# Noise Level Compliance Report APPENDIX

for the

## Lake Winds Energy Park – Spring 2016 Noise Level Measurements

Mason County, Michigan

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August 2016

Prepared for:

## Mason County Michigan
Scottville, Michigan

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Prepared by:


## Hankard Environmental, Inc.
Verona, Wisconsin

HANKARD ENVIRONMENTAL
ACOUSTICS AND VIBRATION CONSULTING


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# APPENDIX A

# NOISE MEASUREMENT EQUIPMENT CALIBRATION CERTIFICATES

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor NY 14564

ISO/IEC 17025: 2005
ACCREDITED
Calibration Lab. Cert. # 1533.01

# REPORT OF CALIBRATION

for

Brüel & Kjær Hand-held Analyzer  Model No.: 2250  Serial No.: 2676058

Company: Hankard Environmental Inc.  ID No.: XXXX

**The procedure from IEC 61672-3-2013 were used to perform the periodic test. (Test limits are from IEC 61672-1-2013)**
**Instrument submitted for testing has successfully completed the Class 1 periodic test of IEC 61672-3-2013 listed below.**
**Also meets the requirements of ANSI/ASA S1.4 - 2014 / Part 3.**
**Fulfils 1/1-Octave and 1/3-Octave Filter ANSI/ASA S1.11 -1-2004 and IEC61260-1 : 2014 requirements.**

| | |
|---|---|
| Absolute Acoustical Sensitivity Level, IEC 61672 - 3 (9) | Pass |
| Electrical Inherent Noise Level, Freq. Weig. Lin, IEC 61672-3 (10) | Pass |
| Determining Electrical Level for 1V at 1kHz | Pass |
| Frequency Response measured with Electrical Signal, Freq. Weig. A with HP filter, IEC 61672 Class 1 (12) | Pass |
| Frequency Response measured with Electrical Signal, Freq. Weig. C with HP filter, IEC 61672 Class 1 (12) | Pass |
| Frequency Response measured with Electrical Signal, Freq. Weig. Z with HP filter, IEC 61672 Class 1 (12) | Pass |
| Frequency Weightings at A - Weighting 1kHz, IEC 61672-3 (13) | Pass |
| Frequency Weightings at C - Weighting 1kHz, IEC 61672-3 (13) | Pass |
| Frequency Weightings at Z - Weighting 1kHz, IEC 61672-3 (13) | Pass |
| Linearity Range at 1kHz, IEC61672 - 3 (14) | Pass |
| Range Level at 1kHz, IEC61672 - 3 (15) | Pass |
| Time Weighting Response to Single Burst, 4kHz, 200ms, F Class 1, IEC61672 - 3 (16) | Pass |
| Time Weighting Response to Single Burst, 4kHz, 2ms, F Class 1, IEC61672 - 3 (16) | Pass |
| Time Weighting Response to Single Burst, 4kHz, 0.25ms, F Class 1, IEC61672 - 3 (16) | Pass |
| Time Weighting Response to Single Burst, 4kHz, 200ms, S Class 1, IEC61672 - 3 (16) | Pass |
| Time Weighting Response to Single Burst, 4kHz, 2ms, S Class 1, IEC61672 - 3 (16) | Pass |
| Peak C Level 8kHz Sine IEC 61672 - 3 Class 1 (17) | Pass |
| Peak C Level 500Hz Positive Pulse IEC 61672 - 3 Class 1 (17) | Pass |
| Peak C Level 500Hz Negative Pulse IEC 61672 - 3 Class 1 (17) | Pass |
| Overload Indication IEC 61672 - 3 (18) | Pass |
| Octave and 1/3 Octave level IEC 61260 - 5.3 | Pass |

Measurements performed by: .....
Kent Zeng

Calibrated on WCCL system type 9700

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor NY 14564

ISO/IEC 17025: 2005
ACCREDITED
Calibration Lab. Cert. # 1533.01

# REPORT OF CALIBRATION

for

Brüel & Kjær Hand-held Analyzer | Model No.: 2250 | Serial No.: 2676018

Company: Hankard Environmental Inc. | ID No.: XXXX

**The procedure from IEC 61672-3-2013 were used to perform the periodic test. (Test limits are from IEC 61672-1-2013)**
**Instrument submitted for testing has successfully completed the Class 1 periodic test of IEC 61672-3-2013 listed below.**
**Also meets the requirements of ANSI/ASA S1.4 - 2014 / Part 3.**
**Fulfils 1/1-Octave and 1/3-Octave Filter ANSI/ASA S1.11 -1-2004 and IEC61260-1 : 2014 requirements.**

| | |
|---|---|
| Absolute Acoustical Sensitivity Level, IEC 61672 - 3 (9) | Pass |
| Electrical Inherent Noise Level, Freq. Weig. Lin, IEC 61672-3 (10) | Pass |
| Determining Electrical Level for 1V at 1kHz | Pass |
| Frequency Response measured with Electrical Signal, Freq. Weig. A with HP filter, IEC 61672 Class 1 (12) | Pass |
| Frequency Response measured with Electrical Signal, Freq. Weig. C with HP filter, IEC 61672 Class 1 (12) | Pass |
| Frequency Response measured with Electrical Signal, Freq. Weig. Z with HP filter, IEC 61672 Class 1 (12) | Pass |
| Frequency Weightings at A - Weighting 1kHz, IEC 61672-3 (13) | Pass |
| Frequency Weightings at C - Weighting 1kHz, IEC 61672-3 (13) | Pass |
| Frequency Weightings at Z - Weighting 1kHz, IEC 61672-3 (13) | Pass |
| Linearity Range at 1kHz, IEC61672 - 3 (14) | Pass |
| Range Level at 1kHz, IEC61672 - 3 (15) | Pass |
| Time Weighting Response to Single Burst, 4kHz, 200ms, F Class 1, IEC61672 - 3 (16) | Pass |
| Time Weighting Response to Single Burst, 4kHz, 2ms, F Class 1, IEC61672 - 3 (16) | Pass |
| Time Weighting Response to Single Burst, 4kHz, 0.25ms, F Class 1, IEC61672 - 3 (16) | Pass |
| Time Weighting Response to Single Burst, 4kHz, 200ms, S Class 1, IEC61672 - 3 (16) | Pass |
| Time Weighting Response to Single Burst, 4kHz, 2ms, S Class 1, IEC61672 - 3 (16) | Pass |
| Peak C Level 8kHz Sine IEC 61672 - 3 Class 1 (17) | Pass |
| Peak C Level 500Hz Positive Pulse IEC 61672 - 3 Class 1 (17) | Pass |
| Peak C Level 500Hz Negative Pulse IEC 61672 - 3 Class 1 (17) | Pass |
| Overload Indication IEC 61672 - 3 (18) | Pass |
| Octave and 1/3 Octave level IEC 61260 - 5.3 | Pass |

Measurements performed by: .....
Kent Zeng

Calibrated on WCCL system type 9700

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor NY 14564

ISO/IEC 17025: 2005
ACCREDITED
Calibration Lab. Cert. # 1533.01

# REPORT OF CALIBRATION

for

**Brüel & Kjær Microphone** **Model No.: 4189** **Serial No.: 2663088**

**Company: Hankard Environmental Inc.** **I. D. No.: XXXX**

Calibration results:

**Before & after data same:** ...X...

**Combined Sensitivity @** 250 Hz and pressure of 100.46 kPa
(Sens. with mic. and preamp.) 0 Volts Polarization voltage (External):

**-26.60 dB re.1V/Pascal**
**46.77 mV/Pascal**
**0.60 Ko ( - dB re 50 mV/Pascal)**

**Sensitivity:** Pass
**Freq. Response:** Pass
**All tests:** Pass

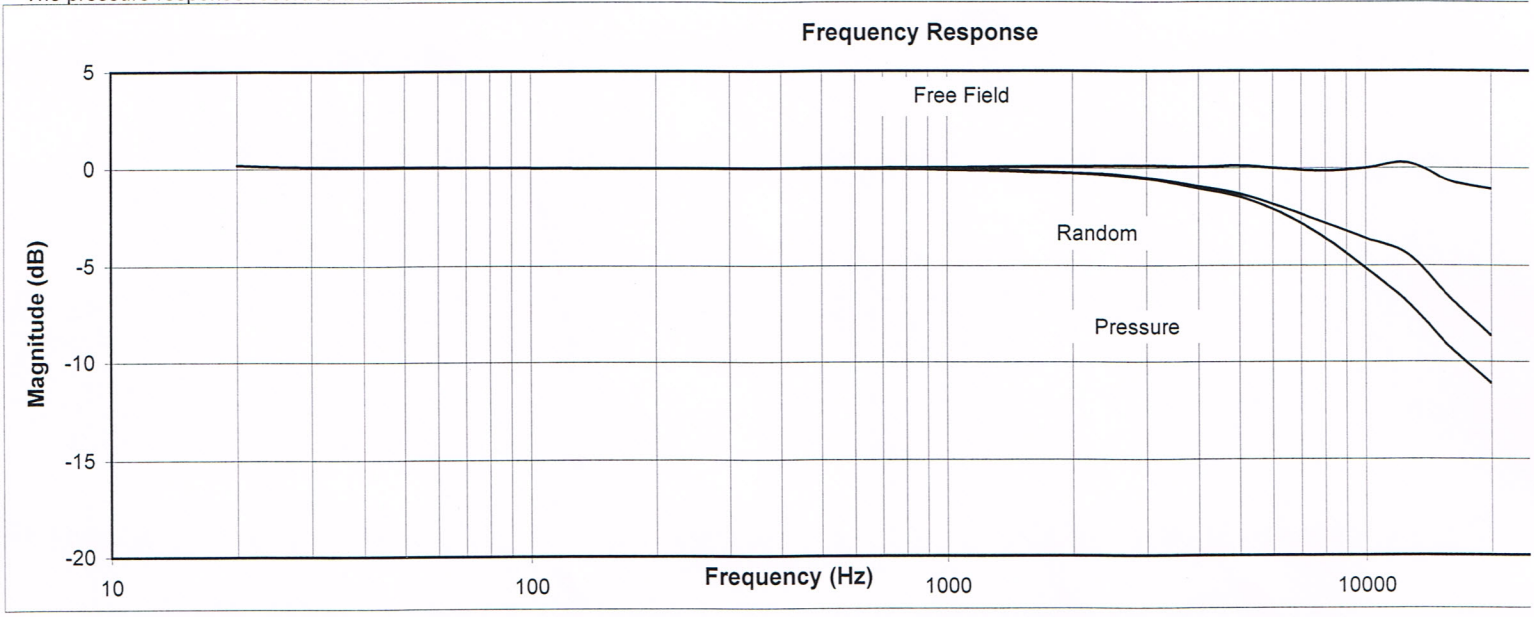
| | | |
|---|---|---|
| Ambient Temperature: | 21.8 | °C |
| Ambient Humidity: | 30.8 | % RH |
| Ambient Pressure: | 100.458 | kPa |
| Calibration Date: | 20-Apr-2016 | |
| Re-calibration Due: | 20-Apr-2017 | |
| Report Number: | 26374 -3 | |
| Control Number: | 26374 | |

**The above listed instrument meets or exceeds the tested manufacturer's specifications.**
**The IEC 651:1979 & 1993 Type 1 specification passed.**

This Calibration is traceable through NIST test numbers: 683/284413-14

The expanded uncertainty of calibration: 0.094dB at 95% confidence level with a coverage factor of k=2.

The pressure response recorded with electroacoustic method.




The above listed instrument was checked using calibration procedure documented in West Caldwell Calibration Laboratories Inc. procedure : **Rev. 7.0 Jan. 24, 2014 Doc. # 1038 P4189B&K**

Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NCSL Z540-1, (MIL-STD-45662A) and ISO 9001:2008, ISO 17025

Measurements performed by: .....
**Kent Zeng**

**Calibrated on WCCL system type 9700**

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor NY 14564

ISO/IEC 17025: 2005
ACCREDITED
Calibration Lab. Cert. # 1533.01

# REPORT OF CALIBRATION

for

**Brüel & Kjær Microphone** **Model No.: 4189** **Serial No.: 2663089**

**Company: Hankard Environmental Inc.** **I. D. No.: XXXX**

Calibration results:

**Before & after data same:** ...X...

**Combined Sensitivity @** 250 Hz and pressure of 100.46 kPa
(Sens. with mic. and preamp.) 0 Volts Polarization voltage (External):

**-26.49 dB re.1V/Pascal**
**47.36 mV/Pascal**
**0.49 Ko ( - dB re 50 mV/Pascal)**

Sensitivity: Pass
Freq. Response: Pass
All tests: Pass

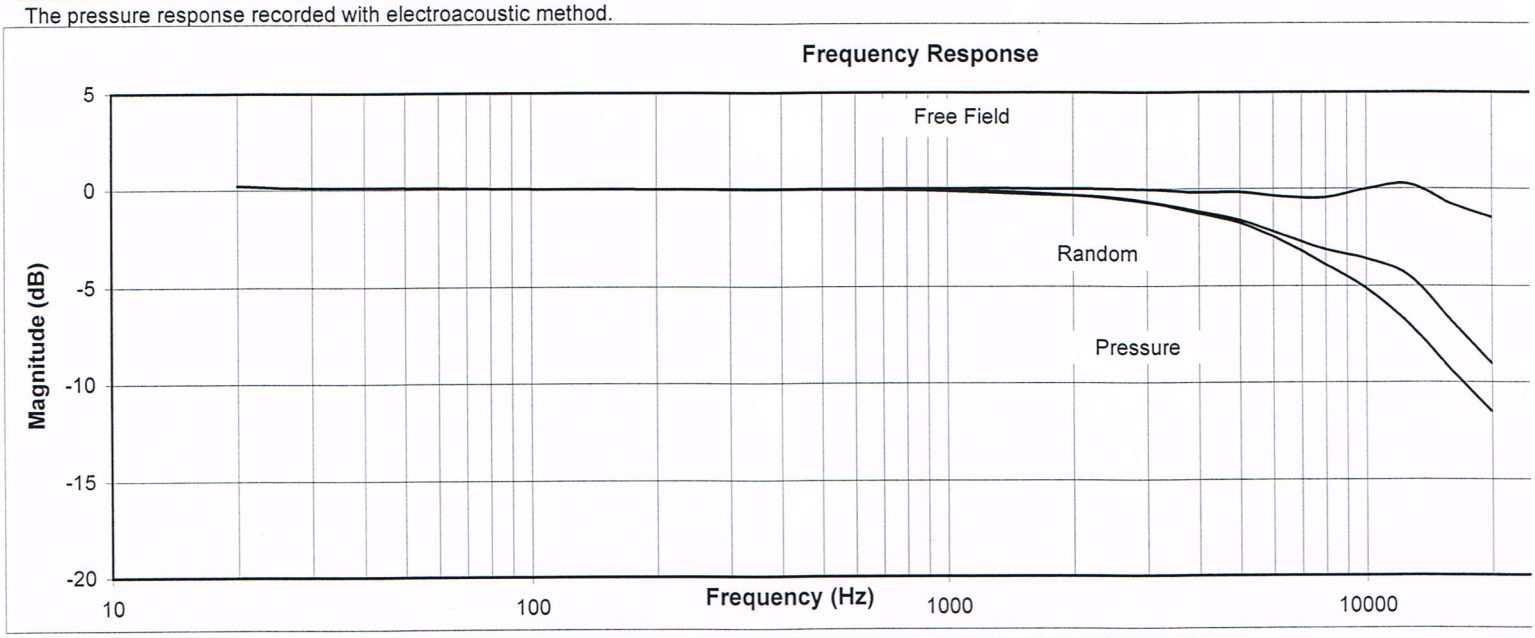
| | | |
|---|---|---|
| Ambient Temperature: | 21.8 | °C |
| Ambient Humidity: | 30.8 | % RH |
| Ambient Pressure: | 100.458 | kPa |
| Calibration Date: | 20-Apr-2016 | |
| Re-calibration Due: | 20-Apr-2017 | |
| Report Number: | 26374 -5 | |
| Control Number: | 26374 | |

**The above listed instrument meets or exceeds the tested manufacturer's specifications.**
**The IEC 651:1979 & 1993 Type 1 specification passed.**

This Calibration is traceable through NIST test numbers: 683/284413-14

The expanded uncertainty of calibration: 0.094dB at 95% confidence level with a coverage factor of k=2.

