



Flooding Hazards

October 16, 2013

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www.ucsusa.org

Issues

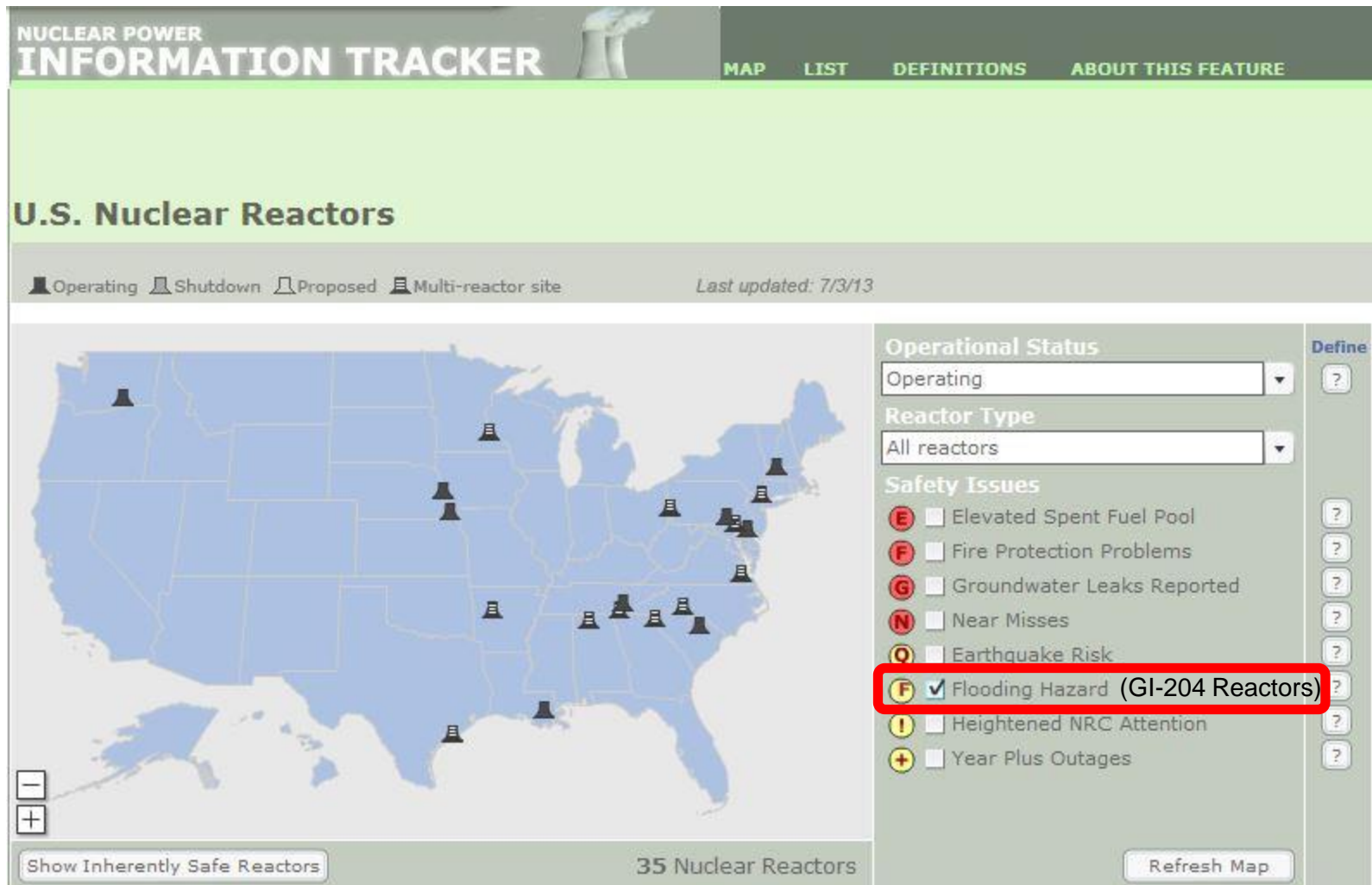
- **Risk integration vs. isolation**
- **Cart before the horse**
- **Inconsistent oversight**

