

IAEA SAFETY STANDARDS

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Volcano hazards in site evaluation for Nuclear Installations DS405

**Regional Workshop on Volcanic, Seismic, and Tsunami Hazard
Assessment Related to NPP Siting Activities and Requirements
June 13-17, Jakarta, Indonesia**

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DS405 – Volcanic Hazards in Site Evaluation

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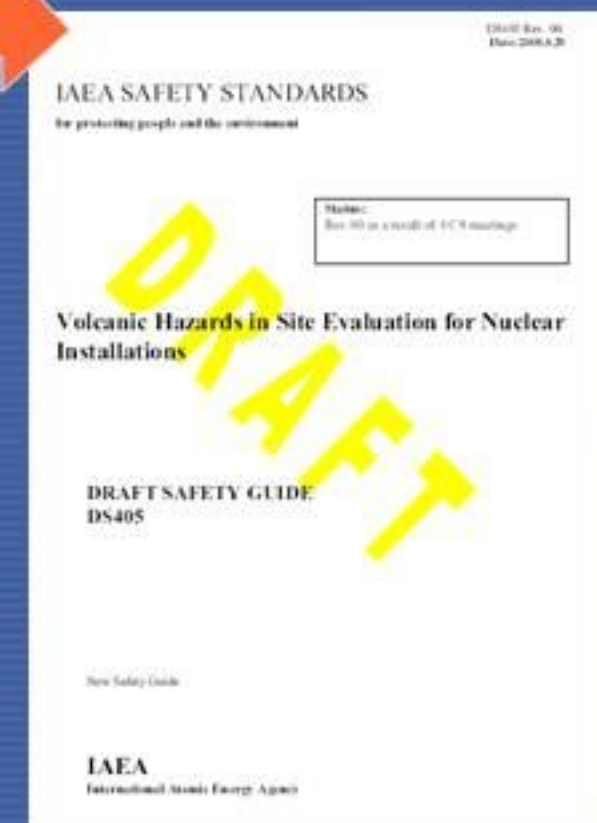
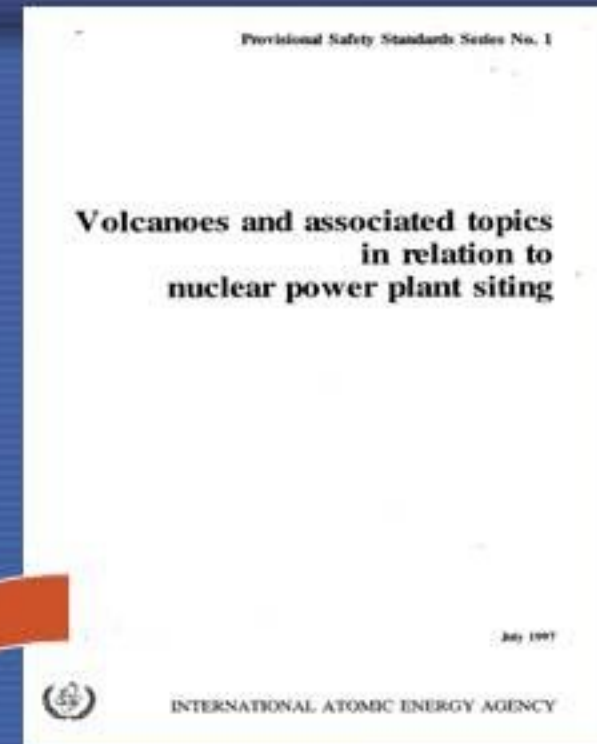
OBJECTIVE

To present the new safety guide on
“***Volcanic Hazards in the site
evaluation for nuclear installations***”.

This Safety Guide is the revision and upgrade of the former Provisional Safety Standard Series N° 1, published in 1997, as decided by NUSSC 19th and as included in the long term structure of Safety Standards.



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The current ***Safety Requirements on Site Evaluation for Nuclear Installations*** (NS-R-3) states, paragraph 3.52.:

“Historical data concerning phenomena that have potential to give rise to adverse effects on the safety of the nuclear installation such as volcanism, sand storms, severe precipitation, snow, ice, hail, and subsurface freezing of subcooled water (frazil), shall be collected and assessed. If the potential is confirmed, the hazard shall be assessed and design bases for these events shall be derived.”

