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RS-05-145

October 17, 2005

U. S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

Dresden Nuclear Power Station, Units 2 and 3
Renewed Facility Operating License Nos. DPR-19 and DPR-25
NRC Docket Nos. 50-237 and 50-249

Quad Cities Nuclear Power Station, Units 1 and 2
Renewed Facility Operating License Nos. DPR-29 and DPR-30
NRC Docket Nos. 50-254 and 50-265

Subject: Technical Documentation Related to Analysis and Design of New Quad Cities Steam Dryers, and Responses to Requests for Additional Information Related to EPU Operation at Dresden and Quad Cities Nuclear Power Stations

References:
1. Letter from J. A. Benjamin (Exelon Generation Company, LLC) to U. S. NRC, "Commitments and Information Related to Extended Power Uprate," dated April 2, 2004
2. Letter from K. R. Jury (Exelon Generation Company, LLC) to U. S. NRC, "Commitments and Plans Related to Extended Power Uprate Operation," dated September 23, 2005

In the referenced letters, Exelon Generation Company, LLC (EGC) made regulatory commitments regarding operation of Dresden Nuclear Power Station (DNPS), Units 2 and 3, and Quad Cities Nuclear Power Station (QCNPS), Units 1 and 2, at extended power uprate (EPU) conditions. EGC completed detailed evaluations of the QCNPS replacement steam dryers in accordance with commitments 9 and 10 of Reference 2, and submitted the results of these evaluations to the NRC. On August 29, through September 1, 2005, EGC met with the NRC technical staff to discuss the results and conclusions of these evaluations. As a result of this meeting, the NRC requested that EGC provide additional information to support a review of issues related to operation of the DNPS and QCNPS units at EPU power levels. The attachments to this letter contain information to support the NRC's review.

APO1

The attachments to this letter contain information considered proprietary to General Electric (GE). Therefore, EGC requests that this information be withheld from public disclosure in accordance with 10 CFR 2.390, "Public inspections, exemptions, requests for withholding," paragraph (a)(4), and 10 CFR 9.17, "Agency records exempt from public disclosure," paragraph (a)(4). An Affidavit attesting to the proprietary nature of these documents in included in the attachments. Non-proprietary versions of these documents are either provided in the attachments, or are intended to be provided to the NRC at a later date.

Should you have any questions concerning this letter, please contact Mr. Thomas G. Roddey at (630) 657-2811.

Respectfully,

Patrick R. Simpson

Patrick R. Simpson
Manager – Licensing

Attachments:

1. Summary of 930 MWe Acoustic Circuit Model Uncertainty Evaluations
2. Structural Integrity Associates Letter SIR-05-198, "Assessment of Quad Cities Unit 1 Power Ascension Main Steam Line Vibration Frequency Spectrum," dated June 17, 2005
3. Affidavit and GE report GENE-0000-0041-1656-01-P, "Test and Analysis Report, Quad Cities New Design Steam Dryer, Dryer #2 Experimental Modal Analysis and Correlation with Finite Element Results," Revision 2, GE Proprietary, dated July 2005
4. GE Report GENE-0000-0041-1656-01, "Test and Analysis Report, Quad Cities New Design Steam Dryer, Dryer #2 Experimental Modal Analysis and Correlation with Finite Element Results," Revision 2, Non-Proprietary, dated July 2005
5. Engineering Change (EC) Evaluation #355702, "Evaluation of Quad Cities Unit 2 Main Steam Line Vibrations at EPU Power Levels with Replacement Dryer," Revision 0
6. Engineering Change (EC) Evaluation #355773, "Evaluation of Quad Cities Unit 1 Main Steam Line Vibrations at EPU Power Levels with Replacement Dryer," Revision 0
7. C.D.I. Technical Note No. 05-37, "Blind Evaluation of Continuum Dynamics, Inc. Steam Dryer Load Methodology Against Quad Cities Unit 2 In-Plant Data At 2831 MWt," Revision 1
8. Affidavit and Exelon Report AM-2005-011, "Quantifying the Effects Associated with the Acoustic Circuit Model Omission of Low Frequency Loads," Revision 0
9. Exelon Report AM-2005-012, "An Assessment of the Uncertainty in the Application of the Modified 930 MWe Acoustic Circuit Model Predictions for the Replacement Quad Cities Units 1 and 2 Steam Dryers," Revision 0

ATTACHMENT 1

Summary of 930 MWe Acoustic Circuit Model Uncertainty Evaluations

ATTACHMENT 1

Summary of 930 MWe Acoustic Circuit Model Uncertainty Evaluations

At the request of Exelon Generation Company, LLC (EGC), Continuum Dynamics, Inc. (CDI) performed a blind benchmark demonstration of the Modified 930 Megawatts-electric (MWe) Acoustic Circuit Model (ACM) using main steam line (MSL) strain gauge data collected on Quad Cities Nuclear Power Station, Unit 2 (QC2). The purpose of this exercise was to demonstrate the ability of the Modified 930 MWe ACM to predict loads on the steam dryer without any further enhancements to the model. EGC provided CDI with MSL strain gauge data collected on QC2 at 2831 MW-thermal (MWt) (i.e., 912 MWe). Using the strain gauge data, CDI provided EGC with the load history results for 26 pressure sensor locations on the dryer. EGC then provided CDI with the actual 26 dryer pressure measurements obtained during start up testing.

CDI Technical Note No. 05-37, "Blind Evaluation of Continuum Dynamics, Inc. Steam Dryer Load Methodology Against Quad Cities Unit 2 In-Plant Data At 2831 MWt," contains the results of the blind benchmark predictions. The accuracy of predictions made at 912 MWe are similar to those previously reported using data collected at 930 MWe. However, no changes were made to modeling parameters contained in the ACM to generate the 912 MWe blind benchmark predictions. The general trend is that the Modified 930 model ACM predictions become more conservative at lower power levels.

At EGC's request, CDI performed additional sensitivity analysis on the Modified 930 MWe ACM to further improve the accuracy of the model and to determine the cause of pressure underpredictions at certain locations on the dryer. Specifically, CDI attempted to refine several model parameters that drive the acoustic circuit prediction. These parameters include: (1) the absorption at the steam froth interface beneath the dryer; (2) the absorption at the steam water interface between the skirt and the steam dome; (3) the damping in the steam dome; and (4) the damping in the MSLs. In performing this analysis, CDI determined that decreasing the damping in the steam dome improves the accuracy of the underpredictions. CDI concluded that previous benchmarking and model tuning assumed a steam dome damping value that was too large. The additional analysis demonstrated that most of the damping of acoustic waves in the ACM occurs inside the steam dryer, where surface areas are large and the steam froth interface absorbs most of the radiated acoustic energy.

EGC performed an evaluation of the uncertainty associated with the methodology utilized in the prediction of time history information for the application of unsteady pressure loads on the QC1 and QC2 steam dryers. The pressure time history output from this methodology was used as the input to the General Electric (GE) Finite Element Model (FEM). The FEM was used to compute the stresses in the dryer for comparison against ASME Code allowable fatigue and stress limits. The intent of this evaluation was to determine the overall accuracy of the methodology used to generate the pressure load history and to determine whether further modifications to the ACM were warranted.

The results of this analysis are contained in Exelon Report AM-2005-012, "An Assessment of the Uncertainty in the Application of the Modified 930 MWe Acoustic

ATTACHMENT 1

Summary of 930 MWe Acoustic Circuit Model Uncertainty Evaluations

Circuit Model Predictions for the Replacement Quad Cities Units 1 and 2 Steam Dryers," Revision 0 (i.e., Attachment 9). The uncertainty evaluations presented during the August 30, 2005, Technical Meeting at Cantera used the minimum error methods. The modified 930 MWe model discussed here yields more conservative results. The report describes three different approaches utilized to quantify the uncertainty of the Modified 930 MWe ACM. These three approaches quantify the uncertainty through a statistical analysis of root mean square (RMS) pressure data, peak-to-peak pressure data, and through the RMS pressure for a frequency interval of 135-160 hertz (Hz). The report also identifies the various elements that, when combined with the ACM uncertainty, constitute the overall uncertainty that occurs in the generation of the pressure load.

The report reaches the following conclusions concerning the uncertainty of the Modified 930 MWe ACM:

- The ACM tends to overpredict the largest pressures on the dryer while underpredicting the lower measured pressures.
- The ACM underpredicts the lower pressures, typically those situated on the horizontal mid-plane of the dryer face.
- The ACM overpredicts the dryer skirt locations by approximately a factor of two on RMS, as well as peak pressure.
- An uncertainty term based on net bias of RMS or peak pressure provides a simplified approach to defining margin requirements, and will yield compounded conservatism due to the ACM behavior noted above.
- The total uncertainty that occurs in the generation of the pressure load was calculated using the three different methods described above. The most appropriate method, using a statistical analysis of peak-to-peak pressure data, resulted in an uncertainty value of 6.3%.

The selection of the most appropriate total uncertainty is based on a review of the structural model results observation of predicted strains found in the interval selected. If energy storage and buildup is observed in the structural model, the total uncertainty calculated using the statistical analysis of RMS pressure data would be most appropriate. This would be evidenced by the peak stresses building and reaching maximum value near the end of the analysis interval. If the structure is being driven by the load (not in a resonant response mode), the total uncertainty calculated using the statistic analysis of peak to peak pressure data would be the most appropriate to use.

To determine which overall uncertainty would be the most appropriate for use in the Quad Cities dryer replacement load analysis, EGC reviewed the results of the hammer tests performed on both replacement steam dryers. The results of the hammer tests clearly indicate that energy storage and build up in the dryer is not observed.

ATTACHMENT 2

Structural Integrity Associates Letter SIR-05-198, "Assessment of Quad Cities Unit 1 Power Ascension Main Steam Line Vibration Frequency Spectrum," dated June 17, 2005

Structural Integrity Associates, Inc.

