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Review on the Regulatory Guides of Geological Investigation for NPP Siting

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Introduction

This paper reviews the regulatory guides of geological investigations applied to NPP (nuclear power plant) siting in U.S.A., Japan, China and IAEA (International Atomic Energy Agency), and recommends possible regulatory guides to the investigation ranges and depths for NPP siting in Korea, considering the specific geological data produced from recently performed multidisciplinary researches at and around Korean NPP sites. Korea has been adopting Appendix A to Subpart A of 10 CFR Part 100 "Seismic and Geologic Siting Criteria for Nuclear Power Plants" of the U.S.A.

Results and discussion: a possible guide for NPP siting in Korea

The ranges and depths of geological investigation for NPP siting are based on performing several steps of investigation with respect to the distance from the NPP site. The investigation can be categorized into four levels - 'regional', 'near regional', 'site vicinity' and 'the site', based on distance from the site and investigation degree of the detail.

'Regional' level of investigation (within a radius of about 150km from the reactor) should be defined all the regional tectonic structures and seismogenic sources that could affect on the safety of the projected NPP. Regarding the distance determination for the regionally geological investigation from the site, it is reasonable to consider the distance range enough to detect all possible seismogenic sources that could generate a considerable vibratory ground motion to the projected NPP sites.

'Near regional' level of investigation (within a radius of about 40km from the reactor) is to verify all the details of regional geological aspects of the region. Size of the area

for the investigation should be large enough to define all geological and structural units that may include or be related to the site in space or time.

'Site vicinity' level of investigation (within a radius of about 5km from the reactor) is to 'scan' any possible sources of permanent surface deformation at the site and define their distributions and characteristics in 3-D. This level of investigation should involve more detailed survey than information or results obtained by regional and near regional investigations, and include equally-spaced drilling operations, trench works and geophysical explorations.

'The site' level of investigation (within a radius of about 1km from the reactor) is to assure that the foundation of the site is sound and acceptable for NPP facilities. This level of investigation should provide engineering information of the foundation, and sufficient data to verify clearly that reactor and safety-related structures should not be constructed on the capable fault.

In addition, final guides of the distances and depths of geological investigations for NPP siting will be available through continuous review and feedback of further research results.

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