The pressure response recorded with electroacoustic method.




The above listed instrument was checked using calibration procedure documented in West Caldwell Calibration Laboratories Inc. procedure : **Rev. 7.0 Jan. 24, 2014 Doc. # 1038 P4189B&K**

Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NCSL Z540-1, (MIL-STD-45662A) and ISO 9001:2008, ISO 17025

Measurements performed by: .....
**Kent Zeng**

Calibrated on WCCL system type 9700

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor NY 14564

ISO/IEC 17025: 2005
ACCREDITED
Calibration Lab. Cert. # 1533.01

# REPORT OF CALIBRATION

for

**Brüel & Kjær Microphone** **Model No.: 4952** **Serial No.: 2653064**

**Company: Hankard Environmental Inc.** **I. D. No.: XXXX**

Calibration results:

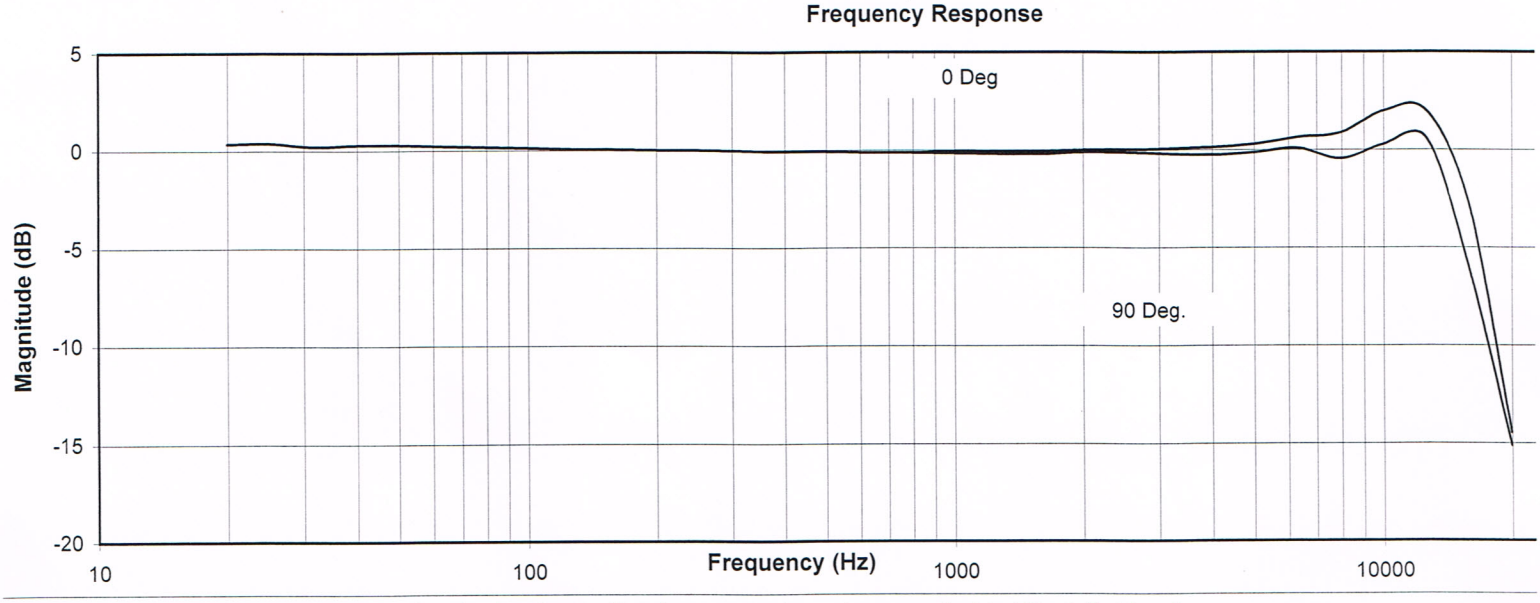
| | | | | | |
|---|---|---|---|---|---|
| **Before & after data same:** | ...X... | | Ambient Temperature: | 21.8 | °C |
| **Combined Sensitivity @** | **250** Hz | **and pressure of** **100.46** kPa | Ambient Humidity: | 30.8 | % RH |
| (Sens. with mic. and preamp.) | 0 Volts Polarization voltage (External): | | Ambient Pressure: | 100.458 | kPa |
| | **-30.15 dB re.1V/Pascal** | | Calibration Date: | 20-Apr-2016 | |
| | **31.08 mV/Pascal** | | Re-calibration Due: | 20-Apr-2017 | |
| | **4.15 Ko ( - dB re 50 mV/Pascal)** | | Report Number: | 26374 -9 | |
| | **Sensitivity:** Pass | | Control Number: | 26374 | |
| | **Freq. Response:** Pass | | | | |
| | **All tests:** Pass | | | | |

**The above listed instrument meets or exceeds the tested manufacturer's specifications.**

This Calibration is traceable through NIST test numbers: 683/284413-14

The expanded uncertainty of calibration: 0.094dB at 95% confidence level with a coverage factor of k=2.

The pressure response recorded with electroacoustic method.




The above listed instrument was checked using calibration procedure documented in West Caldwell Calibration Laboratories Inc. procedure : **Rev. 7.0 Jan. 24, 2014 Doc. # 1038 P4952B&K**

Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NCSL Z540-1, (MIL-STD-45662A) and ISO 9001:2008, ISO 17025

Measurements performed by: .....
**Kent Zeng**

**Calibrated on WCCL system type 9700**

West Caldwell Calibration Laboratories, Inc.
uncompromised calibration
1575 State Route 96, Victor NY 14564

ISO/IEC 17025: 2005
ACCREDITED
Calibration Lab. Cert. # 1533.01

# REPORT OF CALIBRATION

for

**Brüel & Kjær Microphone** **Model No.: 4952** **Serial No.: 2653065**

**Company: Hankard Environmental Inc.** **I. D. No.: XXXX**

Calibration results:

**Before & after data same:** ...X...

**Combined Sensitivity @** **250** **Hz** **and pressure of** **100.46** **kPa**
(Sens. with mic. and preamp.) **0** Volts Polarization voltage (External):
**-30.94 dB re.1V/Pascal**
**28.39 mV/Pascal**
**4.94 Ko ( - dB re 50 mV/Pascal)**
**Sensitivity:** **Pass**
**Freq. Response:** **Pass**
**All tests:** **Pass**

| | | |
|---|---|---|
| Ambient Temperature: | 21.8 | °C |
| Ambient Humidity: | 30.8 | % RH |
| Ambient Pressure: | 100.458 | kPa |
| Calibration Date: | 20-Apr-2016 | |
| Re-calibration Due: | 20-Apr-2017 | |
| Report Number: | 26374 -8 | |
| Control Number: | 26374 | |

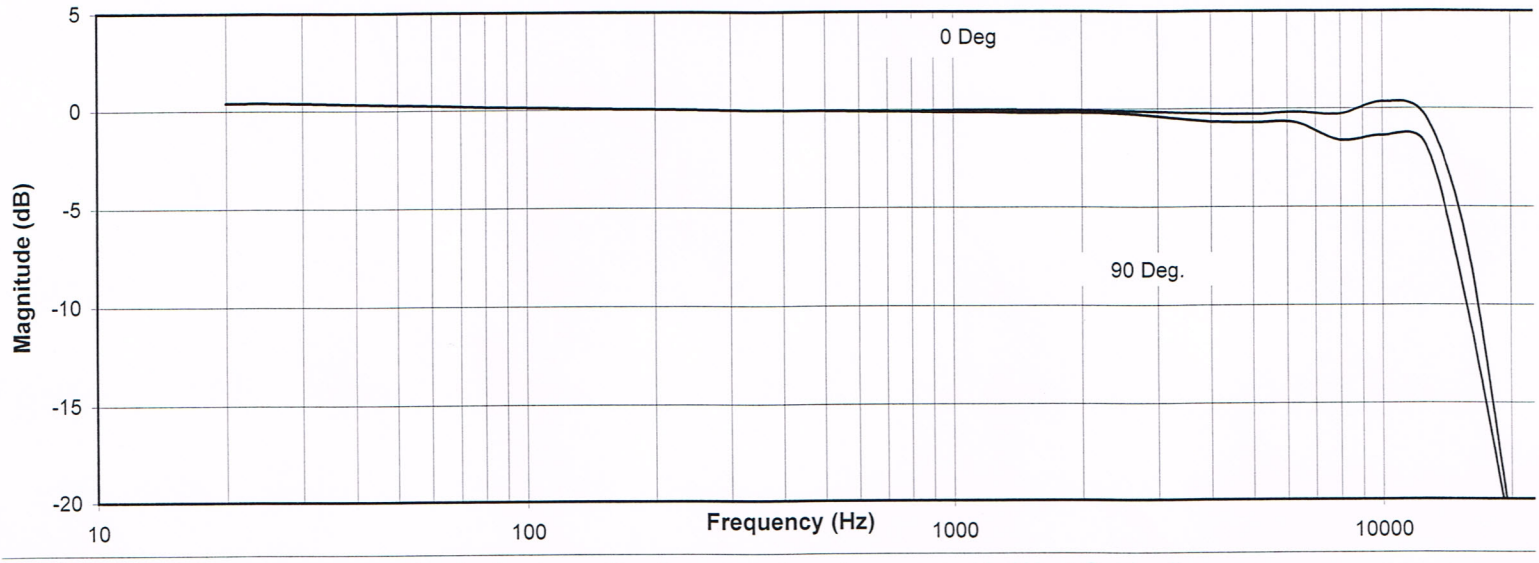
**The above listed instrument meets or exceeds the tested manufacturer's specifications.**

This Calibration is traceable through NIST test numbers: 683/284413-14

The expanded uncertainty of calibration: 0.094dB at 95% confidence level with a coverage factor of k=2.

The pressure response recorded with electroacoustic method.

**Frequency Response**




The above listed instrument was checked using calibration procedure documented in West Caldwell Calibration Laboratories Inc. procedure : **Rev. 7.0 Jan. 24, 2014 Doc. # 1038 P4952B&K**

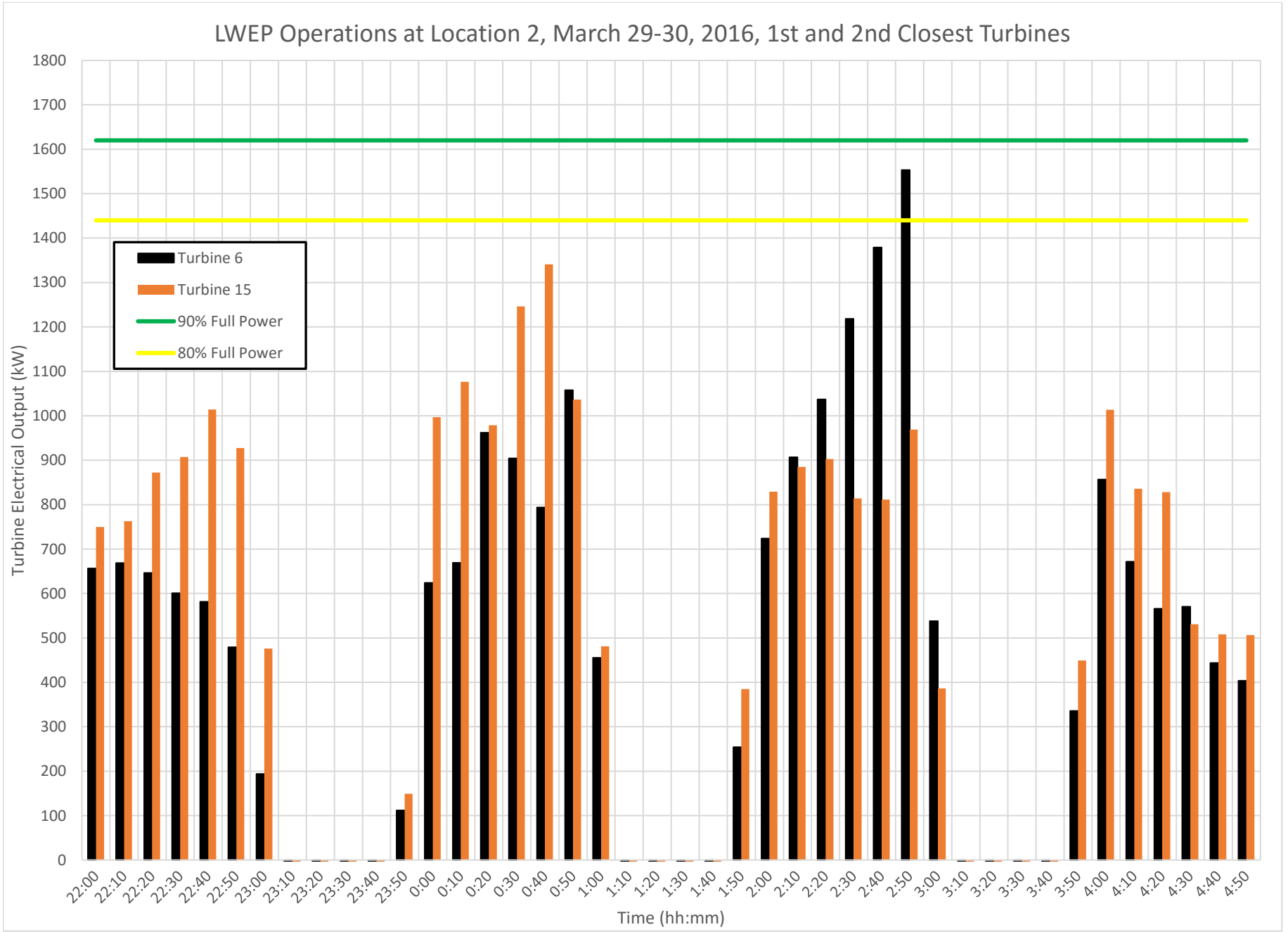
Calibration was performed by West Caldwell Calibration Laboratories Inc. under Operating Procedures intended to implement the requirements of ISO10012-1, IEC Guide 25, ANSI/NCSL Z540-1, (MIL-STD-45662A) and ISO 9001:2008, ISO 17025

