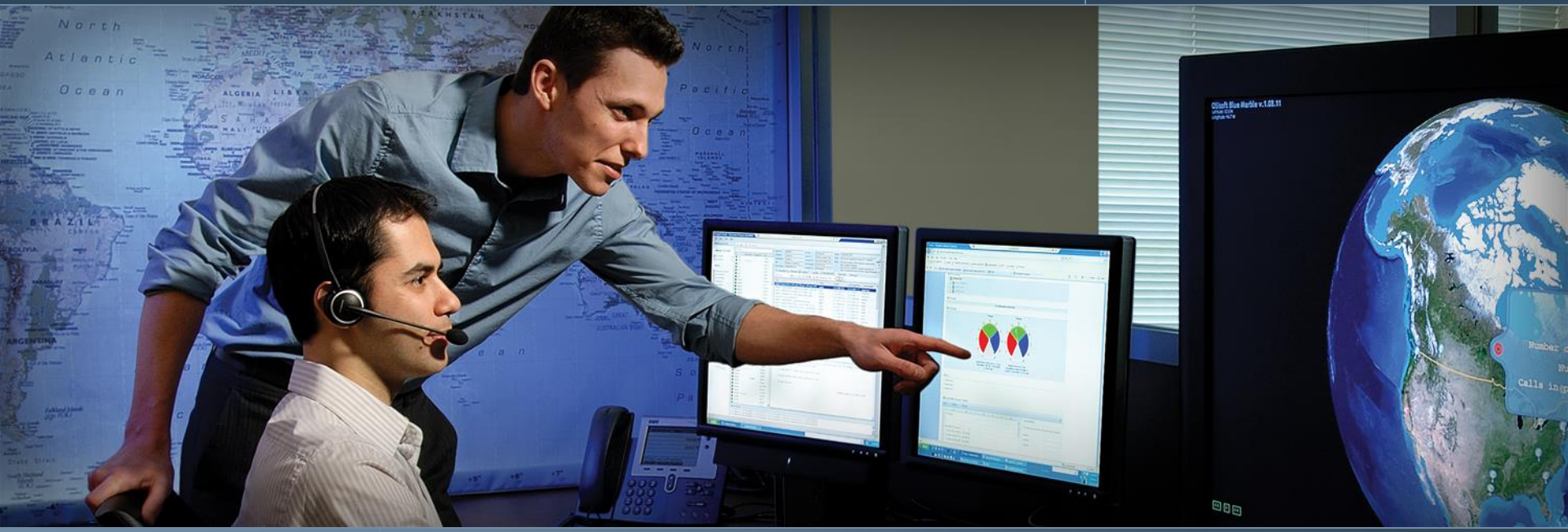
Regional Seminar Series
Orlando



Supporting Mitsubishi Equipment Warranties using PI

Scott Minter, Senior Manager Information Technology,
Mitsubishi Power Systems America, Inc

4th November 2009

Empowering Business in Real Time.

PI SOFTWARE FOR MPSA TURBINE WARRANTY SUPPORT

Scott Minter, Senior Manager IT

Mitsubishi Power Systems Americas, Inc.

What our Remote Monitoring Center Does

- Provides assistance to our customers in optimizing power plant performance, efficiency, operation and Long Term Service Agreement (LTSA) management.
- Monitors over 50,000 data tags of our customer's operational parameters remotely from Orlando, FL.
- Monitors the tags in 1-3 second increments (approximately 1.5GB of data per day)
- Support day to day plant operations.
- Provides data analysis and evaluation to improve customer's overall unit performance.
- Provide a web portal for information sharing with our customers using SharePoint.

What We Use

- PI Historian in high availability mode
- PI Process Book
- PI Ace
- PI Web Parts
- PI Datalink
- SmartSignal
- MPLS network
- A custom built rack (we call an OSM) with proprietary software

PI Historian

- Helps us capture data, process it.
- The result is Information.

