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Safety Assurance through Seismic Hazard Assessment at the Thyspunt Site

In the design of a nuclear power plant, large safety margins are built in against the possible effects of internal and external hazards that could affect the site. Even in regions of relatively low seismicity, earthquakes are always considered since seismic events could potentially impose a severe loading case on the plant, and large margins of resistance against such loads are required to assure safety.

The safety margins in a nuclear power plant are represented by the difference between the structural capacity or resistance and the expected level of seismic loading with low probability level specified to provide acceptable safety levels against radiation release. The performance of several nuclear power plants affected by earthquake shaking in recent years, in Japan and the United States, where recorded levels of ground motion have exceeded design levels, has demonstrated that such safety margins are achieved in practice.

In order to estimate the expected levels of potential earthquake shaking at the Thyspunt site, a probabilistic seismic hazard assessment has been conducted by the Council for Geoscience (CGS) following international best practice. The extensive knowledge base regarding South African geology and seismology of CGS was complemented by the participation of several international experts in the field of earthquake hazard assessment from Europe and the United States. The team included several leading authorities in this field with extensive experience on nuclear projects around the world.

The seismic hazard study was conducted in the framework of what is known as a SSHAC Level 3 process, which has been formulated by the US Nuclear Regulatory Commission as a structured and transparent procedure to ensure that all uncertainties are captured in the hazard assessment. The SSHAC Level 3 framework includes three formal workshops at which several national and international experts were invited to participate, and thorough peer review by an independent panel of experts. The Thyspunt seismic hazard study, completed in June 2013 after a period of about two-and-a-half years of intensive work, is being

cited by many experts in the field of seismic hazard assessment as an example of good practice. Several individuals representing nuclear utilities and regulatory bodies from around the world participated in the second Thyspunt workshop as observers and several more are attending the close-out meeting in Pretoria from 16-18 October 2013 to obtain information and insight about this successfully concluded study.

This statement is issued by the Department of Energy

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