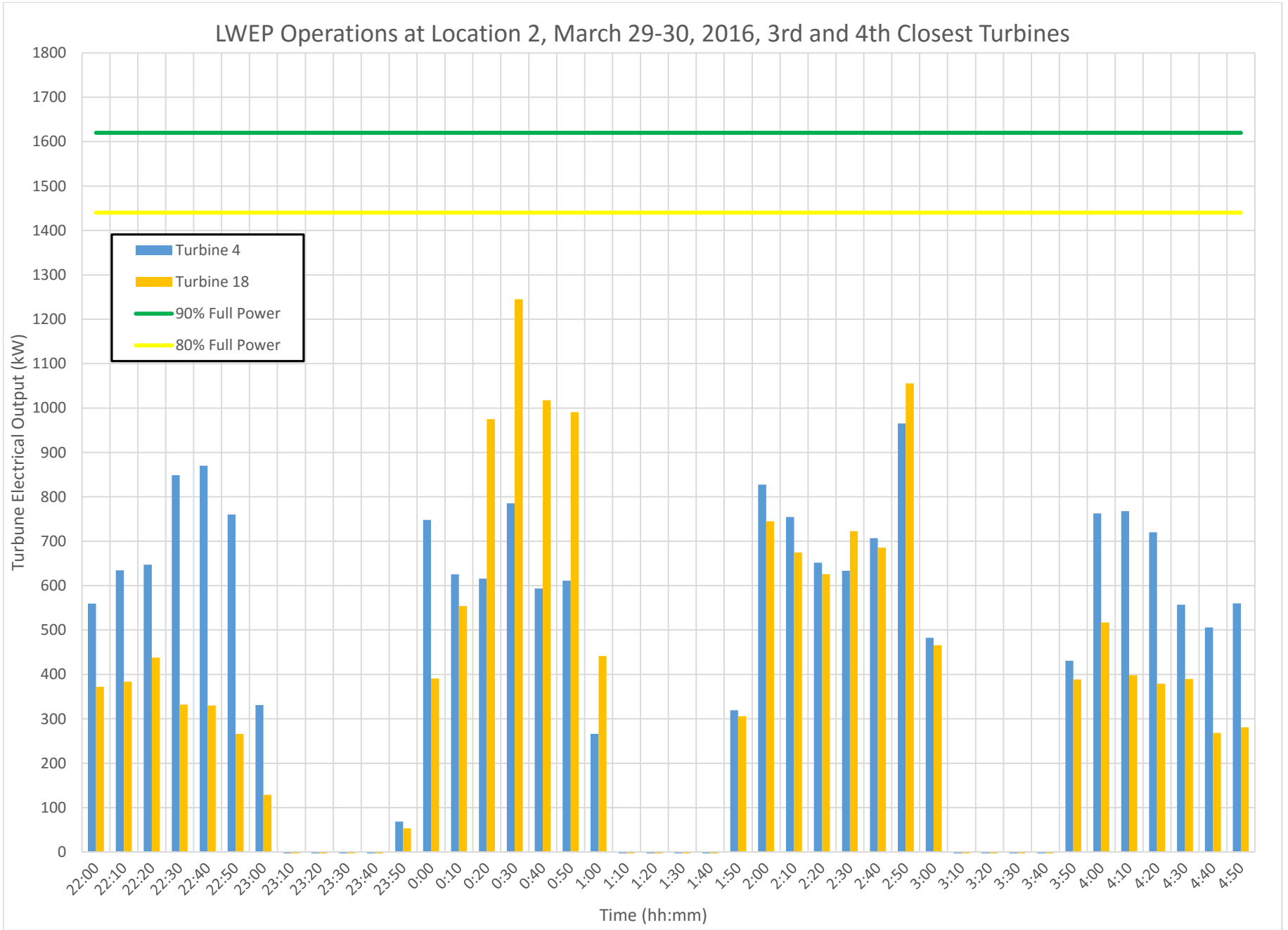
Measurements performed by: .....
**Kent Zeng**

