

**From:** Li, Yong - MRO  
**To:** Franke, Mark; Kolcum, Gregory; Chakravorty, Manas; Park, Sunwoo; Jackson, Rahsean; Walker, Shakur; Suggs, LaDonna  
**Subject:** seismic equipment maintenance and calibration issue  
**Date:** Tuesday, September 13, 2011 11:13:13 AM  
**Attachments:** seismic equipment monitoring.docx

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This summarize the findings for seismic instrumentation.

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## **Seismic equipment maintenance and calibrations**

### **Scope**

The scope of this Charter task is to investigate if the seismic instrument at the North Anna nuclear power plant site is maintained and calibrated properly to provide accurate information for making decision on safe shutdown during and post an earthquake event and for subsequent engineering analysis. The NRC inspectors completed this task by reviewing seismic instrument manuals, and other related documents, but this review does not include all the calibration documents. The NRC inspectors also interviewed the Dominion engineers and observed those scratch plates which recorded the main earthquake.

### **Observations and Findings**

The NRC inspectors conducted walkdowns to all the seismic instruments located in both Unit 1 Containment and Auxiliary Buildings. During the walkdowns, the inspectors visually inspected all the seismic instruments at various levels of elevation of the two buildings. The inspectors noticed that the licensee installed seismic equipment following the vendor's manuals.

Based on documents presented by the Dominion, seismic equipment including both Engdahl and Kinometrics is checked every 18 month during the refueling.

Through the review and the discussions with the Dominion staff engineers, the NRC inspectors determined the following issues with seismic instrument.

1. All the seismic instrumentation are located on the structures, not on free surface in the free field and therefore, not a good indicator for determine if OBE and SSE are exceeded.
2. Alarming system Panel lost power during a loop because it was not connected to non interruptive electric power.
3. Operability of seismic equipment and associated alarming systems.

These issues can be generic to all existing nuclear power plants in the Central and Eastern US too.

The inspectors also identified other specific issues as follows,

1. Seismic recordings are inconsistent between the Kinometrics and Engdahl Scratch plates located on the Basemat of Unit 1. Engdahl scratch plates also did not record any ground motion on certain frequencies.
2. Confusing on plate North and Geographic north in seismic equipment orientation.
3. Poor maintenance on seismic alarming system, for example, instrument panel on one of the OBE exceedance frequencies problem was not fixed in a timely manner.

In sum, the North Anna nuclear power plant seismic monitoring system was not function properly to inform the operator to take immediate action to respond to the Aug. 23, 2011 earthquake. Seismic vibration recorded by different seismometers showed inconsistency and none of the seismometers are located on the free surface in the free field so that recorded motion can provide a good indication if OBE and SSE is exceeded.

**From:** Suggs, LaDonna  
**To:** [Kolcum, Gregory](#)  
**Subject:** System Health Report Ratings/Colors  
**Date:** Tuesday, September 20, 2011 6:04:00 PM  
**Attachments:** [image001.png](#)

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Greg –

One last question for the evening...I think...the transformers system health report is "Red" with an overall status of 67.4...I'm assuming that red means bad based on the contents of the report (LTC issues for RSSTs, operator work arounds, etc.), but is there an official meaning for each color for these health reports?



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**From:** [Suggs, LaDonna](#)  
**To:** [Merriweather, Norman](#)  
**Subject:** Typical Transformer Service Life  
**Date:** Wednesday, September 14, 2011 3:56:00 PM

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Norm –

Here at North Anna they're RSSTs (Reserve Station Service Transformers) have been in place for approx. 40yrs. They are due to be replaced in 2014. I haven't been able to find anything in the vendor manual regarding service life and the site has not been able to locate the purchase order spec, so I'm wondering if you had any insights into the typical service life for GE transformers. The electrical power supervisor said that typically the transformers are more performance based and as long as it's performing, passing PMTs and DGA testing shows no problems then they would be run-to-failure. Does that sound reasonable?

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