RECLAMATION

Managing Water in the West

TR-2013-01

Travel to Glen Canyon Dam

Dates of Travel: January 13-19, 2013

U.S. Department of the Interior
Bureau of Reclamation
Technical Service Center
Hydraulic Investigations and Laboratory Services Group
Denver, Colorado

BUREAU OF RECLAMATION
Technical Service Center
Denver, Colorado

TRAVEL REPORT

Code: 86-68460 Date: February 6, 2013

To: Manager, Hydraulic Investigations and Laboratory Services Group

From: Josh Mortensen

Subject: Travel to Glen Canyon Dam for strain measurements on generator spider arms to assist in determining cause of damage to rotor jumpers and excess vibration of unit 6.

1. Travel period: 13 January 2013 – 19 January 2013

2. Places or offices visited: Glen Canyon Dam

3. Purpose of trip: Obtain strain measurements of the rotor spider arms to help determine the cause of frequent failures of jumpers mounted between rotor poles of Unit 6. Strain data are to be used in conjunction with measurements from accelerometers, thermocouples, current meters and other devices to quantify vibrations and other factors that may contribute to the frequent failures.

4. Synopsis of trip: On Sunday January 13th Josh Mortensen (86-68460), John Germann (86-68410), Jim DeHaan (86-68440), Sam Dyas (86-68410), and Dustin Grenemyer (86-68440) traveled to Page, AZ. On Monday morning the 14th they met with Glen Canyon personnel to review the test plan and JHA and to walk clearances. Monday afternoon was spent installing instrumentation inside the Unit 6 generator housing.

Tuesday the 15th was spent completing the equipment installation and troubleshooting the test setup. Unit 6 testing was performed and completed on Wednesday the 16th. Test data were collected at about eight different generator settings. After testing was completed and the clearance reinstated all test equipment was removed from within the Unit 6 generator housing.

Thursday the 17th Unit 5 was shut down to install test equipment in the exact same manner as Unit 6. Data from Unit 5 (a unit that currently runs quite smoothly) were necessary to establish a baseline to which Unit 6 data could be compared. Measurements were taken at approximately the same eight generator settings as Unit 6. Installation was completed by Thursday evening.

Unit 5 testing was performed and completed on Friday the 18th. Following testing all test equipment was removed and packed. The crew returned to Denver on Saturday January 19th, Sam and Dustin drove the work truck with equipment and Josh, John, and Jim flew home.

5. Conclusions: Strain measurements were taken at 4 different locations on one spider arm of generator units 5 and 6. These data will be used in conjunction with measurements from other instruments to quantify Unit 6 vibrations. Preliminary strain data are enclosed with this report. Stress results were calculated assuming a modulus of elasticity of 30 Mpsi for carbon steel. Paul Scannell from Glen Canyon will provide a more accurate modulus that is specific to the steel used in the spider arms. Final results will be presented with data from the other instruments in a full report to the client.

6. Action correspondence initiated or required: None

7. Client feedback received: N/A

cc:
Paul Scannell (GC-220)
John Germann (86-68410)
Jim DeHaan (86-68440)
Sam Dyas (86-68410)
Dustin Grenemyer (86-68440)

bc: N/A

SIGNATURES AND SURNAMES FOR:

Travel to: Glen Canyon Dam, Page, AZ

Dates of Travel: January 14 - 19, 2013

Names and Codes of Travelers: Josh Mortensen, 86-68460

Travelers:

Joshua D Mortensen 2/6/13

Joshua D. Mortensen — Date
Hydraulic Investigations and Laboratory Services Group

Peer Review by:

Brent W Mefford 1/31/2013

Brent W. Mefford — Date
Hydraulic Investigations and Laboratory Services Group

Noted and Dated by:

Robert F. Einhellig 2/5/13

Robert F. Einhellig, Manager — Date
Hydraulic Investigations and Laboratory Services Group