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June 17, 2005
SIR-05-198
KJO-05-003

Mr. Robert Stachniak
Exelon Nuclear
4300 Winfield Road
Warrenville, IL 60555

Subject: Assessment of Quad Cities Unit 1 Power Ascension Main Steam Line Vibration Frequency Spectra

Dear Rob,

This letter report contains an assessment of the Quad Cities Unit 1 (QC1) June 2005 power ascension vibration frequency spectra and the acceleration versus power level vibration trends for the Electromatic Relief Valves (ERVs) and the Target Rock (TR) Three-Stage Safety Relief Valve.

BACKGROUND

During the QC2 April 2004 outage, the ERV solenoid and TR pilot valve internal components were inspected and found to have sustained excessive wear. All valves were overhauled and/or repaired, then put back into service. During the power ascension immediately following the April 2004 outage, several main steam valves (ERV-3B, ERV-3C, ERV-3D, ERV-3E and TR-3A) were monitored to determine their vibration characteristics (frequency content and vibration magnitudes). The resulting frequency spectra at the ERV and TR inlet flanges indicated high accelerations (1.7 grms max). Most of this energy was concentrated at two discrete frequencies, 139 and 157 Hz. Since QC1 and QC 2 are very similar power plants, both plants were evaluated for high vibration levels and the potential for ERV and TR component wear.

In order to assess the actuator wear and identify design features or materials which would eliminate or substantially minimize wear, vibration testing was performed at Wyle Test Laboratories (Wyle Labs) for the ERV and the TR valves (this testing applied to ERV and TR valve components for both QC1 and QC2).

ERV Vibration Testing – February 2004

Full-scale ERV vibration testing was conducted at Wyle Labs from February 7 through February 13, 2004. This included modal testing and extensive shaker-table vibration testing, which included sine sweep and random vibration tests. Sine sweeps were conducted from 5-200 Hz at 0.25 g, whereas, random vibration testing was conducted from 20-200 Hz with test profiles representative of the acceleration magnitudes observed during plant operation [1].

Valve random vibration testing revealed that the solenoid plunger became excited at 70-85 Hz range [4]. This observed solenoid plunger motion was the same type of motion that would have resulted in wear marks found on field ERV solenoid guide rods. Both material and design modifications were evaluated and all ERVs were modified to incorporate the recommended design changes.

TR Vibration Testing – July-October 2004

Full-scale TR vibration testing was conducted at Wyle Labs from July 12 through October 15, 2004. This included modal testing and extensive shaker-table vibration testing, which included sine sweep and random vibration tests. Sine sweeps were conducted from 5-200 Hz at 0.25 g, whereas, random vibration testing was conducted from 20-200 Hz with a flat-random vibration magnitude of 1.34 grms that resulted in accelerated component aging. It must be noted, that the Wyle Labs random vibration test levels were much higher than the measured plant random vibration levels [2].

Valve random vibration testing revealed that the bellows cap spring became excited at 70-90 Hz. Post test inspection, revealed wear marks consistent with the wear found on field bellows cap. The bellows cap material and spring tolerances were evaluated during the accelerated wear tests and the TR valve was modified during the June 2005 outage to incorporate the recommended design changes.

QC1 ERV and TR Vibration Monitoring – June 2005

The vibration levels of two ERVs (ERV-3B and ERV-3C) were monitored [6] during the June 2005 power ascension. These locations were selected because they had the highest amplitudes observed during the December 2003 outage [3]. Six accelerometers were mounted on each valve inlet in the x, y and z axes (two tri-axial mounts on either side of the valve inlet flange, Table 1 and Figures 1 through 3). These accelerometers were in the same location for both the December 2003 and June 2005 outages. Vibration data was captured and processed by Exelon personnel and Structural Integrity Associates received frequency spectra for each of 10 power levels [5]. This spectra data was captured from 89 - 930 MWe and RMS acceleration trend plots were generated. For all ERV and TR valves, the June 2005 trend data were compared to the December 2003 trend data. It should be noted that ERV-3D, ERV-3E and TR-3A valves were not monitored, but their vibration levels were estimated based upon scaled data from the both the December 2003 and June 2005. This scaled data was used for comparative assessments only.

ERV-3D, -3E and the TR RMS accelerometer data was scaled by power level based on the December 2003 data to the representative June 2005 power levels and then scaled by the ERV-3B and ERV-3C RMS ratios (June 2005/December 2003 RMS magnitudes). This technique provides an estimate of RMS vibration for ERV-3D, -3E and the TR valve RMS accelerations.

ASSESSMENT OF FREQUENCY SPECTRA

Acceleration trend plots are shown in Figures 4-8. These plots show the RMS accelerations versus power level. Inspection of the frequency spectra [5] indicates that the data quality is acceptable, except for ERV-3C, y-axis, for data sets above 786 MWe (TC 11). This channel does show frequency content, but it also shows a "high DC shift" indicating that the time history has a large transient spike or poor signal quality, whereas, the alternate y-axis spectra data showed good signal-to-noise (S/N) quality. For conservatism, alternate y-axis data was used at the higher power levels (786 to 930 MWe). All other channels have good quality data.

Further inspection of all frequency spectra revealed the following:

- 3B ERV Inlet Flange, all channels have quality data based on spectra plots. Graphs showed similar amplitudes as the December 2003 vibration data, low-to-moderate amplitude (~0.5 grms max). ERV-3B Inlet Flange, y-axis had the highest amplitude, which ramped up between 700 and 900 MWe and reached a plateau at 900-930 MWe. All plant vibration amplitudes were below the levels of the Wyle Labs tests.

  Frequency spectra show two discrete frequencies: 139 and 157.5 Hz (similar amplitudes, when compared to the December 2003 power ascension data).

- 3C ERV Inlet Flange, x and z channels have quality data based on spectra plots, whereas, the y-axis spectra plot had a "high DC shift" and the alternate y-axis spectra plot had good quality data. Graphs showed similar amplitudes as the December 2003 vibration data, except for the y-axis amplitude which was <u>much lower</u> in magnitude. ERV-3C Inlet Flange, alternate y-axis had the highest amplitude (1.1 grms), which ramped up between 700 and 900 MWe and reached a peak at 930 MWe. Most of this energy was concentrated at 139 and 157 Hz. ERV-3C, y-axis vibration amplitudes exceeded the x and z-axis test levels, but was equivalent to the y-axis test level the Wyle Labs testing when compared to the random floor and the sine sweeps of the Wyle Labs test.

  Frequency spectra show two discrete frequencies: 139 and 157.5 Hz (similar in amplitude, when compared to the December 2003 power ascension data).

- 3D ERV Inlet Flange data channels were not recorded. The acceleration data was scaled using both the December 2003 and June 2005 data. Based on this scaled data, the ERV-3D vibration magnitudes were projected to be no worse than the December 2003 vibration magnitudes and below the Wyle labs test levels.

- 3E ERV Inlet Flange data channels were not recorded. The acceleration data was scaled from both the December 2003 and June 2005 data. Based on this scaled data, the y-axis data (maximum estimated amplitude) was projected to be no worse than the December 2003 vibration magnitudes and below the Wyle Labs y-axis test level.

- Target Rock Valve Inlet Flange data channels were not recorded. The acceleration data was scaled from both the December 2003 and June 2005 data. Based on this scaled data, all acceleration data was projected to be no worse than the December 2003 vibration magnitudes and well below the Wyle Labs test level.

Only ERV-3B and 3C inlet flanges [6] vibration levels were monitored, but inspection of Figures 5 and 7 (ERV-3C and ERV-3E y-axis RMS acceleration levels) show plant vibration levels did exceed the Wyle Labs x and z axis testing, but did not exceed the Wyle Labs y-axis vibration level. Note that ERV-3D, ERV-3E and the Target Rock-3A RMS vibration levels are estimated from December 2003 and June 2005 data and are only meant to bound the vibration levels that would have been expected. Additionally, it is assumed that current ERV-3D, ERV-3E and the Target Rock-3A valves would have seen the same discrete frequencies at 139 and 157 Hz based on ERV-3B and 3C spectra data and the December 2003 spectra data.

ERV ASSESSMENT

ERV-3B and 3C, June 2005 spectra (Figures 9 and 10) show the maximum vibration responses at two discrete frequencies, 139 and 157 Hz, but vibration amplitudes are low at frequencies below 120 Hz. Vibration magnitudes in the 70-90 Hz frequency range do not exceed ≤0.025 grms (considered very low). Therefore, most of the vibration energy is concentrated at the two discrete frequencies.

Based on the ERV testing performed at Wyle Labs, the largest response of the actuator occurred at a frequency of ~85 Hz. From the Wyle Labs test results, the x-axis testing resulted in the largest contributor to actuator wear. Figure 11 from Reference [1] contains a frequency spectrum of the ERV actuator response to an input that consisted of a flat random vibration (20-200 Hz) with superimposed sine sweeps at 138–142 Hz and 154–158 Hz. The two sine sweep frequency ranges correspond to the acoustic frequency response that was observed in the plant data [3]. While the plant data (Figures 9 and 10) shows significant acoustic response between 139 and 157 Hz, the Wyle Test results show that the largest actuator response occurs at frequencies below 100 Hz.

The frequency spectra for ERVs 3B and 3C contain responses at discrete frequencies between 139-157 Hz, which would have no effect on either valve or solenoid components of concern. This was confirmed by two types of Wyle Labs vibration tests:

1) A sine sweep test from 5-200 Hz (Tests 2.A.X, 2.A.Y, and 2.A.Z; ERV with no tie-back support and with the actuator cover on); gave no response in the 139-157 Hz range on any axis. Sine sweep responses were at 35, 70, and 85 Hz only.
2) A flat random vibration from 20-200 Hz (Tests 2.B.X, 2.B.Y and 2.B.Z; ERV with no tie-back support and with the actuator cover on); gave no response in the 139-157 Hz range on any axis. Random vibration responses were at 70 and 85 Hz.

