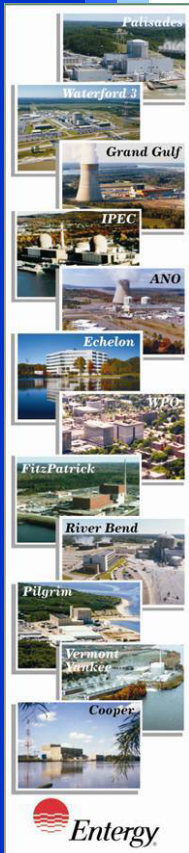


License Amendment Request NFPA 805 Acceptance Review

Arkansas Nuclear One Unit 2

June 29, 2012

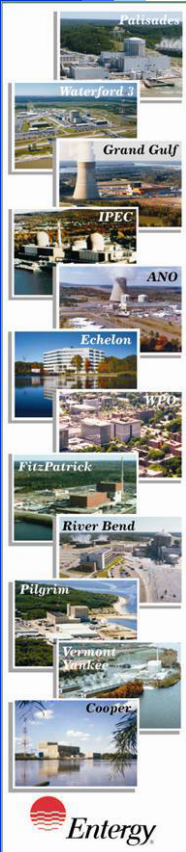
Technical Acceptance Issues



- Modification Details
 - The modifications for transition need to be described and, as appropriate, modeled in the probabilistic risk analysis (PRA) to properly estimate the change in risk associated with transition
 - The License Amendment Request (LAR) needs to be supplemented with the descriptions of these modifications and provide adequate information to review the evaluations supporting these modifications
- Risk Estimates for Recovery Actions (RAs)
 - About one third of the fire areas in the “Additional Risk of RAs” column of Table W-2 of the LAR do not contain a quantitative risk result
 - The LAR needs to be supplemented with the quantitative RA risk estimates to demonstrate that the evaluations supporting the transition have been satisfactorily completed

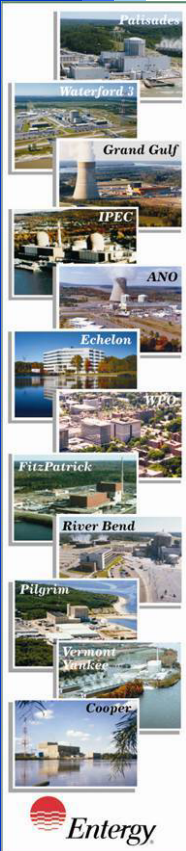
Technical Acceptance Issues

- RAs Credited for Control Room (CR) Abandonment
 - Attachment G of the LAR states that ANO-2 has no primary control station, besides the main CR, yet only eight RAs are identified for Fire Area G
 - Unclear how both the total change in risk and the additional risk from RA is bounded by a risk estimate of “0.0”
 - The LAR needs to be supplemented with additional discussion about the planned modifications and RAs, and how these are modeled in the PRA in sufficient detail to explain the unexpected results
- Sensitivity Study
 - Two sensitivity studies compare the results based on one “unaccepted method” to results based on another “unaccepted method”
 - The LAR needs to be supplemented with the risk results (in relation to the sensitivity analyses for non-suppression probability for long-term fires and adjustment factor for electrical cabinet ignition frequency) calculated using an acceptable analysis method



Technical Acceptance Issues Response Overview

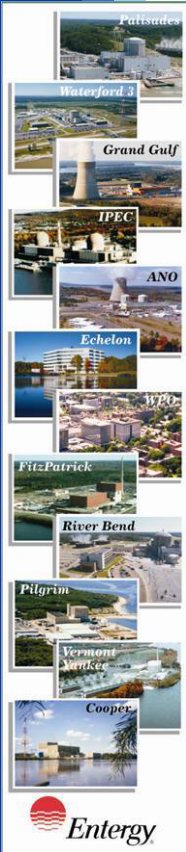
- Modification Details
 - Attachment S revised to provide additional detail for proposed modifications
- Risk Estimates for Recovery Actions (RAs)
 - Additional analysis performed to address the risk estimates of the quantitative RAs and included in revised Table W-2.
- RAs Credited for Control Room (CR) Abandonment
 - Additional information to be provided relating to Fire Area G and how the modifications and RAs were modeled in the Fire PRA. Table G-1 and Table W-2 are revised accordingly.
 - List of defense-in-depth RAs will be included
- Sensitivity Study
 - A new sensitivity analysis has been completed in compliance with NUREG/CR-6850 for comparison to the current results
 - Further analysis is needed to accurately reflect the risk and minimize the need for unnecessary plant modifications
 - Attachment V revised to capture revised sensitivity analysis.