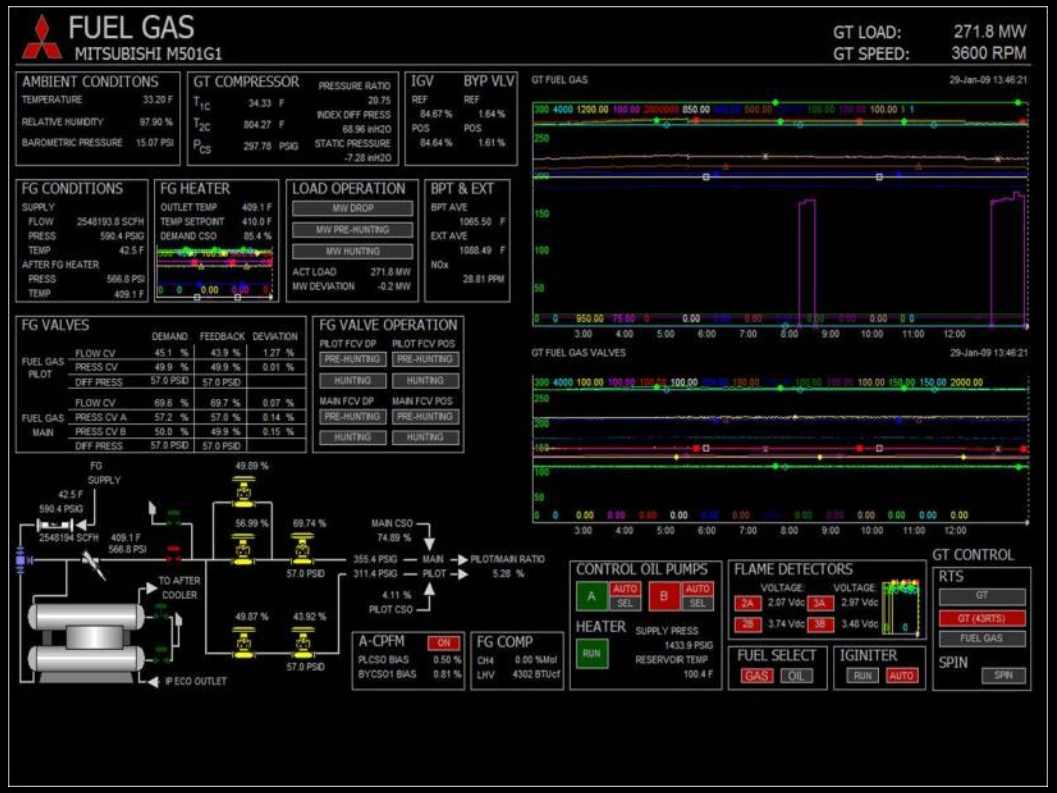
Why HA mode? Hurricanes. Reliability. 24 Hour operations.

On-Site Monitor (OSM)

PI Process Book

Gives our Remote Monitoring Center (RMC) staff the ability to quickly build data trends that aid in the RMC troubleshooting and presentation efforts.

Uses the Information from PI. The RMC expert adds perception to gain Knowledge.



PI ACE

Create unit performance tags to evaluate the past and present operating performance with an advanced analytical data processing and computing program.

This allows us to assist and recommend maintenance such as water washing to improve operational efficiency.

