

## Canada Deuterium Uranium Updated Fire Probabilistic Risk Assessment Model for Canadian Nuclear Plants

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**Abstract :** The Canadian Nuclear Power Plants (NPPs) use some portions of NUREG/CR-6850 in carrying out Fire Probabilistic Risk Assessment (PRA). An assessment for the applicability of NUREG/CR-6850 to CANDU reactors was performed and a CANDU Fire PRA was introduced. There are 19 operating CANDU reactors in Canada at five sites (Bruce A, Bruce B, Darlington, Pickering and Point Lepreau). A fire load density survey was done for all Fire Safe Shutdown Analysis (FSSA) fire zones in all CANDU sites in Canada. National Fire Protection Association (NFPA) Standard 557 proposes that a fire load survey must be conducted by either the weighing method or the inventory method or a combination of both. The combination method results in the most accurate values for fire loads. An updated CANDU Fire PRA model is demonstrated in this paper that includes the fuel survey in all Canadian CANDU stations. A qualitative screening step for the CANDU fire PRA is illustrated in this paper to include any fire events that can damage any part of the emergency power supply in addition to FSSA cables.

**Keywords :** fire safety, CANDU, nuclear, fuel densities, FDS, qualitative analysis, fire probabilistic risk assessment

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