

## **David Marttila**

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### **Biography**

David Marttila has been working in the nuclear industry for 10 years and in the Environmental Qualification, Seismic Testing, and Commercial Grade Dedication areas for over 7. David is currently the Service Line Lead for Equipment Qualification at Kinectrics in Toronto, and has extensive experience in developing and executing EQ harsh test programs for OEMs and utilities around the world, in accordance with the relevant test standards including IEEE 323 and Westinghouse AP1000.

### **Abstract – Seismic Testing (Random Input Motion) Of Large Nuclear Grade Piston-Type Actuator**

Kinectrics Inc. have recently successfully completed the RIM testing of a large nuclear grade spring-to-extend piston type actuator manufactured, which was mated to a yoke and attached to a fixture, to simulate a valve connection. A number of issues were encountered during the testing which required additional FEA analysis. As a result, redesign of the sample bolting, as well as changes to Kinectrics RIM table setup were required before the test sample successfully completed the qualification program. The testing issues were the result of the response of the actuator at resonant frequencies caused by the large mass of the actuator spring moving out of phase with the RIM table drive system. In addition, the sample response can change with the valve open and closed due to the changing response of the compressed or extended spring. This presentation discusses the issues encountered with specific reference to testing at or near spring resonant frequencies which raises some interesting questions about testing to the IEEE 344 recommended RIM test levels as well as the extended requirements of AP1000 qualification of line mounted valves.

Successful methodologies such as correlation between FEA analysis and test item/fixturing redesign, seismic table modifications and SSE sine beat pre-conditioning will also be discussed.