the V&V Results