

FLEX in Risk-Informed licensing action

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Documents related to submittal and review guidelines for FLEX Equipment

- NEI 16-06, “Crediting Mitigating Strategies in Risk-Informed Decision Making,” August 26, 2016
- Assessment of the Nuclear Energy Institute 16-06, “Crediting Mitigating Strategies in Risk-Informed Decision Making,” Guidance for Risk-Informed Changes to Plants Licensing basis” May 30, 2017 (ML17031A269)
- Human Reliability Analysis (HRA) for Diverse and Flexible Mitigation Strategies (FLEX) and Use of Portable Equipment, EPRI-3002013018, November 2018
- NRC Regulatory Audit summary, Operational data, June 10, 2020 (ML20155K827)

Credit for FLEX in LARs

- FLEX equipment currently credited in some LARs but not in most
 - becoming more frequent and with greater credit
- Some LARs credit semi-quantitative FLEX evaluations to support excluding unlikely external hazards
- Some LARs do not mention FLEX
 - the staff has started always asking how FLEX is credited

Identified FLEX Modelling Issues – Human Errors

- **Human Error Probabilities for Deployment** (identifying, locating, transporting, and installing)
 - Permanently installed equipment - not an issue
 - Portable equipment – human actions may be outside of current HEP methodologies
- **Human Error Probabilities for Execution** (alignment, activation, and operation)
 - Permanently installed equipment – assumed to be similar to alternative uses of current equipment (e.g., align fire fighting systems to LPSI)
 - Portable equipment - currently assumed to be similar to alternative uses of current equipment

Identified FLEX Modelling Issues – Equipment Failure Data

- **Failure rates/demand probabilities** of portable equipment is not believed to be the same as current equipment, most likely greater
- **Observed data** – far less observed data available and the data which is available may be difficult to interpret
- **Factor increase method** – use of factors to increase failure parameters is simple but generally appears to be used to avoid technical defensible justification

FLEX reviews in LARs

- If fixed FLEX equipment is credited, limited additional evaluation
- If deployable FLEX equipment is credited (key source of uncertainty)
 - RAIs about impact on the decision
 - If important may request details of equipment and deployment
 - If important usually request sensitivity studies on both HEPs and equipment failure parameters
 - If sensitivity studies confirms importance, may request the sensitivity studies become part of the application implementation
- Generally accepted guidance needed to replace RAIs

Next Steps

- **Equipment Failure Data**
 - PWROG issued a draft report on FLEX equipment failure rates
 - NRC audited the draft report and issued an audit report with observations and concerns
 - Final PWROG report expected this summer
- **HRA for FLEX**
 - IDHEAS-ECA evaluation and data reports will be issued in August.
- **FLEX Summit** (first 2 weeks of September)
 - Opportunity to discuss resolution of open items related to crediting FLEX