DS405 - BACKGROUND

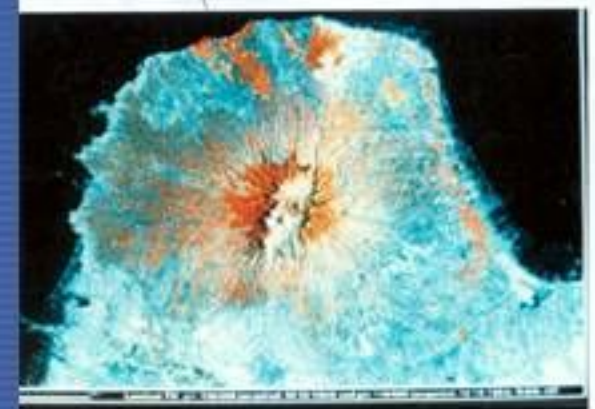
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- Since 1993, and due to the contribution of the safety re-evaluation project in Armenia and the siting project in Indonesia, IAEA established the first integrated approach for conducting volcanic hazard evaluation for nuclear installations, in line with the treatment given to other external events.
- Thus, between 1993 and 1997, a Document was prepared, reviewed and issued with the aim to be part of the IAEA SSS as a Safety Guide.
- Approved for publication in March 1997 as "*Provisional Standards Series No 1*".



An aerial view of Merapi Peninsula at Central Java, Indonesia, with the Merapi volcano at the centre of the picture, the Genek volcano directly straight to the north, and showing the location of Ujung Lemahabang site.

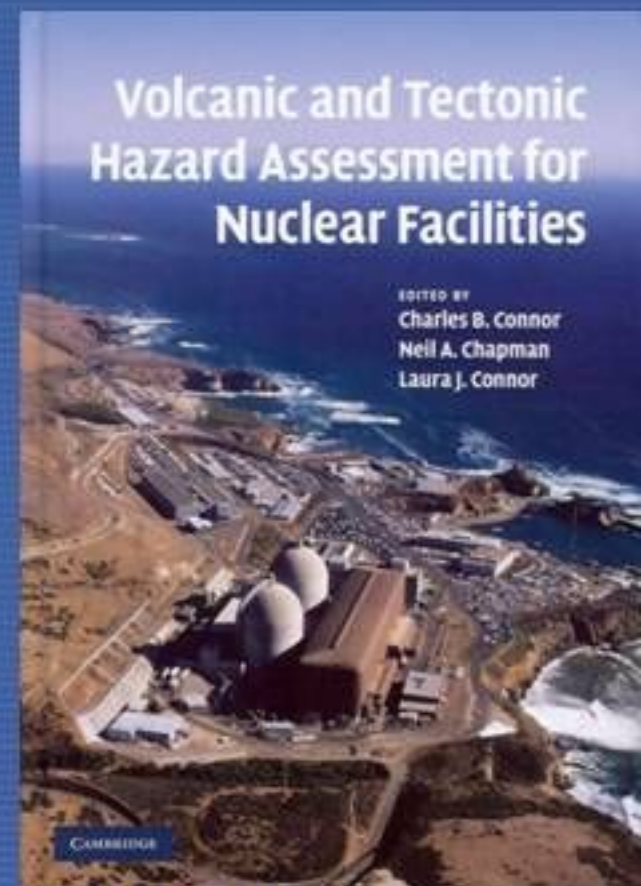
Ujung Lemahabang site



DS405 - BACKGROUND

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- The science of volcanology has been transformed by **significant advances in numerical modelling of volcanic processes** and hazard assessment based, mainly, on stochastic models of these processes.
- The volcanology community has gained **experience in applying these models in national hazard assessments and in national volcanic hazard mitigation programmes.**
- **Probabilistic volcanic hazards assessments for nuclear facilities have been conducted** (e.g., in the USA, Japan, Armenia, Germany, Philippines, Indonesia) with important practical experience gained as a result.



VOLCANIC HAZARDS IN SITE EVALUATION

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GENERAL REMARKS:

- Detailed guidance is essential because volcanic processes are complex and varied, requiring multidisciplinary expertise and specialist knowledge.
- The Safety Guide will provide a staged approach for assessing these complex volcanic hazards. A staged approach will allow the hazard assessment to focus on phenomena that represent credible hazards to the site, rather than require an equivalent level of investigation and support for all types of volcanic phenomena and their hazards.
- This staged approach recognizes the need for increasing levels of information for increasing levels of potential hazard.
- This approach recognizes that sites located far from potentially active volcanoes may need to consider only a limited subset of potential volcanic hazards, whereas sites located closer to potentially active volcanoes may need to consider a full range of potential hazards.
- Thus, the Safety Guide is intended to clarify procedures and focus investigations on assessment of such credible external hazards.

VOLCANIC HAZARDS IN SITE EVALUATION

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- **OBJECTIVES:**

to provide recommendations and guidance on assessing the volcanic hazards at a nuclear installation site, so as to enable the identification and characterization in a comprehensive manner of all potentially hazardous phenomena that may be associated with future volcanic events. These volcanic phenomena may affect the acceptability of the selected site during the survey and selection process and some of which may determine corresponding design basis parameters for the installation.