The results of these tests confirm that ERV discrete frequencies between 139-157 Hz have no effect on either valve or solenoid components of concern, since these valves components do not respond to this frequency range. Thus, the current vibration levels are acceptable and should not cause excessive actuator component wear.

TARGET ROCK ASSESSMENT

TR 3A, June 2005 vibration data was not recorded, but based on comparisons of the June 2005 ERV-3B and 3C valve inlet vibration spectra (Figures 9 and 10) to the December 2003 TR-3A valve inlet vibration spectra (Figures 12 through 14), it is estimated that the TR vibration magnitudes would have been equivalent or lower and the observed discrete frequencies would have been similar (139 and 157 Hz). December 2003 TR-3A spectra plots were inspected for magnitudes in the 70-90 Hz frequency range, these magnitudes do not exceed $\leq$0.04 grms. Therefore, most of the vibration energy is concentrated at the two discrete frequencies.

Based on the TR testing performed at Wyle Labs, the largest response of the actuator (bellows cap and spring) occurred at a frequency of 79 Hz. Figure 15 from Reference [2] contains a frequency spectrum of the TR actuator response to an input that consisted of a flat random vibration from 20-200 Hz. While the plant data (Figures 12 and 14) shows high acoustic response at 139 and 157 Hz, the Wyle Test results shows that the largest actuator response occurs at frequencies below 100 Hz.

TR 3A discrete frequencies of 139 and 157 Hz would have no effect on the valve or solenoid components of concern. This was confirmed by four types of Wyle Labs vibration tests:

1) A flat random vibration from 20-100 Hz (Test run 2) had a response in the 70-90 Hz range.
2) A flat random vibration from 100-200 Hz (Test run 3), where there was no real response for either valve or solenoid.
3) Sine sweep tests from 5-200Hz (Test runs 21 and 23; baseline cap with field spring); gave no response in the 139-157 Hz range on any axis. Sine sweep responses were at 79 Hz only.
4) A flat random vibration from 20-200 Hz (Test runs 22 and 24; baseline cap with field spring); gave no response in the 139-157 Hz range on any axis. Random vibration responses were at 70-90 Hz range.

The results of these tests confirm that TR discrete frequencies between 139-157 Hz have no effect on the pilot valve components of concern, since these valves components do not respond to this frequency range. Thus, the current vibration levels are acceptable and should not cause excessive bellows cap wear.

CONCLUSIONS

Based on the June 2005 frequency spectra and acceleration trend plots, the December 2003 vibration data, and the Wyle Labs shake table test results, all valve 'problem components' responded only to frequencies below 100 Hz. Thus, the ERV solenoid spring guides and the TR pilot valve bellows cap should not have sustained any significant wear during the June 2005 power ascension, since most of the vibration energy (80-90%) was in the 139-157 Hz frequency range at the maximum power level (930 MWe). Amplitudes in the 70-90 Hz range were less than 0.04 grms (at 930 MWe), which was well below the Wyle Labs testing. Therefore, continued operation at the current vibration level should not result in excessive wear of these valve components.

If you have any questions, please do not hesitate to contact me at (303) 792-0077.

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Approved By:

Karen K. Fujikawa, P.E.
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kjo

REFERENCES:

1. Wyle Test Report No. 50584-01, dated 2/23/04, "Test Report – Vibration Endurance Test Program for a Dresser Electromatic Relief Valve Type 6" 1525-VX for Exelon Nuclear," SI File No. QC-16Q-202.
2. Wyle Test Report No. 50947R02 Revision 0, dated 11/04/04, "Test Report for a vibration aging Test Program for a Pilot/Base Assembly of a Target Rock Three-Stage Safety Relief Valve for Exelon Nuclear," SI File No. QC-25Q-204.
3. Structural Integrity Associates Report No. QC-11Q-302, Revision 0, "Quad Cities Unit 1 Main Steam Line Vibration Data Reduction," SI File No. QC-11Q-302.
4. Structural Integrity Associates Report No. SIR-04-023, Revision 0, Quad Cities ERV Vibration Testing Assessment," SI File No. QC-16Q-401.
5. Frequency spectra received from Exelon via ibackup.com, SI File No. QC-28Q-203.
6. ERV-3B and 3C Accelerometer Locations and Orientation Drawing, SI File No. QC-28Q-202.

cc: QC-28Q-402

Table 1: Accelerometer Locations from December 2003 Outage

Quad Cities Tape Deck

Location / Figure	Identification	Channel	Axis	Remarks
ERV 3B Inlet Flange / Figure 1	QC1-ID-MS1-3B-1A	1	X	
	QC1-ID-MS1-3B-1B	2	Y	Vertical
	QC1-ID-MS1-3B-1C	3	Z	
ERV 3B Pilot Valve / Figure 1	QC1-ID-MS1-3B-2A	4	X	Same direction as channel 3
	QC1-ID-MS1-3B-2B	5	Y	Vertical
	QC1-ID-MS1-3B-2C	6	Z	Same direction as channel 1
ERV 3E Inlet Flange / Figure 2	QC1-ID-MS1-3E-1A	7	X	
	QC1-ID-MS1-3E-1B	8	Y	Vertical
	QC1-ID-MS1-3E-1C	9	Z	
HPCI-4 Valve / Figure 6	QC1-ID-HPCI-4-1A	10	X	
	QC1-ID-HPCI-4-1B	11	Y	Vertical
	QC1-ID-HPCI-4-1C	12	Z	
ERV 3B Pilot Valve	QC1-ID-MSB-3B	13	X	Same as channel 4
	QC1-ID-MSB-3B	14	Y	Same as channel 5
ERV 3B Inlet Flange	QC1-ID-MSB-3B	15	Y	Same as channel 2

Dresden Tape Deck

Location	Identification	Channel	Axis	Remarks
Target Rock 3A Inlet Flange / Figure 5	QC1-ID-MS1-3A-1A	1	X	
	QC1-ID-MS1-3A-1B	2	Y	Vertical
	QC1-ID-MS1-3A-1C	3	Z	
ERV 3D Inlet Flange / Figure 4	QC1-ID-MS1-3D-1A	4	X	
	QC1-ID-MS1-3D-1B	5	Y	Vertical
	QC1-ID-MS1-3D-1C	6	Z	
ERV 3D Pilot Valve / Figure 4	QC1-ID-MS1-3D-2A	7	X	Same direction as channel 4
	QC1-ID-MS1-3D-2B	8	Y	Vertical
	QC1-ID-MS1-3D-2C	9	Z	Same direction as channel 6
ERV 3C Inlet Flange / Figure 3	QC1-ID-MS1-3C-1A	10	X	
	QC1-ID-MS1-3C-1B	11	Y	Vertical
	QC1-ID-MS1-3C-1C	12	Z	
1B MSIV / Figure 6	QC1-ID-MSIVB-1A	13	X	
	QC1-ID-MSIVB-1B	14	Y	
	QC1-ID-MSIVB-1C	15	Z	

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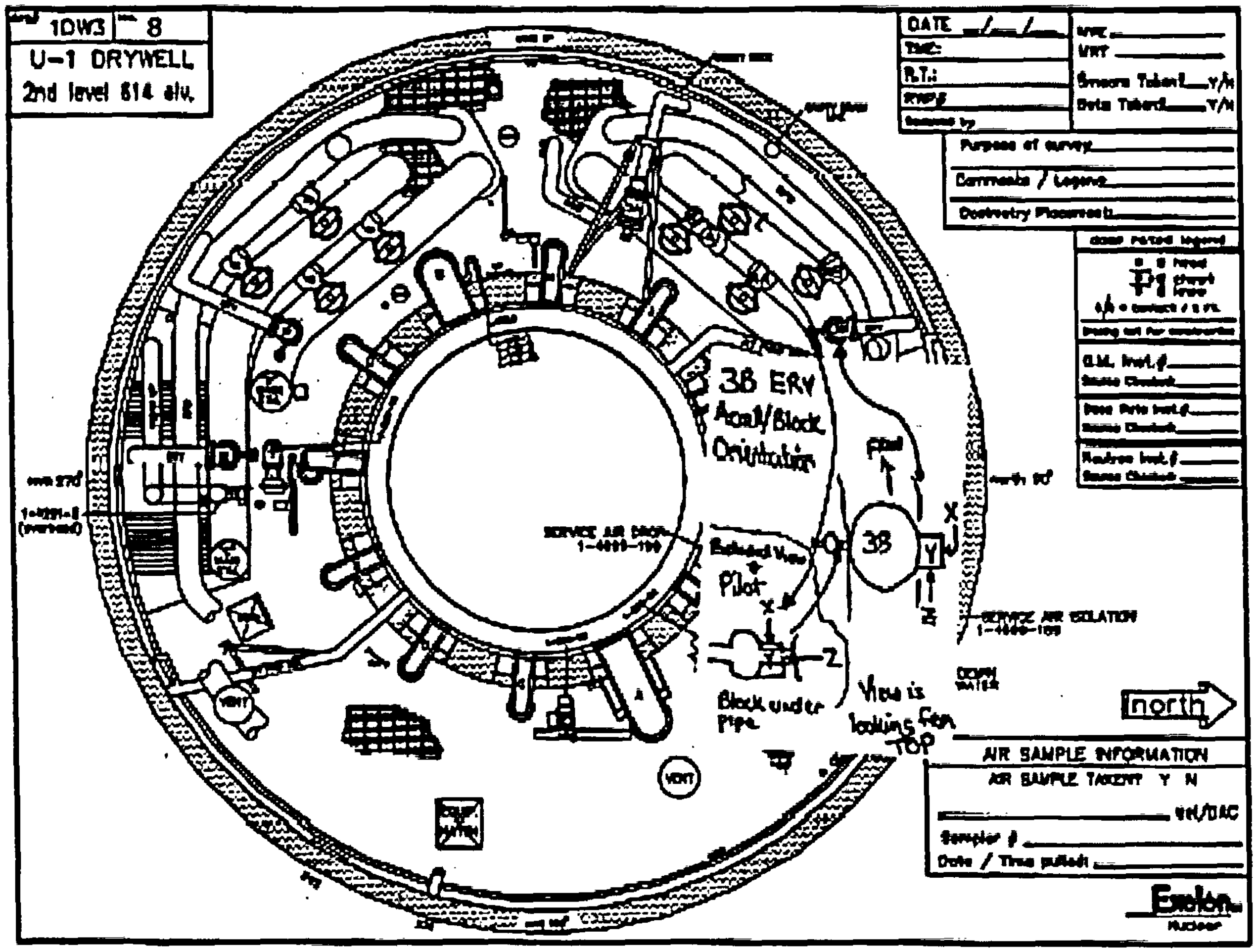

