

# Fire PRA Research *Plans for 2017-2019*

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**Fire PRA FAQ Meeting**  
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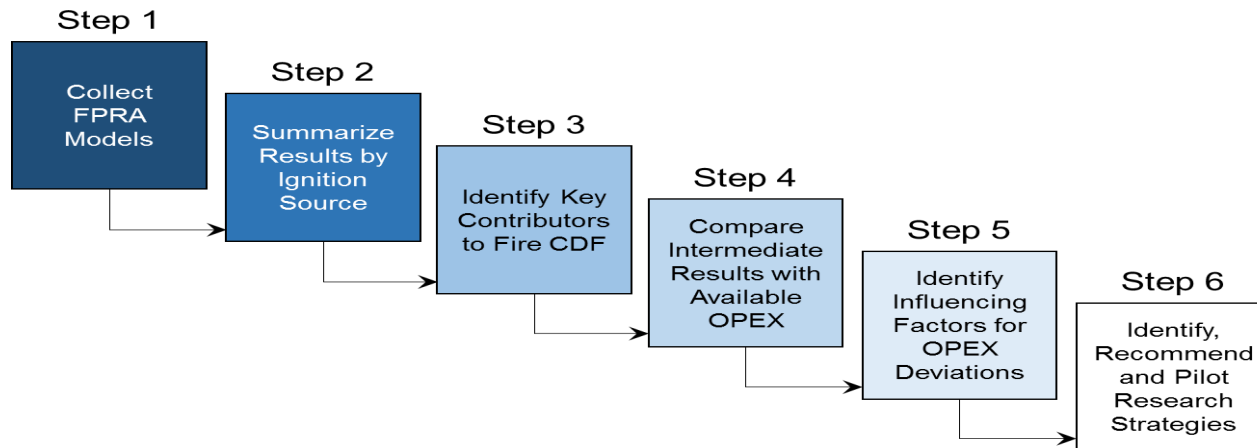
# Introduction

- Fire PRA methodology still in need of realism / refinement
  - Recent research (electrical cabinet HRR / obstructed plume) an advancement, but not the holy grail
  - Additional refinements needed to support risk-informed applications (50.69, 4b, 5b, etc.)
- Obvious deltas still apparent from analysis of current FPRA results
  - Clear overestimation of number of significant events (CCDPs  $> 1E-4$ ) calculated from FPRAs as compared to OPEX
  - For electrical cabinets: FPRAs calculate the rate of severe fires  $\sim 25$  per decade ( $\sim 70\%$ ), while OPEX shows that 75% of fires are limited to the ignition source only

**In the current dynamic, there is limited testing possible and limited OE available, and the “bridging” inputs of reasonable judgement and feedback are not working**