VOLCANIC HAZARDS IN SITE EVALUATION

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DOCUMENT STRUCTURE:

- 1. Introduction**
- 2. Overview of volcanic hazard assessment**
- 3. General recommendations**
- 4. Necessary information and investigations (Database)**
- 5. Screening volcanic hazards**
- 6. Site-specific volcanic hazard assessment**
- 7. Nuclear installations other than power plants**
- 8. Monitoring and preparation for response**
- 9. Management of volcanic hazards evaluation**

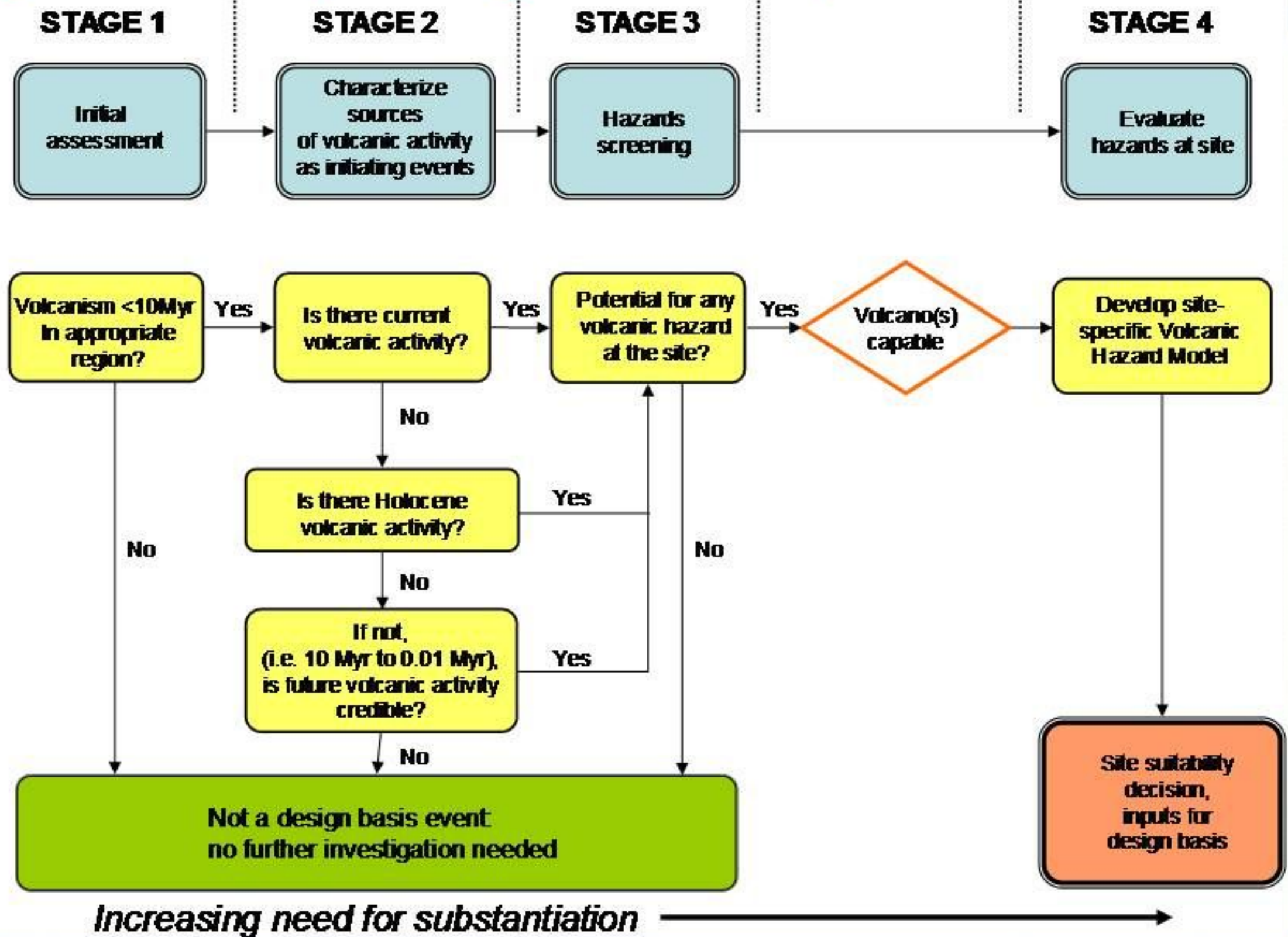
Appendix 1: Description of types of volcanic phenomena.

Annex 1: Volcanic Hazard Scenarios

Annex 2: Worldwide sources of information

Recommended Stages in the Volcanic Hazard Assessment

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SOME COMMENTS ON VOLCANIC HAZARDS FOR SUBSURFACE INSTALLATIONS-GEOLOGICAL REPOSITORIES:

- Igneous intrusions processes (magma flows) and development of hydrothermal systems, should be treated in great detail;
- The conceptual model of volcanism should be adequate to other time scales (10000-1000000 yr) than for surface installations.
- Different treatment of uncertainties.

VOLCANIC HAZARDS IN SITE EVALUATION

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- Since 2006, the DRAFT was prepared following NUSC's decision in 2005. Finished in Jan09.
- The background and status of development of the DRAFT was approved for publication by the CSS in June 2011.

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Thank you for your attention



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