Stellar Regulatory Performance



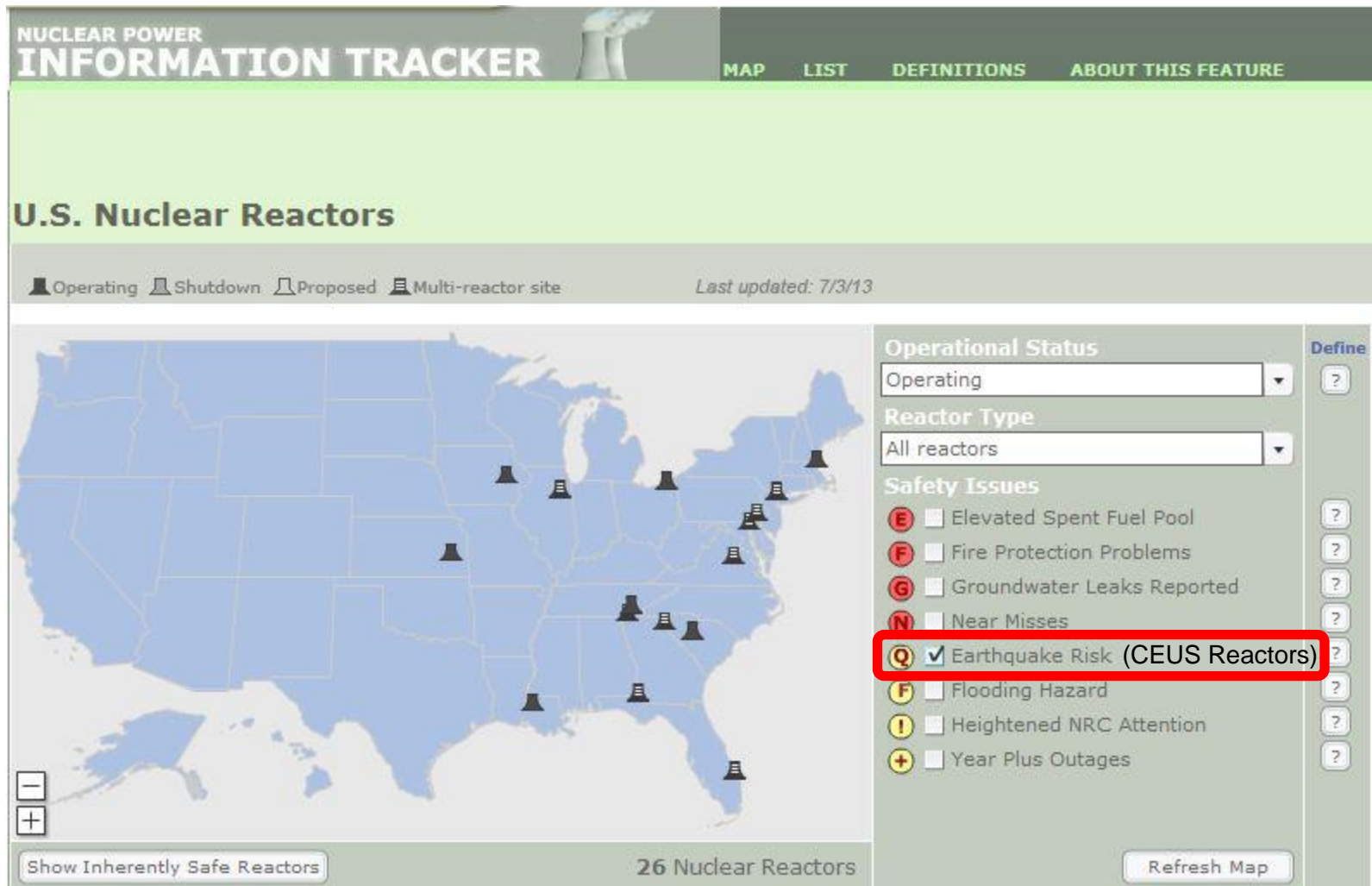
Source: ML120400493

Flood of Known Safety Issues

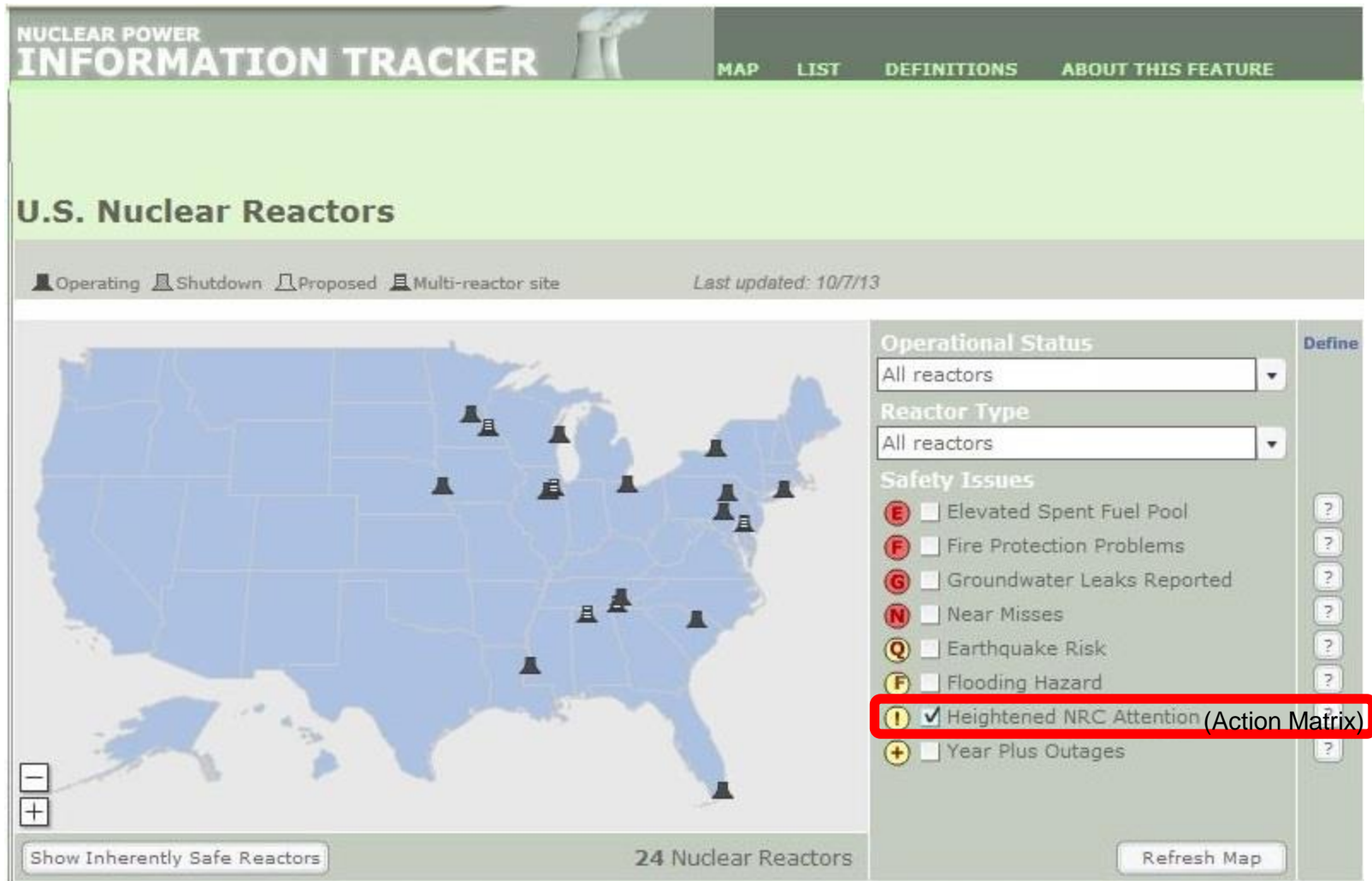


Source: http://www.ucsusa.org/nuclear_power/reactor-map/embedded-flash-map.html

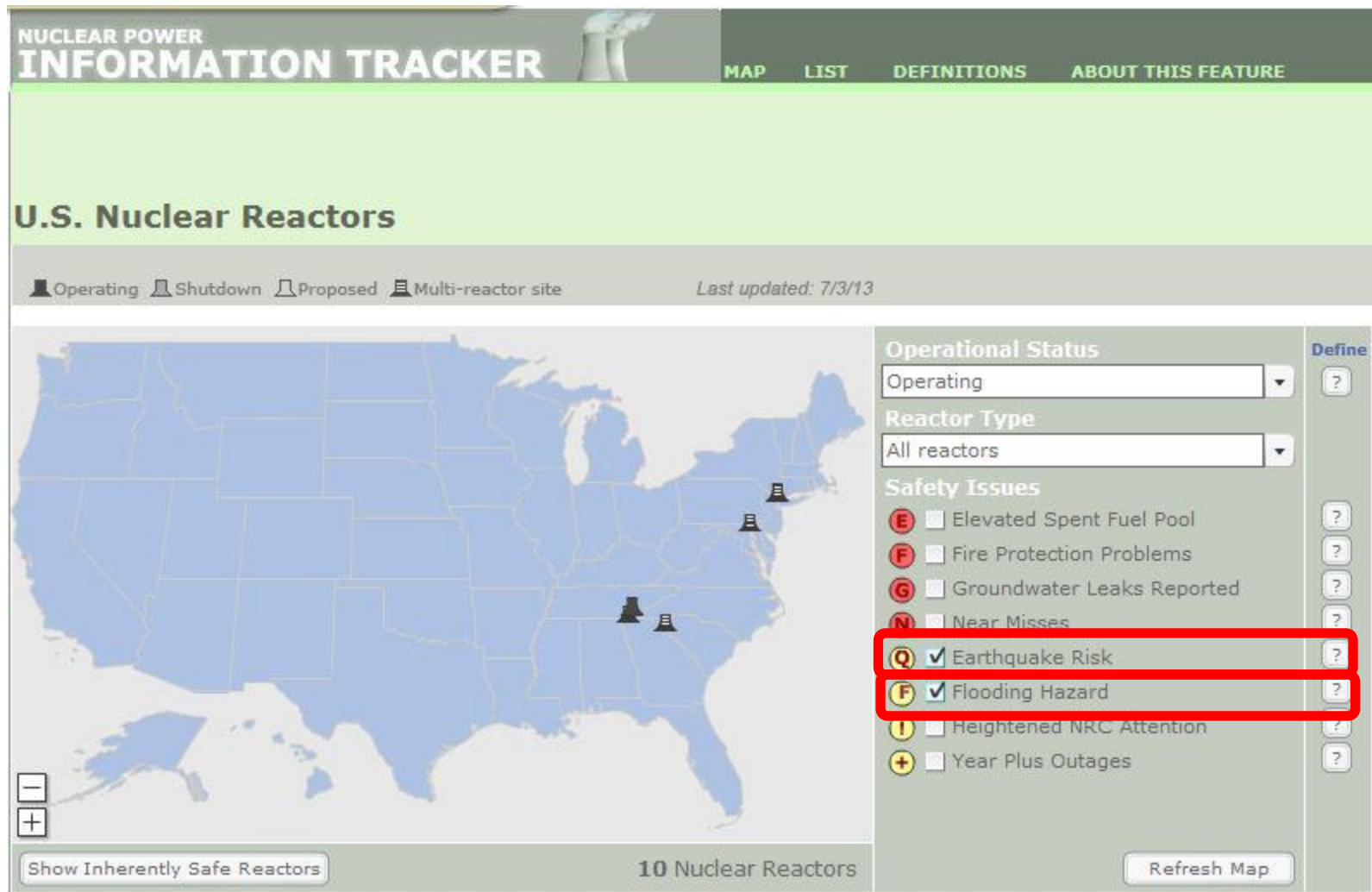