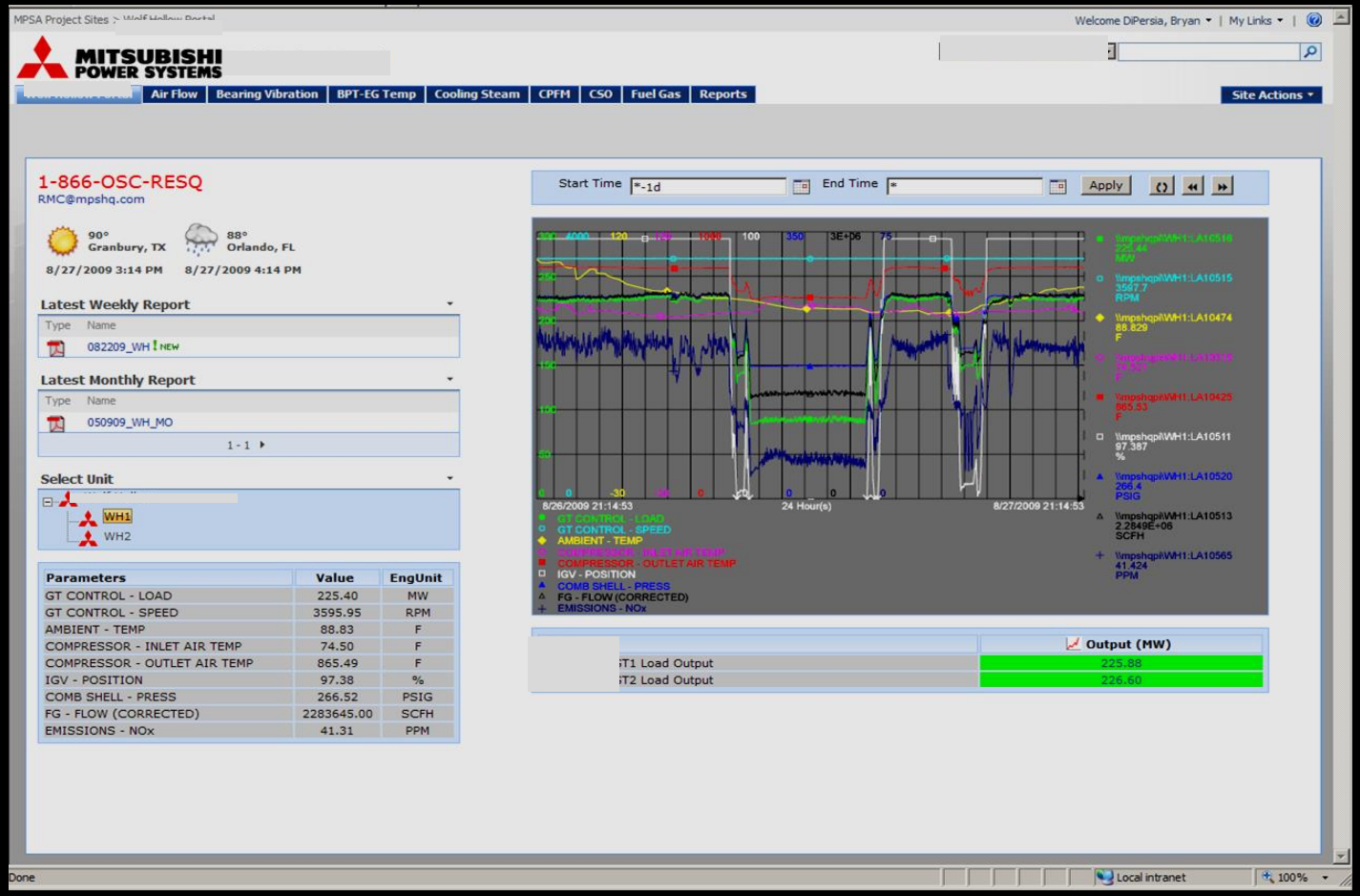
Once again we are taking the Information captured by PI and adding perception to create Knowledge.

```
'HR Calculation
   L_HR = (FGFlow / LHV) * load
   L_HRSL =      _HR / HRT1C / HRPAMB / HRIGV / HRT1T
   L_HRSE =      _HRSL / SETamb / SEPamb / SEigv
    ''''''''''''''''''''''''''''''''''''''''''''''

CE Calculation
   PresRatio = (combshellP + ambP) / ambP
   T2Cc = (PresRatio ^ ((kTavg - 1) / kTavg)) * T1CK
       L_CE = ((T2Cc - T1CK) / (T2CK - T1CK)) * 100
       L_CESE = I    _CE / kT1C / kIGV
       L_CEIGV =     1_CESE * elevation
```

