Steam turbine: alternative emergency drive for secure removal of residual heat from the reactor cores that use water as coolant after Fukushima

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In 2011 the nuclear power generation suffered an extreme probation. That could be the meaning of what happened in Fukushima Nuclear Power Plants. In those plants, an earthquake of 8.9 on the Richter scale was recorded. The quake intensity was above the trip point of shutting down the plants. Since the heat still continued to be generated, the procedure for cooling the reactor was started. One hour after the earthquake, a tsunami rocked the Fukushima shore, degrading all cooling system of plants. Since the earthquake time, the plant began to lose external electricity, impacting the pumping working, driven by electric engine. When they are operable, the BWR plants responded to the management of steam. However, the lack of electricity degraded the plant maneuvers. In this development we have presented a scheme to use the steam as an alternative driven to maintain operable the cooling system of nuclear power plant. This scheme adds more reliability and robustness to the cooling systems. Additionally, we purposed a solution to the cooling in case of lacking water for the condenser system. In our approach, steam driven turbines substitute electric motors in the ultimate emergency core cooling system – UECCS [1]. The Figure 1 shows the system proposed in this work.

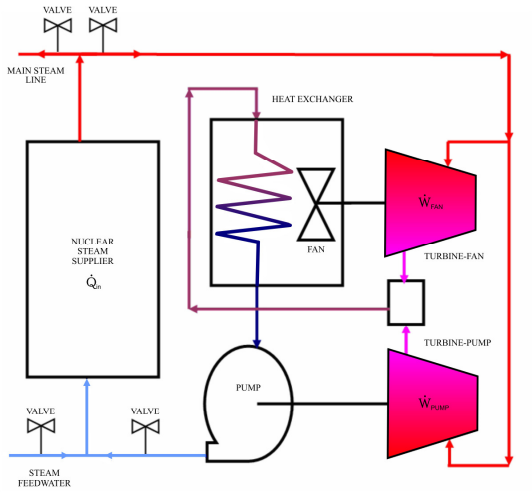

Figure 1. A simplified UECCS.

References

[1] R. S. Santos, "Steam Turbine: Alternative Emergency Drive for the Secure Removal of Residual Heat from the Core of Light Water Reactors in Ultimate Emergency Situation," *Proceedings of ANS Topical Meeting on Reactor Physics, PHYSOR 2012*, Knoxville, (2012).

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