



RIPB Terminology Across the Nuclear Industry--

**With Observations for Updating the
ABS RIPB Guidance Document**

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Agenda

- RIPB Terminology – We are not speaking the same language
 - Overview of comparative study: DOE, NRC, NEI
 - Proposal to move toward a common vocabulary
- Updating the ANS RIPB Guidance Document
- A Call for Volunteers



RIPB Terminology – We are not speaking the same language



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A quick thought exercise

Imagine yourself as a new nuclear engineer, attending meetings and reading documents for approximately 2 years before you are confident and competent with the lingo



How did we get here?

The U.S. Regulatory Environment – rules and regulations depend on the nature and owner of a nuclear facility

August 30, 1954

- President Eisenhower signs the Atomic Energy Act of 1954, opening the way for the development of a civilian nuclear power program.

October 11, 1974

- President Ford signs the Energy Reorganization Act of 1974, abolishing AEC and establishing the Energy Research and Development Administration and the U.S. Nuclear Regulatory Commission.

1974-2026 (50+ years)

- The now-named Department of Energy and the Nuclear Regulatory Commission work in relative silos, with occasional benchmarking and crossover between the two



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Why do Linguistics Matter?

- The potential for miscommunication, even among subject matter experts in RIPB
- Nuclear is growing and collaboration between stakeholders is growing with it
- If we can't communicate with each other, how can we possibly communicate to the general public?



Linguistic Analysis- Scoping the Study

- Nonreactor Nuclear Facilities
- U.S. Specific Guidance
- Desktop Exercise

DOE STANDARD
PREPARATION OF NONREACTOR
NUCLEAR FACILITY DOCUMENTED
SAFETY ANALYSIS

U.S. Department of Energy
Washington, DC 20585

U.S. NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

NUREG-1520, Rev. 2

**Standard Review Plan
for Fuel Cycle Facilities
License Applications**

Final Report

Office of Nuclear Material Safety and Safeguards

NEI TECHNICAL REPORT

Modernization of Technical Requirements
for Licensing of Advanced Non-Light Water Reactors

Risk-Informed Performance-Based Technology
Inclusive Guidance for Non-Light Water Reactor
Licensing Basis Development

