We solve a Hydrothermal Coordination (HC) problem for the Chilean power system through Progressive Hedging (PH), a stochastic programming decomposition method. For this problem, the uncertainty is presented as hydrological scenarios for each planning stage. A hydrological scenario consists of the amount of water (in cubic meters) available to generate energy in every stage through the horizon. These scenarios are built using information from previous years. When considering all the historical data to generate the scenarios, the problem becomes extremely large. We construct, using different approaches, a reasonable number of scenarios that represent the uncertainty in an accurate way. Since the problem is still too large to be solved by traditional methods, a decomposition technique (like PH) is needed. PH solves each scenario separately and then finds an optimal solution by penalizing iteratively scenario solutions that do not respect non-anticipativity.