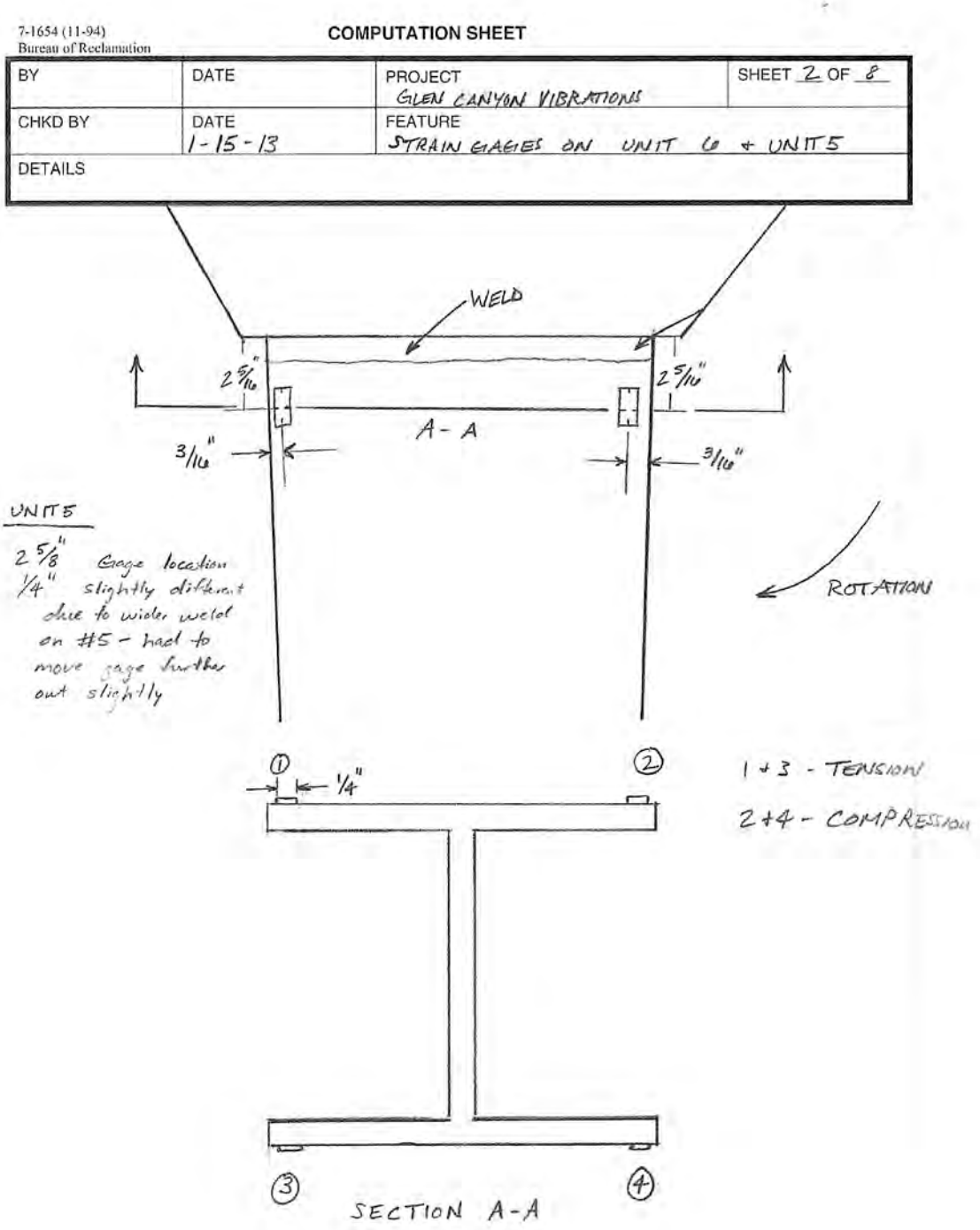

Figure 1 Strain gage location on spider arm for both units 5 and 6.