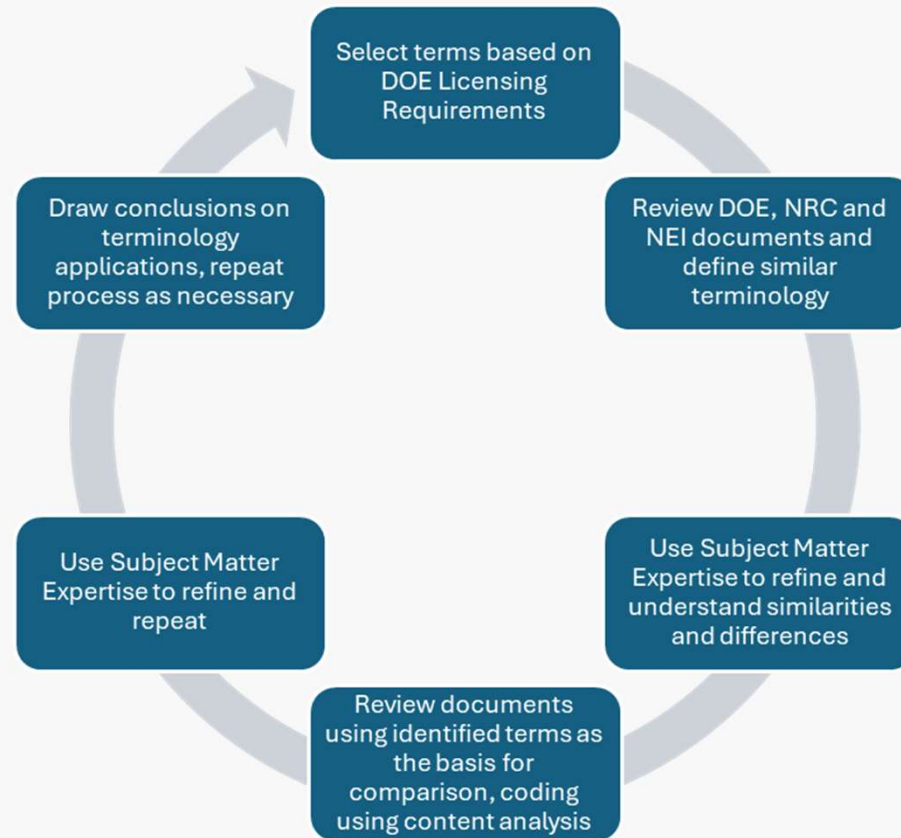
Report Revision 1

August 2019

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Methodology



Coding Structure

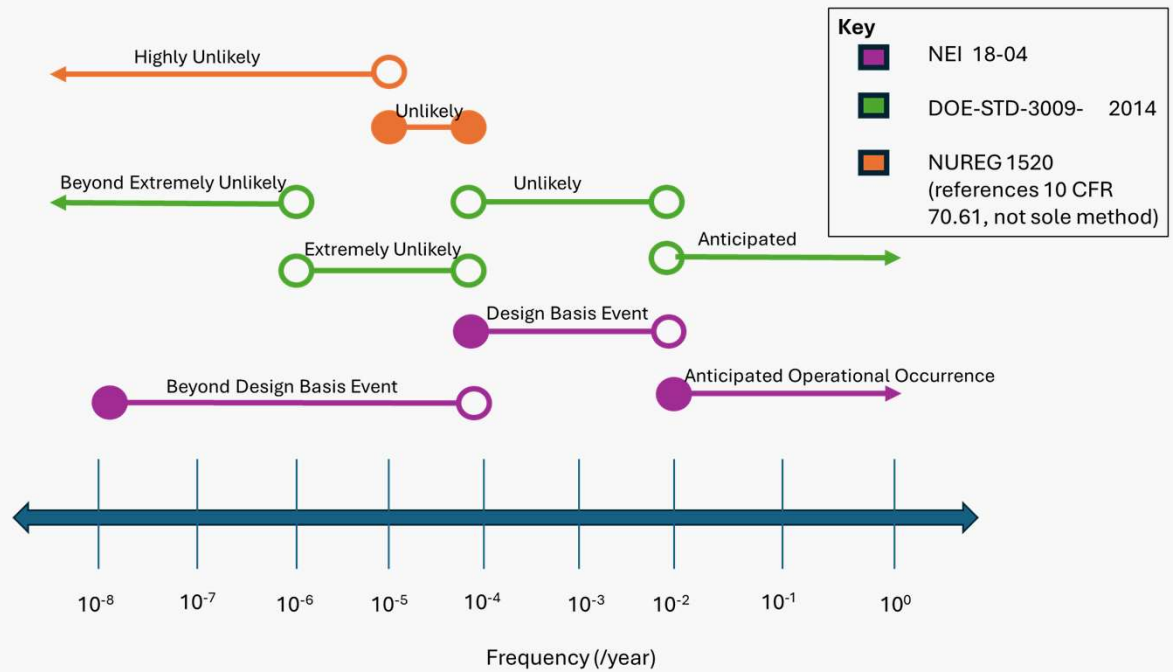
Thematic Term	DOE Term	NRC Term	NEI Term
Risk	Risk	Risk	Risk
Analysis	Probabilistic Risk Assessment	Probabilistic Risk Assessment	Probabilistic Safety Assessment
Consequence	Consequence	Consequence	Consequence
Event	Initiating Event	Event	Initiating Event
	Hazard Scenario	Accident Sequence	Event Sequence
Accident	Design Basis Accident and Evaluation Basis Accident		Design Basis Accident and Licensing Basis Event
Frequency	Anticipated	Abnormal Condition	Abnormal Operational Occurrence
	Unlikely	Unlikely	Design Basis Event
	Extremely Unlikely	Highly Unlikely	Beyond Design Basis Event
	Beyond Extremely Unlikely	--	--
Control	Safety Class	Items Relied on for Safety	Safety Related
	Safety Significant	--	Non-Safety Related with Special Treatment
	Administrative Control and Specific Administrative Control	Administrative Control; Augmented Administrative Control; Simple Administrative Control	Programmatic Controls; Programmatic DID

Results

- Orange indicates that the term is not present in that standard
- Frequency and control definitions in particular show a large degree of disharmony
- For full results, check out: *(In)Consistencies Among Nuclear Facility Safety Analysis Terminology in the United States: An Exercise in Semantics or a Call for Consistency? In Nuclear Technology*