Another Drop in the Flood



Another Drop in the Flood



Flood is More Than One Drop



But NRC Only Sees a Drop

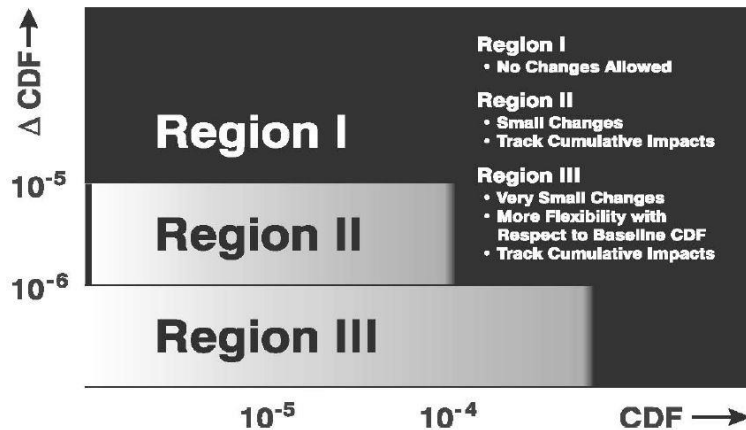


Figure 4 Acceptance guidelines* for core damage frequency

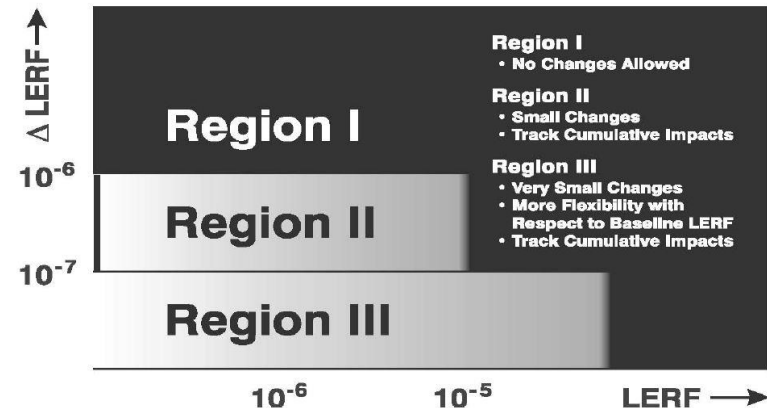