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Figure 1: ERV-3B Inlet Flange and Pilot Valve

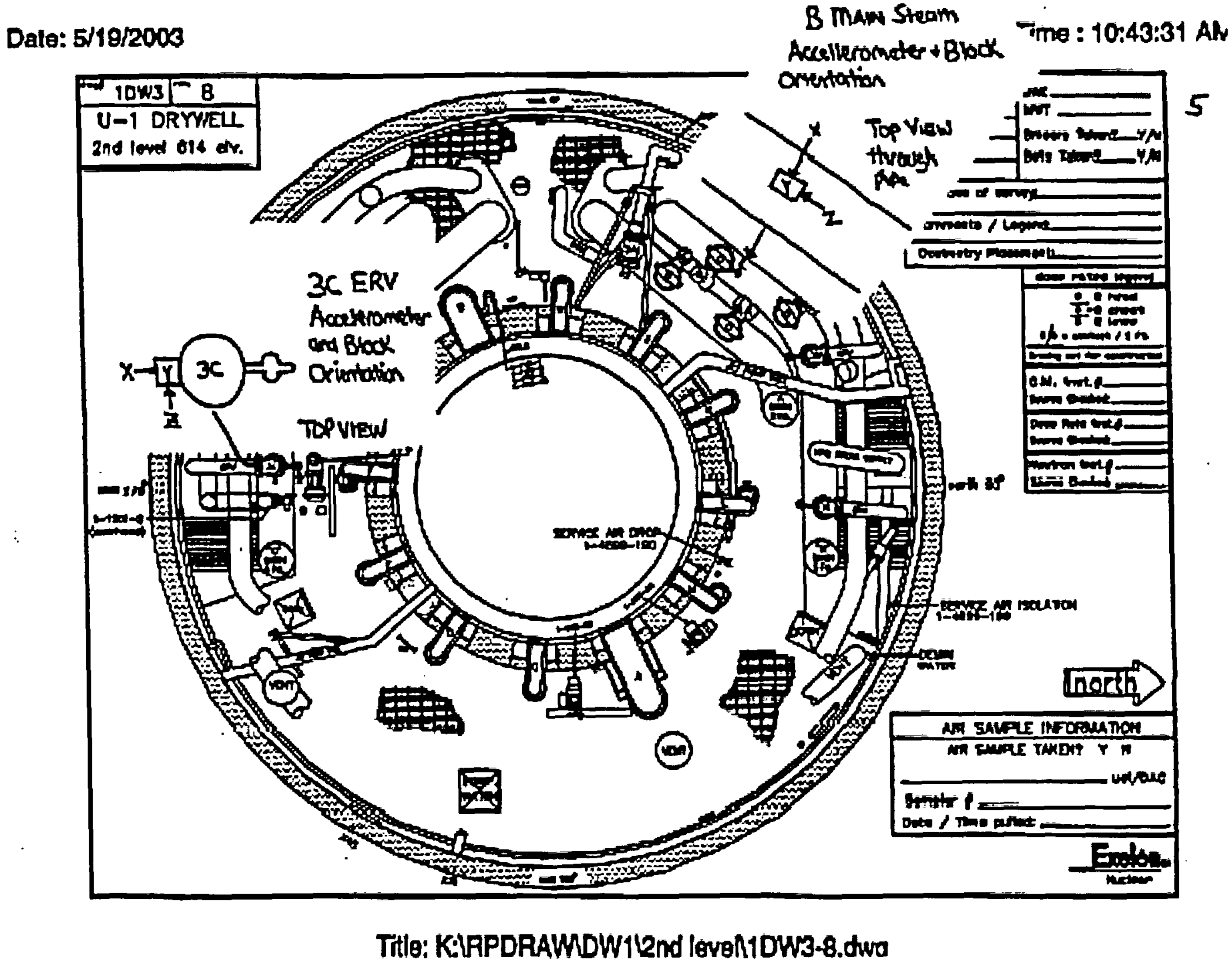
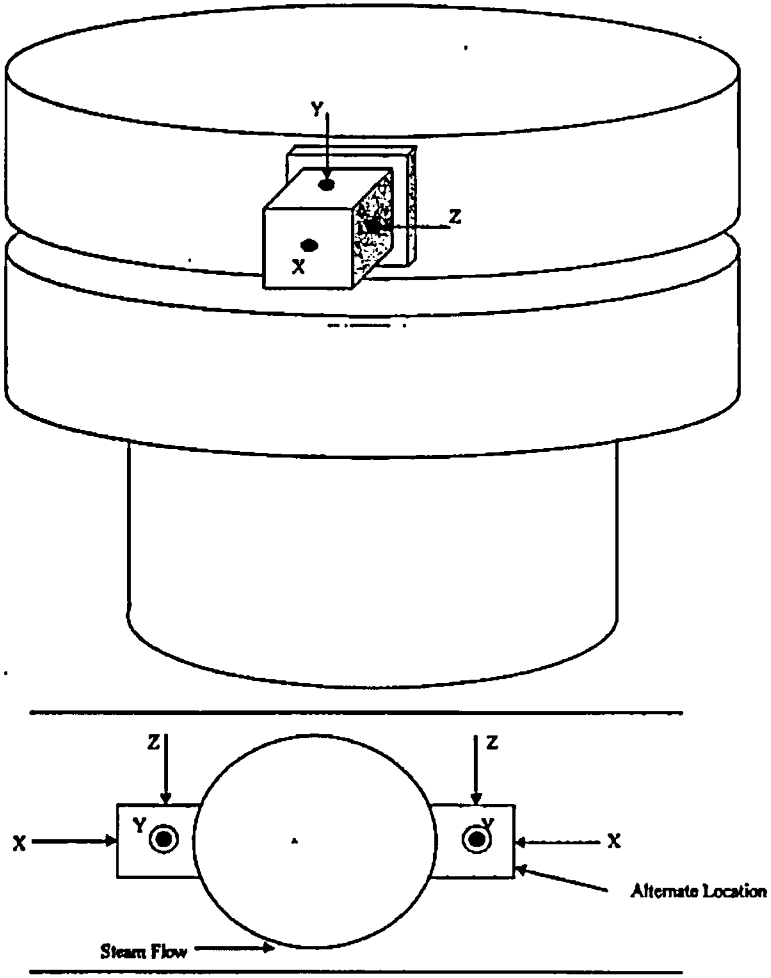


Figure 2: ERV-3C Inlet Flange and Pilot Valve



B ERV			
Direction	Label	Cable	Accel S/N
X	BX	TOD06 Pair 1	10537
Y	BY	TOD06 Pair 2	10533
Z	BZ	TOD13 Pair 1	10445
Alt X	BAX	TOD13 Pair 2	10532
Alt Y	BAY	TOD12 Pair 1	10598
Alt Z	BAZ	TOD12 Pair 2	10564

C ERV			
Direction	Label	Cable	Accel S/N
X	CX	TOD03 Pair 1	10539
Y	CY	TOD03 Pair 2	10565
Z	CZ	TOD15 Pair 1	10557
Alt X	CAX	TOD05 Pair 1	10550
Alt Y	CAY	TOD05 Pair 2	10558
Alt Z	CAZ	TOD16 Pair 1	10562

X = Parallel To Flow

Y = Vertical

Z = Perpendicular To Flow

Figure 3: ERV Accelerometer Location – Tri-Axial Accelerometer Blocks [6]

