NRC Staff Reviews Pilot Plant Fire PRA Models General Results

NRC Public Meeting

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U.S.NRC
UNITED STATES NUCLEAR REGULATORY COMMISSION
Protecting People and the Environment

Topics

- Scope of Review
- High-Level Overview & General Results
- Breakdown of HLRs and SRs
- Numbers of Findings and Suggestions
- SR Comparison
- Overall Conclusions

Scope of Review

HNP

- **NRC staff reviewed 139 applicable supporting requirements**
- **Additional 18 SRs could not be reviewed (not complete)**
  - Seismic fire element
  - Uncertainty/sensitivity element
  - Two HLRs in FSS element
- **30 SRs not applicable, e.g.:**
  - Qualitative screening
  - Quantitative screening
- **Both CDF and LERF**
  - But LERF not performed

ONS

- **NRC staff reviewed 172 applicable supporting requirements**
- **Additional 2 SRs could not be reviewed (not complete)**
  - Uncertainty/sensitivity element
- **Both CDF and LERF**

High Level Overview

HNP

- **Fire PRA was not complete**
  - Some tasks had yet to be started
  - Many areas in draft form
- **Appeared to represent a scoping analysis**
  - Very little detailed fire modeling
  - Conservative HGL screening approach
  - Unity spurious actuation probability
  - Very conservative results
- **NRC staff review was not sufficient to assess fire PRA technical adequacy**
- **NRC team recommended a full-scope industry peer review when fire PRA model is complete**

ONS

- **Fire PRA was not complete**
  - All tasks but one started
  - Many of the tasks were complete
- **Areas requiring the most additional work**
  - Internal events PRA peer review comments
  - Fire modeling (including multi-compartment)
  - Identify/refine higher risk scenarios
  - Complete uncertainty analysis
- **NRC staff review was not sufficient to assess fire PRA technical adequacy**
- **NRC team recommended a focused-scope industry peer review of parts of the fire PRA that change substantially**

General Results

HNP

- **Excessive modeling conservatisms leading to unrealistic results**
- **Equipment selection deficiencies**
- **Issues with fire modeling**
- **Plant response model and quantification issues**
- **Human reliability analysis issues**
- **Several areas not performed**
  - LERF analysis
  - Uncertainty analysis
  - Seismic-fire interaction
  - Assessment of potential fire effect on exposed structural steel

ONS

- **Fire PRA model developed before resolving internal PRA model issues**
- **Issues with fire modeling**
- **Plant response model and quantification issues**
- **Human reliability analysis issues**
- **Incomplete analyses or ones not performed**
  - Seismic-fire interaction not complete
  - Uncertainty not performed

