SLOPE HAZARD MAPPING AND FINDINGS INFLUENCING RISK TO THE RADIOACTIVE WASTE FACILITY

N. Harun, A. Ibrahim, L. Mejus, M.M. Mohd Hashim, M.S. Mustafa

Environmental and Waste Technology Division, Malaysian Nuclear Agency,
Bangi, 43000 Kajang, Selangor Darul Ehsan, Malaysia
nazranharun@nm.gov.my

1. Background and Goal of the present work

In Malaysia, the Malaysian Nuclear Agency conducts research and development, provides technical service and training in nuclear and related technology, coordinates and manages nuclear affairs and acts as the National Centre for Radiation Metrology and as the National Radioactive Waste Centre.

This paper gives a finding of recent geological mapping activities aimed at slope failure around radioactive waste facility influencing risk to the radioactive waste activities.

2. System description

Radioactive waste facilities in this study consist of Building A (effluent treatment plant), and Building B (laboratories, segregation, conditioning facility). There are cracks at effluent pond and a depression at the Building A. Longitudinal cracks has been found at east, west and south of the Building B. A depression area also has been found below the building B. Several types of failures have been found at the south of Building A in the recreational forest.

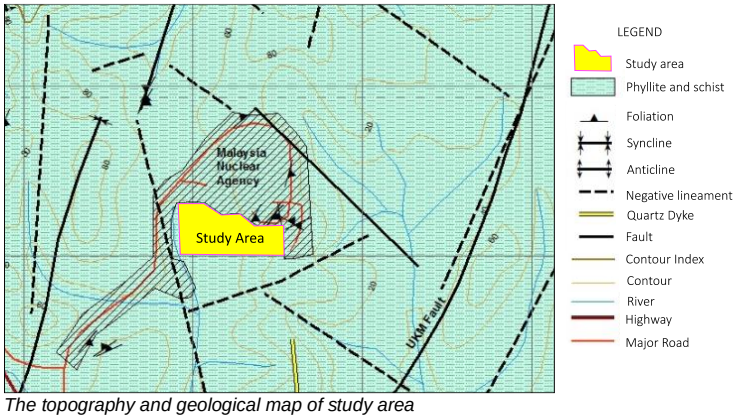
3. Study Area and findings

3.1. Topography

The study area is located on undulating topography with the hilly landform occupy the western and northern part. The highest point is 74 m located at the eastern part of the study area. The western part of the area is relatively lower ground; about 40 m height above mean sea level. The top soil is thicker in the low ground or valley areas, and relatively thinner on top of the hilly areas. These might be due to the active erosional processes in the hilly areas, where the weathered materials being eroded and transported down-slope by gravity. These materials later deposited in the lower ground areas. Based on seismic characteristics, Abdul Rahim Samsudin (1985) reported that the thickness of top soil and weathered rock cover in the study area varies from 6 m to 58 m with average of 20 m in thickness.

3.2 Geology

Geologically, the study area is underlain by the metasedimentary rocks of the Kenny Hill Formation. The original sedimentary rocks had been slightly metamorphosed to formed well foliated schist and phyllite. Due to the active tropical weathering process, the residual soil cover is quite thick; hence it's difficult to get the fresh rock outcrop throughout the study area. Most of the outcrops are made up of highly weathered to completely weathered rocks. However, at certain localities, relicts of schistosity and phyllitic textures and secondary structures such as joints and fault zones still can be observed. The term Kenny Hill formation had been informally used by Yin (in manuscript) for the Carboniferous clastic sequence exposed in Kenny Hill Residential area of Kuala Lumpur. The term had been considered as a formal term when the report published in 2011. The term also had been used by Stauffer (1973) and Tjia (1976). Generally, the Kenny Hill Formation comprises series of interbedded quartzite and shales with occasionally phyllites that occur near the base of the formation (Yin, 2011). However, within the study area, the rocks are slightly metamorphosed to psammitic schist and phyllite. Detail studies on structural geology using geophysical methods had been undertaken throughout the UKM campus that also includes the study area by Abdul Rahim Samsudin & Tjia (1983) and Abdul Rahim Samsudin (1985). Besides geophysical survey, structural features also had been observed on the road cut outcrops as well as in the shallow test pits (Abdul Rahim Samsudin, 1985). General strike of the geological structures in the study area was trending in the range between 350° and 025° (Abdul Rahim Samsudin & Tjia, 1983).



The topography and geological map of study area

3.3. Failure findings

No.	Type of failure	Hazard	Risk	No.	Type of failure	Hazard	Risk
1	Seepage	Low	Medium	10	Erosion	Low	Low
2	Stream	Low	Medium	11	Erosion	Low	Low
3	Longitudinal Crack	High	High	12	Erosion	Low	Low
4	Water ponding	High	High	13	Erosion	Low	Low
5	Depression	High	High	14	Rotational Slide	High	High
6	Crack	High	High	15	Soil Creep	High	High
7	Gully	Low	Low	16	Erosion	High	High
8	Slip scar	Low	Low	17	Erosion	High	High
9	Rotational slip	Low	Low	18	Erosion	High	High

5) Depression (Photo by A.Ibrahim)

6) Crack (Photo by A.Ibrahim)

14) Rotational Slide (Photo by A.Ibrahim)

16) Erosion

4) Water ponding (Photo by A.Ibrahim)

3) Longitudinal Crack (Photo by A.Ibrahim)

18) Erosion

17) Erosion (Photo by A.Ibrahim)

4. Conclusions and Acknowledgements

- Slope failures findings compiled are presented. These failures findings lead for further investigation on subsurface properties, groundwater and geochemistry behaviour. The results of the current site investigation initiated will support decision on operational of these facilities and necessary remediations to be taken.