Term	NEI 18-04	DOE STD 3009-2014	NUREG 1520 R2
Frequency			
Anticipated			
Abnormal Condition			
Anticipated Operational Occurrence			
Unlikely			
Design Basis Event			
Extremely Unlikely			
Highly Unlikely			
Beyond Design Basis Event			
Beyond Extremely Unlikely			

Frequency Terminology Comparison



Benefits of Harmonizing Terminology

- Reduced ambiguity and improved consistency/clarity of risk assessments to stakeholders
- Improved ability to verify and validate models used during risk analysis
- Consistent adoption of risk concepts/terminologies across stakeholder groups, including those without formal training
- Improved ability of stakeholders to engage in risk debates



Barriers to Harmonizing Terminology

- Inertia– is it possible to make changes
 - Whose version is adopted?
 - Imagine the retraining!
- Legislation is not easy or fast to change
 - Drafting changes through publication within a single programmatic silo can take years

What happens if we don't?

“How can the nuclear safety analysis community expect the public to understand risks and benefits of nuclear energy if subject matter experts cannot reach agreement on the terminology used within safety analyses?”

“The proposed rule mixes regulatory terminology. Terms are used interchangeably in some instances...but in other instances it is stated that one does not constitute another. This creates more than regulatory uncertainty. The lack of clarity makes it difficult to even determine what is intended, and completely obscures what would be sufficient to meet the requirements in the rule.”

“the consequences of non-standard terminology are increased regulatory burden, confusion, and over-prescriptive requirements”



Proposal: Step-wise Harmonization

- Develop a concordance of risk-related terminology used within the U.S. nuclear industry that facilitates a wholistic understanding of variations in terminology
- Use it to develop a crosswalk- find harmony in a single area first
- Leverage a committee-based approach
- Provide guidance that uses program neutral language and do the translating



Updating the ANS RIPB Guidance Document



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Project Scope and Goals

- Update ANS's document endorsing the use of risk-informed, performance-based (RIPB) methods, *Incorporating Risk-Informed and Performance-Based Approaches/Attributes in ANS Standards* (issued 3/28/22 for trial use).
- Goals:
 - Provide clarity and- update based on user feedback
 - Enhance usability with additional tools or examples



Incorporating Risk-Informed and
Performance-Based
Approaches/Attributes in ANS
Standards

Issued 3/28/22 for Trial Use

ANS

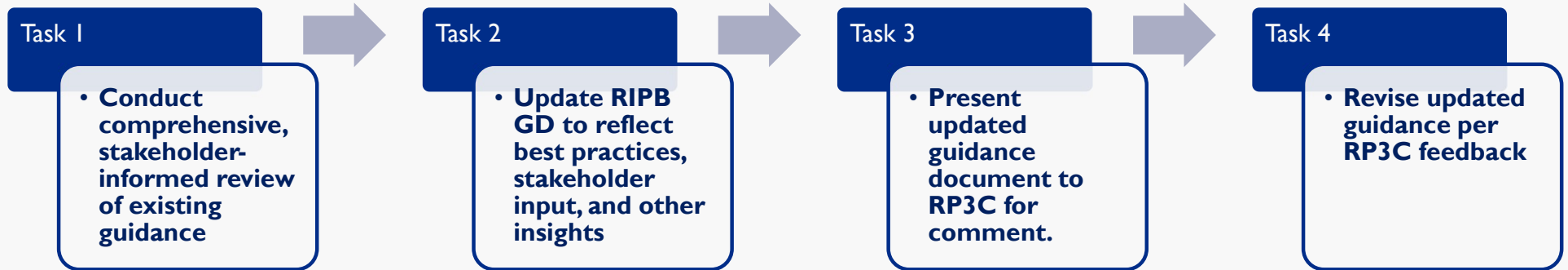


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Milestone Tasks

We are here



A Call for Volunteers

Dr. Harkema and I want to speak to guidance document (GD) users to understand first-hand perspectives



- What's working well
- What would help clarify when RIPB Methods are appropriate?
- What tools would help you implement RIPB methods more easily (checklists, etc.)
- What other feedback do you have to share?

Thank you

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