

## **Best Practice for Component Reliability Assessments Applied to Nuclear Instrumentation**

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### **ABSTRACT**

A neutron detector is a piece of specialized instrumentation used in the detection neutrons. Neutrons are sub-atomic particles that are of a huge interest to many industries related to radioactive materials. As neutrons are very small and do not have an electrical charge, detecting them can be a difficult task when using detection techniques used on other sub-atomic particles i.e. proton and electron detection. Currently there are a number of neutron detectors available to purchase commercially but in general they are all a very expensive and delicate piece of equipment which has to be handled very sensitively.

The most common type of neutron detector is one that operates through a scintillation detection method, the scintillator is a special type of material that allows the neutron to enter it and then changes the neutrons energy to that of light energy. The light energy is then absorbed by a surrounding light sensor and processed in to a pulse of energy. This pulse is then analysed for energy levels using computational software and the neutrons energy level can be assessed.

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