

Regulatory Conference

Oyster Creek Generating Station

Electromatic Relief Valve (EMRV)

Preliminary White Finding

March 9, 2017



Exelon Generation®

Exelon Representatives

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Agenda

- Purpose Garey Stathes, Site Vice President
- Background Mike Gillin, Plant Manager
- Common Cause Greg Krueger, Risk Management
Director
- Recommendations Jim Barstow, Licensing Director
- Closing Remarks Chris Mudrick, Sr. VP Operations

Purpose

To provide a comprehensive overview of the event (degradation of one EMRV) and establish a common understanding of the following factors that should influence the final significance of the Regulatory Finding:

- Causal analysis of the single EMRV degradation
- Corrective actions taken by Exelon
- NRC application of the guidance in RASP Handbook
- Reasonable estimates of the potential risk impact of the performance deficiency (both qualitative and quantitative)

Preliminary White Finding

- Inspection Report 05000219/2016004 (EA-16-241)
- Violation of Technical Specification 6.8.1, “Procedures and Programs” and TS 3.4.B (inoperable > allowed outage time)
- Failure to follow EMRV reassembly instructions, causing ‘E’ EMRV to be incorrectly reassembled
- Finding of low to moderate safety significance
- Human performance cross-cutting aspect in Procedure Adherence
- NRC preliminary evaluation concluded increase in core damage frequency (CDF) related to failure of ‘E’ EMRV is greater than Green

Causal Product Investigation Conclusions

- One of five EMRVs found failed due to a maintenance technician error in reassembly of the valve actuator
- The other four valves were correctly assembled (with star washers installed) and tested satisfactory
- Conditions typically associated with *shared* common cause, including organizational factors, were not present

Inattention to detail resulted in washers not being installed on one EMRV

Unique Defenses to Prevent Common Cause

Qualitative factors applied to the EMRV actuator rebuild and modification that should be considered in an SDP case:

- Specific just-in-time training
- Oversight and observations
- Industry subject matter experts
- Original equipment manufacturer representative consultation
- Human performance briefings
- Quality Assurance modification inspections

Numerous actions were taken as barriers to prevent common cause effects

Potential Consequences of Undervaluing Causal Factors when Quantifying Risk

Exelon requests that the following potential consequences of undervaluing causal factors be considered when quantifying risk:

- Applying full conditional Common Cause Factor (CCF) probability establishes an upper bound and does not reflect a graded approach - warranted in this case
- RASP Handbook guidance represents a bounding application of common cause, which dominates the risk significance result
- SDP practices that overestimate risk significance can cause undue effort (on both sides) not commensurate with safety significance