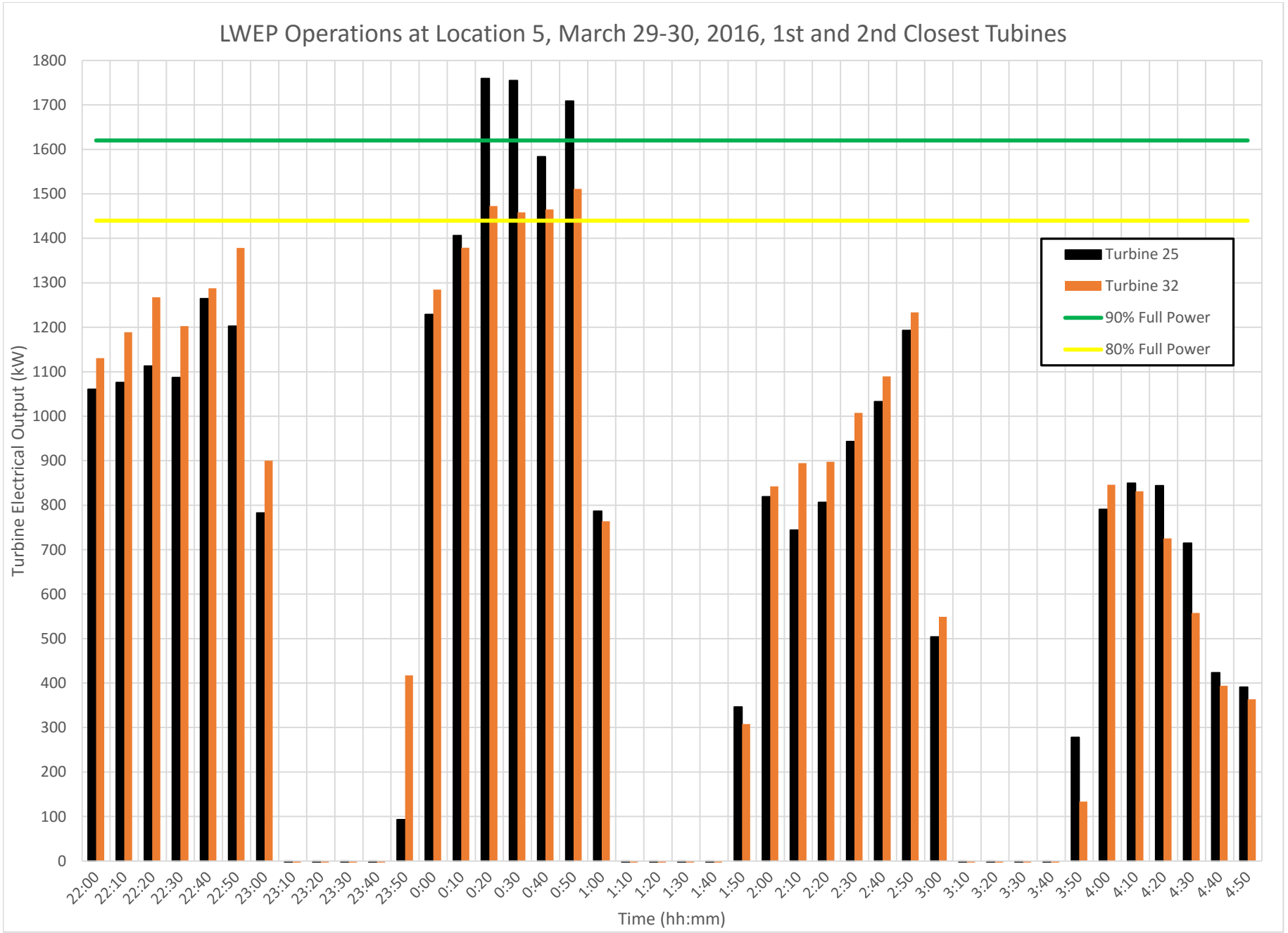
**Calibrated on WCCL system type 9700**

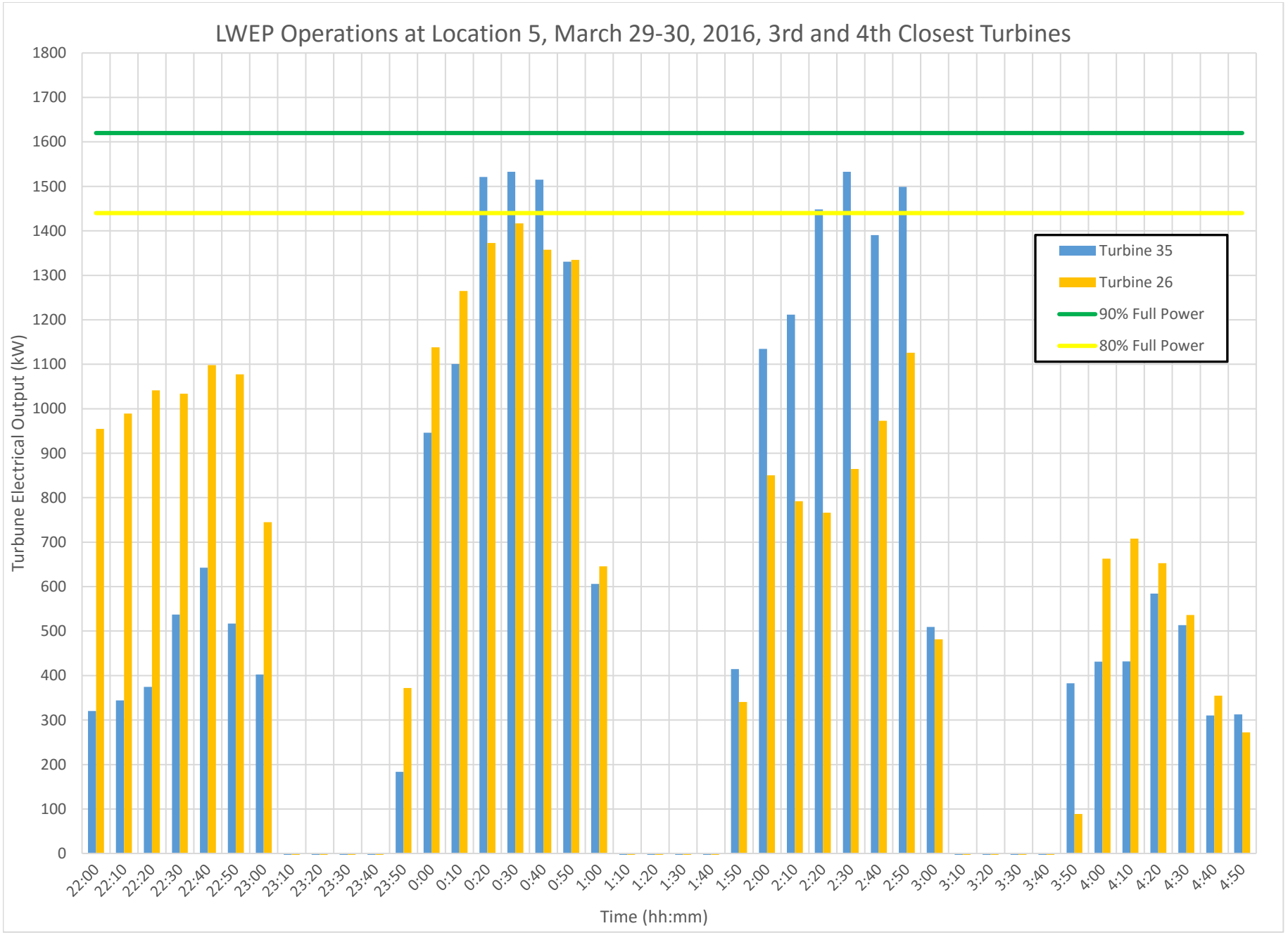
# APPENDIX B

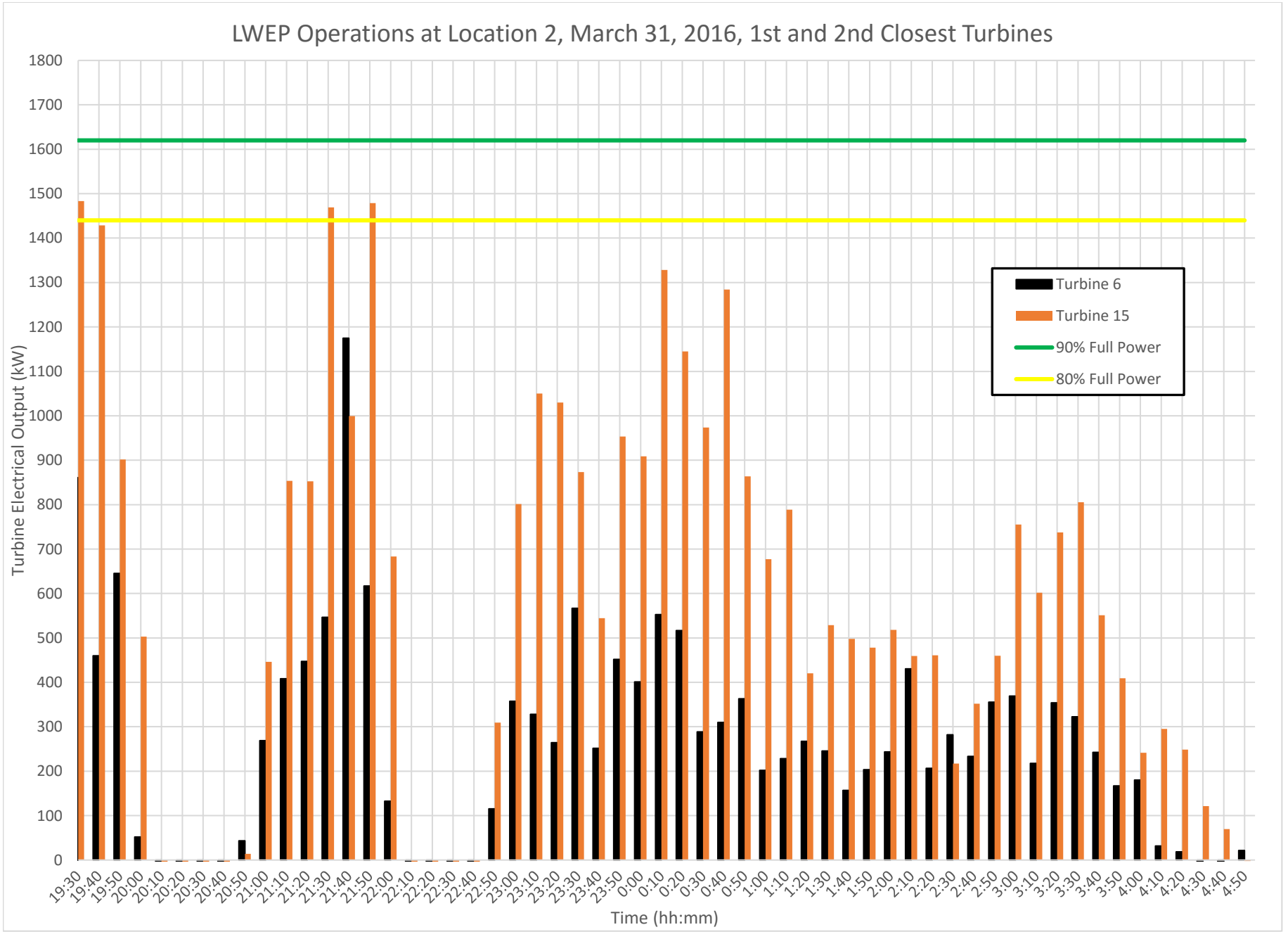
# TURBINE POWER PRODUCTION DURING MEASUREMENTS

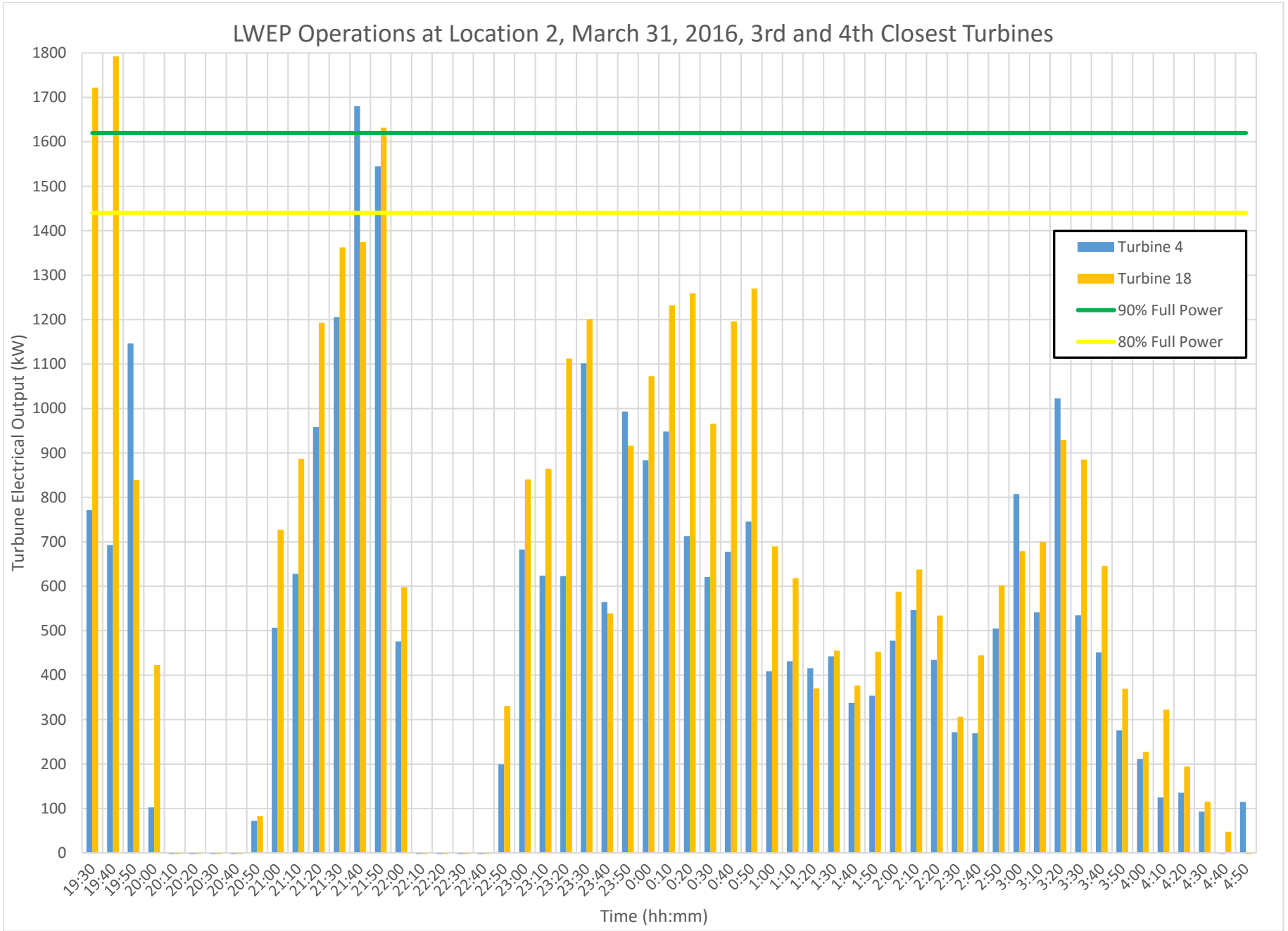

LWEP Operations at Location 2, March 29-30, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
Time (hh:mm)
Turbine 6
Turbine 15
90% Full Power
80% Full Power
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
22:00
22:10
22:20
22:30
22:40
22:50
23:00
23:10
23:20
23:30
23:40
23:50
0:00
0:10
0:20
0:30
0:40
0:50
1:00
1:10
1:20
1:30
1:40
1:50
2:00
2:10
2:20
2:30
2:40
2:50
3:00
3:10
3:20
3:30
3:40
3:50
4:00
4:10
4:20
4:30
4:40
4:50


LWEP Operations at Location 2, March 29-30, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Turbine 4
Turbine 18
90% Full Power
80% Full Power
22:00
22:10
22:20
22:30
22:40
22:50
23:00
23:10
23:20
23:30
23:40
23:50
0:00
0:10
0:20
0:30
0:40
0:50
1:00
1:10
1:20
1:30
1:40
1:50
2:00
2:10
2:20
2:30
2:40
2:50
3:00
3:10
3:20
3:30
3:40
3:50
4:00
4:10
4:20
4:30
4:40
4:50
Time (hh:mm)


LWEP Operations at Location 5, March 29-30, 2016, 1st and 2nd Closest Tubines
Turbine Electrical Output (kW)
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Turbine 25
Turbine 32
90% Full Power
80% Full Power
22:00
22:10
22:20
22:30
22:40
22:50
23:00
23:10
23:20
23:30
23:40
23:50
0:00
0:10
0:20
0:30
0:40
0:50
1:00
1:10
1:20
1:30
1:40
1:50
2:00
2:10
2:20
2:30
2:40
2:50
3:00
3:10
3:20
3:30
3:40
3:50
4:00
4:10
4:20
4:30
4:40
4:50
Time (hh:mm)


LWEP Operations at Location 5, March 29-30, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
22:00
22:10
22:20
22:30
22:40
22:50
23:00
23:10
23:20
23:30
23:40
23:50
0:00
0:10
0:20
0:30
0:40
0:50
1:00
1:10
1:20
1:30
1:40
1:50
2:00
2:10
2:20
2:30
2:40
2:50
3:00
3:10
3:20
3:30
3:40
3:50
4:00
4:10
4:20
4:30
4:40
4:50
Time (hh:mm)
Turbine 35
Turbine 26
90% Full Power
80% Full Power


LWEP Operations at Location 2, March 31, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
Time (hh:mm)
Turbine 6
Turbine 15
90% Full Power
80% Full Power


LWEP Operations at Location 2, March 31, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
Time (hh:mm)
Turbine 4
Turbine 18
90% Full Power
80% Full Power
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
19:30
19:40
19:50
20:00
20:10
20:20
20:30
20:40
20:50
21:00
21:10
21:20
21:30
21:40
21:50
22:00
22:10
22:20
22:30
22:40
22:50
23:00
23:10
23:20
23:30
23:40
23:50
0:00
0:10
0:20
0:30
0:40
0:50
1:00
1:10
1:20
1:30
1:40
1:50
2:00
2:10
2:20
2:30
2:40
2:50
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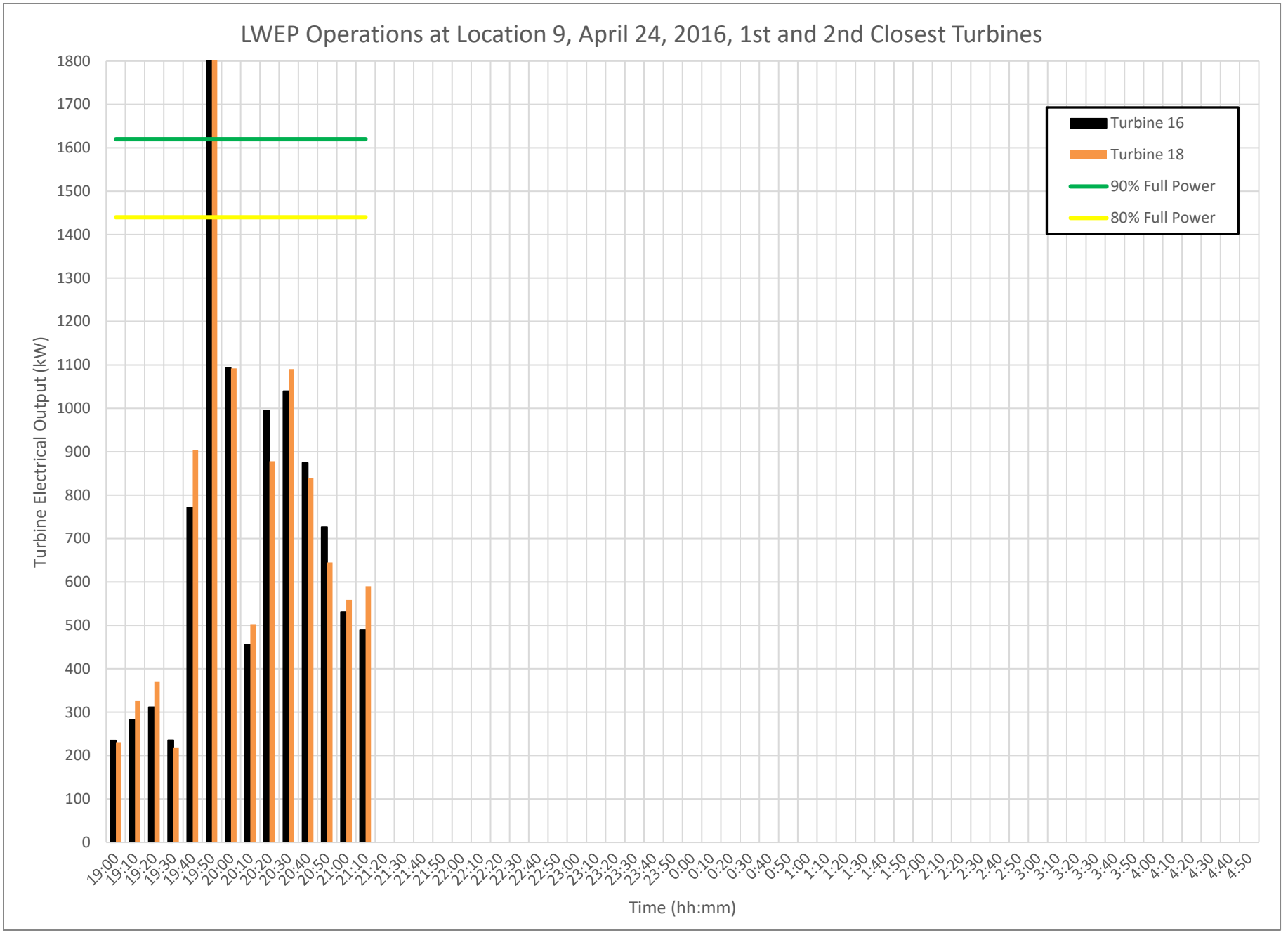
4:00
4:10
4:20
4:30
4:40
4:50


LWEP Operations at Location 9, April 24, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
Time (hh:mm)
Turbine 16
Turbine 18
90% Full Power
80% Full Power
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
1300
1400
1500
1600
1700
1800
19:00
19:10
19:20
19:30
19:40
19:50
20:00
20:10
20:20
20:30
20:40
20:50
21:00
21:10
21:20
21:30
21:40
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22:00
22:10
22:20
22:30
22:40
22:50
23:00
23:10
23:20
23:30
23:40
23:50
0:00
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0:20
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1:00
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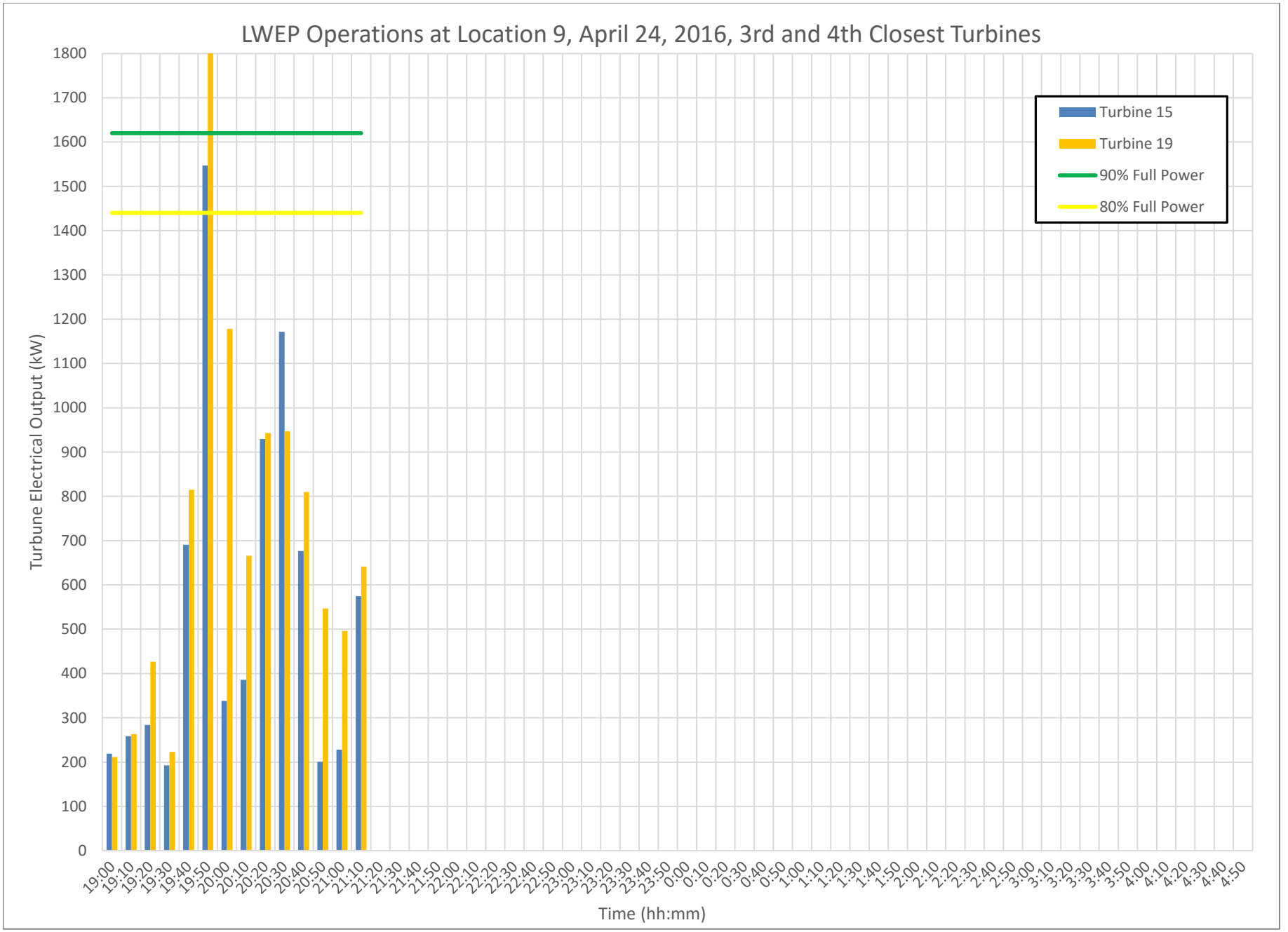
4:00
4:10
4:20
4:30
4:40
4:50


