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Dialogue Session Contributing Paper: After the Fukushima Daiichi Accident, Extending the Human and Organizational Factors (HOF) Framework to Safety Regulation

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Synopsis

The accident of Fukushima-Daichi is regarded as a product of multiple failures of the nuclear risks regulation system in Japan and more particularly as a failure of the regulatory system (authorities, regulator and operator) to take into account seismic risks and flood risks caused by tsunamis. This statement conducted the French institute for radiological protection and nuclear safety (IRSN) to develop a research program dedicated to the study of the way the French nuclear regulatory system developed and addresses flood risks.

A regulatory system rests upon a number of institutional and organizational devices and upon normative tools, such as technical standards or guidelines. The aim of these normative tools is to guide NPP operators during both stages of risks identification and characterization and of the design of protections against risks. These instruments have profound and multiple effects on the stakeholders involved. They affect the design of nuclear facilities, significantly influence the safety demonstration of a plant, but also the manner in which the actions implemented by the operator are evaluated and their reality controlled by the regulator.

Our research began with an important work aiming to reconstruct the genealogy of the guidelines developed in France to address flood risks for NPP. The design of these guidelines took place during the second part of the 2000's and was achieved by their publication in 2013 replacing those published in 1984. This work helped to highlight important evolutions in the way flood risks are conceived, as well as the important role played by the flood occurring on the Blayais NPP, in 1999. This work also emphasize the importance of the institutional developments related to the progressive independence of the safety authority and of its technical safety organization (TSO) and the promulgation of the law on transparency and nuclear safety (TSN law), with, in particular, the creation of the nuclear safety agency (ASN) in France.

The approach developed can be considered as a risk regulation analysis from the point of view of the human and organizational factors (HOF). Indeed, it appears to be fruitful to transpose the HOF framework usually used to analyze the safety management of the French NPP operators by IRSN, and to extend this framework to the analysis of the activities defining the French risk regulatory system. This extension presents many challenges: identifying the characteristics of the system and control activities, understanding the social and cognitive mechanisms involved in these activities, identifying the contribution of the normative tools in developing the effectiveness of this regulation and, of course, adapting the HOF conceptual framework to carry out these analyses.

One of the fundamental issues raised in our paper is the effectiveness of the regulation instruments such as standards and technical guides. Our main assumption is that legitimacy is one of the essential keys to the effectiveness of regulatory tools and is the product of a plurality of factors and characteristics of the regulatory system. We will present in particular three modes of legitimation (based on examples concerning flood risk management): legitimacy based on specific knowledge and demonstration about safety, legitimacy based

on the procedures specifically developed or adapted for the elaboration of the regulatory tool and legitimacy based on the existing institutional system and particular arrangements built for this purpose.

Country or International Agency

France

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