From: Miller, Ed
To: NTTF Rec 2.1 Flooding
Subject: NEI flowchart
Date: Wednesday, August 29, 2012 7:57:00 AM
Attachments: JLD.pdf

Attached is the flowchart presented by NEI at the public meeting yesterday.

Ed

1A

1B

Guidance for Performance of Integrated Assessment

Information Collection

Assemble Peer Team

Define Flood Parameter Scenario(s) (1)

Identify Flood Protection Systems

Simple Systems Evaluation

(Permanent, Passive)

(Temporary, Active)

Complex Systems Evaluation

Define Failure/Success Criteria

Water Allowed to Enter Category Class 1 Equipment

Define Failure/Success Criteria

N/A

NO

Yes

Mitigation Capability Evaluation

Define Associated Features

For Permanent Passive Features: See Simple Systems

Define Associated Features/Actions

Quantitative Integrity Evaluation Exterior and Incorporated Passive Features (2)

Criteria Outlined in ISG

Sensitivity Study If Applicable

Temporary Barriers

Active Protection Features, TBD

Complex Flood System Dependencies Evaluation

Determine Physical Margin

Document Barrier Placement Trigger(s)

Quantitative Loads and Associated Effects Evaluation

Comparison to Codes, Standards, Best Practices

Qualitative Evaluation of Operational Requirements (Maintenance, Inspection --)

System Logic Model (or equivalent)

?Margin Criteria?

Conservative, Qualitative Operator Actions HRA Evaluation

OK

OK

Not OK

Identification of Feature/Action Dependencies

Have Integrity and Margin?

Report

Make Adjustments

Use In other Evaluations

? Report

Yes

NO

?Criteria?

Mitigation

Effect Elevation

Prepare Qualitative Description of Mitigation Resources

Report

Capability Evaluation

OK

Not OK

Determine Temporal Margin

? Margin Criteria?

Not OK

OK

Report

Quantitative H'A Evaluation ? Methods?

? Criteria?

Not OK

OK

Report

Sensitivity Study If Applicable

(1) Process repeated for each Flood Scenario.

(2) Incorporated Passive Features under development, treatment of hatches, water-tight doors, etc. (simple vs. complex) TBD.

1C

(Physical Margin

? Margin Criteria?

OK

Not OK

Report

Sensitivity Study If Applicable

Not OK

Quantitative Reliability Estimate

May Require Laboratory or Field Testing, Analytical Modeling or Demonstrations

Sensitivity Study If Applicable

? Criteria?

OK

Not OK

Determine Physical and/or Temporal Margin

? Marin Criteria?

