Drives

Design Certifications PRA's need to be completed
COL Certifications PRA's need to be completed
    For both DC and COL, need guidance for level of depth, quality, etc. (needed fall 2007)
    For both DC and COL need risk screening criteria (needed Fall 2007)
For risk-informing applications and review (1.174) need performance based criteria (need Spring 2009)

Problem statement

NRC and the nuclear power industry would like to:

- Have a success path for digital system modeling in current and future plant PRAs, and
- Have the option to use risk-informed licensing methods for digital system in both new and existing plants.
- Ensure that risk-insights are addressed in the resolution of other TWG digital system issues.

However:

1. Currently there is no agreement or guidance on addressing uncertainties associated with digital system modeling, including:
    - Digital system common cause failures (including software)
    - Level of modeling detail
    - Failure data
    - Adequacy of modeling methods
    - Interfacing digital system models with the rest of the PRA
2. Currently there is no agreement or guidance on integrating risk insights into digital system reviews and/or risk-informing digital system reviews.
3. Without adequate risk-insights during resolution, technical issues currently being addressed by other TWGs may negatively impact how the uncertainties associated with these issues are addressed in PRAs or result in design changes that may not achieve desired safety benefits.

Goals/Success Criteria

1. Reach agreement on and develop guidance addressing uncertainties associated with digital system modeling (short term) (supporting PRA completeness)
    a. Develop general guidance on what is adequate in terms of digital system modeling for regulatory applications (DC, COL, operating plant upgrades)
    b. Develop, if possible, guidance that specifies the level of modeling detail, based on risk information (what level of detail for, what application)

2. Reach agreement on and develop guidance on integrating risk insights into digital system reviews and/or risk-informing digital system reviews (long term) (changing plant stuff)
    a. Reach agreement on open technical issue associated with digital system risk and reliability modeling (such as, software reliability modeling, data, etc.)

b. Complete research to resolve issues in (a)
c. Develop guidance (maybe a regulatory guide (RG 1.17X)) that define how to regulatory decision-making for risk informed digital system reviews
d. Update other regulatory guidance, if needed
e. Develop methods to review (independently audit) digital system risk and reliability assessments
f. Determining whether practical approaches to risk informing diversity and defense-and-depth evaluation in digital systems can be developed (and if so develop them).

3. Integrate the resolutions being addressed by the other TWGs with the resolutions of the PRA TWG solutions (Short term) (Don't operate in a vacuum!!).
    a. Develop an effective process to interface with the other TWGs
    b. For each of the other TWG resolutions developed, make sure the PRA TWG solution takes this into account.
    c. For each of the PRA TWG issues make sure that the appropriate other TWG takes the information into account in there work.

Critical paths and steps to reach goals

Brainstorming

a) Industry provide technical paper that discusses leassons learned from the D.C. and Operating Plant experience, associated with modeling of digital system in PRA and the proposed methods.

b) NRC review industry input on experience and leasson learned

c) Discuss current insights from NRC research efforts to date (maybe before (a))

d)

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- Failure data
- Adequacy of modeling methods
- Interfacing digital system models with the rest of the PRA

f) provide guidance on what we have agreed on in a RIS or other appropriate method.

Reach agreement on and develop guidance addressing uncertainties associated with digital system modeling (short term) (supporting PRA completeness)

d. Develop general guidance on what is adequate in terms of digital system modeling for regulatory applications (DC, COL, operating plant upgrades)
e. Develop, if possible, guidance that specifies the level of modeling detail, based on risk information (what level of detail for, what application)

Make sure that we use the lesson learns from DC review

Identifying what the uncertainties are associated with Digital system risk and reliability modeling.