NRC Nuclear Regulatory Commission

Coming Soon, ANS-2.34-202x, Characterization and Probabilistic Analysis of Volcanic Hazards

JENISE THOMPSON
NUCLEAR REGULATORY COMMISSION
SEPTEMBER 23, 2026
DOE-NRC NATURAL PHENOMENA HAZARDS WORKSHOP

NRC

Working Group Membership

- L. M. Bauer, *Nuclear Regulatory Commission*
- M. Cline, *Rizzo International*
- C. Connor, *University of South Florida*
- K. Coppersmith, *Coppersmith Consulting, Inc.*
- M. Diaconeasa, *North Carolina State University*
- P. Frias, *Department of Energy*
- W. R. Hackett, *WRH Associates Inc.*
- B. E. Hill, *Individual*
- L. Mastin, *U.S. Geological Survey*
- S. McDuffie, *Associate Member*
- S. J. Payne, *SMJP Consulting Service LLC*
- F. Perry, *Los Alamos National Laboratory*
- L. Schleicher, *U.S. Geological Survey*
- E. Schultz-Fellenz, *Oak Ridge National Laboratory*
- T. Sisson, *U.S. Geological Survey*
- M. Sweeney, *Los Alamos National Laboratory*
- A. Zandieh, *Lettis Consultants International, Inc.*

NRC

Timeline

2012 – IAEA SSG-21
2016 – IAEA TecDoc 1795
DOE-STD-1020-2016

2021 – NRC Reg Guide 4.26

- Project Initiation
- Project plan finalized
- Draft standard completed
- Working group hiatus for ongoing volcanic hazard assessment activities
- Draft standard revised based on completed volcanic hazard assessments

Content of the Standard

WHAT IS INCLUDED

- Data types, compilation, and uncertainties
- Tectono-magmatic framework
- Screening of volcanic phenomena
- Options for conducting a PVHA

WHAT IS EXCLUDED

- Does not provide guidance on when a volcanic hazards assessment is needed
  - Refer to applicable regulations and guidance (e.g., RG 4.26)

Volcanic Phenomena

- Tephra fallout
- Lava flow
- Lava domes
- Pyroclastic density currents
- Debris flows
- Sector collapses and volcano debris avalanches
- Opening of new vents and near-vent volcanic hazards
- Volcanic earthquakes and their mechanisms
- Coupled and cascading volcanic events

- Developing the tectono-magmatic framework
  - Description of phenomena
  - Types of data
- Screening volcanic phenomena
- Recommended approaches to conducting PVHA analyses

