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To: Ministry of Employment and the Economy of Finland PL 32,

00023 VALTIONEUVOSTO

Reference number: 49/815/2009

- COPIES: 1) Mrs. Vuokko Moisala, Ollinsaarentie 35 B 14, 92120 Raahe
2) Suomen Säteilyturvakeskus
3) Geological Survey of Finland
4) Fennovoima Oy

Oulu, 10.06.2009

REPORT ON THE DOCUMENT ?YDINVOIMALAITOKSEN PERIATEPÄÄTÖSHAKEMUS, FENNOVOIMA OY?

On the request of Mrs. Vuokko Moisala I examined the documents ?Ydinvoimalaitoksen ympäristövaikutusten arviointiselostus? (Fennovoima Oy, 2008) and ?Ydinvoimalaitoksen periatepäätöshakemus? (Fennovoima Oy, 2009) and found out that selection of possible sites for new nuclear power plant (NPP) proposed by the Fennovoima Oy (in particular, evaluation of geological conditions and seismic hazard) was done without taking into consideration the safety standards provided by the International Atomic Energy Agency (IAEA). These standards are described in the IAEA documents No. NS-R-3, Site Evaluation for Nuclear Installations and No. NS-G-3.3 Evaluation of Seismic Hazard for Nuclear Installations. The IAEA standards were developed for site evaluation for both new and existing NPP.

According to the IAEA document NS-R-3, the evaluation of the suitability of a site for a nuclear installation should include analysis of the effects of external events occurring in the region of the particular site (these events could be of natural origin or human induced). As earthquakes and surface faulting are the most dangerous groups of the natural events, the evaluation of sites for a new NPP should include detailed analysis of the hazard due to these events, and this is clearly written in the Part 3 of the document NS-R-3. It is important to understand that such analysis is necessary for all potential NPP sites (e.g., not only for sites located in interplate regions with high seismic activity, but also for sites located in the intraplate tectonic environment, where the seismic activity is difficult to evaluate properly due to short period of instrumental recordings or absence of them). Two of the potential sites proposed by Fennovoima Oy (namely, Puhäjoki and Simo) are located on the shore of the Bothnian Bay. According to observations carried out by permanent seismic networks in Fennoscandia (Institute of Seismology of the University of Helsinki, Sodankylä Geophysical Observatory of the University of Oulu, Swedish National Seismological Network and NORSAR, Norway), the Bothnian Bay is an area of intraplate seismicity that manifests itself by microseismic activity concentrated along reactivated ancient fault zones. In spite of this, the site evaluation prepared by the Fennovoima Oy contains neither any estimates of seismic hazard for probabilistic safety assessment, no analysis of surface faulting. It is based upon very incomplete analysis of surface geology and seismicity, which, in turn, is presented only for a very small area around each proposed site. The analysis of surface faulting is a very important part of site selection procedure, however, because existence of a fault that has the potential to affect the safety of the nuclear installation causes the necessity to consider an alternative site (see paragraph 3.7 of the document NS-R-3 and paragraph 6.9 of the document NS-G-3.3). Moreover, the document NS-G-3.3 describes in details how the analysis of seismic hazard and surface faulting needs to be done, what kind of geological, geophysical and geotechnical data should be collected, and how this information need to be documented

for each potential NPP site, in order to evaluate its suitability. Attached to the present report is a copy of this document. However, this important document was completely ignored in site evaluation procedure. For example, Part 3 of the document NS-G-3.3 prescribes that site investigations should be conducted not only for small area around the potential site (as it was done in the site evaluation prepared by the Fennovoima Oy), but on four scales ? regional (in the area around the site with radial extent of 150 km and even more), near regional (in the area with radial extent of about 25 km around the potential site), site vicinity (in the area with radial extend of about 5 km) and site area (area covered by the plant). Moreover, where necessary, the site region should include areas extending beyond national borders and, for sites located near a coastline, the relevant offshore area. In addition, the seismological database for site evaluation should include not only all available instrumental earthquake data recorded by national seismic agency, but need to include also data from catalogues maintained by neighbouring States and international agencies, analysis of palaeoseismological information and site specific microseismic data.

The minimum monitoring period for collection of site specific microseismic data is several years for regions of high seismicity, but it may be longer for regions of low seismicity, like Finland. When fault (buried or outcropping) is known, or just suspected to be present near the potential site, investigations on the site vicinity scale should include very detailed geological-geomorphological mapping, topographic analyses, geophysical surveys (including geodesy, if necessary), trenching, boreholes, age dating, local seismological investigations etc. This is a very incomplete list of procedures necessary for proper site evaluation (see the document NS-G-3.3 for more detailed description). Neither of these studies has been carried out for the potential sites proposed by the Fennovoima Oy.

Finally, I would like to point out that although the IAEA standards concerning site evaluation are not legally binding on Member States, they are accepted by many of these states in their own national regulations regarding nuclear power activities (for example, by the

Canadian Nuclear Safety Commission (CNSC); see the document CNSC RD-346 : Site Evaluation for New Nuclear Power Plants. Canadian Nuclear Safety Commission, 2008) and by the United States Nuclear Regulatory Commission (U.S.NRC; see the document NRC Regulations - Title 10, Code of Federal Regulations, 2009). In these countries site selection for new NPP and evaluation of hazard associated with natural phenomena (including geological and seismic ones) is performed by state organisations, having the status of a national geological survey, with participation of experts from different disciplines in geosciences, and under strict control of nuclear safety bodies.

Therefore, it is abnormal and unsafe situation that selection of a site for a new NPP in Finland is performed by a private company in collaboration with local authorities, without taking into consideration international safety standards.

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References

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Litteenä lisäksi IAEA:n standardi
NS-G-3.3 "Maanjäristyksen"

JL 12.6.2009