

Sandia 2009 Wind Turbine Reliability Workshop



“Digging Down for Reliability”

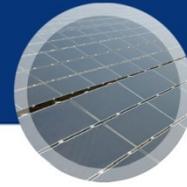
Larry Barr





enXco Service Corporation

- **Largest third party O&M provider in the world.**
- **Contracts totaling 5,200 WTG's (4,200 MW)**
- **24 MW of Solar generation under contract**
- **22 years experience**



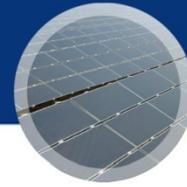
Data Collection - Overload or Abundance?

- **Modern turbines have 1000's of data points**
- **High resolution sampling is critical - key data such as vibration, voltage, current at 1 sec or higher resolution**
- **5 points/sec on a 1000 WTG Fleet = 432,000 values per day**



Managing Mass Information Problem

- **Difficult to store, manage and analyze**
- **Requires data historian and data analysis engines**
- **Don't forget your CMMS data base**



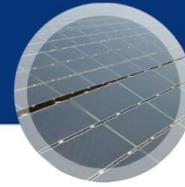
Wind Plant Staffing

- **CBM instrumentation is a wonderful thing, but does not replace the need to have a technician see, smell, hear and feel the problems.**
- **Experience / Training**
- **If a WTG is designed, and operated properly, then the technician become the next most important element to reliability.**



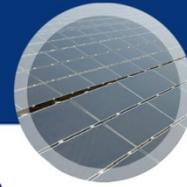
WTG Safety Will Also Impact Reliability

- **Safety as it relates to turbine design**
- **Build them so they are safer and easier to work on and reliability will go up**
- **WTG Purchaser /Owner is most influential**
- **Ergonomics, Confined Space, AFH**



Miscellaneous comments

- **We operate > 1,500 WTG's that are 22-25 years old – and they are not crap ☹**
- **Collection system availability does not (or should not) have a significant impact on plant availability**
- **Having to do pre-employment fit for duty screens is a sad commentary**



Utility Wind Integration Group - Turbine User Group Meetings

- **Shameless plug ☺**
- **Patterned like CTOTF**
- **Meet twice per year**
- **Plenary session**
- **Turbine round tables - Vestas, GE and Siemens so far.**
- **Site tours**



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