



Geohazard components of Strategic Environmental Assessments in South Africa: fracking, electricity grid infrastructure & gas pipeline networks

Raymond Durrheim (1), Brassnaavy Manzunzu (2), Vunganai Midzi (3), and Moctar Doucoure (4)

(1) University of the Witwatersrand, School of Geosciences, Johannesburg, South Africa (raymond.durrheim@wits.ac.za), (2) Council for Geosciences, Pretoria, South Africa (bmanzunzu@geoscience.org.za), (3) Council for Geosciences, Pretoria, South Africa (vmidzi@geoscience.org.za), (4) Nelson Mandela University, Port Elizabeth, South Africa (Moctar.Doucoure@nmmu.ac.za)

A Strategic Environmental Assessment (SEA) is an essential precursor to any major infrastructural and industrial development. Several SEAs have been recently conducted in South Africa with regard to shale gas development, the expansion of the national electricity grid, and the construction of a gas pipeline network. We report on the geohazard component of these SEAs.

The Karoo Basin of South Africa is thought to contain significant resources of shale gas. A SEA was commissioned by the Department of Environmental Affairs to provide input to the formulation of regulations governing the exploration for shale gas, extraction of any viable resources, and the decommissioning of any wells. We assessed the risk posed by earthquakes triggered by the injection of fluids. Natural earthquakes occur occasionally within the Karoo, and the increase in risk posed by fracking is considered to be slight. A range of mitigation measures are recommended.

Two 'energy corridor' SEAs were commissioned by the national electricity public utility, ESKOM, to identify the optimum route for extensions of the existing electricity grid to the borders of Namibia and Mozambique, named the Western and Eastern Corridors, respectively; and the optimum routes for a national gas pipeline network that links major ports and cities. We assessed the risk using several products recently published by the Council for Geoscience: (i) a probabilistic seismic hazard assessment, (ii) seismotectonic map, (iii) landslide susceptibility map, and (iv) problem soil distribution maps. The seismic hazard in most parts of South Africa is low. Eight damaging earthquakes ($5.0 < M < 6.3$) have occurred in South Africa during the last 120 years. Five had an unequivocal tectonic origin, while three were in mining districts. It was concluded that the risks to electricity grid and gas pipeline infrastructure posed by the primary or secondary effects of earthquakes are low, provided international best practice is followed with regard to the design, construction and management of the facilities, especially in areas prone to landslides and/or characterised by problem soils.