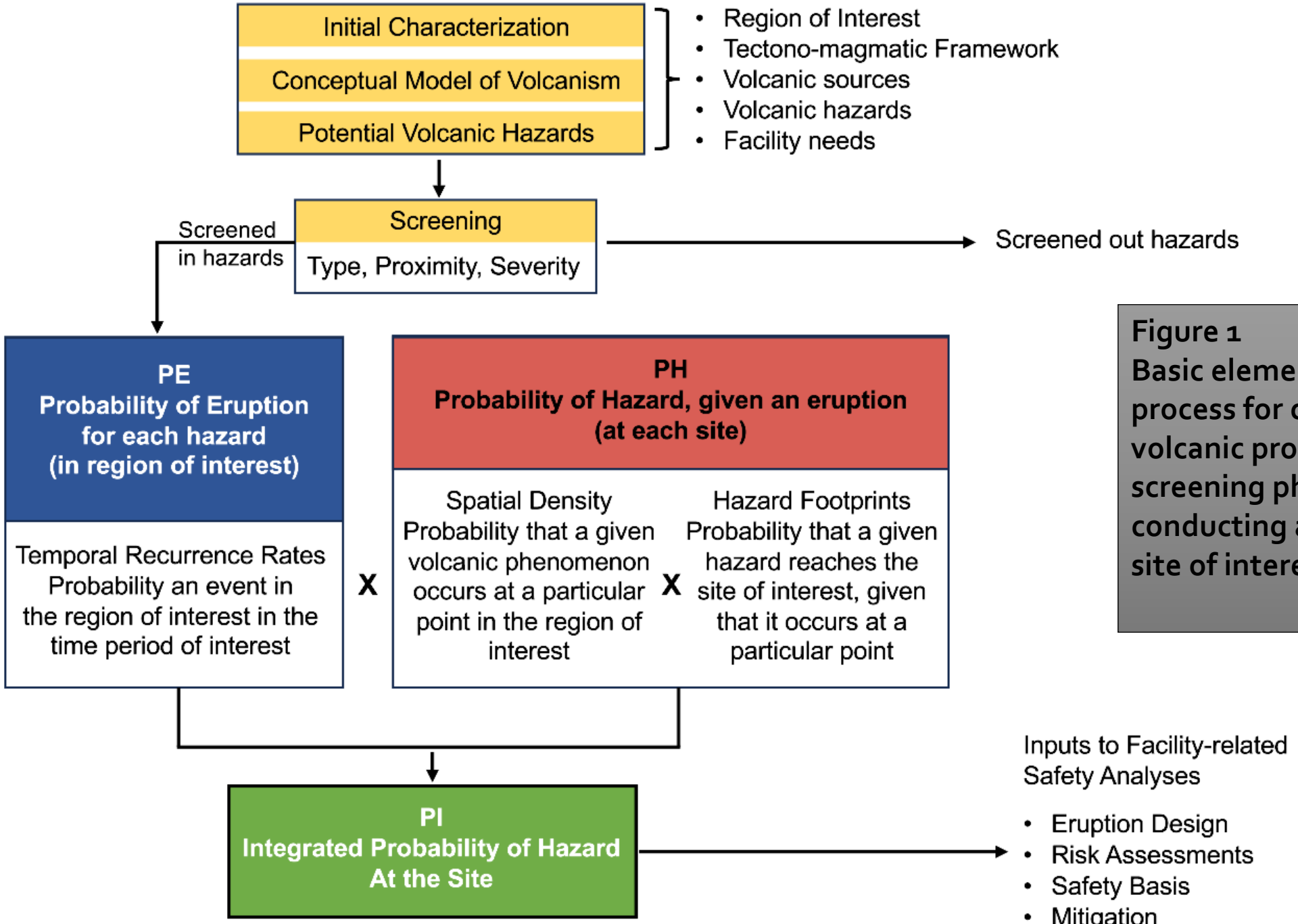


Figure 1
Basic elements of the process for characterizing volcanic processes, screening phenomena, and conducting a PVHA for a site of interest.

Essential Attributes of a PVHA

- Roles of participants
- Objective evaluation
- Integration
- Documentation
- Independent peer review

Flexibility in conducting a PVHA

- Products of the PVHA should be appropriate for intended use
- Support facility's safety case
  - Decision-making
  - Existence of hazard at the site
  - SSC design
  - Input to facility-specific PRA
  - Operational measures for hazard mitigation

Flexibility in conducting PVHA

TECHNICAL INVESTIGATION

- Evaluate the timing and character of Quaternary volcanism in the site region
- Determine whether data and models are sufficient to provide the needed evaluations of potential volcanic hazards
- May evolve to a SSHAC approach if there are significant uncertainties in the available data or numerical modeling