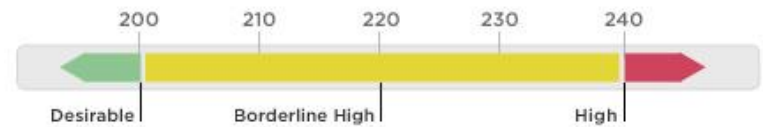
Figure 5 Acceptance guidelines* for large early release frequency

NRC's decision-making processes, such as this one from RG 1.174, are largely made without formally considering other known risks.

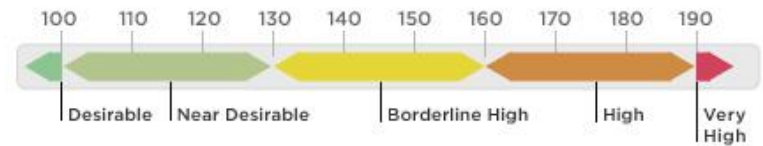
Connect-the-Dot?



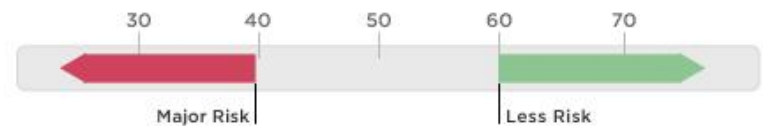
TOTAL CHOLESTEROL LEVEL (in mg/dl)



LDL CHOLESTEROL LEVEL (in mg/dl)



HDL CHOLESTEROL LEVEL (in mg/dl)



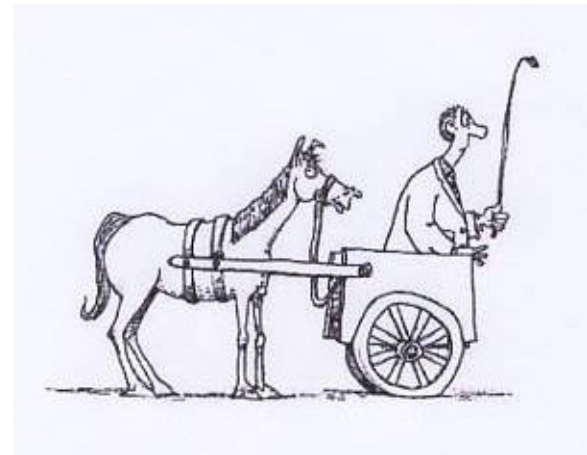
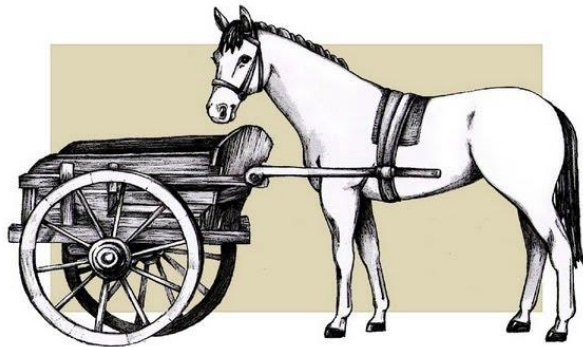
Connect-the-Dot?