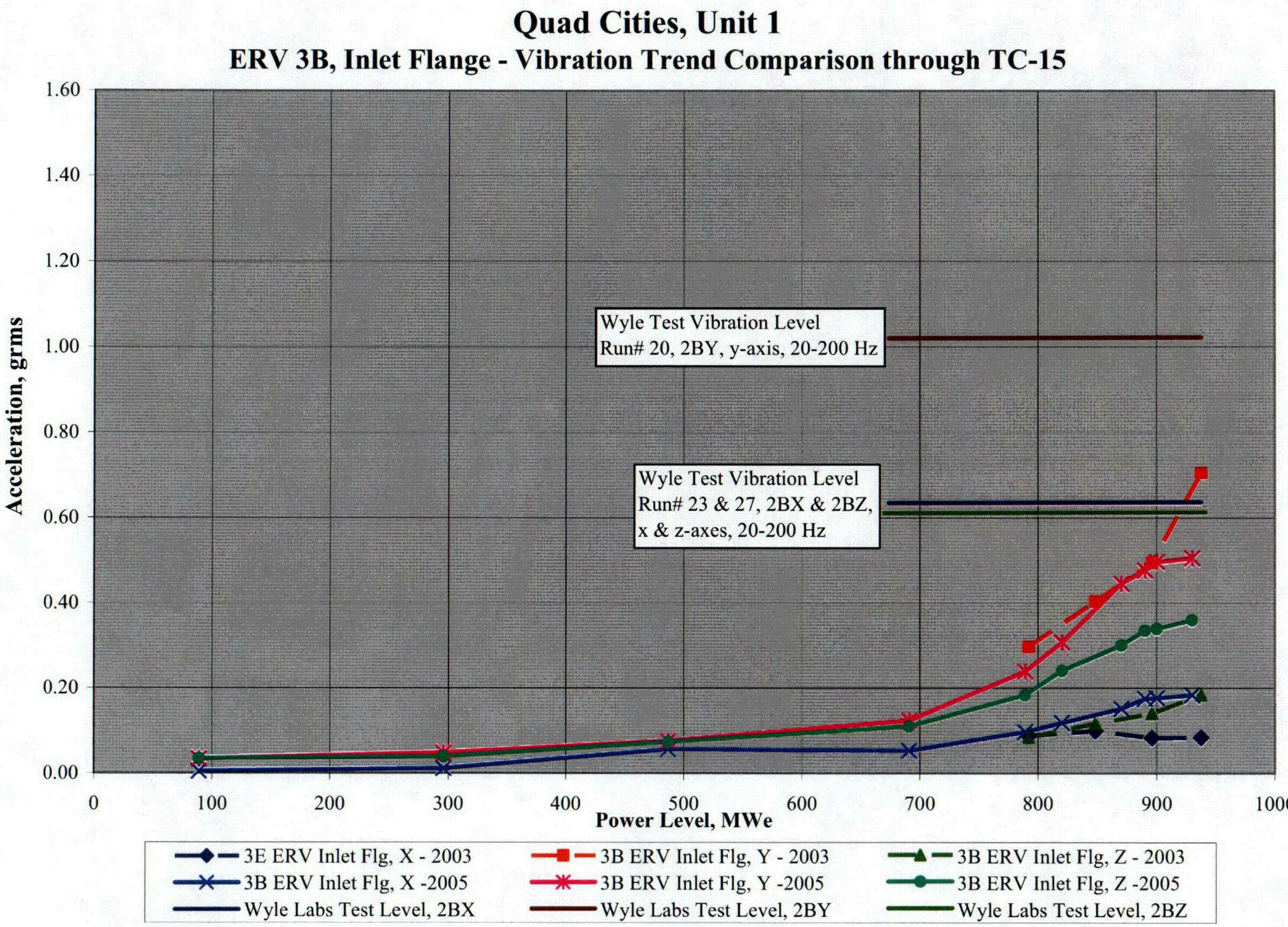


Figure 4: ERV 3B, Inlet Flange RMS Trend Plots

C01

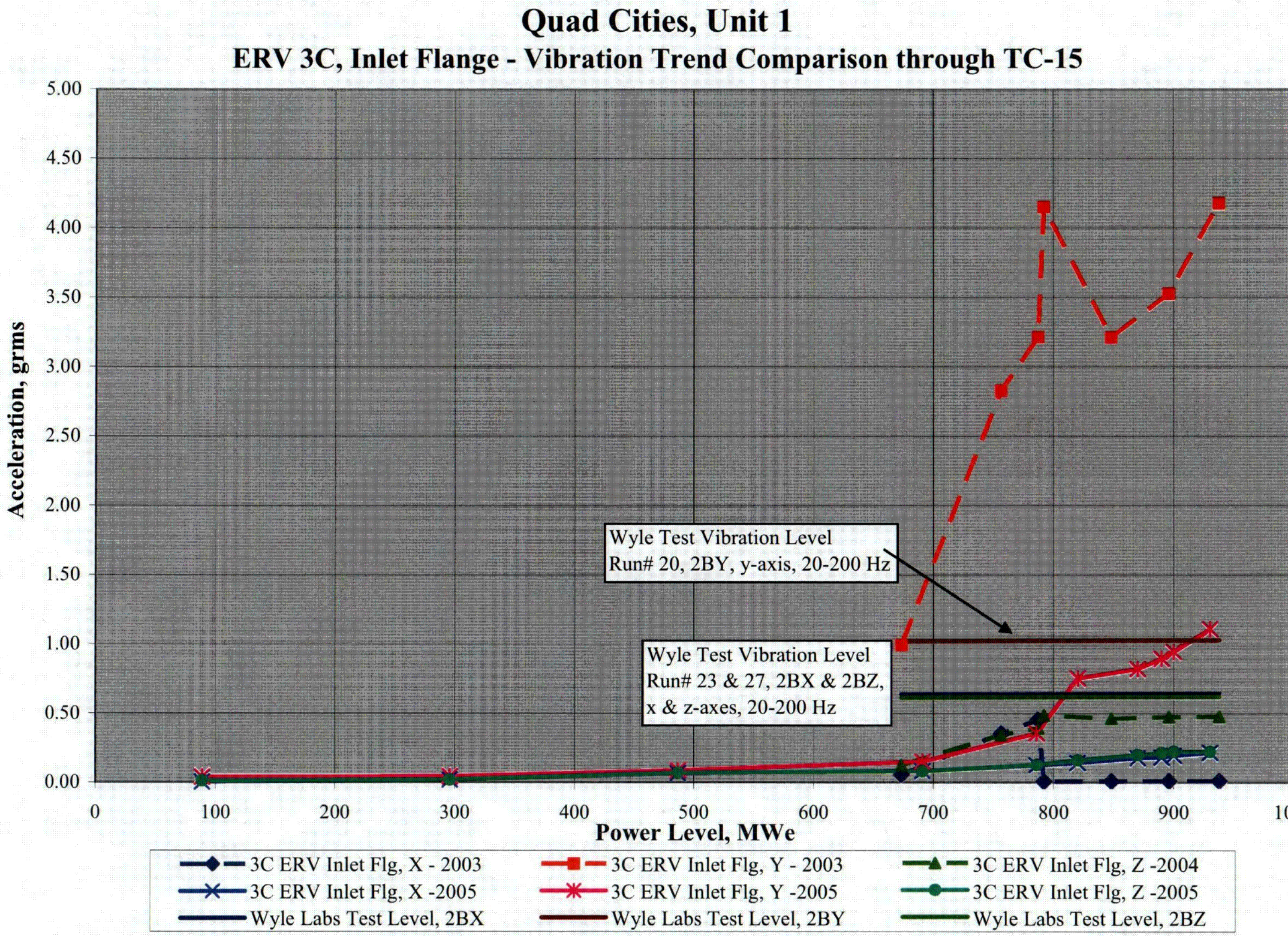


Figure 5: ERV 3C, Inlet Flange RMS Trend Plots

C02

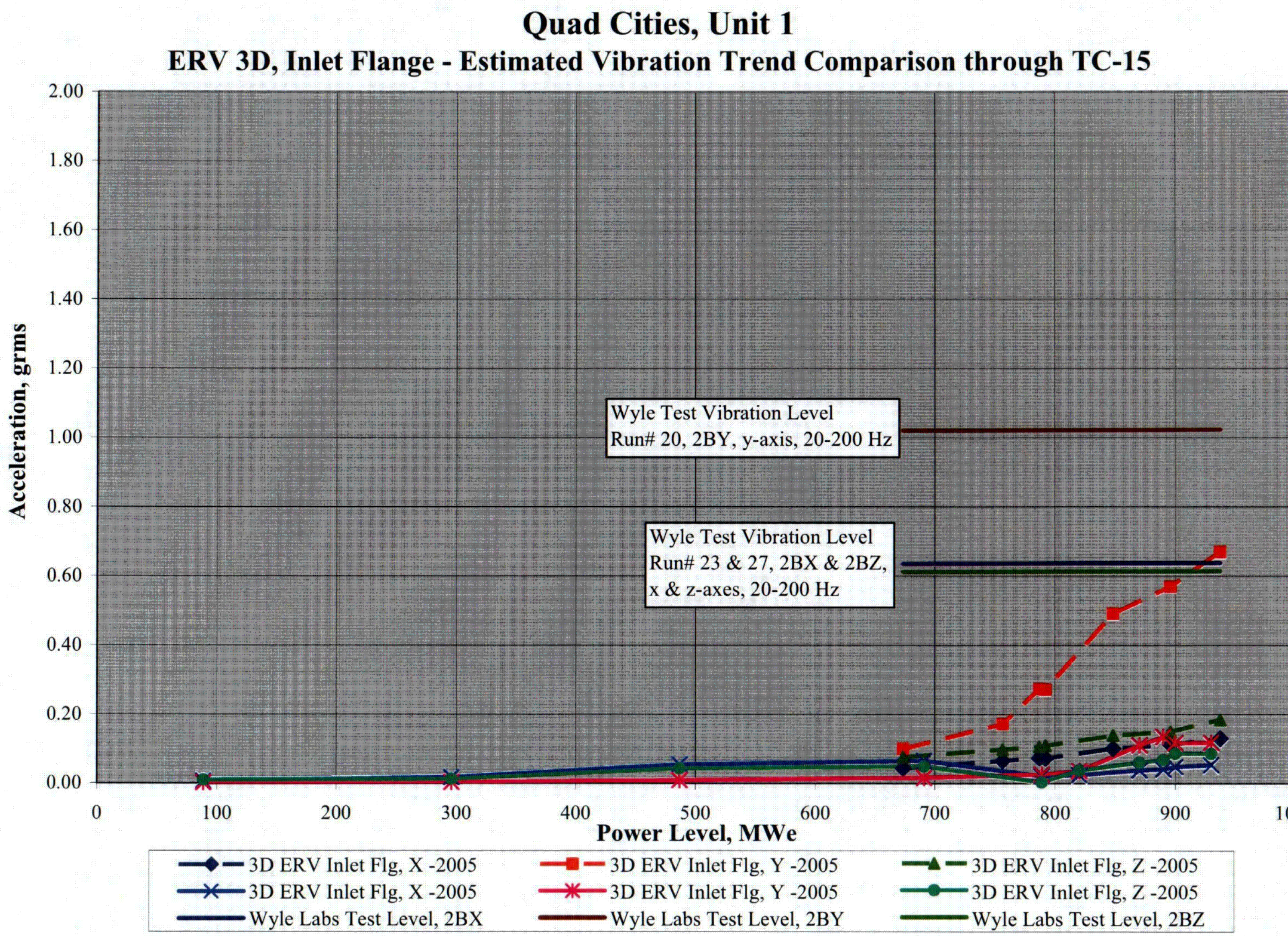


Figure 6: ERV 3D, Inlet Flange RMS Trend Plots

C03