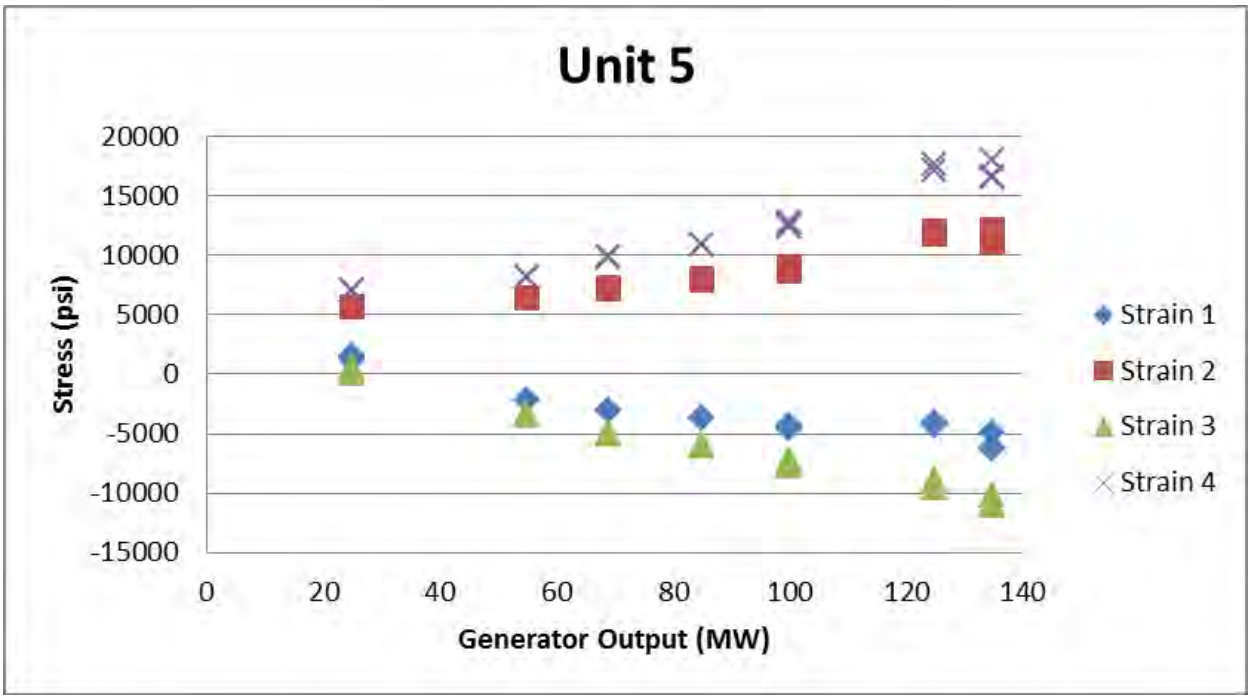

Figure 2 Max stress measurements on Unit 5 spider arms vs. generator power. Negative values indicate tension and positive values compression.

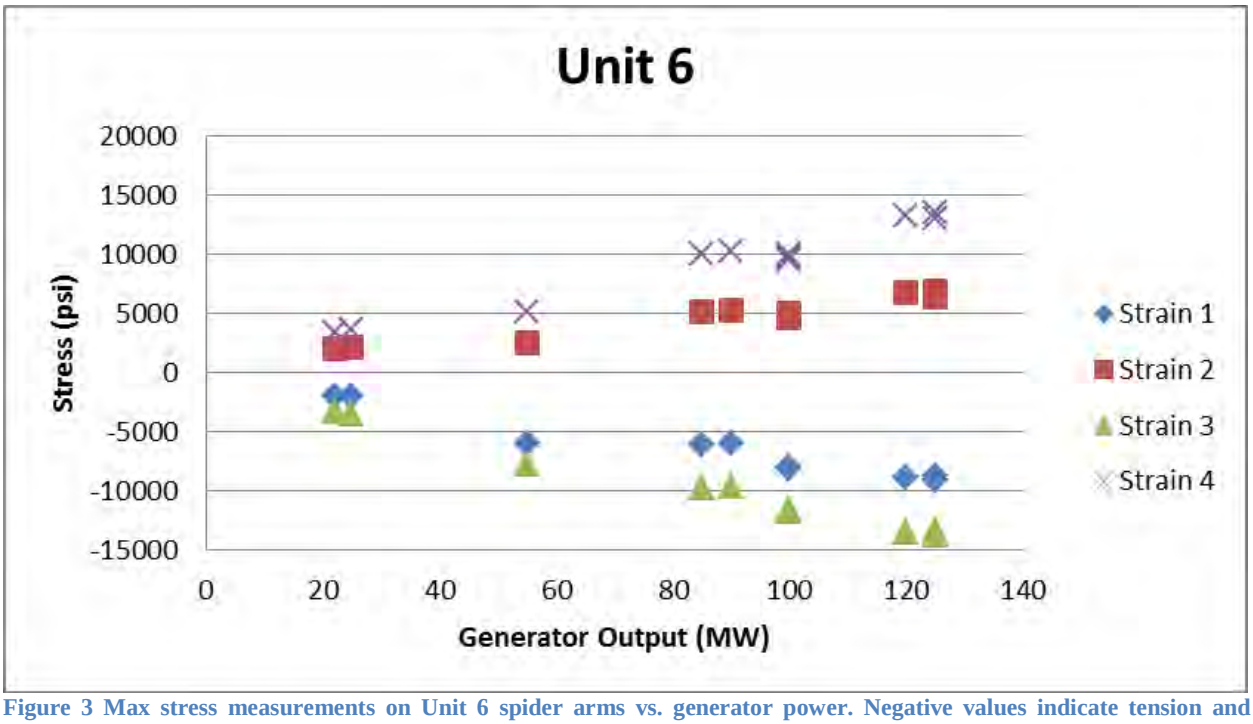

Figure 3 Max stress measurements on Unit 6 spider arms vs. generator power. Negative values indicate tension and positive values compression.