Item 1

Modification Details

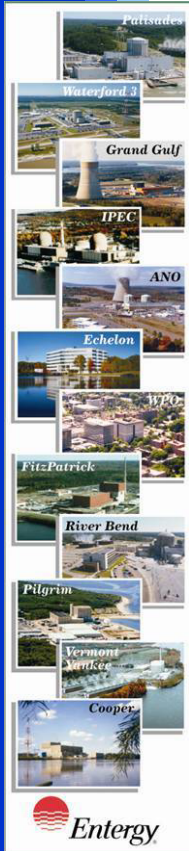
- The modifications for transition need to be described and, as appropriate, modeled in the PRA to properly estimate the change in risk associated with transition
- The LAR needs to be supplemented with the descriptions of these modifications and provide adequate information to review the evaluations supporting these modifications



Item 1

Modification Details

- Detailed final plant configuration descriptions have been completed and will be discussed for the 16 modifications identified
- Attachment S revised to provide additional detail for proposed modifications
- Modifications will be implemented in a manner that supports the assumptions of the Fire PRA



Proposed Attachment S Revision

Arkansas Nuclear One – Unit 2

Att. S – Plant Modifications and Items to be Completed

S. Plant Modifications and Items to be Completed During Implementation

Table S-1, Plant Modifications, provided below includes a description of the modifications along with the following information:

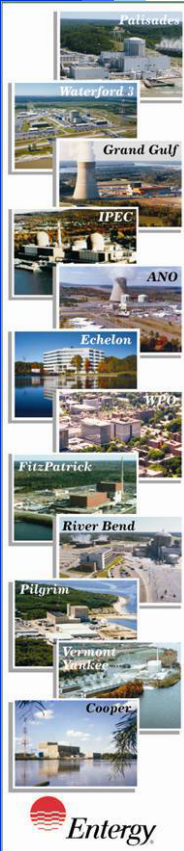
- A problem statement,
- Risk ranking of the modification,
- An indication if the modification is currently included in the FPRA,
- Compensatory measure in place, and
- A risk-informed characterization of the modification and compensatory measure.

The following ranking legend should be used when reviewing the table:

- High = Modification which would have an impact on FPRA and affect multiple Fire Areas.
- Med = Modification which would have an impact on FPRA and affect individual Fire Areas, or include IN 92-18 modifications.
- Low = Modification which would have no or insignificant impact on risk.

Table S-1 Plant Modifications

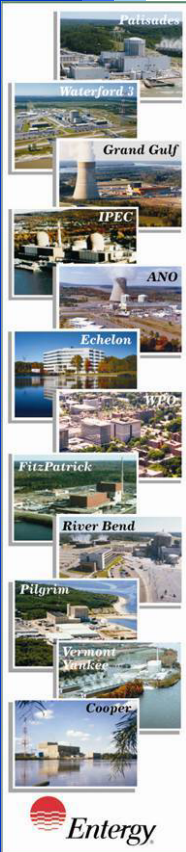
| Item | Rank | Unit | Problem Statement | Proposed Modification | In FPRA | Comp Measure | Risk Informed Characterization |
|------|-----------|------|--|---|---------|--------------|---|
| S1-1 | Med (PRA) | 2 | In Fire Area HH, a separation issue was identified on the EFW valves 2CV-1026-2 and 2CV-1076-2. During a fire induced circuit failure the feedwater valves may be impacted by a fire in Fire Zone 2096-M. LAR Source: Attachment C (NEI-04-02 Table B-3) Section for EFW Valves 2CV-1026-2 and 2CV-1076-2 in Fire Area HH Risk Summary | ANO plans to relocate interposing relays and affected cables associated with 2CV-1026-2 and 2CV-1076-2 from Fire Area HH, Fire Zone 2096-M, to the adjacent room in Fire Area G, Fire Zone 2098-C. Circuits for 2CV-1026-2 and 2CV-1076-2 are currently routed through Fire Area G and no new impacts will be generated by this modification. | Yes | Yes | This modification is specifically credited from a PRA perspective. Modification reduces the risk in Fire Area HH of a fire induced circuit failure for EFW valves 2CV-1026-2 and 2CV-1076-2 in Fire Zone 2096-M. In accordance with station directives, compensatory measures per OP-1003.014 have been established as appropriate. |



Item 2

Risk Estimates for RAs

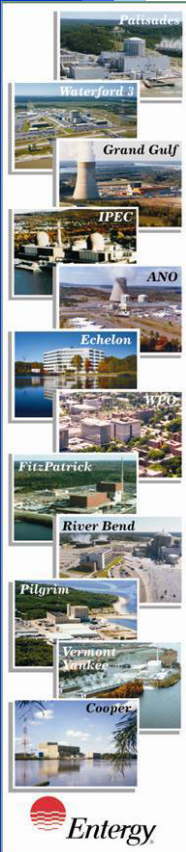
- About one third of the fire areas in the “Additional Risk of RAs” column of Table W-2 of the LAR do not contain a quantitative risk result
- The LAR needs to be supplemented with the quantitative RA risk estimates to demonstrate that the evaluations supporting the transition have been satisfactorily completed