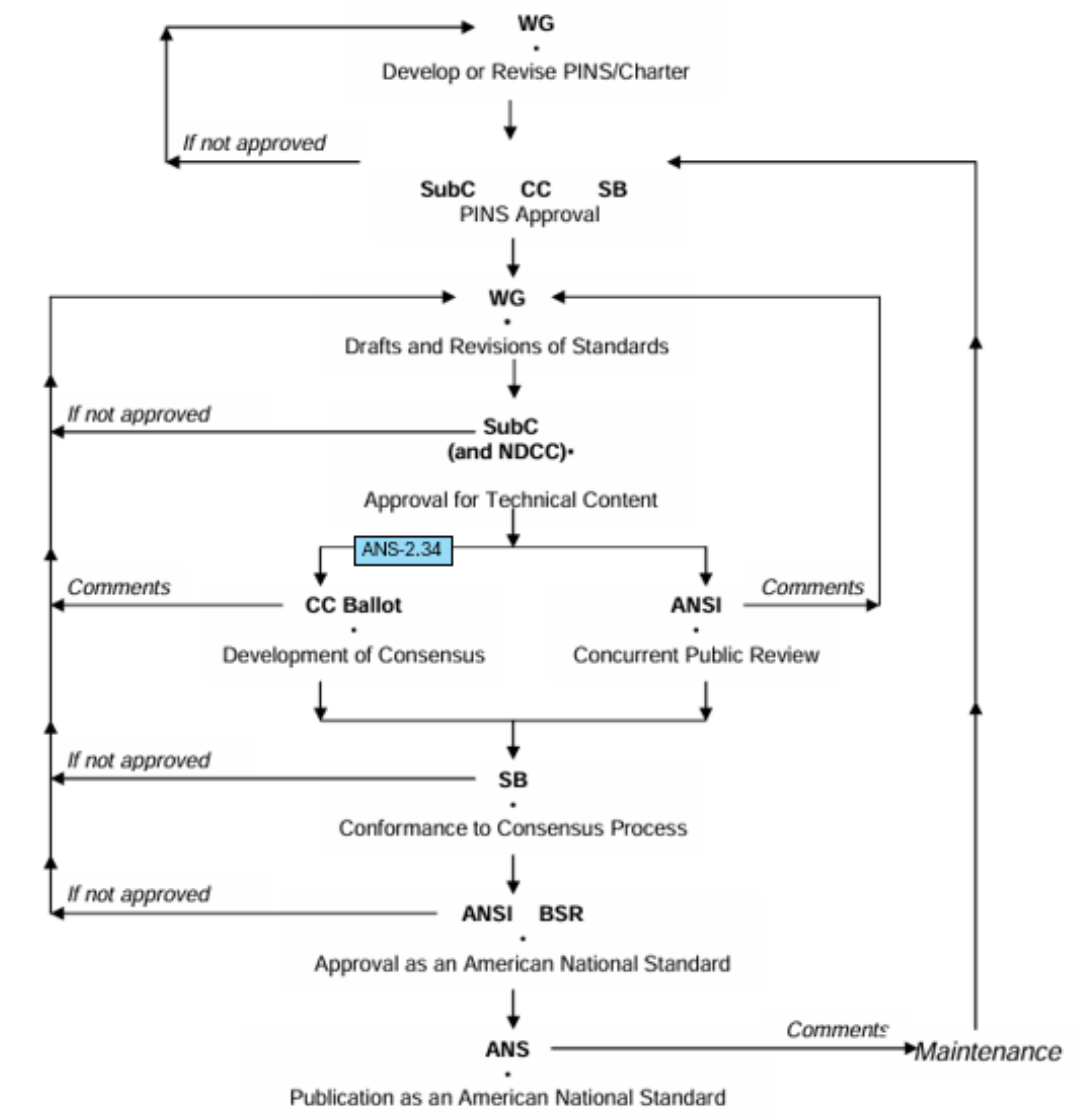
SSHAC

- Guidelines in NUREG-2213
- Evaluate the complete data, models and methods
- Integration representing the CBR of the TDI
- Thorough documentation

NRC

Where we are in the process

Figure 1
Steps in the Development of a New Standard or Revision of a Current Standard



- WC - Working Group
- SubC - Subcommittee
- CC - Consensus Committee
- SB - Standards Board
- ANSI - American National Standards Institute
- BSR - Board of Standards Review
- ANS - American Nuclear Society
- Non-Developing Consensus Committee (NDCC)


NRC
Nuclear
Regulatory
Commission
Coming soon...
NRC