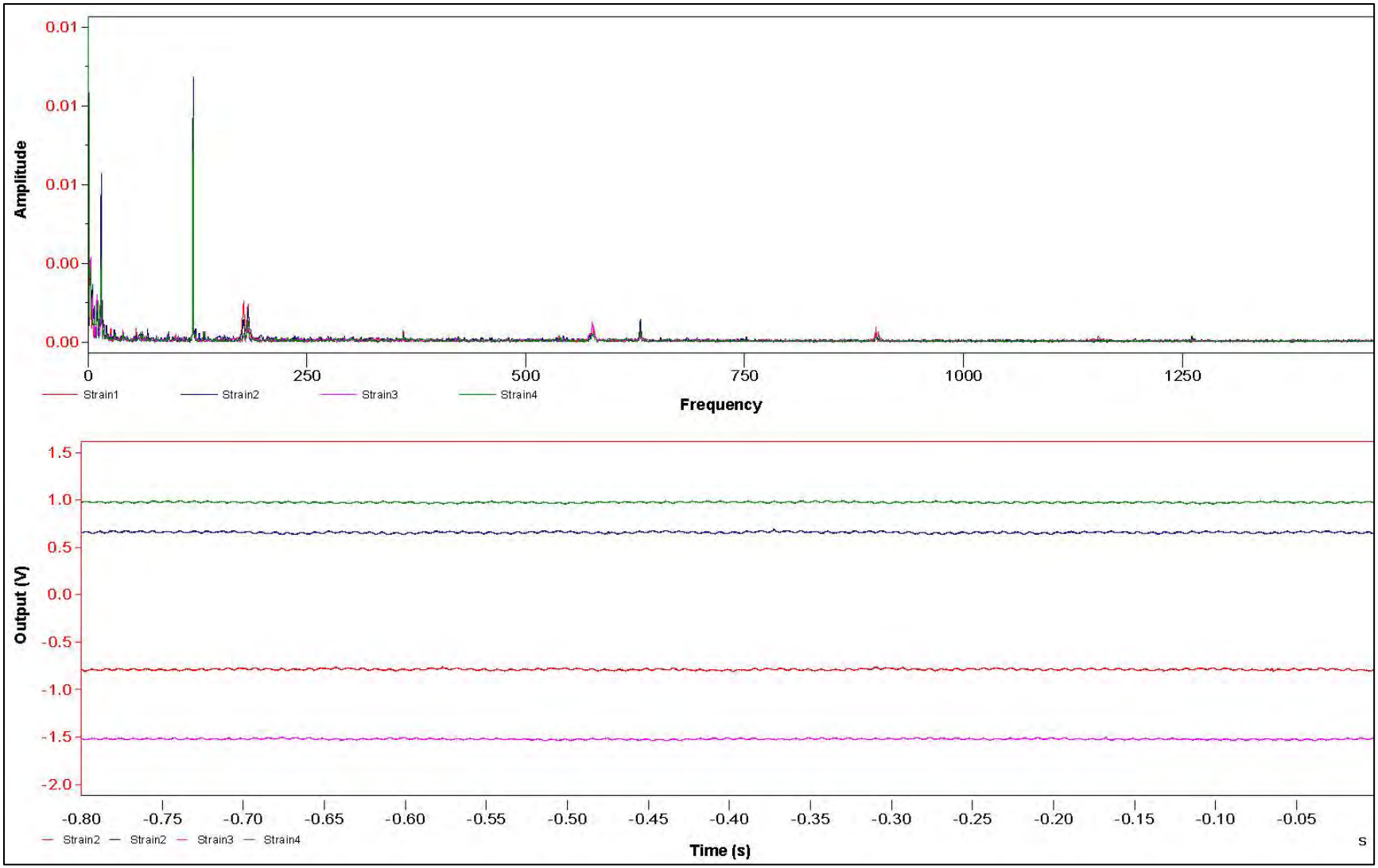

Figure 4 Unit 5 frequency and time data at 125 MW. Amplitudes at 120 Hz correlate with the generator pole passing frequency. The time span of 0.8 seconds shows 2 revolutions of the generator.