Item 2

Risk Estimates for RAs

- The delta risk from recoveries have been generated and the results are being finalized
- Delta risk of recoveries are based upon post transition model with modifications
- Results will be provided in a revision to Attachment W of the LAR



Item 2

Risk Estimates for RAs - Example

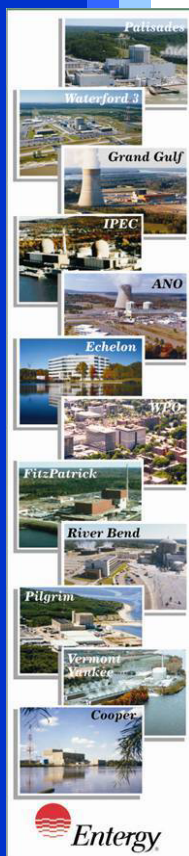


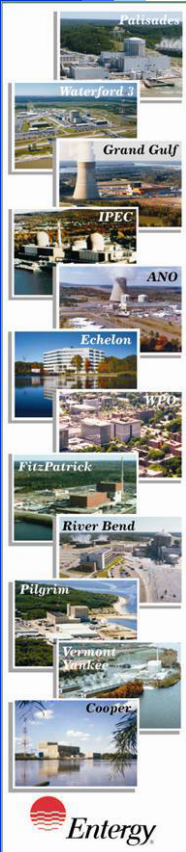
Table W-2 ANO-2 Fire Area Risk Summary

| Fire Area | Area Description | NFPA 805 Basis | Fire Area CDF | Fire Area LERF | VFDR (Yes/No) | RAs | Fire Risk Eval. ΔCDF | Fire Risk Eval. ΔLERF | Additional Risk of RAs (CDF/LERF) |
|-----------|--|----------------|---------------|----------------|---------------|-----|----------------------|-----------------------|-----------------------------------|
| EE-L | Fire Zones 2055-JJ and 2084-DD (piping penetration rooms) | 4.2.4.2 | 3.81E-07 | 7.53E-09 | yes | yes | -7.89E-07 | -2.64E-08 | 9.56E-07/ 3.12E-08 |
| EE-U | Fire Zone 2111-T (lower south electrical penetration room) | 4.2.4.2 | 2.03E-06 | 4.81E-08 | yes | yes | -5.77E-06 | -1.94E-07 | 1.54E-05/ 4.59E-07 |
| FF | Fire Zone 2025-JJ (motor-driven emergency feedwater pump room) | 4.2.3.2 | 1.15E-08 | 3.66E-10 | no | n/a | n/a | n/a | n/a |
| G | Fire Zones 2199-G, 2110-H, 2136-I, 2137-I, 2150-C, 2098-C, and 2098-L (control room and other alternate shutdown areas) | 4.2.4.2 | 2.64E-06 | 3.52E-08 | yes | yes | -2.65E-06 | -9.78E-08 | 7.42E-05/ 1.04E-06 |
| GG | Fire Zones 2076-HH and 2081-HH (electrical equipment room and upper north and lower north piping penetration room) | 4.2.4.2 | 1.03E-06 | 2.17E-08 | yes | yes | -1.12E-05 | -3.82E-07 | 2.93E-05/ 9.51E-07 |
| HH | Fire Zones 2063-DD, 2072-R, 2073-DD, 2096-M, 2106-R, and 2107-N (sample room, VCT room, 2B-62 room, 2B-63 room, degasifier vacuum pump room, and corridor) | 4.2.4.2 | 3.11E-06 | 4.65E-08 | yes | no | -5.80E-07 | -2.18E-08 | n/a |
| II | Fire Zone 2101-AA (north switchgear 2A-3 room) | 4.2.4.2 | 2.90E-06 | 9.31E-08 | yes | no | -1.33E-04 | -4.52E-06 | n/a |
| JJ | Fire Zone 2109-U (corridor) | 4.2.4.2 | 2.70E-06 | 7.97E-08 | yes | yes | -3.78E-06 | -1.21E-07 | 2.82E-04/ 3.27E-06 |

