



Géosciences pour une Terre durable

**brgm**



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Subject: GG&S contract

Dear Mr. Špiler,

Following your request, please find below BRGM's position related to the results obtained during the investigations carried out on Libna fault in the frame of GG&S contract. In October 2010 after significant geophysical campaigns and logging of several test pits, three paleoseismological trenches were excavated within the zone of the Libna fault that was interpreted to be between 150 and 200 m wide. Observations made in trench n° 2 concluded that *the geologic build-up of the Libna hill is affected by strike-slip faulting, including deformation of the Globoko gravels and the overlying silts*. The trench survey also revealed a *structural pattern that may be indicative of coseismic and recurrent displacements*. Based on these findings, the consortium stated that the Libna fault may be described as capable if capability is defined in line with the Safety Guide SSG-9 (IAEA, 2010); where capability is not necessarily related to earthquakes on the fault of concern.

It is not the role of BRGM to comment issues related to nuclear safety as considered in the IAEA Safety Guide SSG-9. However, during these investigations, several ambiguities appeared for which the consortium has not been able to draw any conclusive arguments; notably concerning the age of deformation, the potential rate of fault slip, the geometry and the spatial pattern of the fault zone and the co-seismic or aseismic character of the fault. Furthermore, potential hypotheses other than seismic movement regarding the genesis of the observed phenomena and the mechanism of deformation may exist that are not yet excluded by available evidence and data.

Therefore, BRGM considers that it is possible to deepen the state of knowledge by performing additional investigations in order to remove ambiguities regarding the origin and the behaviour of the Libna fault. We thereby recommend:

- 1- To pursue and widen investigations on Libna fault by examining all the possible hypotheses on the genesis of this fault.
- 2- To better characterize the fault and to narrow down the ambiguities noticed during the first observations notably regarding the age of the Plio-Quaternary sediments and the geometry and location of the fault.
- 3- To perform additional geophysical investigations (i.e. HRS and electrical mapping).

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- 4- To assess the nature of the fault (i.e. rupture-related (coseismic) or creep-related (aseismic) character). For this purpose microstructural fault zone analysis in near-surface sediments might be performed to elucidate the faulting process.
- 5- To process all available data for producing a 3D structural model of the concerned area. In particular, the structural relation between Libna and Orlica and Artiče faults has to be investigated.
- 6- To proceed with enlarged geomorphological investigation.
- 7- To proceed with new trenching to validate (or not) the different interpretations arising from previous trenches.
- 8- If the results of additional investigations confirm the capability of the fault, it is then recommended to assess its potential for displacements. Evaluation of these displacements could be implemented through a Probabilistic Fault Displacement Hazard Analysis (PFDHA).

We remain at your disposal for any further questions or comments you may require.

Yours sincerely,



Behrooz BAZARGAN SABET  
Consortium and Project leader