OK

Not OK

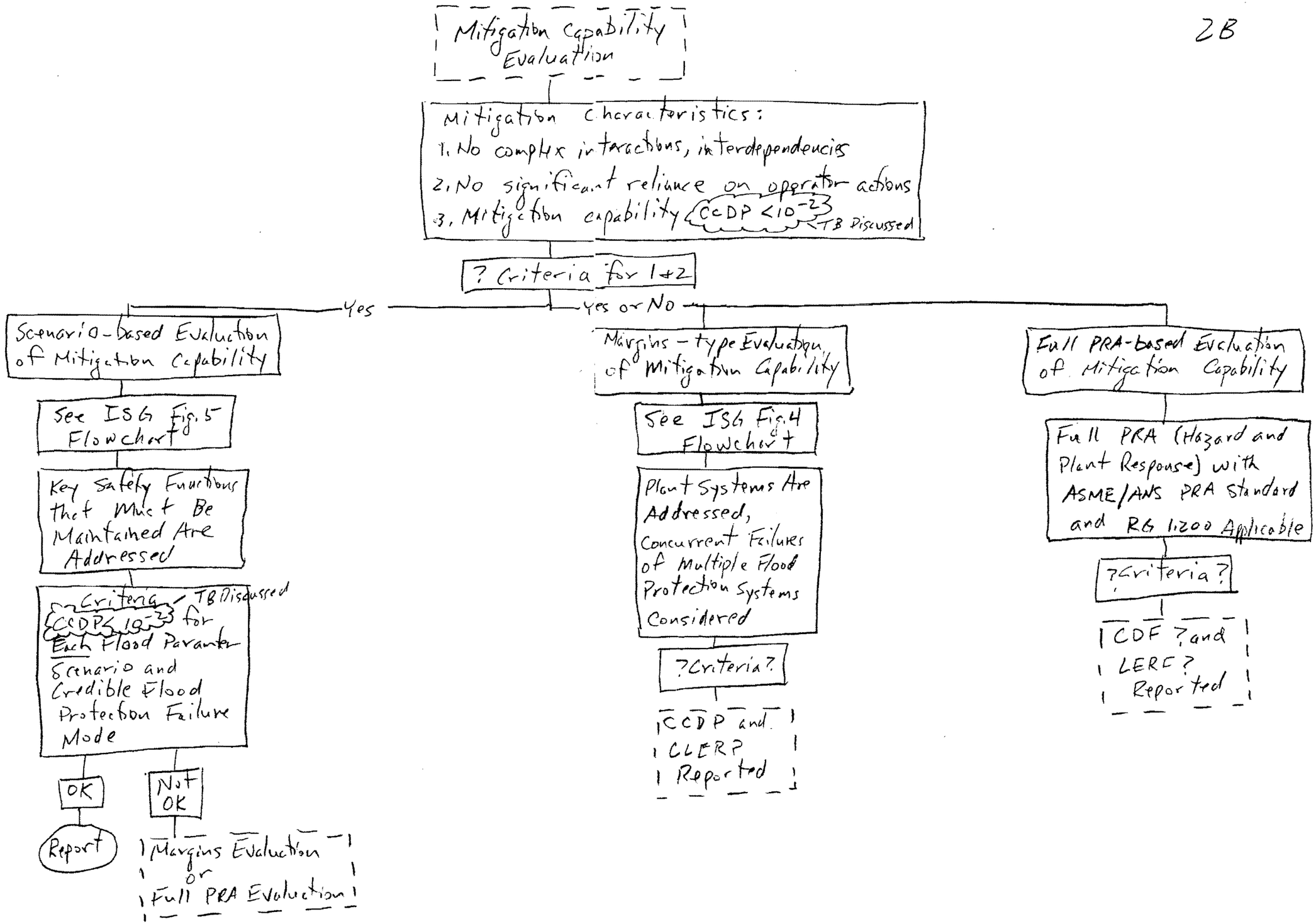
Repor

Mitigation Capability Evaluation

1D

2A

2B


Mitigation Capability Evaluation
Mitigation Characteristics:
1. No complex interactions, interdependencies
2. No significant reliance on operator actions
3. Mitigation capability CCDP < 10^-2 TB Discussed
? Criteria for 1+2
Yes
Yes or No
Scenario-based Evaluation of Mitigation Capability
See ISG Fig. 5 Flowchart
Key Safety Functions that Must Be Maintained Are Addressed
Criteria - TB Discussed CCDP < 10^-3 for Each Flood Parameter Scenario and Credible Flood Protection Failure Mode
OK
Not OK
Report
Margins Evaluation or Full PRA Evaluation
Margins-type Evaluation of Mitigation Capability
See ISG Fig. 4 Flowchart
Plant Systems Are Addressed, Concurrent Failures of Multiple Flood Protection Systems Considered
?Criteria?
CCDP and CLERP Reported
Full PRA-based Evaluation of Mitigation Capability
Full PRA (Hazard and Plant Response) with ASME/ANS PRA Standard and RG 1.200 Applicable
?Criteria?
CDF ? and LERF ? Reported

Documentation of Evaluations

1. Procedure and methodologies
2. Flood mechanisms and Flood Parameter Scenario(s)
3. Site condition with Flood Parameter Scenario(s) and risk-significant SSCs affected.
4. Effectiveness of current licensing basis protection.
5. Effectiveness of current licensing basis mitigation.
6. Effectiveness of in-place and planned protection and mitigation.

Results

* Supplements basic flood protection system and mitigation evaluations.

* 1. Evaluation of Available Margin
- Available margin after reevaluation
- Additional flood hazard required to eliminate margin.
- Effects of exceeding margin on key safety functions.

* 2. Identification of Vulnerabilities
- Identify vulnerabilities
- Safety functions affected
- Combined effect of vulnerabilities on key safety functions
- Elevation at which each SSC has been compromised
- 2.3 Walkdown deficiencies not yet resolved.

* 3. Cliff-edge Effects
- Elevation cliff-edge effect occurs
- Safety consequences of exceeding cliff-edge elevation
- Effect of all available resources on reducing consequences.
- "Qualitative" description of mitigation resources at site (sites with acceptable simple protection systems)

* 4. Risk Insights and Defense-in-Depth (DID)
- Flood protective features if unavailable significantly increase risk
- Substantial safety consequences or risk increases below the maximum water for Flood Parameter Scenarios.
- Risk-significant SSCs affected by reevaluated flood (were "dry" and now are "wet")
- Document if and how DID considerations are used to address unknown and unforeseen failure mechanisms and phenomena.