If Reactors A and B each had flooding protection issues, NRC's processes would treat each equally in terms of urgency, etc.

But what if Reactor B also had seismic and fire issues and was in Action Matrix column 4 while Reactor A had no other issues and was in column 1?

Cart Before Horse

The NRC mandated that walkdowns and assessments be performed BEFORE it clearly articulated its expectations and appropriate standards.



Cart Before Horse

- 08-09-2010:** NRC accepted upstream dam failure issue in its generic issue program
- 03-11-2011:** Fukushima Daiichi experienced earthquake and tsunami
- 03-23-2011:** NRC began walkdowns per Temporary Inspection 2515/183
- 07-12-2011:** Near-Term Task Force issued report and recommends external flooding walkdowns

Cart Before Horse

- 02-29-2012: NRC approved upstream dam failure issue as Generic Issue 204**
- 03-12-2012: NRC mandated walkdowns and reevaluations of flooding hazards**
- 05-31-2012: NRC endorsed NEI flooding walkdown guidance**
- 11-30-2012: NRC issues flooding assessment guidance**
- 01-04-2013: NRC issues tsunami, surge, seiche hazard assessment guidance**

Cart Before Horse

Draft 18; January 17, 2013

Program

Workshop on
Probabilistic Flood Hazard Assessment
(PFHA)

January 29 - 31, 2013, 8:30 a.m. – 6:00 p.m. (EST)
U.S. NRC Headquarters Auditorium
11555 Rockville Pike, Rockville, MD 20852

Federal Agency Partners



More than 10 months AFTER the walkdown directive, NRC hosted a flooding assessment workshop.

Cart Before Horse

Extreme Flood Frequency Analysis: Concepts, Philosophy and Strategies

Jery R. Stedinger

Cornell University and USGS

Member HFAWG

sabbaticals USGS, US ACE

with V. Griffis, A. Veilleux, E. Martins, T. Cohn

**More than two
years later,
federal
government is
playing catch-up.**

Bulletin 17B

- Uniform flood frequency techniques used by US Federal agencies
- **Bulletin not updated in 20+ years**
 - despite significant amount of research
 - additional 30 years of data for skew map
 - better statistical procedures for censored data

Bulletin 17C

- **Revision on the way**
- Provides a tune up addressing
 - Use of historical information
 - Potentially Influential Low Floods (PILFs)
 - Censored & interval data
 - **Confidence intervals & uncertainty analyses**
- Also developing better regional skew

Cart Before Horse

Some unanswered questions:

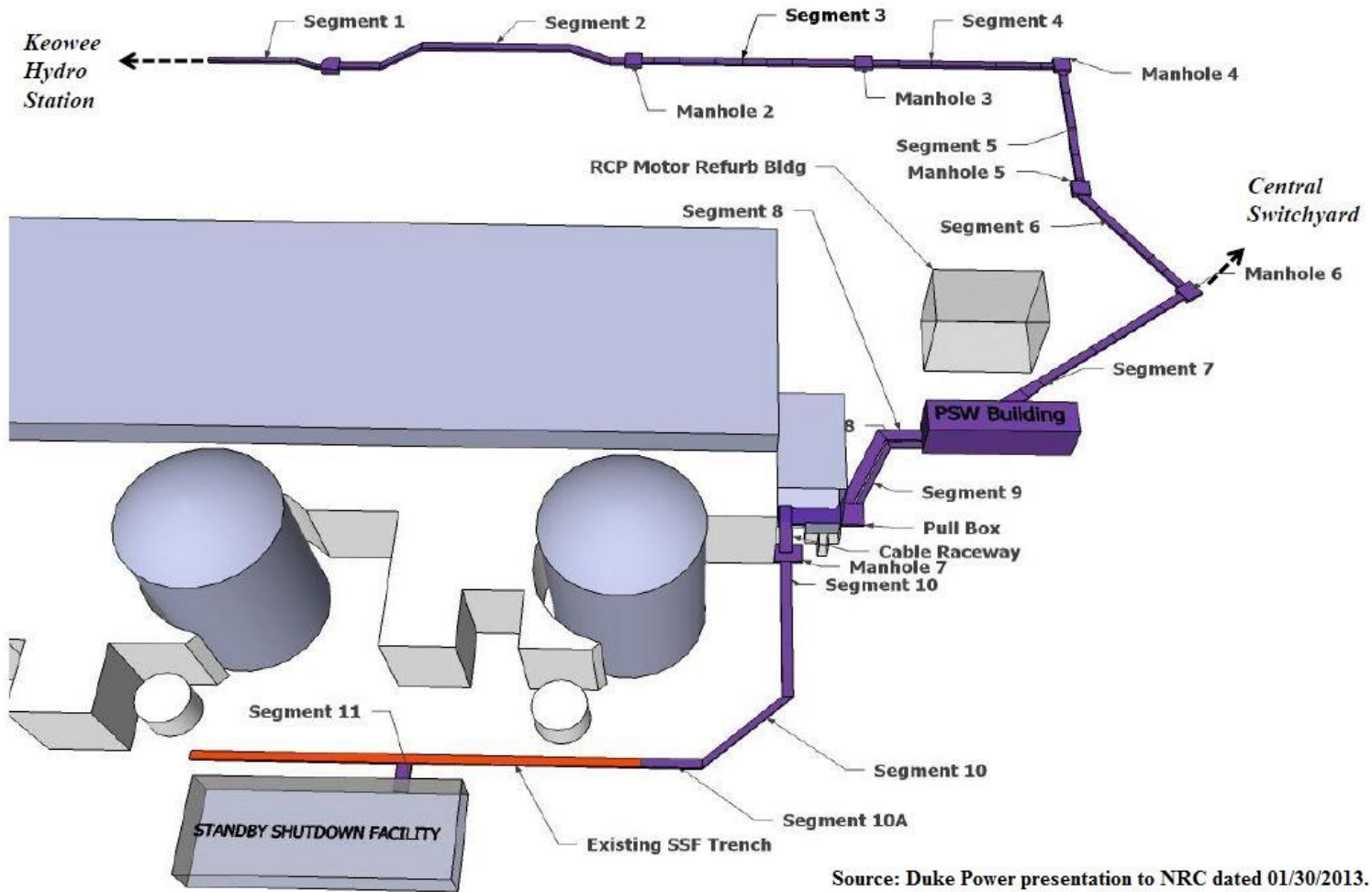
- 1) Should dam failures be postulated concurrent with heavy rainfall, or should the current “sunny day” practice continue?**

Cart Before Horse

Some unanswered questions:

2) When assessing flooding above design basis levels, should factors like weight of water affecting structures be considered, or totally ignored as is the current practice?

Cart Before Horse



Source: Duke Power presentation to NRC dated 01/30/2013.
Available in NRC's ADAMS under ML13035A233

Cart Before Horse

Some unanswered questions:

3) When assessing flooding below design basis levels, should manual actions being impaired by flood water be considered, or totally ignored as is the current practice?

Cart Before Horse

Had they been completed at Fukushima Daiichi before March 10, 2011, would the NRC-mandated flooding walkdowns and assessments have prevented the three reactor meltdowns?

Cart Before Horse

Near Term Task Force recommendation 2.2:

Initiate rulemaking to require licensees to confirm seismic hazards and flooding hazards every 10 years and address any new and significant information. If necessary, update the design basis for SSCs important to protect against the updated hazards.

Duck and Uncover

06/22/2010 – Secret confirmatory action letter for Oconee flood protection shortcoming

10/08/2010 – Public yellow finding for Fort Calhoun flood protection shortcoming

06/18/2013 – Public yellow finding for Point Beach flood protection shortcoming

08/28/2013 – Public yellow finding for Monticello flood protection problem

Issues

- **Risk integration vs. isolation**
- **Cart before the horse**
- **[redacted] oversight**

Acronym List

**CEUS – Central and Eastern
United States**

GI – Generic issue

NEI – Nuclear Energy Institute

**NRC – Nuclear Regulatory
Commission**

RG – Regulatory Guide

**SSC – Systems, structures, and
components**

**USGS – United States Geological
Survey**