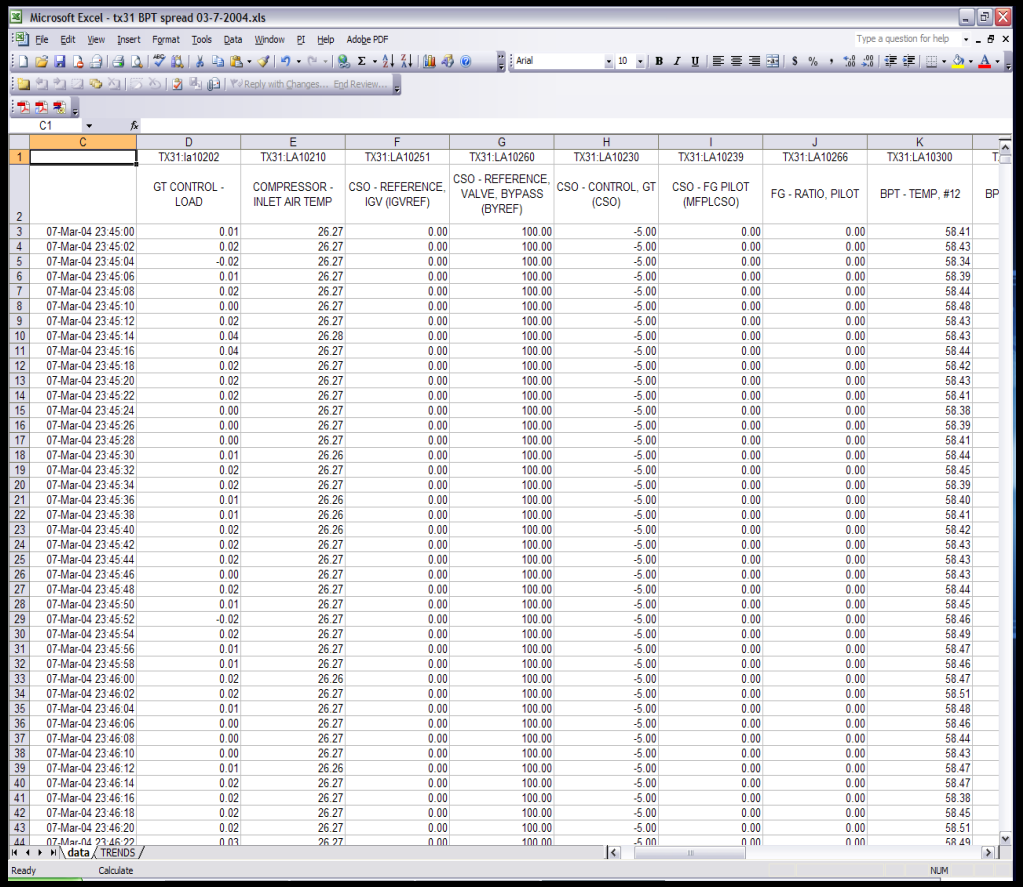
PI Web Parts

PI Web Parts are utilized in a portal fashion to allow secure convenient access for our customers from any place in the world (given Internet access). Our goal is to enable visibility to Information with our customers and enable better communication and collaboration.



PI Data Link

- We needed further examination of the data captured with PI for additional trending, filtering, reporting, and comparative analysis.
- We export the data to Excel.
- This allows us to take the Information from PI and view it with a different tool. Perception is added to gain Knowledge.