# Near-Term Fire PRA Research Plan

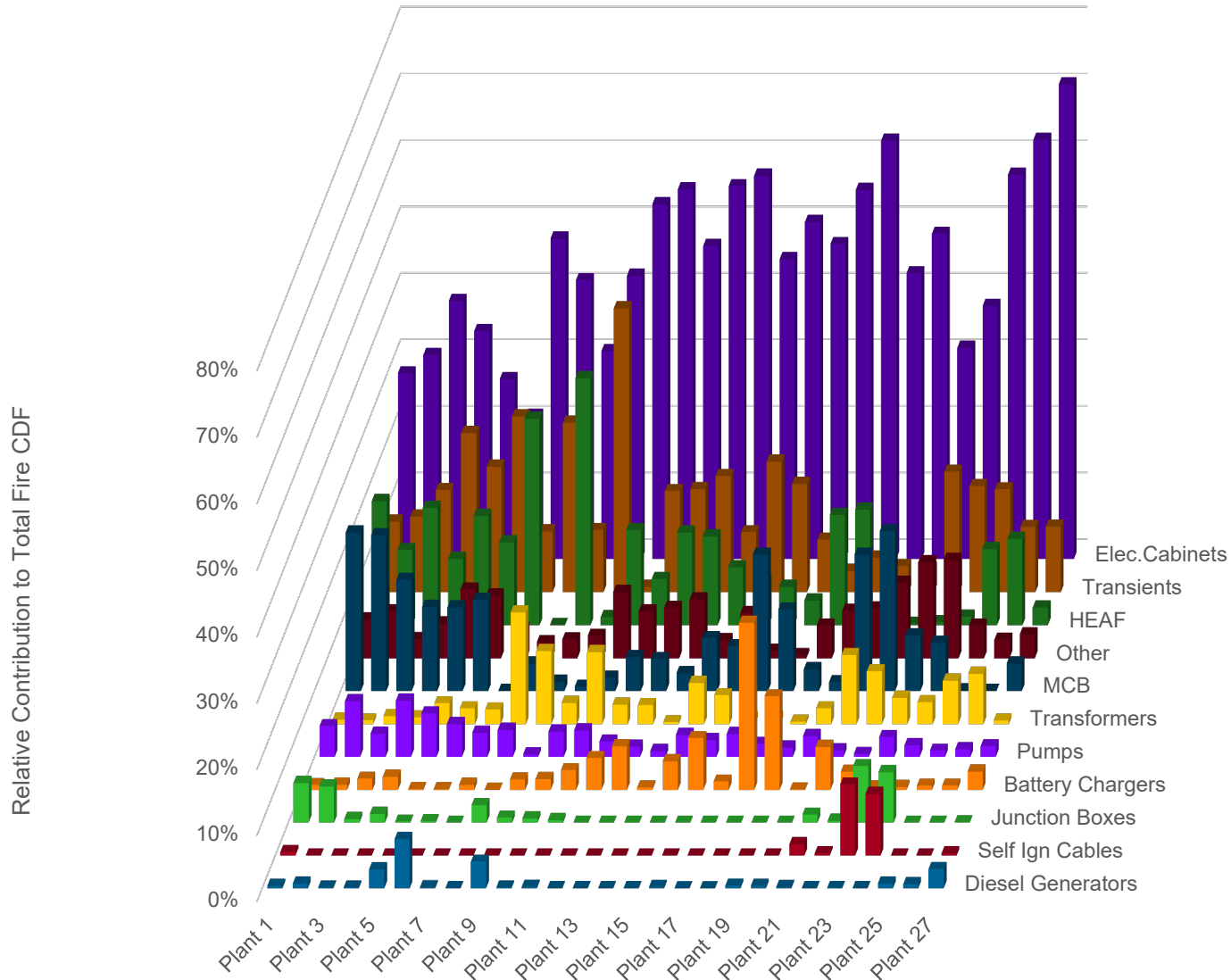
- Structured approach followed to set plan priorities



- Plan attributes:

- Need to accomplish “meaningful” improvement to fire PRA realism and provide results within 2 years (i.e. technical work by 2019) to support risk-informed applications (50.69, 4b, 5b, etc.)
- Data or technical bases can be obtained in the near term from established sources without the need for large scale experimental tests which may or may not produce conclusive results
- Priority was given to tasks which can be completed in accordance with the above principals and that have the highest probability of providing statistically significant improvement in realism
- Stakeholder input welcomed at all points

# Key Contributors to Fire PRA Results “Skyline”



# Comparison with Operating Experience

- Reviewed data in SECY 14-0107 Accident Sequence Precursor Data (2004-2013)
  - 7 events with CCDPs  $> 1E-4$ / year
    - 2 involving fire
      - Robinson (2010), estimated CCDP =  $4E-4$
      - Fort Calhoun (2011), estimated CCDP  $\Rightarrow 1E-4$
- Extrapolating the FPRA results for the US industry over the same time period would have estimated:
  - ~15 events with CCDPs  $> 1E-4$
  - ~5 events with CCDPs  $> 1E-3$

# Summary of FPRA Research Tasks

- Task 1a/1b: Technical basis and fire progression event tree
- Task 2: Plant personnel suppression
- Task 3: Fire resulting in plant trip
- Task 4: High energy arc fault (frequency and consequence)
- Task 5: Transient fire scenarios
- Task 6: Main control board

# Key Takeaways

- Skyline exercise in early 2017 provided a “reset” used to re-calibrate the path forward for fire PRA research
- The results from Fire PRAs are not reflective of the operating experience
  - Screening level analysis and methodology assumptions may be inappropriately biasing our understanding of fire risk contributors
- EPRI research plan focused on most impactful research in near term (now through 2019)
  - Top research tasks to improve the realism in the fire PRA models
  - Not intended to be exhaustive list of low hanging fruit or listing of every task or data set to be improved



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