Item 3

RAs Credited for CR Abandonment

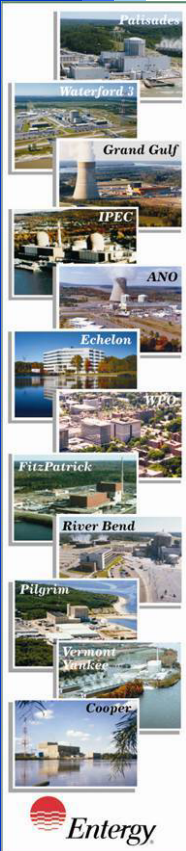
- Attachment G of the LAR states that ANO-2 has no primary control station, besides the main CR, yet only eight RAs are identified for Fire Area G
- Unclear how both the total change in risk and the additional risk from RA is bounded by a risk estimate of “0.0”
- The LAR needs to be supplemented with additional discussion about the planned modifications and RAs, and how these are modeled in the PRA in sufficient detail to explain the unexpected results



Item 3

RAs Credited for CR Abandonment

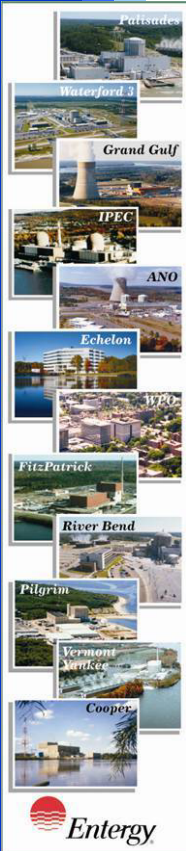
- The “0.0” for delta CDF and LERF will be removed from Attachment W and replaced with actual change in risk values
- Attachment G updated for Fire Area G (CR) to show defense-in-depth actions in addition to the key risk based RAs
- A description of the modeling details for CR abandonment will be included in the supplement



Item 4

Sensitivity Study

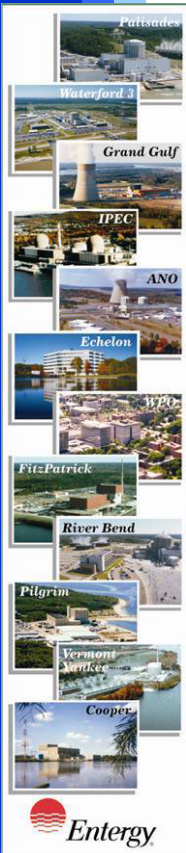
- Two sensitivity studies compare the results based on one “unaccepted method” to results based on another “unaccepted method”
- The LAR needs to be supplemented with the risk results (in relation to the sensitivity analyses for non-suppression probability for long-term fires and adjustment factor for electrical cabinet ignition frequency) calculated using an acceptable analysis method



Item 4

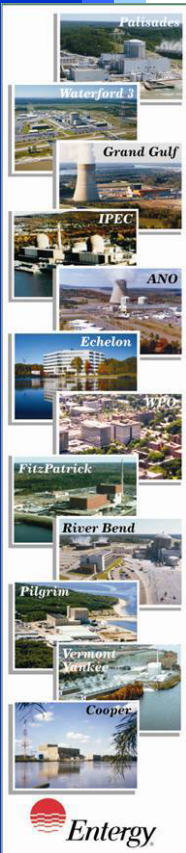
Sensitivity Study

- A new sensitivity analysis based upon post transition model with modifications is being completed to comply with NUREG/CR-6850 for comparison to the current results
- Public meeting on June 12, 2012 provided preliminary results of unscreened fire scenarios due to sensitivity without reliance on panel factors
- Additional unscreened scenarios have been added stemming from the adjustment of manual suppression of long term fires that were lower than .001
- Delta risk input has also been calculated and is available for review
- Further analysis is needed to accurately reflect the risk and minimize the need for unnecessary plant modifications



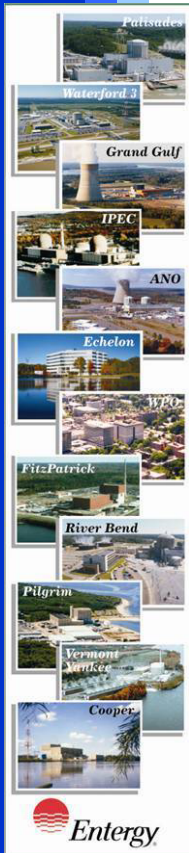
Impact on ANO-1 LAR

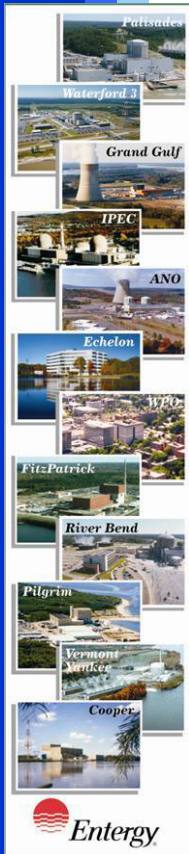
- The ANO-1 LAR will require revision to address items identified for ANO-2
- The ANO-1 LAR submittal is scheduled for August 31, 2012



Summary

ANO-2 supplemental response will be provided by July 11, 2012 addressing identified gaps in the original LAR.





Questions ??