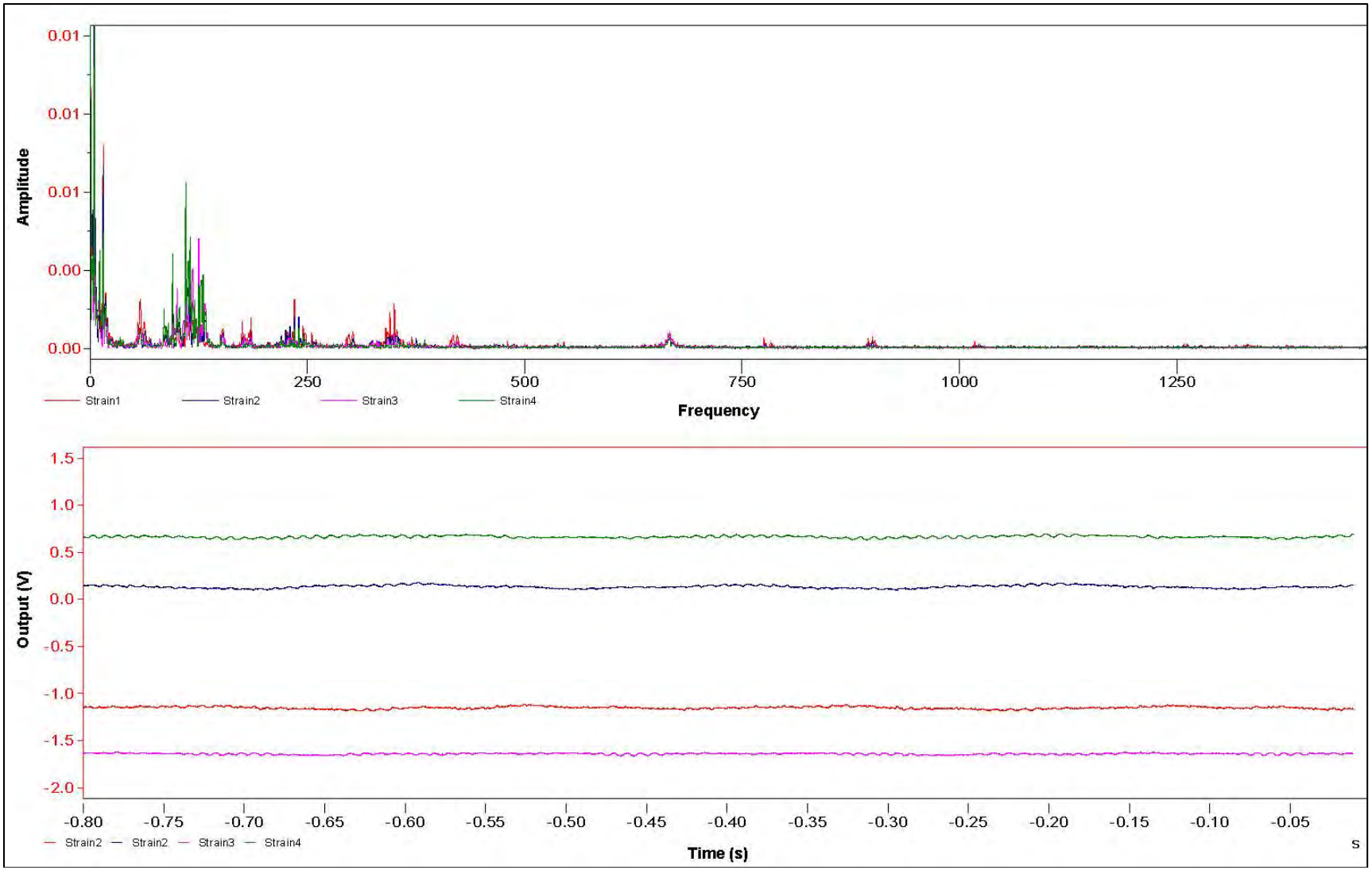

Figure 5 Unit 6 frequency and time data at 125 MW. Amplitudes at 120 Hz correlate with the generator pole passing frequency. The time span of 0.8 seconds shows 2 revolutions of the generator.