

FMECA of the Ajaure Dam - A Methodology Study

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SYNOPSIS. In 1998 Vattenfall decided to introduce the use of risk analysis in dam safety in Sweden, by issuing two pilot studies on the Seitevare and Ajaure embankment dams. The objective of these studies was to demonstrate methods to be applied for risk analysis on dams. SwedPower performed the Ajaure study in collaboration with BC Hydro International. Incorporated into this assignment were also a number of technical investigations in order to improve the knowledge base of the dam.

In 2000-2001 a second study was performed focusing on development of the application of FMEA/FMECA and other available methods and on staff training, while still relying on the information gathered during the 1998-1999 study. This “Methodology” study is summarised in this document.

The initial step of the FMECA of the Ajaure Facility was to set up a system model and break it down into subsystems and components by the use of block diagrams. The component failure modes their root causes and effects were analysed and documented using fault trees and pathway diagrams. The FMEA was extended to an FMECA for a few components to demonstrate the proposed technique for criticality analysis. The analysis was summarised in FMECA tables complemented by more extensive component data sheets.

The study concludes that the FMECA framework provides a suitable framework for working with dam safety issues at dams. Other methods, such as, functional modelling, pathway diagrams, event and fault tree analysis should be integrated as considered necessary with regard to the characteristics of the sub-system at hand. In fact, coupling of various methods can be looked upon as a promising direction for further development in the area.

It is envisaged that studies of this type will be performed for a limited number of dams in the Vattenfall portfolio.