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Summary of Monitoring Station Component Evaluation Project 2009-2011

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Ground-based Monitoring R and E
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Abstract

Sandia National Laboratories (SNL) is regarded as a center for unbiased expertise in testing and evaluation of geophysical sensors and instrumentation for ground-based nuclear explosion monitoring (GNEM) systems. This project will sustain and enhance our component evaluation capabilities. In addition, new sensor technologies that could greatly improve national monitoring system performance will be sought and characterized.

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1 Summary

1.1 Relevance to Mission

This work directly impacts the Ground-based Nuclear Explosion Monitoring mission by verifying that the performance of monitoring station sensors and instrumentation is characterized and suitable to the mission. It enables the operational monitoring agency to deploy instruments of known capability and to have confidence in operational success. This effort will ensure that our evaluation capabilities are maintained for future use.

1.2 Application

Ground-based nuclear explosion monitoring (GNEM) requires highly sensitive geophysical instrumentation deployed in a global network of sensor arrays to meet monitoring mission goals. Stations are designed to respond to various signals as determined by station location, signal propagation paths, and local noise characteristics. Currently teleseismic and regional seismic arrays form the foundation for global and broad area regional monitoring. Future systems will focus on nearer-source deployment and seismo-acoustic installations. This project serves as an important suitability and quality validation for current-generation and future station instrumentation. The work presented below is a continuation of work presented in Hart (2009).

SAND Reports produced as products for the Monitoring Station Component Evaluation project:

1. **2009-2131C – Evaluation of DCA as Test Site for Broadband Seismometers**
2. **2009-7419C – Seismic Sensor Research using Unique Design of Borehole Seismometer**
3. **2009-5935C - Power Noise Coupling onto an Infrasound Sensor's Output Signal**
4. **2009-7107C - Infrasound Sensor and Porous-Hose Filter Evaluation Results**
5. **2009-7892 – Summary of Monitoring Station Component Evaluation Project 2007-2009**
6. **2009-8175C – Determine Digital Recorder and Infrasound Sensor Noise Characteristics**
7. **2010-0702– Evaluation of the Miltec Infrasound Sensor Design**
8. **2010-1071 – Evaluation of four 3" diaphragm PCB Infrasound Sensors**
9. **2010-1569 – Evaluation of Eight Inter-Mountain Labs Model ST Infrasound Sensors**
10. **2010-2636 - Acquisition System Evaluation for CASPAR Project**
11. **2010-3862 – The Development of Methodologies for Determining Non-Linear Effects in Infrasound Sensors**
12. **2010-4000 Seismic Sensor Evaluation for CASPAR Project**
13. **2010-6094C - Component Evaluation Project and Facility for Acceptance, Calibration and Testing (FACT Site) at Sandia**
14. **2010-6872– Evaluation of Two Chaparral Physics Model 50A Infrasound Sensors**
15. **2011-1958C - Component Evaluation Project Summary**
16. **2011-7012C – Effects on Aging Hardware on Data Quality**
17. **2011-8060C – Infrasound Sensor Testing at the Facility for Acceptance, Calibration and Testing (FACT) site**
18. **2011-8025C – Infrasound Side Bar – Infrasound Sensor Technology**

19. 2011-8265 – Component Evaluation Testing and Analysis Algorithms

2 References

Hart, D.M., (2009). "*Summary of Monitoring Station Component Evaluation Project 2007-2009"*. SAND2009-7892

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