LWEP Operations at Location 9, April 24, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
Time (hh:mm)
Turbine 15
Turbine 19
90% Full Power
80% Full Power
0
100
200
300
400
500
600
700
800
900
1000
1100
1200
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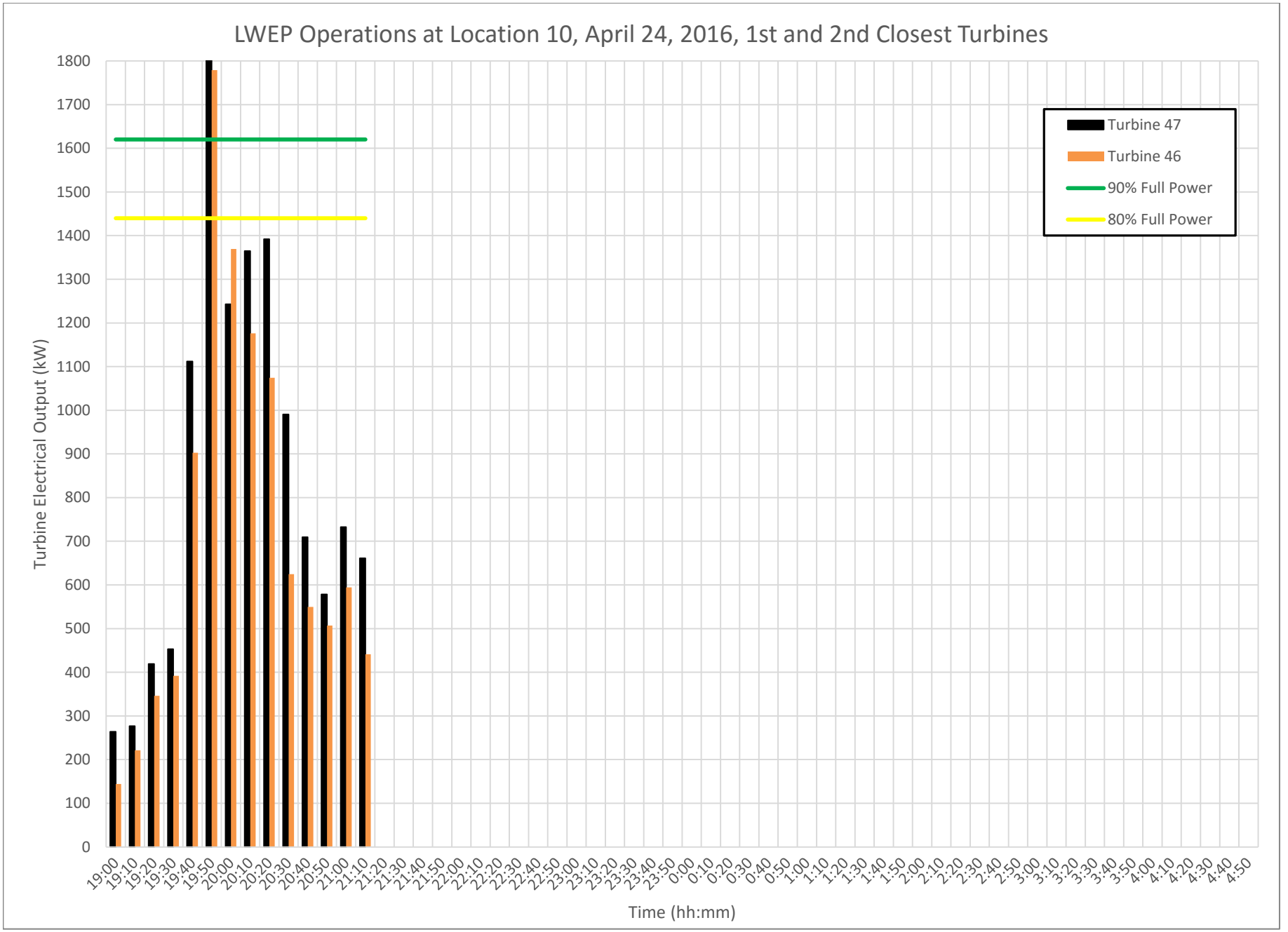
LWEP Operations at Location 10, April 24, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
Time (hh:mm)
Turbine 47
Turbine 46
90% Full Power
80% Full Power
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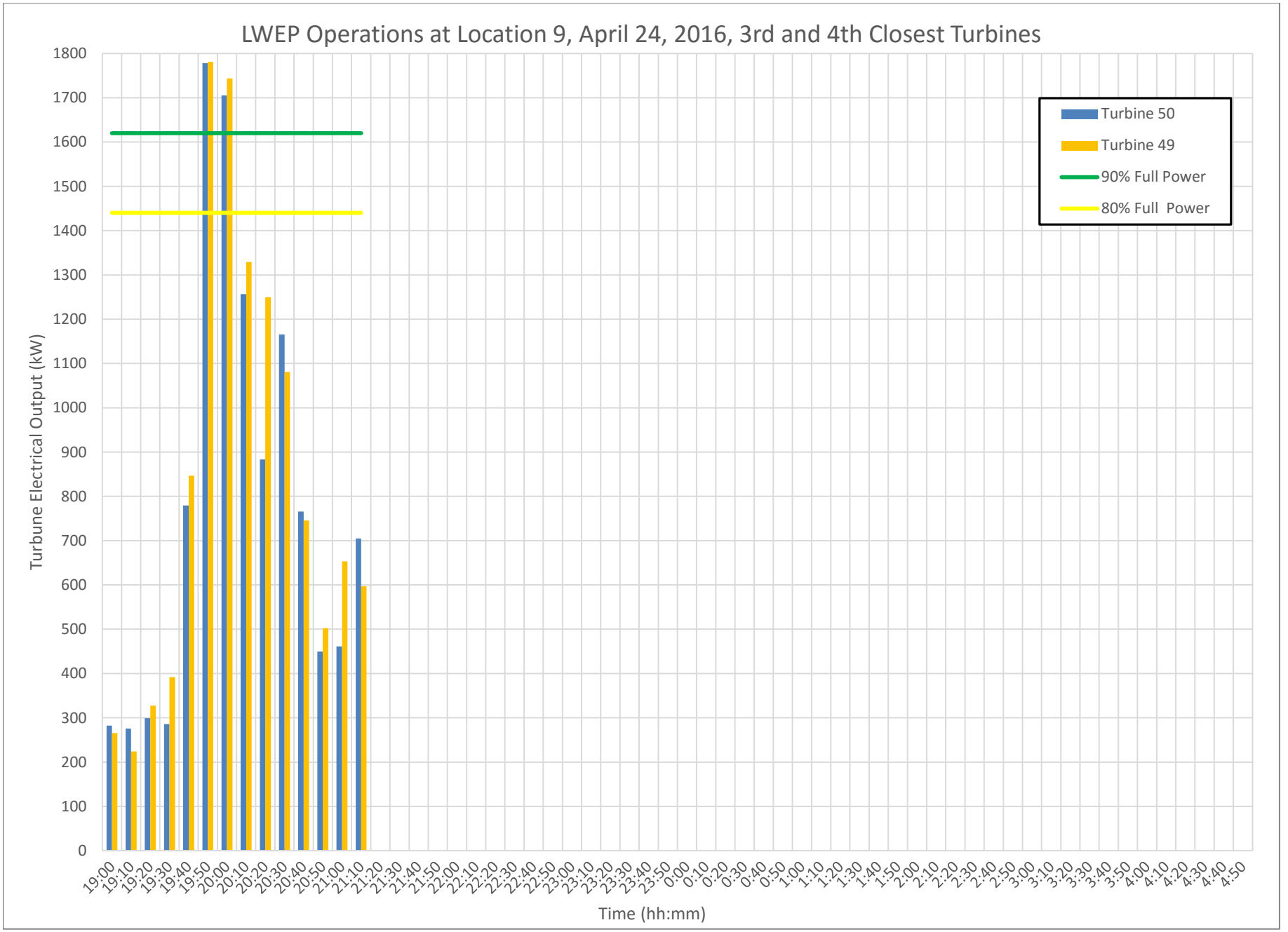
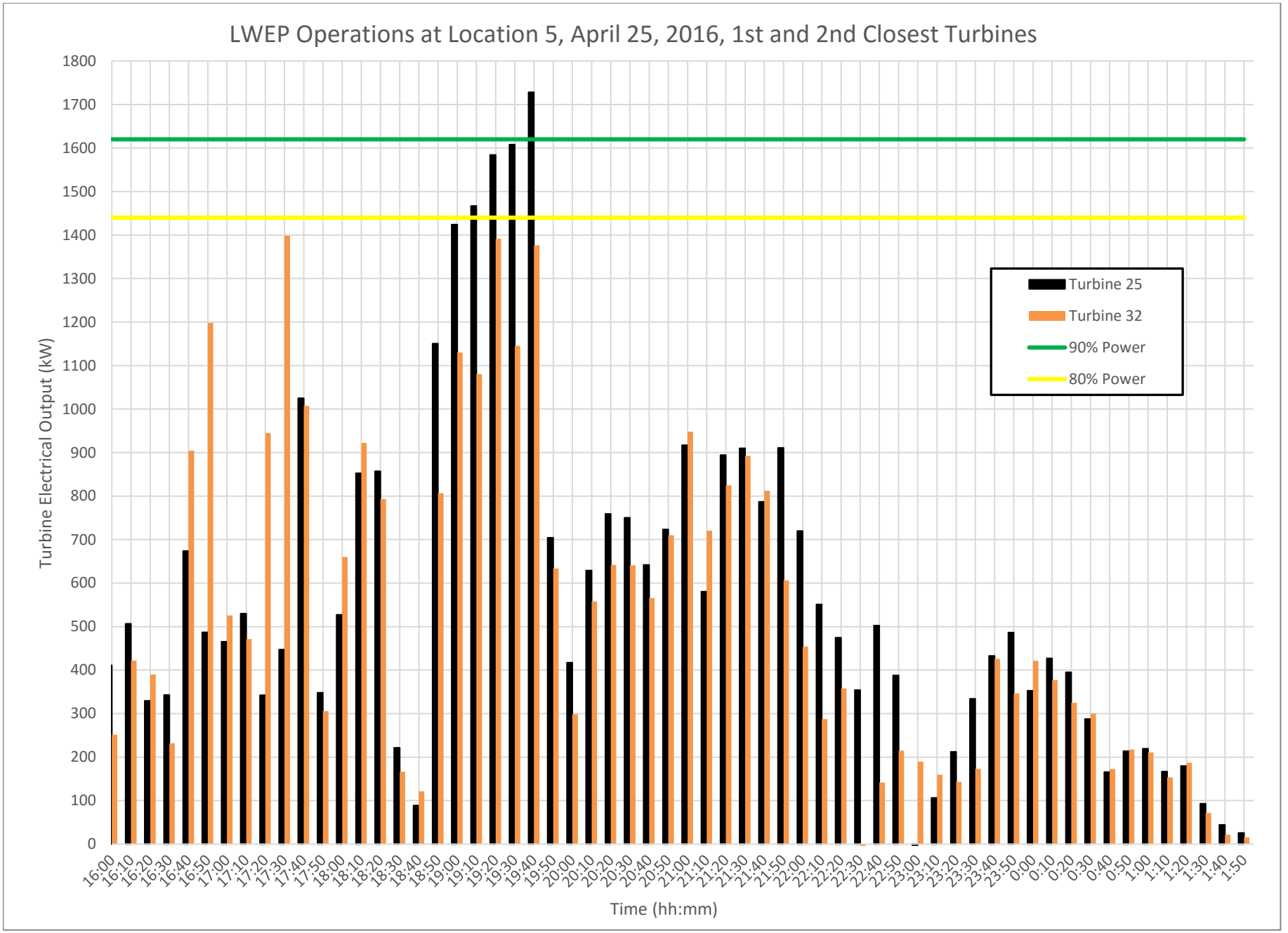
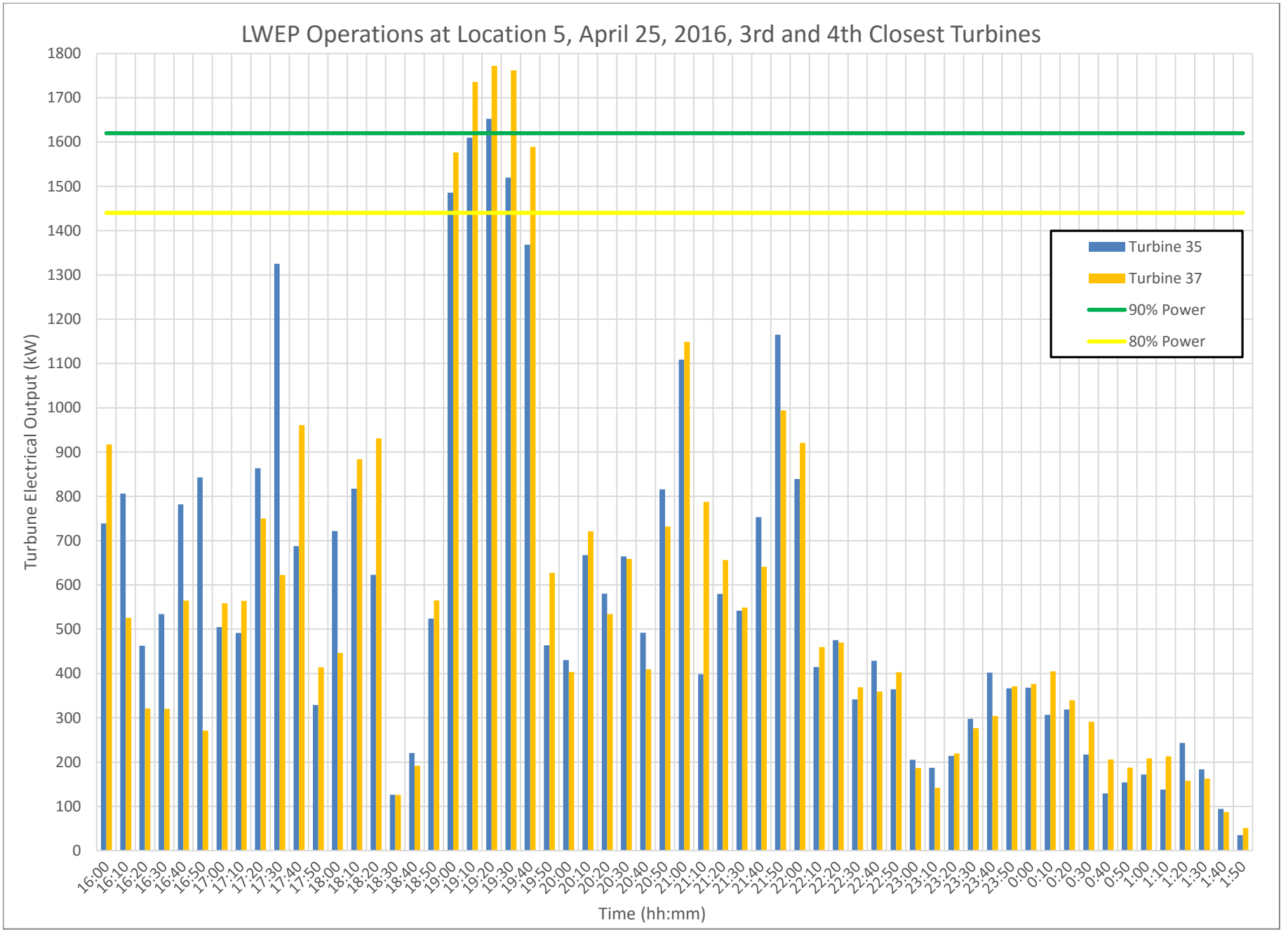
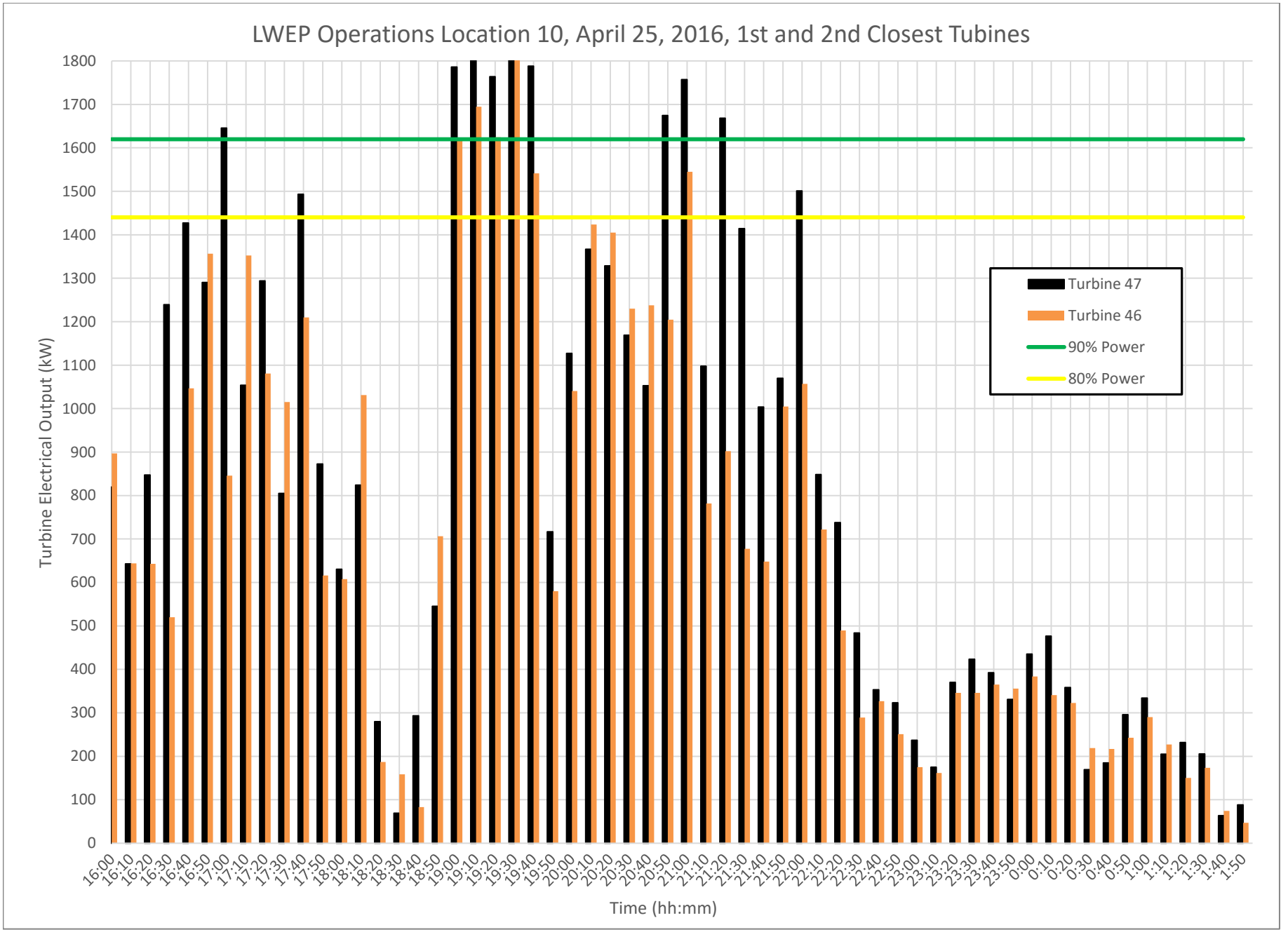
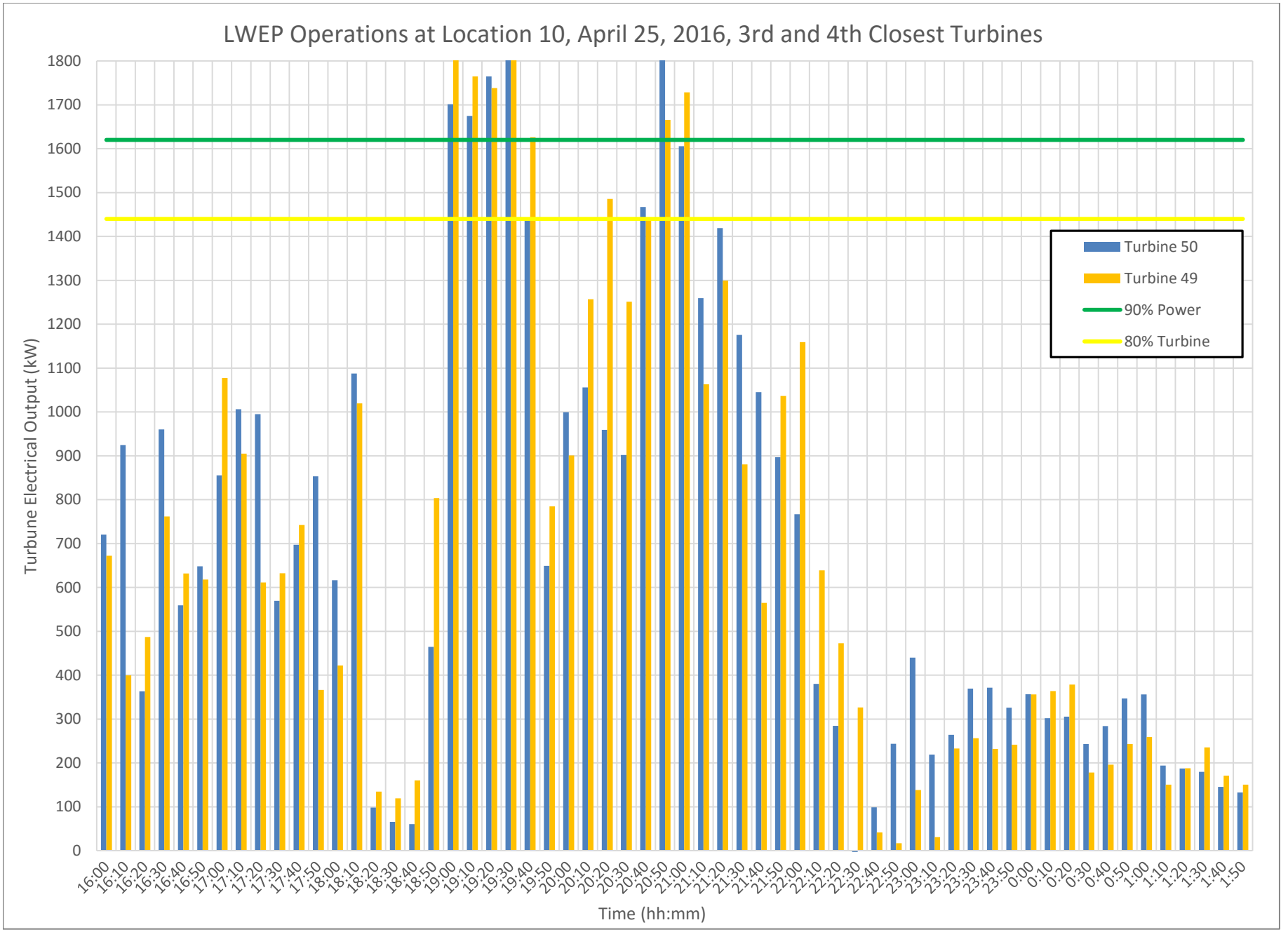
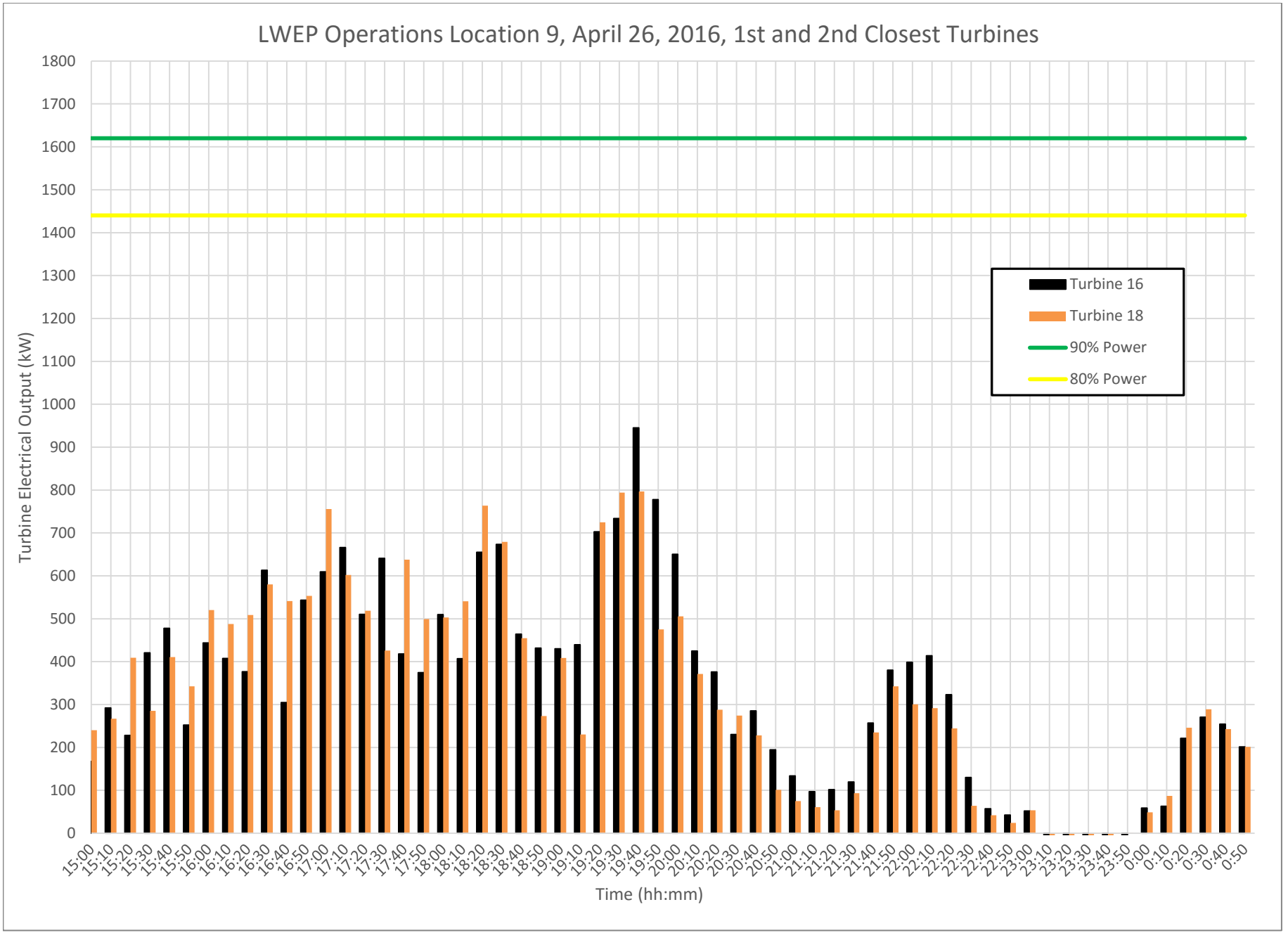