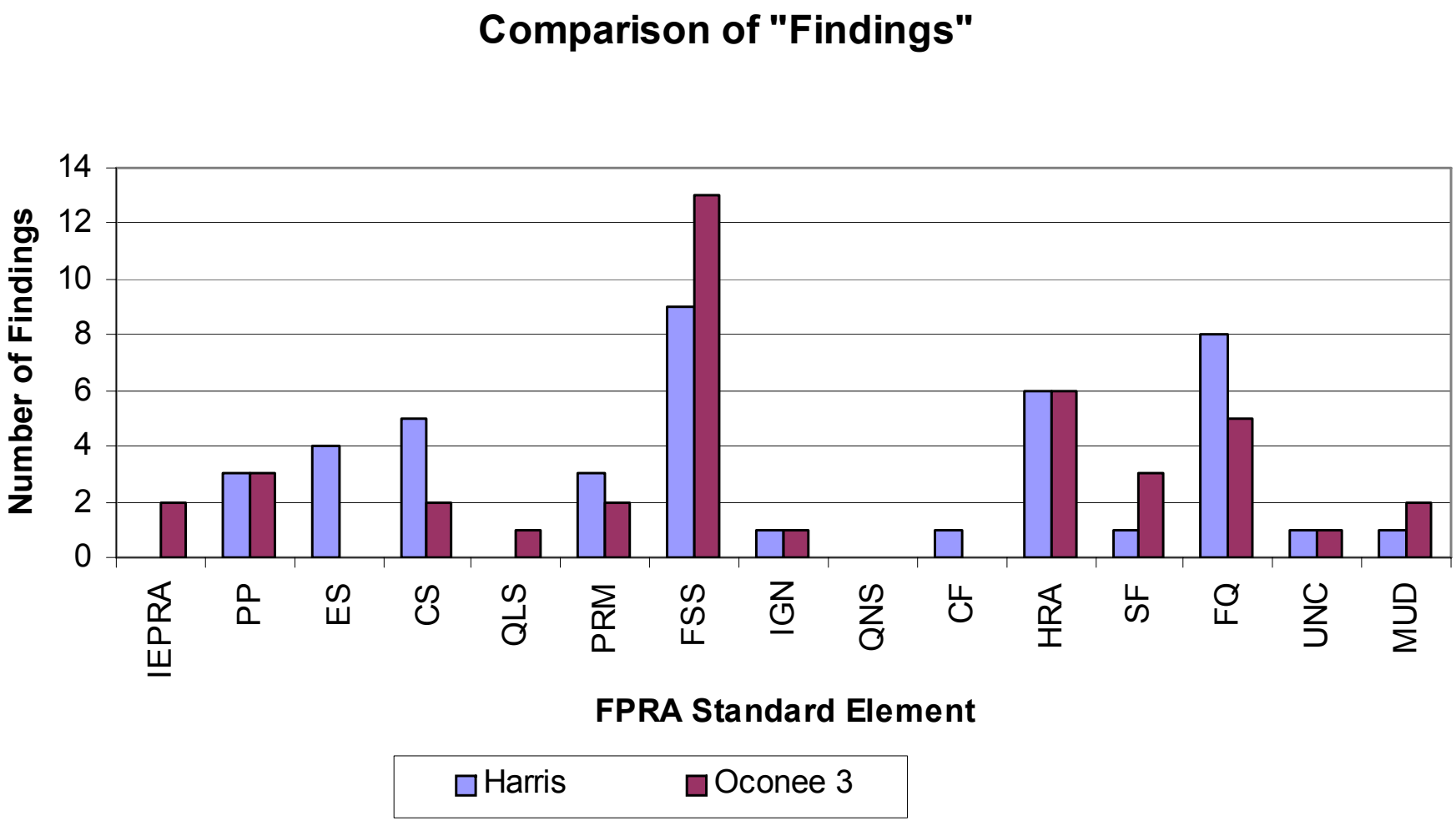
HLR Breakdown

	HNP		ONS	
High Level Requirements	#	%	#	%
One or more Supporting Requirements “not met”	24	55	22	43
Not ready for review	5	11	1	2
All applicable Supporting Requirements Met	15	34	28	55
Total	44	100	51	100

SR Breakdown

	HNP		ONS	
Supporting Requirements	#	%	#	%
Not met – PRA model not finished	15	10	-	-
Not met – PRA model ready	21	13	33	19
Not reviewed (not complete)	18	11	2	1
Met	103	66	139	80
Total	157	100	174	100

