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## Development of hydrologic characterization technology of fault zones: plan and status

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The Nuclear Waste Management Organization of Japan (NUMO), after volunteering municipalities arise, will start a three-staged program for selecting a HLW and TRU waste repository site. It is recognized from experiences from various site characterization programs in the world that the hydrologic property of faults is one of the most important parameters in the early stage of the program. It is expected that numerous faults of interest exist in an investigation area of several tens of square kilometers. It is, however, impossible to characterize all these faults in a limited time and budget. This raises problems in the repository designing and safety assessment that we may have to accept unrealistic or over conservative results by using a single model or parameters for all the faults in the area. We, therefore, seek to develop an efficient and practical methodology to characterize hydrologic property of faults. This project is a five year program started in 2007, and comprises the basic methodology development through literature study and its verification through field investigations. The literature study tries to classify faults by correlating their geological features with hydraulic property, to search for the most efficient technology for fault characterization, and to develop a work flow diagram. The field investigation starts from selection of a site and fault(s), followed by existing site data analyses, surface geophysics, geological mapping, trenching, water sampling, a series of borehole investigations and modeling/analyses. Based on the results of the field investigations, we plan to develop a systematic hydrologic characterization methodology of faults. A classification method that correlates combinations of geological features (rock type, fault displacement, fault type, position in a fault zone, fracture zone width, damage zone width) with widths of high permeability zones around a fault zone was proposed through a survey on available documents of the site characterization programs. The field investigation started in 2008, by selecting the Wildcat Fault that cut across the Lawrence Berkeley National Laboratory (LBNL) site as the target. Analyses on site-specific data, surface geophysics, geological mapping and trenching have confirmed the approximate location and characteristics of the fault. The plan for the remaining years includes three borehole investigations at LBNL, and another series of investigations in the northern part of the Wildcat Fault.

Keywords: fault, hydrology, radioactive waste, geophysics, trench, boring