LWEP Operations at Location 9, April 24, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
Time (hh:mm)
Turbine 50
Turbine 49
90% Full Power
80% Full Power

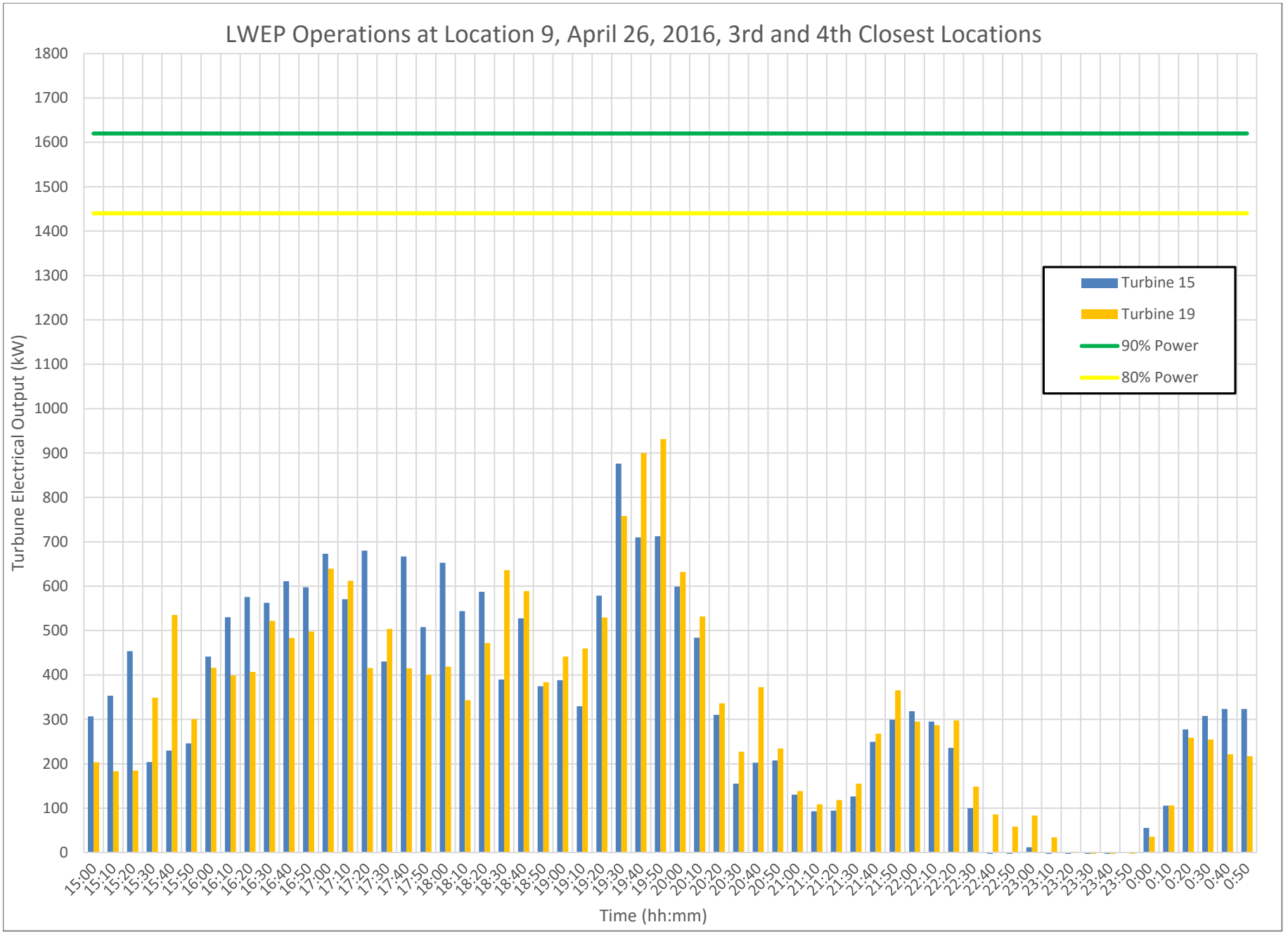

LWEP Operations at Location 5, April 25, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
Time (hh:mm)
Turbine 25
Turbine 32
90% Power
80% Power