Microsoft Excel - tx31 BPT spread 03-7-2004.xls

	C	D	E	F	G	H	I	J	K
1		TX31:la10202	TX31:LA10210	TX31:LA10251	TX31:LA10260	TX31:LA10230	TX31:LA10239	TX31:LA10266	TX31:LA10300
2		GT CONTROL - LOAD	COMPRESSOR - INLET AIR TEMP	CSO - REFERENCE, IGV (IGVREF)	CSO - REFERENCE, VALVE, BYPASS (BYREF)	CSO - CONTROL, GT (CSO)	CSO - FG PILOT (MFPLCSO)	FG - RATIO, PILOT	BPT - TEMP, #12
3	07-Mar-04 23:45:00	0.01	26.27	0.00	100.00	-5.00	0.00	0.00	58.41
4	07-Mar-04 23:45:02	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.43
5	07-Mar-04 23:45:04	-0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.34
6	07-Mar-04 23:45:06	0.01	26.27	0.00	100.00	-5.00	0.00	0.00	58.39
7	07-Mar-04 23:45:08	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.44
8	07-Mar-04 23:45:10	0.00	26.27	0.00	100.00	-5.00	0.00	0.00	58.48
9	07-Mar-04 23:45:12	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.43
10	07-Mar-04 23:45:14	0.04	26.28	0.00	100.00	-5.00	0.00	0.00	58.43
11	07-Mar-04 23:45:16	0.04	26.27	0.00	100.00	-5.00	0.00	0.00	58.44
12	07-Mar-04 23:45:18	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.42
13	07-Mar-04 23:45:20	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.43
14	07-Mar-04 23:45:22	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.41
15	07-Mar-04 23:45:24	0.00	26.27	0.00	100.00	-5.00	0.00	0.00	58.38
16	07-Mar-04 23:45:26	0.00	26.27	0.00	100.00	-5.00	0.00	0.00	58.39
17	07-Mar-04 23:45:28	0.00	26.27	0.00	100.00	-5.00	0.00	0.00	58.41
18	07-Mar-04 23:45:30	0.01	26.26	0.00	100.00	-5.00	0.00	0.00	58.44
19	07-Mar-04 23:45:32	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.45
20	07-Mar-04 23:45:34	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.39
21	07-Mar-04 23:45:36	0.01	26.26	0.00	100.00	-5.00	0.00	0.00	58.40
22	07-Mar-04 23:45:38	0.01	26.26	0.00	100.00	-5.00	0.00	0.00	58.41
23	07-Mar-04 23:45:40	0.02	26.26	0.00	100.00	-5.00	0.00	0.00	58.42
24	07-Mar-04 23:45:42	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.43
25	07-Mar-04 23:45:44	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.43
26	07-Mar-04 23:45:46	0.00	26.27	0.00	100.00	-5.00	0.00	0.00	58.43
27	07-Mar-04 23:45:48	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.44