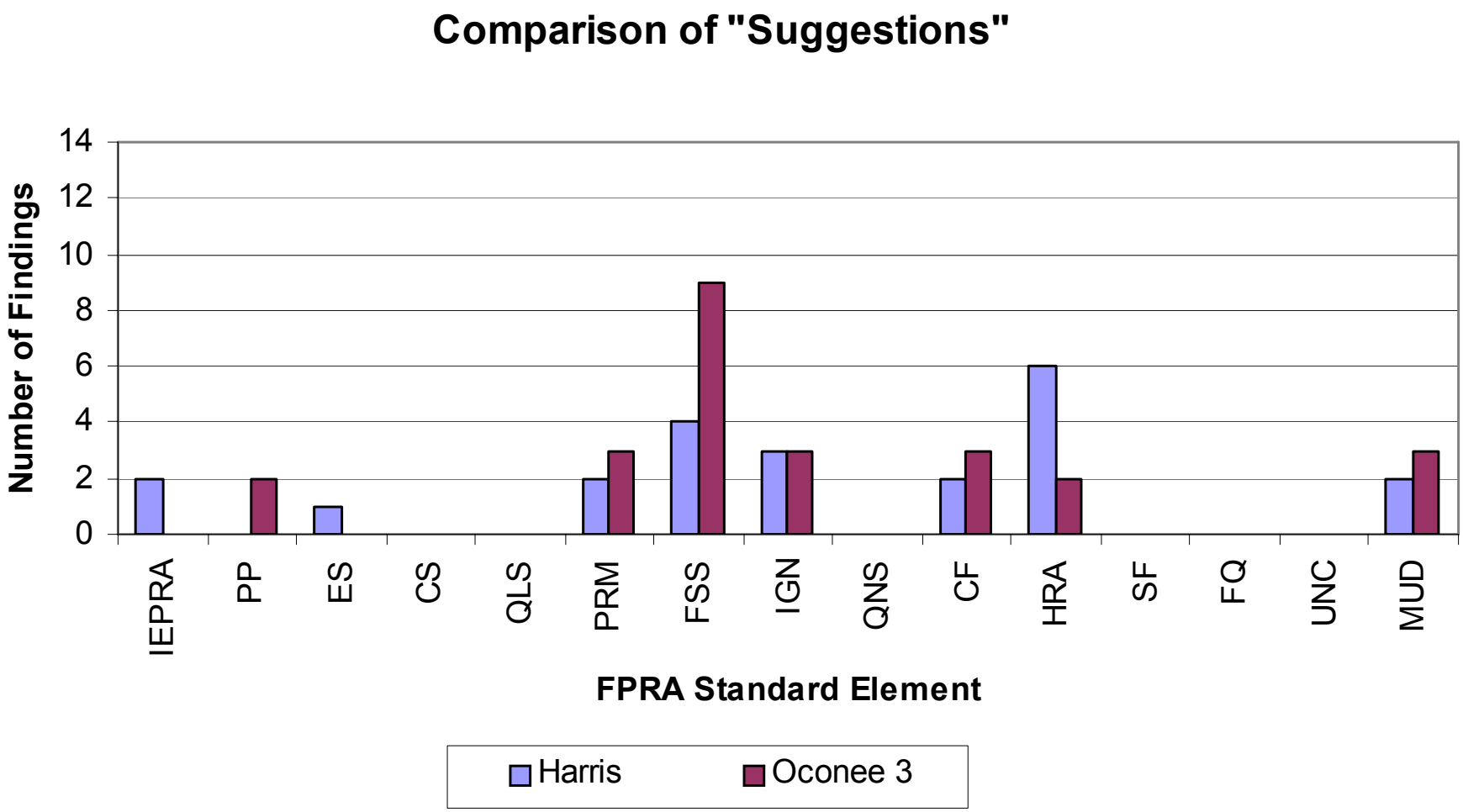
Numbers of Findings



HNP – 43 Findings

ONS – 41 Findings

Numbers of Suggestions



HNP – 22 Suggestions

ONS – 25 Suggestions

Compare Supporting Requirement Results

Supporting Requirements Met by Both Plants:	
"Met" at same capability category	74
"Met" at different capability categories	13
One plant "met," other plant "N/A"	32
"N/A" for both plants	3
Total for this Category:	122

Compare Supporting Requirement Results

Supporting Requirements Not Met by Only One Plant:	
Harris "met;" Oconee "not met" or "not reviewed"	9
Oconee "met;" Harris "not met" or "not reviewed"	29
One plant "N/A;" other plant "not met" or "not reviewed"	3
Total for this Category:	41

Compare Supporting Requirement Results

Supporting Requirements Not Met by Either Plant:	
Both plants received "not met"	13
Both plants received "not reviewed"	2
One plant "not reviewed;" the other "not met"	9
Total for this Category:	24
Total Supporting Requirements:	187

Overall Conclusions

- **Fire PRA Standard (draft) provides appropriate set of requirements to assess technical adequacy of a fire PRA**
  - ~65% SRs met (or not applicable) by *both* fire PRA models
  - ~13% SRs not met (or not reviewed) by *either*
- **Neither licensee's fire PRA was complete**
  - Neither was ready for industry peer review
- **Neither licensee completed uncertainty/sensitivity task**
- **Must start with technically adequate internal events PRA**
- **Both licensees stopped at NUREG/CR-6850 screening**
  - Did not pursue detailed fire modeling
- **Fire PRA development appears very resource-intensive**