LWEP Operations at Location 5, April 25, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
Time (hh:mm)
Turbine 35
Turbine 37
90% Power
80% Power


LWEP Operations Location 10, April 25, 2016, 1st and 2nd Closest Tubines
Turbine Electrical Output (kW)
Time (hh:mm)
Turbine 47
Turbine 46
90% Power
80% Power


LWEP Operations at Location 10, April 25, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
Time (hh:mm)
Turbine 50
Turbine 49
90% Power
80% Turbine


LWEP Operations Location 9, April 26, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
Time (hh:mm)
Turbine 16
Turbine 18
90% Power
80% Power


LWEP Operations at Location 9, April 26, 2016, 3rd and 4th Closest Locations
Turbune Electrical Output (kW)
Time (hh:mm)
Turbine 15
Turbine 19
90% Power
80% Power
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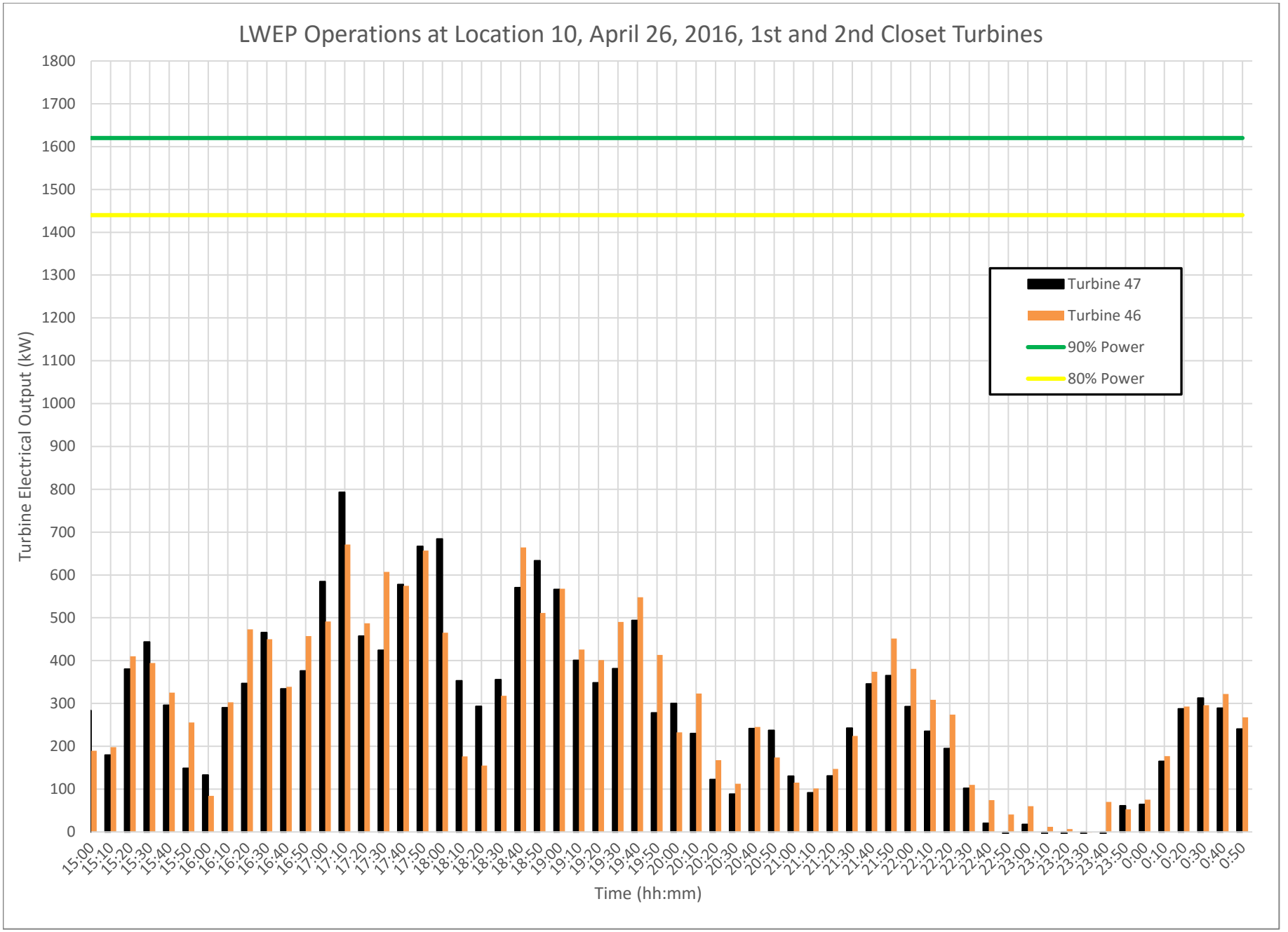
LWEP Operations at Location 10, April 26, 2016, 1st and 2nd Closet Turbines
Turbine Electrical Output (kW)
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Turbine 47
Turbine 46
90% Power
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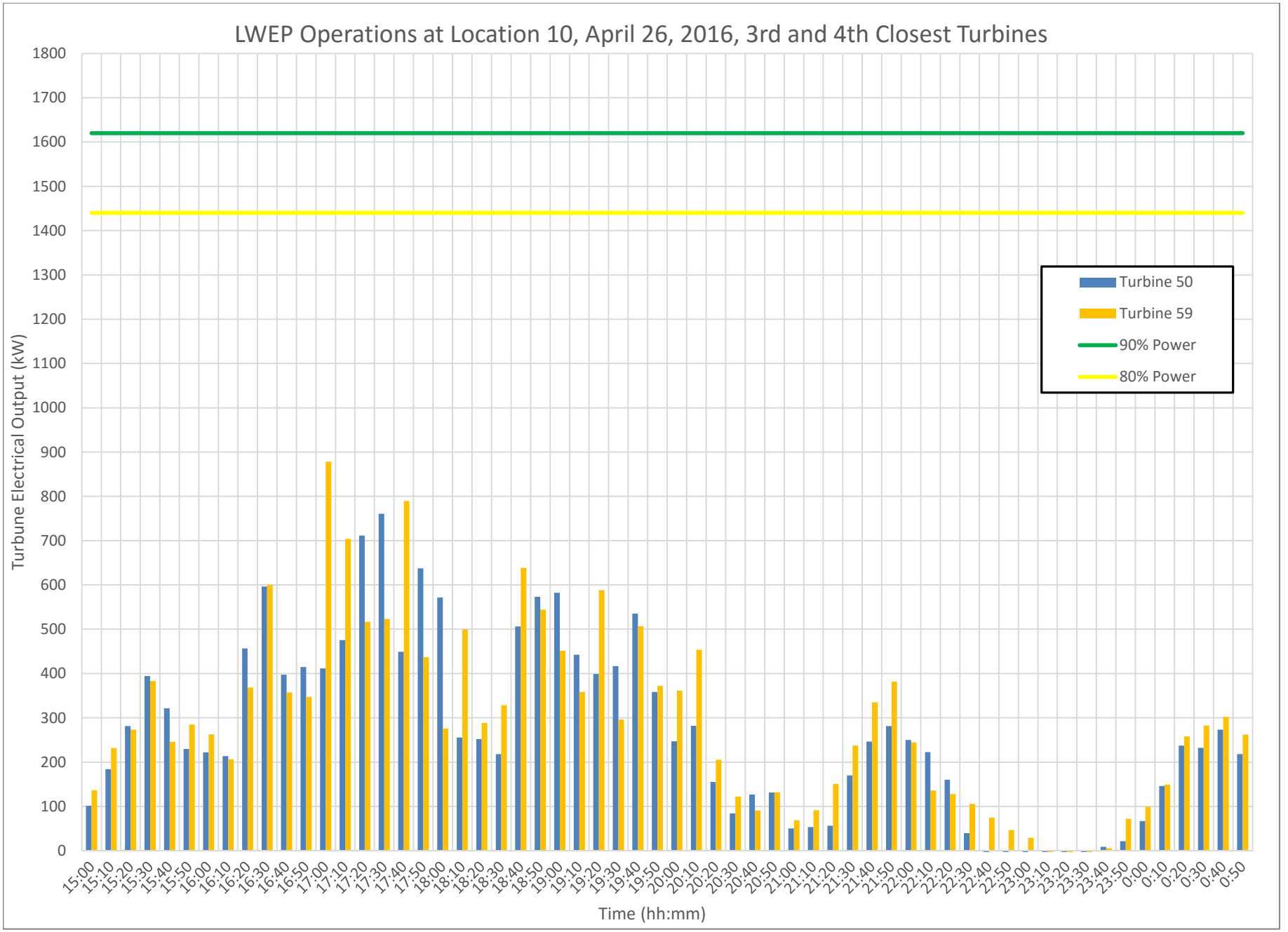
Time (hh:mm)


LWEP Operations at Location 10, April 26, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
Time (hh:mm)
Turbine 50
Turbine 59
90% Power
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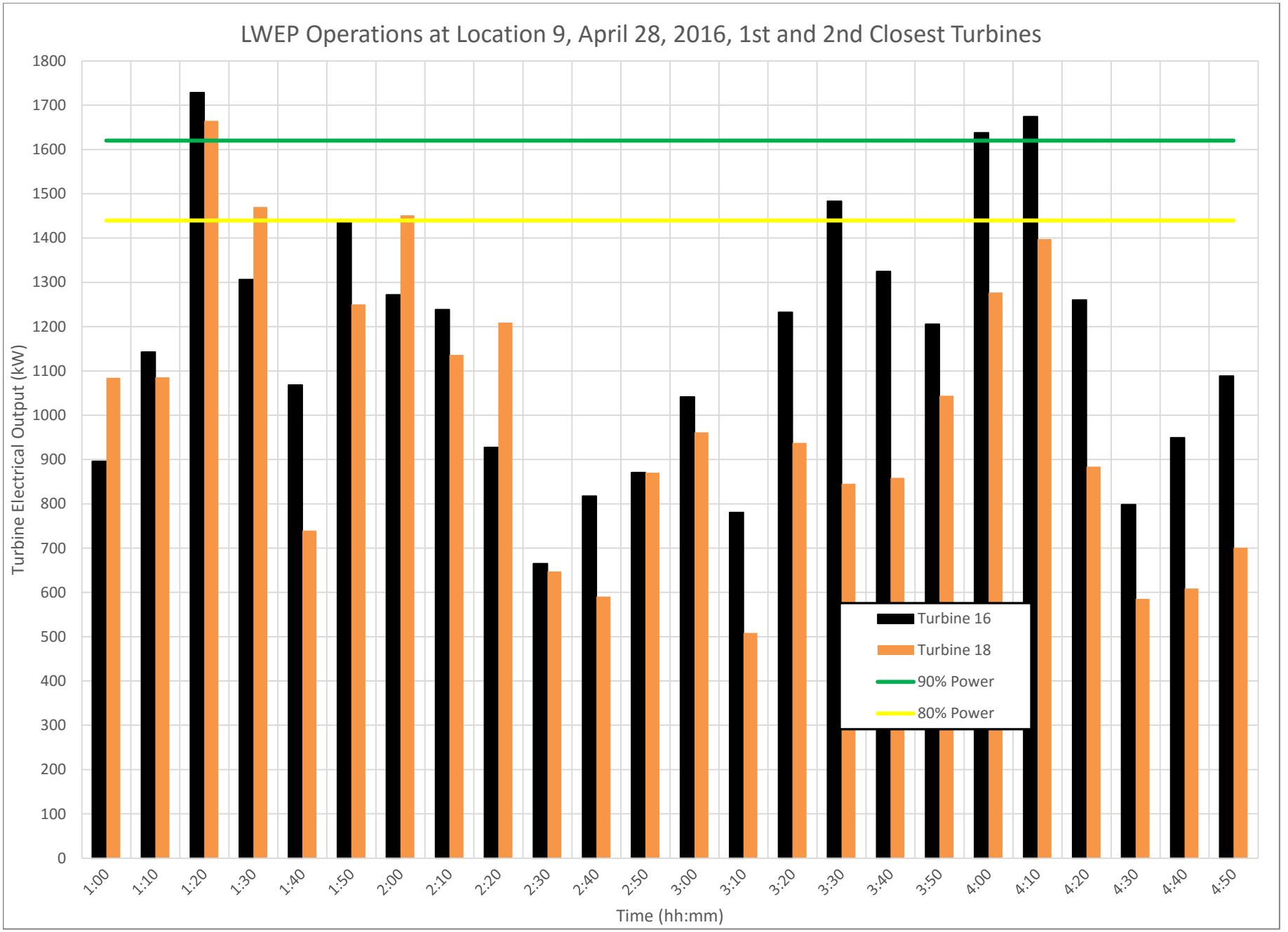
LWEP Operations at Location 9, April 28, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
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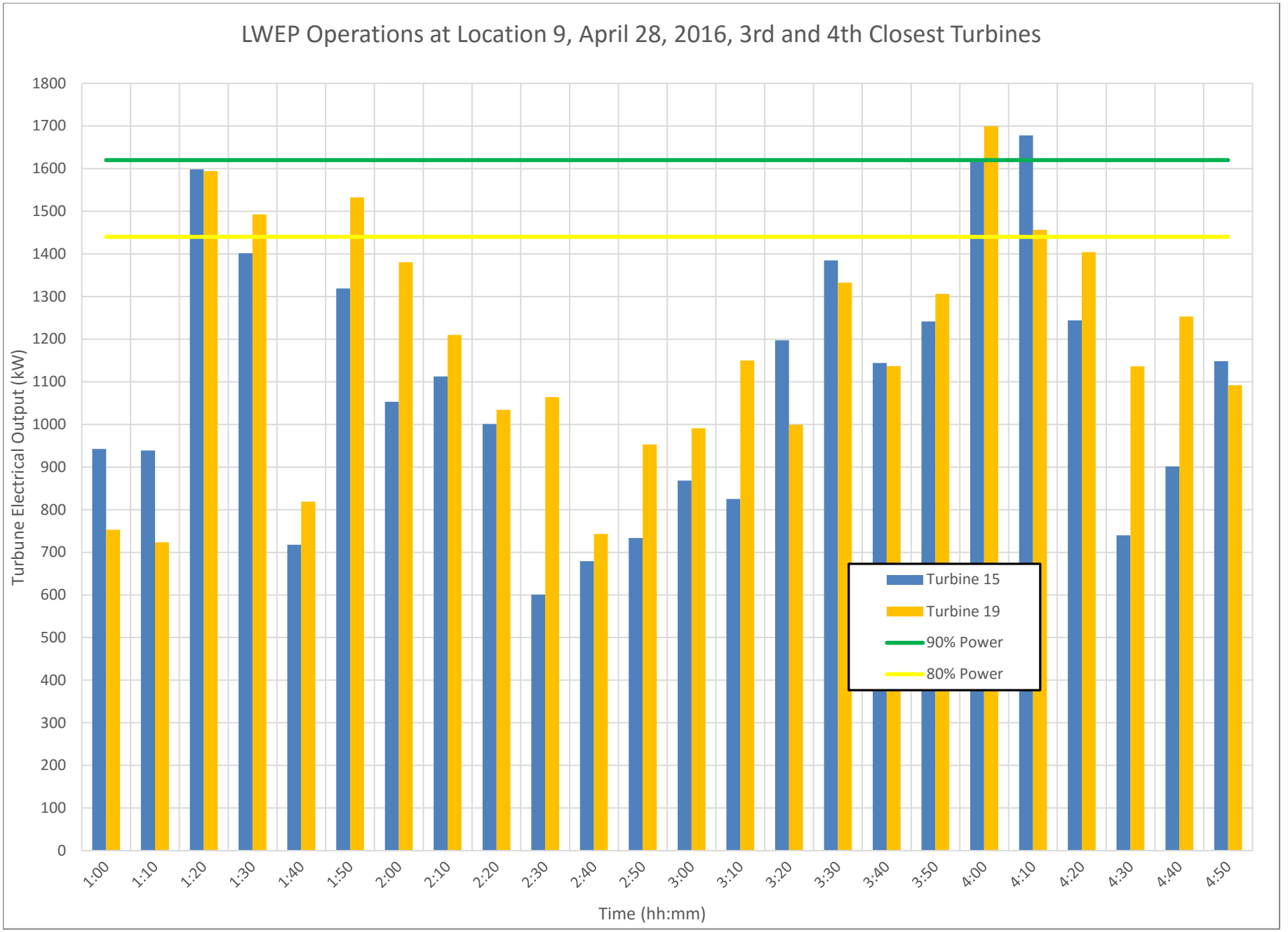
Time (hh:mm)
Turbine 16
Turbine 18
90% Power
80% Power