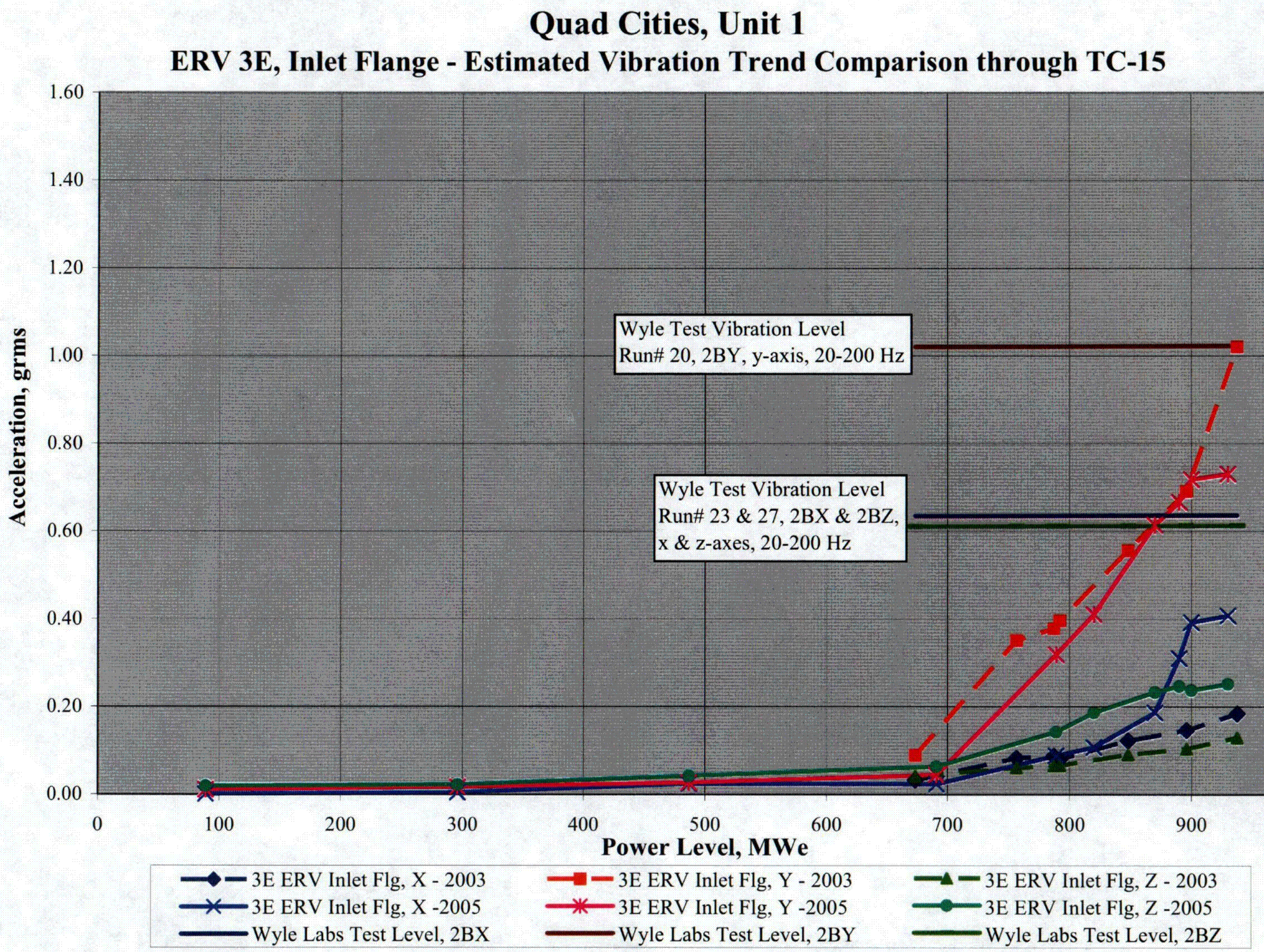


Figure 7: ERV 3E, Inlet Flange RMS Trend Plots

C04

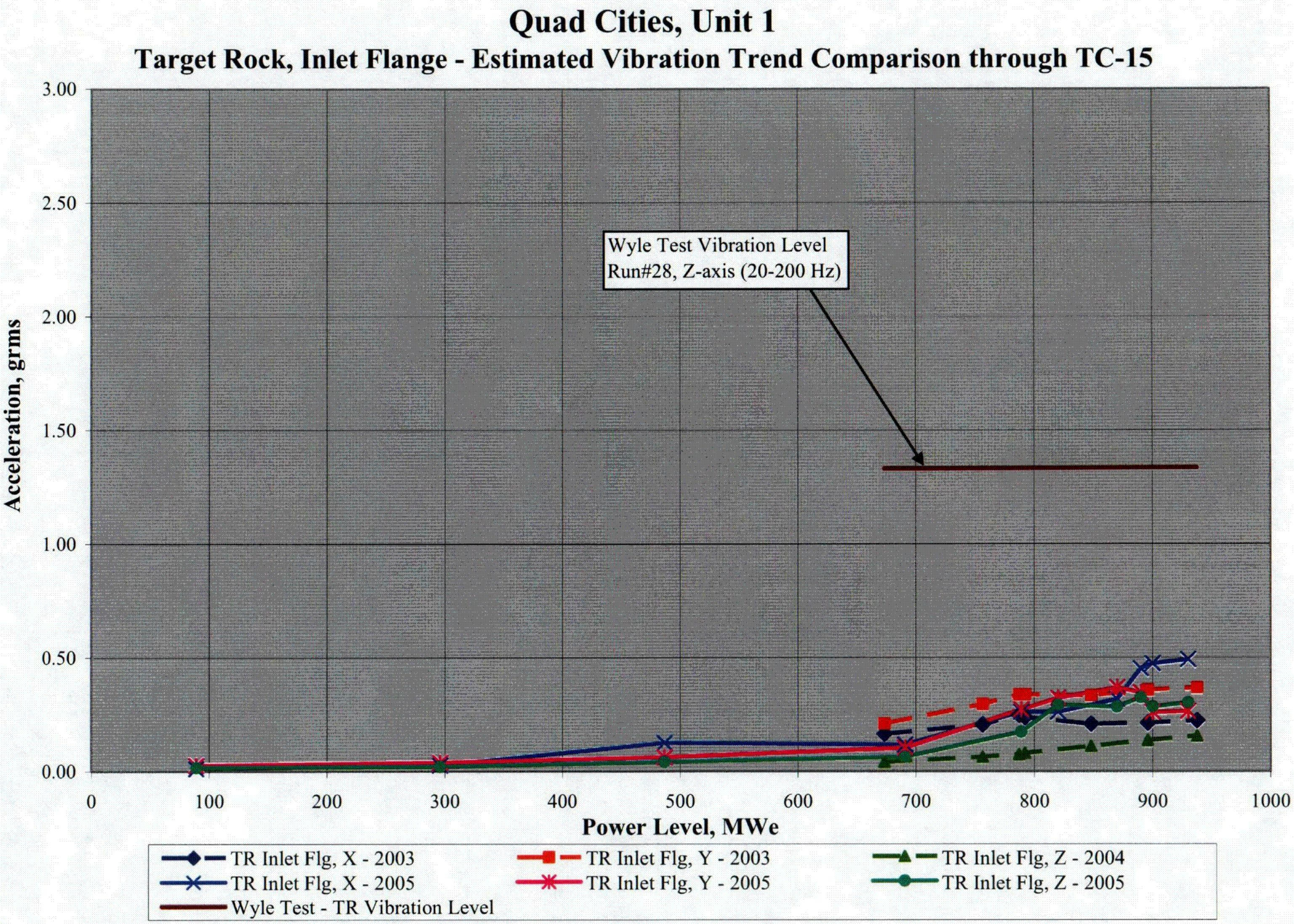


Figure 8: TR 3A, Inlet Flange RMS Trend Plots

C05

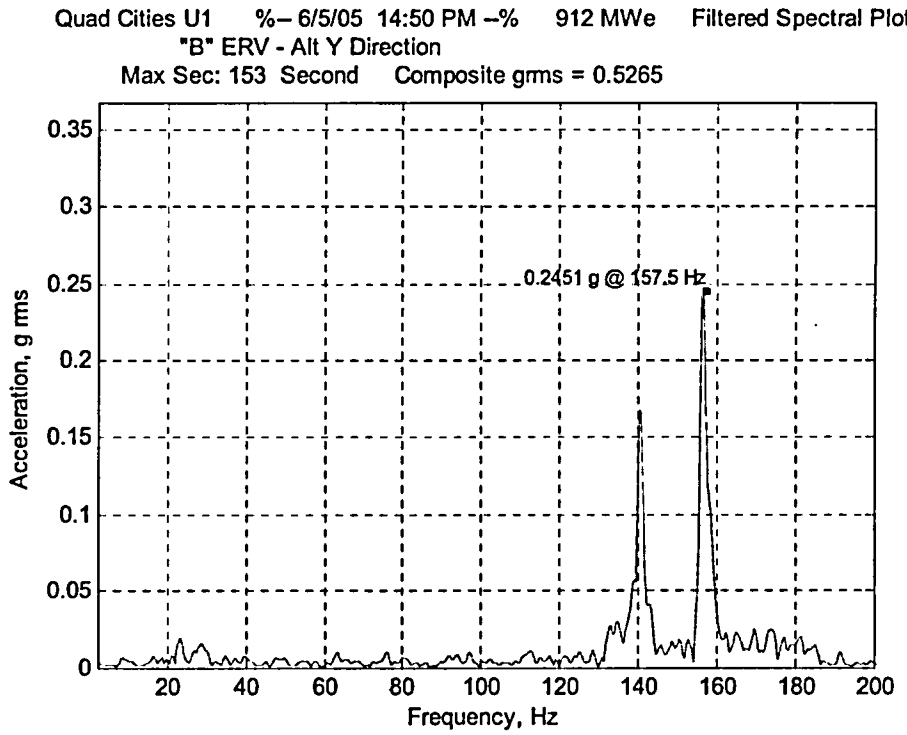


Figure 9: ERV 3B, Inlet Flange, y-axis (maximum response June 2005 data)

