

Upper plate crustal faults and earthquakes in and around the Hamaoka Nuclear Power Plant

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This paper aims at examination of the evaluation on seismic risks from upper plate faults and earthquakes on the Hamaoka Power Plant of the Chubu Electric Power Company, based on the reports submitted by the Chubu Electric Power Company to the Nuclear Regulation Authority, former Nuclear Safety Committee, and former Nuclear and Industrial Safety Agency. The upper plate onshore and offshore crustal faults and earthquakes are roughly classified into three categories. They are (1) specific sources of earthquake ground shaking in the seismogenic zone of the upper plate to be evaluated for the design of the reactor facilities, (2) Onshore active faults and lineaments that are not to be taken in to account for seismic safety design, and (3) faults next to and under critical facilities. (1) The specific sources are late Quaternary active faults that are capable of earthquakes in the future. A longer fault with larger magnitude at a shorter distance tends to induce stronger ground motion at the site. The nearest active faults on shore are about 30 km away and less than 10 km long. These faults and longer but farther away faults on shore generate much less ground motion than the off-shore faults that extend within 20 km from the site. In addition to 72.6 km long East of Omaezaki Spur fault zone, recent survey revealed a shorter but more proximal source of the 46.9 km long West of Omaezaki Spur fault zone. This newly found fault zone and the 173.7 km long Enshu fault system are recently taken into the evaluation of the design basis ground motion. (2) The short N-S trending lineaments on the Omaezaki upland are not regarded as seismogenic active faults. The lineaments are interpreted as secondary superficial faults associated with the NW-SE trending anticline along the north shore of the Omaezaki peninsular. Seismic profiles do not show any down-dip structures offset Miocene layers below. (3) The H fault system are a swarm of E-W trending south-dipping normal faults in the Hamaoka site. The Nuclear and Industry Safety Agency and the Nuclear Regulation Authority did not conduct reviews of the H fault zone as a fracture zone in nuclear power plant site after the 2011 Tohoku Earthquake and Tsunami. In the review meetings on conformity to the new regulatory requirements the capability of the H fault system as sources of fault displacement is being examined. The Chubu Electric Power Company reported the H fault systems had been generated before the consolidation of the Miocene sediments and there had been no evidence of activities in Late Quaternary.

Keywords: active fault, fault displacement, nuclear power plant