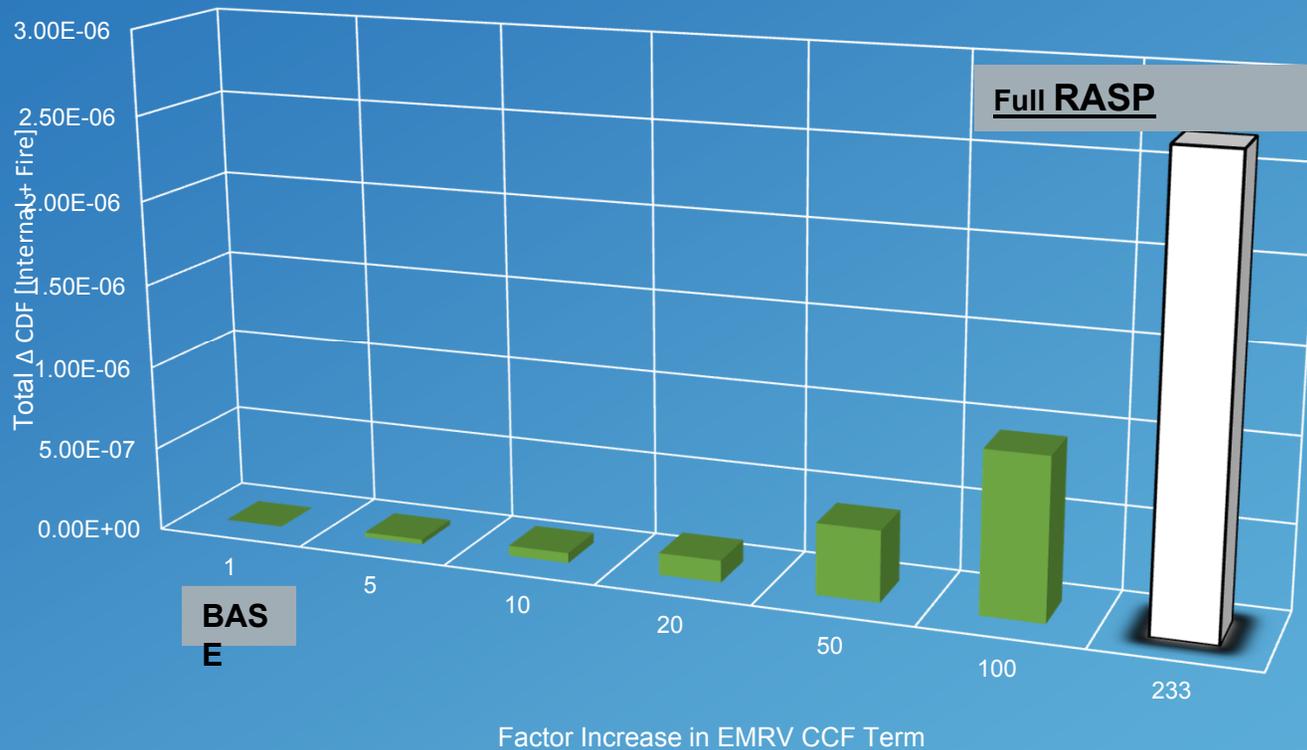
Results should not be driven by limitations of models, methods, databases

Sensitivities - CCF Increase vs. CDF

CCF Increase	CCF Probability	Change in CDF
Base value	3.05E-05	7.00E-07
5X	1.53E-04	7.30E-07
10X	3.05E-04	7.60E-07
20X	6.11E-04	8.30E-07
50X	1.53E-03	1.02E-06
100X	3.05E-03	1.35E-06
Full RASP(233X)	9.17E-03	2.67E-06

- CCF probability changes from 3 chances in 100,000 to 9 chances in 1,000
- Green-White threshold at about 100X increase in CCF
- The base value is more representative of “true” risk given that there was no extent of condition and many barriers applied
- Demonstrates extreme nature of applying full RASP CCF increase

Increasing CCF Probability vs. Risk Significance



NRC should strive to represent “true risk” and should not apply the full RASP CCF increase unless warranted by the extent of condition and lack of barriers associated with the cause

Current SDP Common Cause Choices

Current Application of CCF

- 
1. Nominal impact of common cause
 - Base value for CCF remains unchanged
 2. Full impact of common cause
 - Large numeric impact from increased common cause
 - No credit for actual extent of condition
 - No credit for defenses employed

What it Should be

- Explore sensitivities of graded approach to increasing common cause
- Credit the actual extent of condition and defenses employed
- Arrive at a reasonable estimate of potential risk impact of deficiency

Align Safety Significance with the Facts

- Increasing common cause “potential” (by factor of 233) does not reflect the true nature of the particular deficiency in question
- Full CCF increase has a disproportionate impact on risk significance, particularly given EMRV success criteria (2 of 5 EMRVs) for dominant PRA model sequences
- It is not anticipated that this case would be considered as a common cause event when processed in the industry database (NUREG/CR-6268)

Application of common cause in an SDP calculation should be tempered by known extent of condition and defenses employed

Recommendations

Short Term

- Credit unique defenses employed and actual extent of condition to address EMRV common cause
- Treatment of CCF probability should be a graded application in this case as opposed to the full RASP increase

Long Term

- Factor-in actual extent of condition and barriers in SDP cases
- Institute a graded approach for increasing CCF probability
- Revise the RASP Handbook guidance to reflect these changes
- Create inspection guidance for evaluating/crediting CCF defenses
- Promote pre-emptive industry use of defenses for common cause

Closing Remarks

- Health and safety of the public is best served by showing the true risk of an event
- NRC has the flexibility to do this under existing guidance
- Following the RASP Handbook without looking at actual extent of condition and existing barriers is not in keeping with good regulatory principles