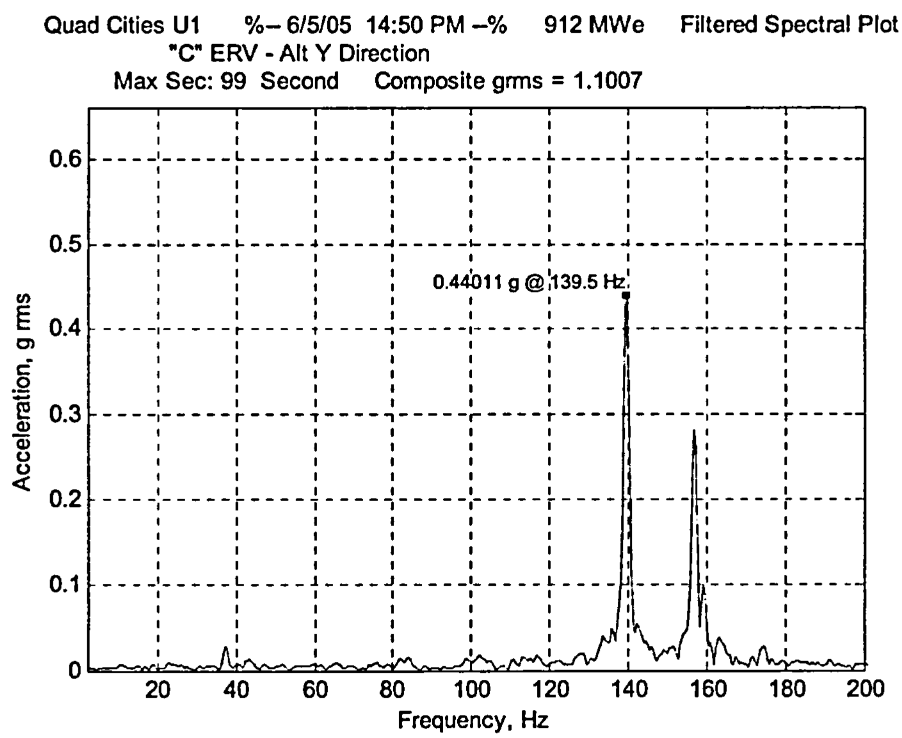


Figure 10: ERV 3C, Inlet Flange, y-axis (maximum response June 2005 data)

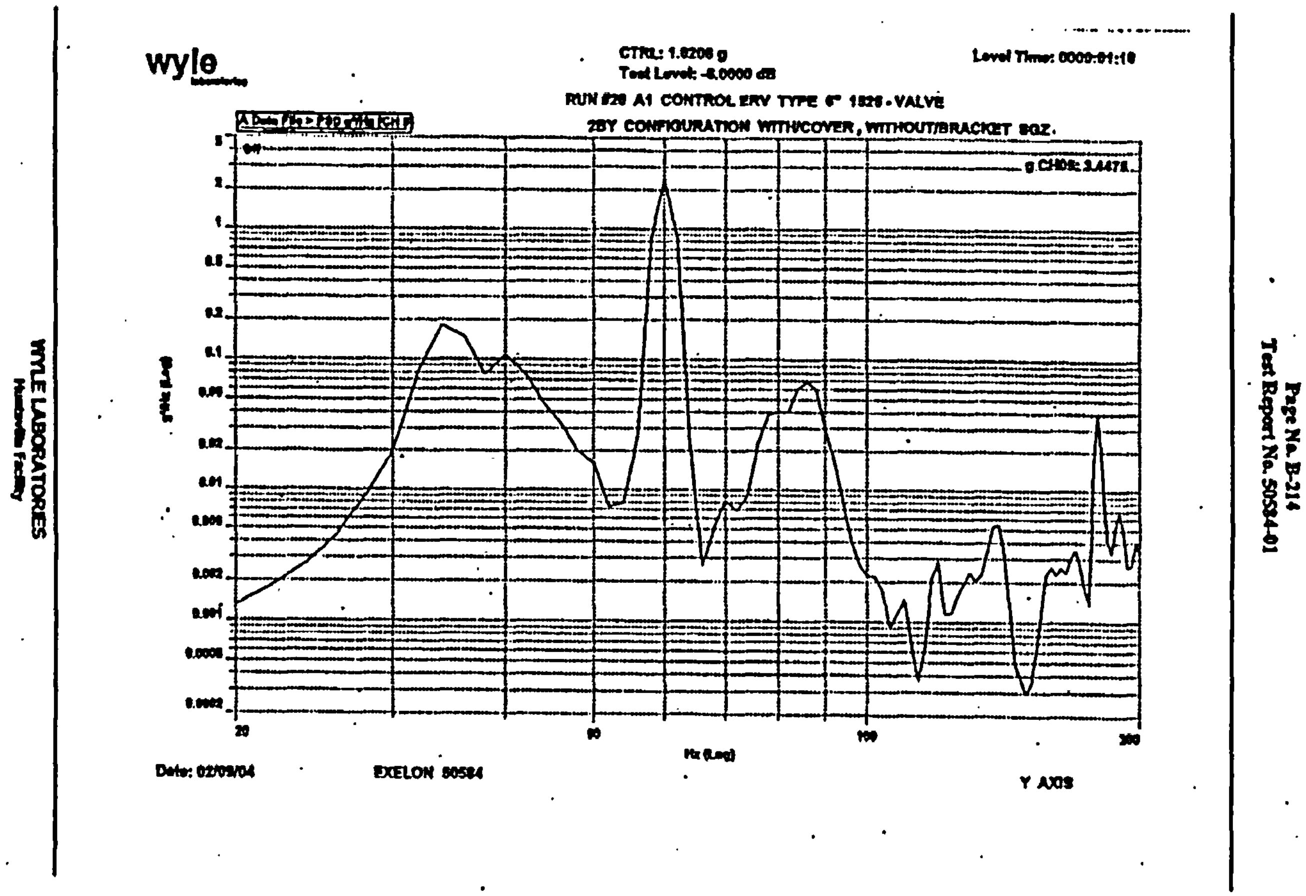


Figure 11: Wyle Labs ERV Actuator Aging Test

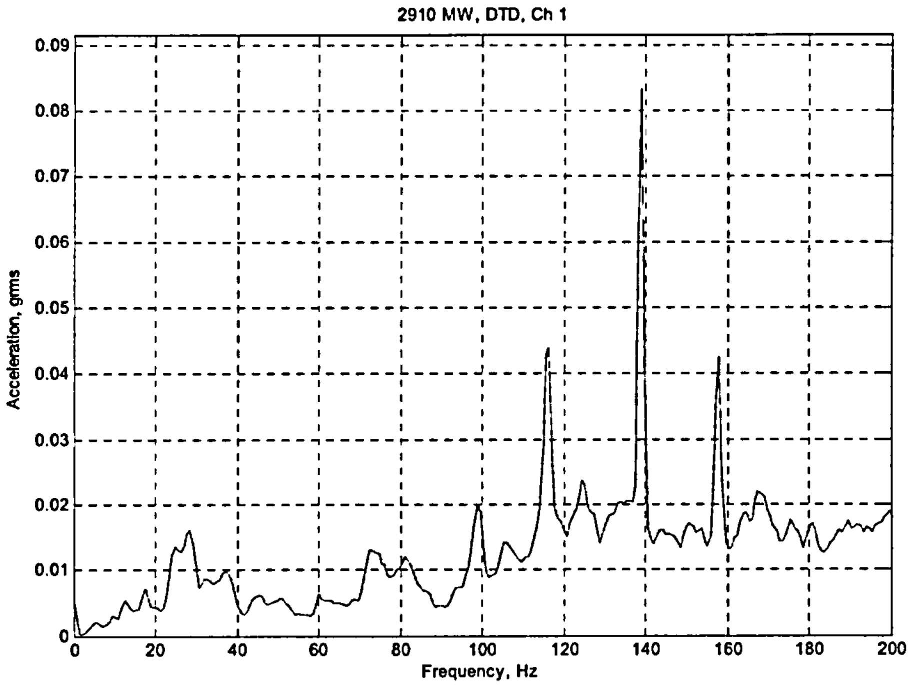


Figure 12: Target Rock, Inlet Flange, x-axis (December 2003 data)

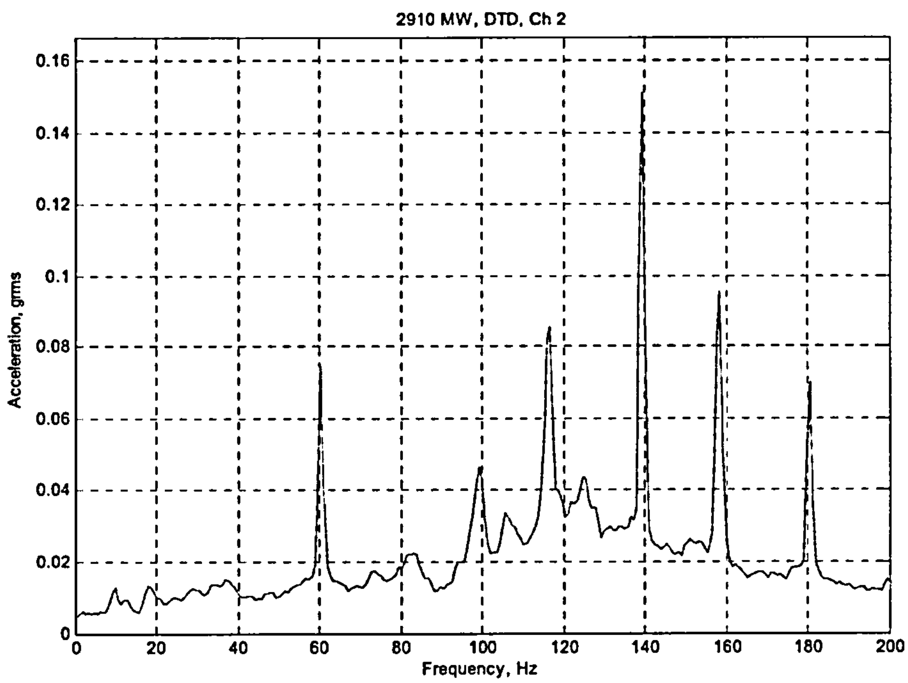


Figure 13: Target Rock, Inlet Flange, y-axis (December 2003 data)