28	07-Mar-04 23:45:50	0.01	26.27	0.00	100.00	-5.00	0.00	0.00	58.45
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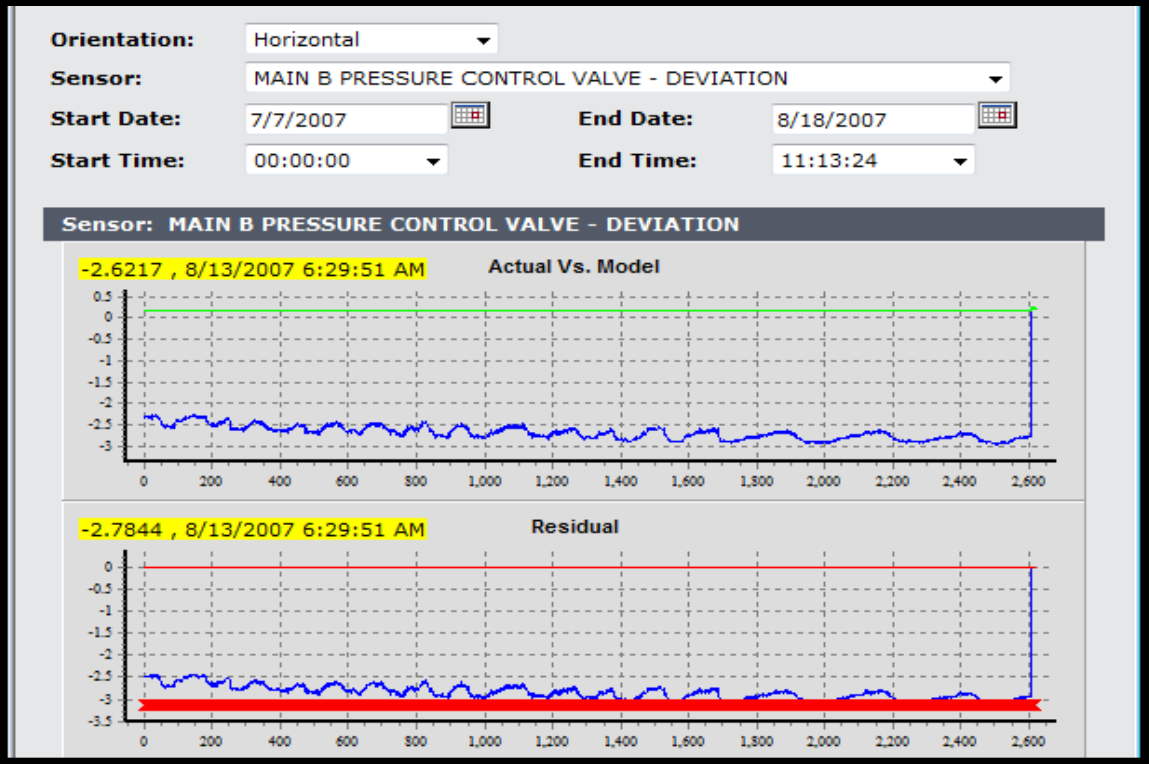
31	07-Mar-04 23:45:56	0.01	26.27	0.00	100.00	-5.00	0.00	0.00	58.47
32	07-Mar-04 23:45:58	0.01	26.27	0.00	100.00	-5.00	0.00	0.00	58.46
33	07-Mar-04 23:46:00	0.02	26.26	0.00	100.00	-5.00	0.00	0.00	58.47
34	07-Mar-04 23:46:02	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.51
35	07-Mar-04 23:46:04	0.01	26.27	0.00	100.00	-5.00	0.00	0.00	58.48
36	07-Mar-04 23:46:06	0.00	26.27	0.00	100.00	-5.00	0.00	0.00	58.46
37	07-Mar-04 23:46:08	0.00	26.27	0.00	100.00	-5.00	0.00	0.00	58.44
38	07-Mar-04 23:46:10	0.00	26.27	0.00	100.00	-5.00	0.00	0.00	58.43
39	07-Mar-04 23:46:12	0.01	26.26	0.00	100.00	-5.00	0.00	0.00	58.47
40	07-Mar-04 23:46:14	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.47
41	07-Mar-04 23:46:16	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.38
42	07-Mar-04 23:46:18	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.45
43	07-Mar-04 23:46:20	0.02	26.27	0.00	100.00	-5.00	0.00	0.00	58.51
44	07-Mar-04 23:46:22	0.03	26.27	0.00	100.00	-5.00	0.00	0.00	58.49

data | TRENDS

Ready Calculate NUM

SmartSignal

- Power Plant Turbines are expensive.
- Using SmartSignal together with PI we are able to correlate the data gathered and provide predictive analysis of failures or other conditions.
- This information is very useful for our customers.



Summary

- Mitsubishi Power Systems Americas, Inc. has created a world class Remote Monitoring Service in Orlando, FL to assist our customers and support Long Term Service Agreements.
- PI software is the foundational piece of technology utilized
- The PI software helps us take Data from Gas Turbine controllers and process the Data to capture Information.
- PI tools allow us to take the Information we gained and add perception. We then have Knowledge that will support our customer's operations and our own.
- Finally, if we can take that Knowledge and make a judgment we arrive at Understanding.

Thank You For Your Time.
Questions?

Thank you

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