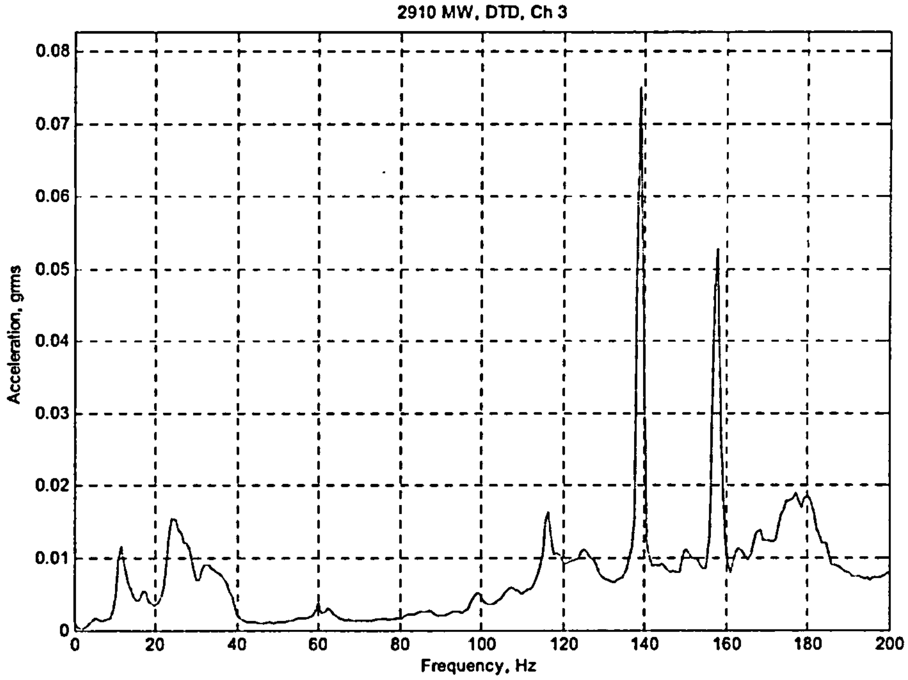


Figure 14: Target Rock, Inlet Flange, z-axis (December 2003 data)

June 17, 2005
SIR-05-198/KJO-05-003

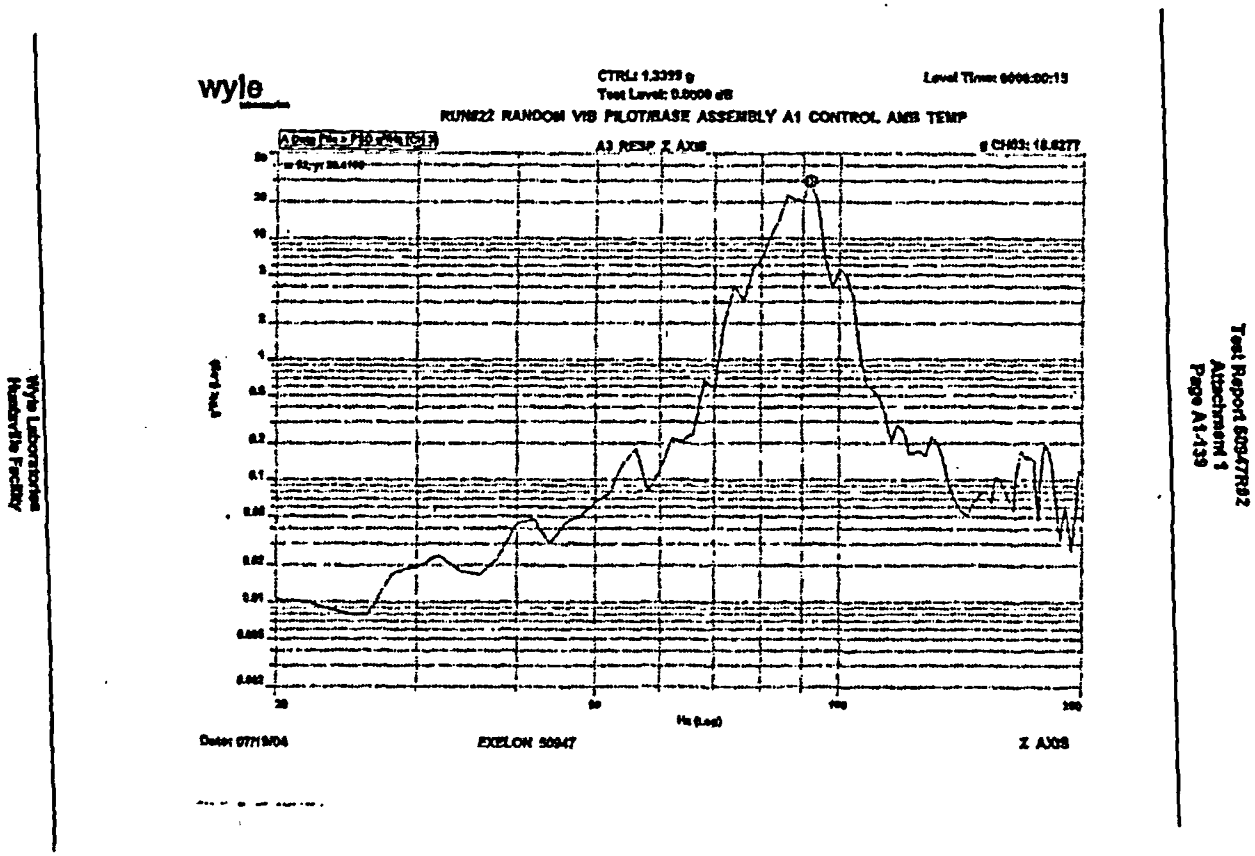


Figure 15: Wyle Labs Target Rock Actuator Aging Test

ATTACHMENT 3

Affidavit and GE Report GENE-0000-0041-1656-01-P, "Test and Analysis Report, Quad Cities New Design Steam Dryer, Dryer #2 Experimental Modal Analysis and Correlation with Finite Element Results," Revision 2, GE Proprietary, dated July 2005

General Electric Company

AFFIDAVIT

I, George B. Stramback, state as follows:

(1) I am Manager, Regulatory Services, General Electric Company ("GE") and have been delegated the function of reviewing the information described in paragraph (2) which is sought to be withheld, and have been authorized to apply for its withholding.

(2) The information sought to be withheld is contained in GE proprietary report, GENE-0000-0041-1656-01-P, *Test and Analysis Report Quad Cities New Design Steam Dryer Dryer #2 Experimental Modal Analysis and Correlation with Finite Element Results*, Revision 2, Class III (GE Proprietary Information), dated July 2005. The proprietary information is delineated by a double underline inside double square brackets. Figures and large equation objects are identified with double square brackets before and after the object. In each case, the superscript notation{3} refers to Paragraph (3) of this affidavit, which provides the basis for the proprietary determination.

(3) In making this application for withholding of proprietary information of which it is the owner, GE relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4), and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10 CFR 9.17(a)(4), and 2.390(a)(4) for "trade secrets" (Exemption 4). The material for which exemption from disclosure is here sought also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

(4) Some examples of categories of information which fit into the definition of proprietary information are:

a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by General Electric's competitors without license from General Electric constitutes a competitive economic advantage over other companies;

b. Information which, if used by a competitor, would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing of a similar product;

c. Information which reveals aspects of past, present, or future General Electric customer-funded development plans and programs, resulting in potential products to General Electric;

d. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs (4)a., and (4)b, above.

(5) To address 10 CFR 2.390 (b) (4), the information sought to be withheld is being submitted to NRC in confidence. The information is of a sort customarily held in confidence by GE, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by GE, no public disclosure has been made, and it is not available in public sources. All disclosures to third parties including any required transmittals to NRC, have been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

(6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within GE is limited on a "need to know" basis.

(7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his delegate), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside GE are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.

(8) The information identified in paragraph (2), above, is classified as proprietary because it contains modal analysis and comparisons to finite element model analysis of a BWR Steam Dryer. Development of this information and its application for the design, procurement and analyses methodologies and processes for the Steam Dryer Program was achieved at a significant cost to GE, on the order of approximately two million dollars.

The development of the evaluation process along with the interpretation and application of the analytical results is derived from the extensive experience database that constitutes a major GE asset.

(9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to GE's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of GE's comprehensive BWR safety and technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology and includes development of the expertise to determine and apply the appropriate evaluation process. In addition, the technology base includes the value derived from providing analyses done with NRC-approved methods.

The research, development, engineering, analytical and NRC review costs comprise a substantial investment of time and money by GE.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

GE's competitive advantage will be lost if its competitors are able to use the results of the GE experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to GE would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive GE of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.

I declare under penalty of perjury that the foregoing affidavit and the matters stated therein are true and correct to the best of my knowledge, information, and belief.

Executed on this 12th day of July 2005.

George B. Stramback
General Electric Company