LWEP Operations at Location 9, April 28, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
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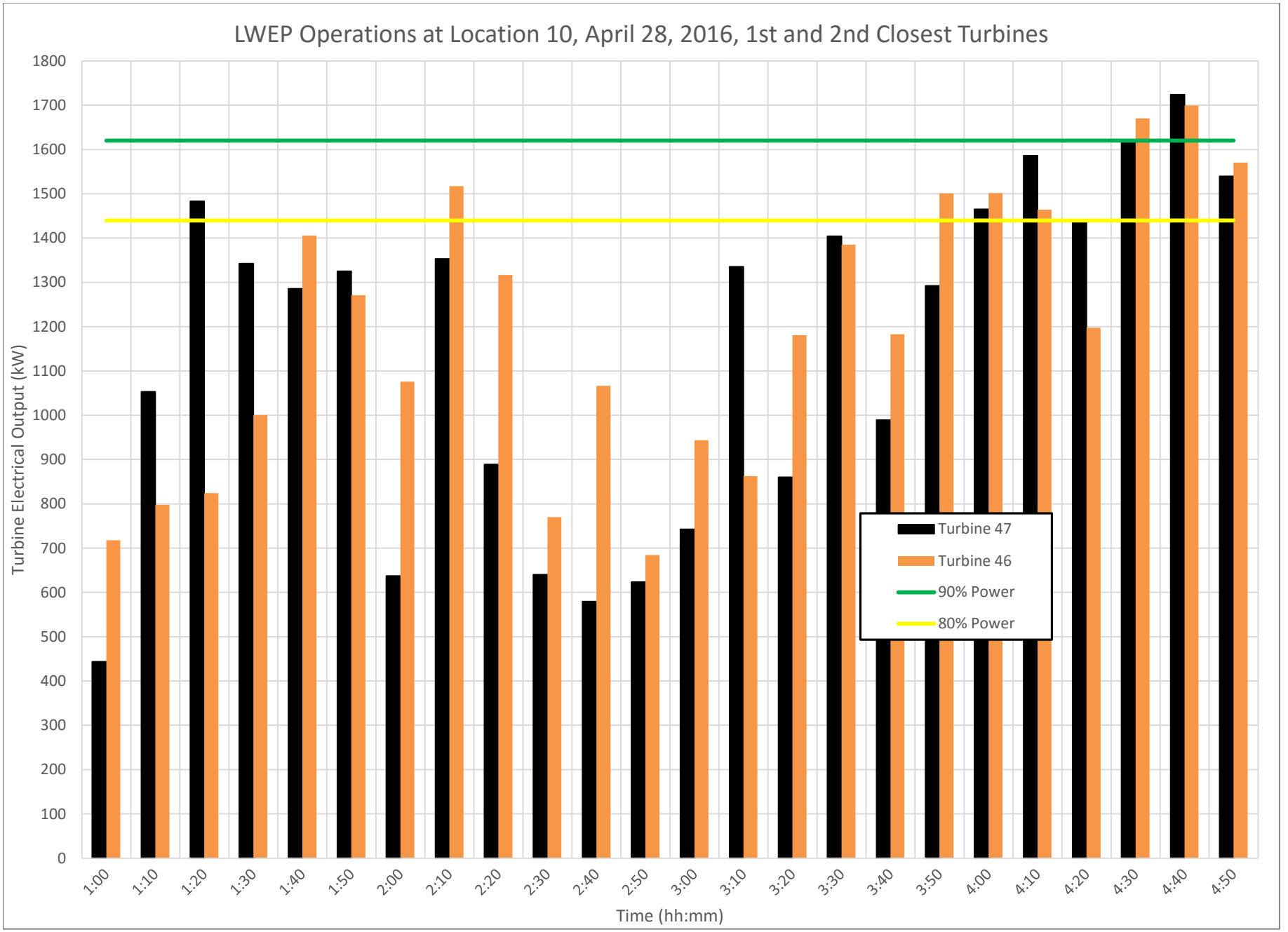
Time (hh:mm)
Turbine 15
Turbine 19
90% Power
80% Power


LWEP Operations at Location 10, April 28, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
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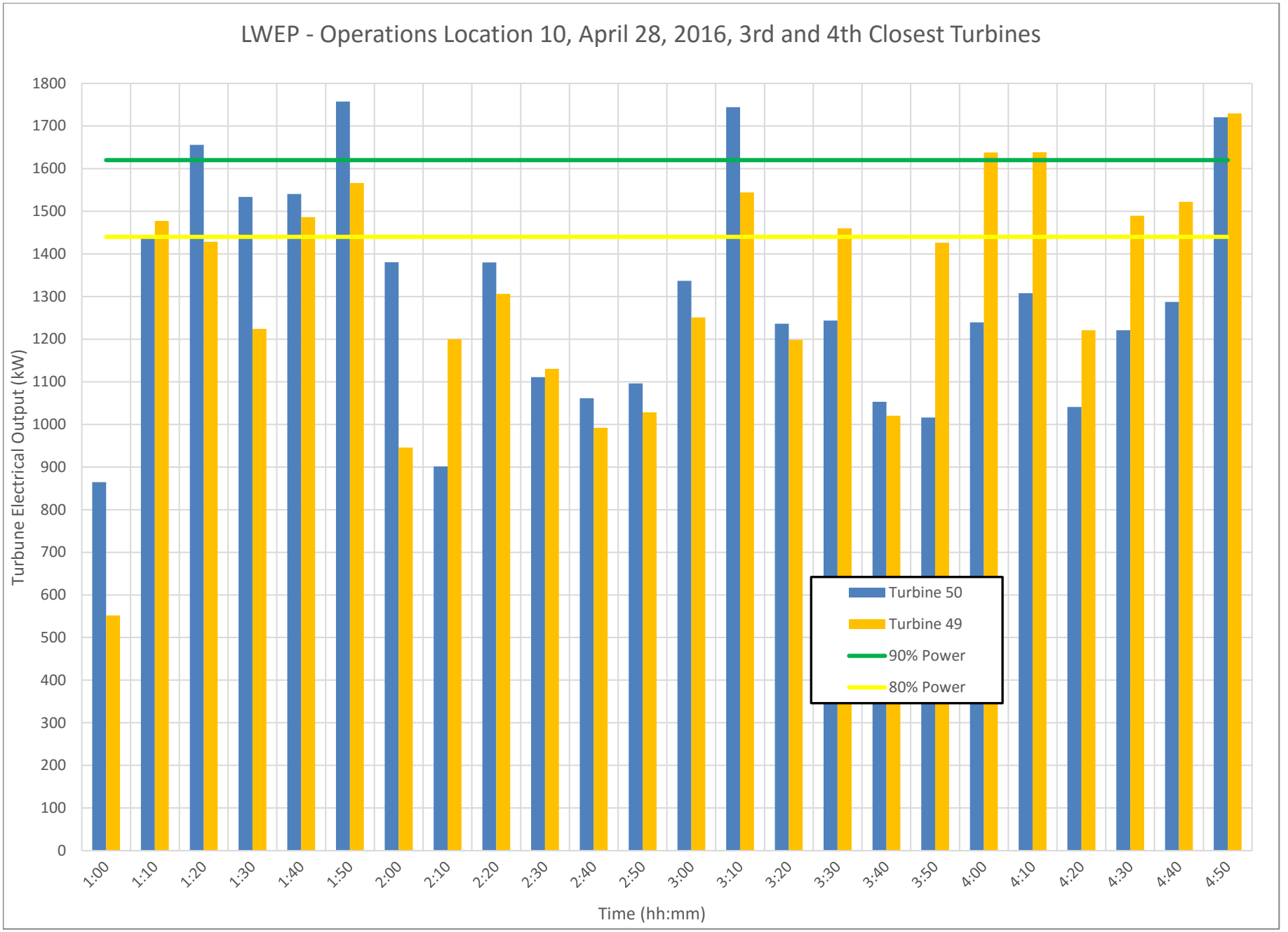
Time (hh:mm)
Turbine 47
Turbine 46
90% Power
80% Power


LWEP - Operations Location 10, April 28, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
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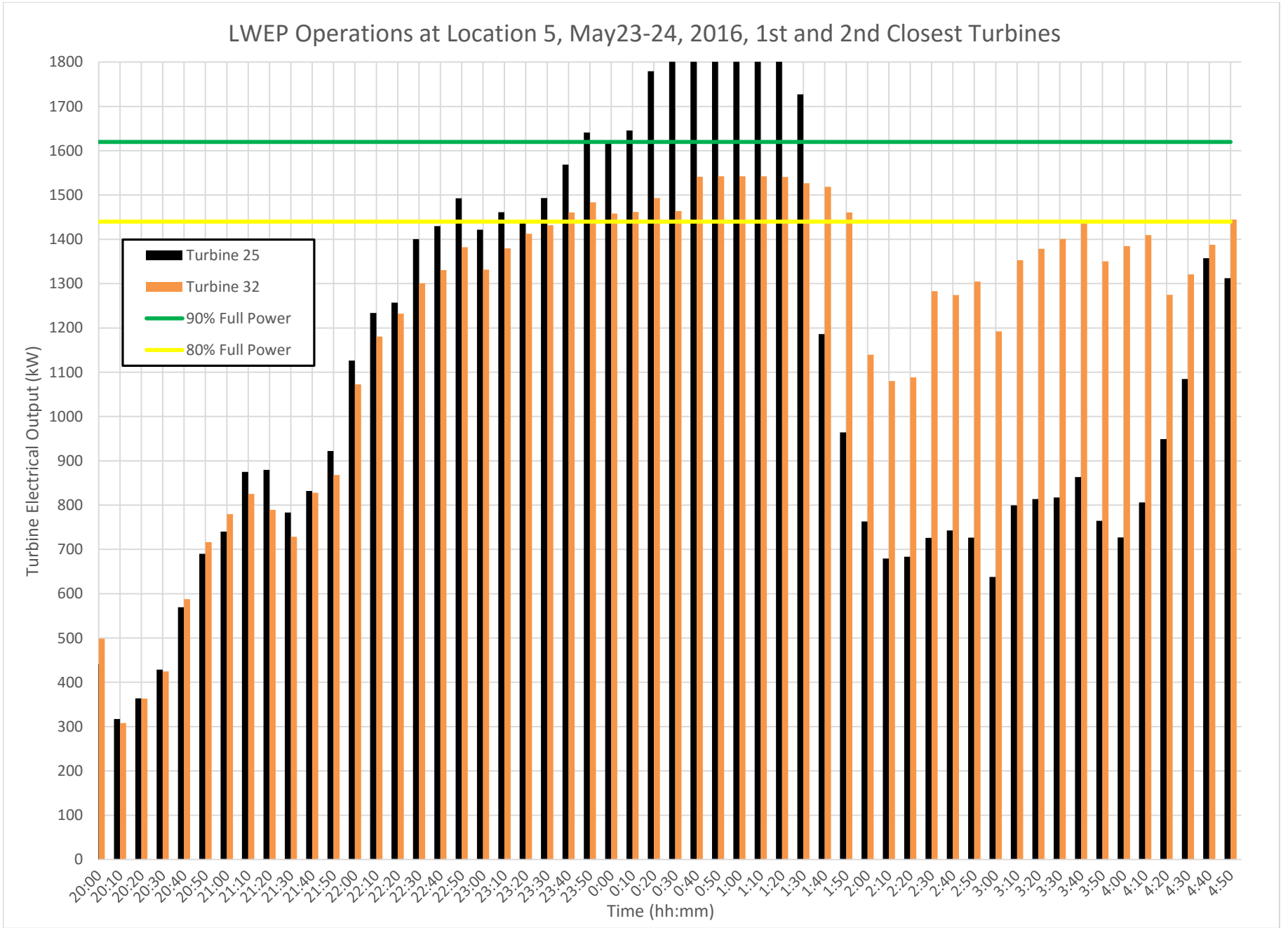
Time (hh:mm)
Turbine 50
Turbine 49
90% Power
80% Power


LWEP Operations at Location 5, May23-24, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
Time (hh:mm)
Turbine 25
Turbine 32
90% Full Power
80% Full Power
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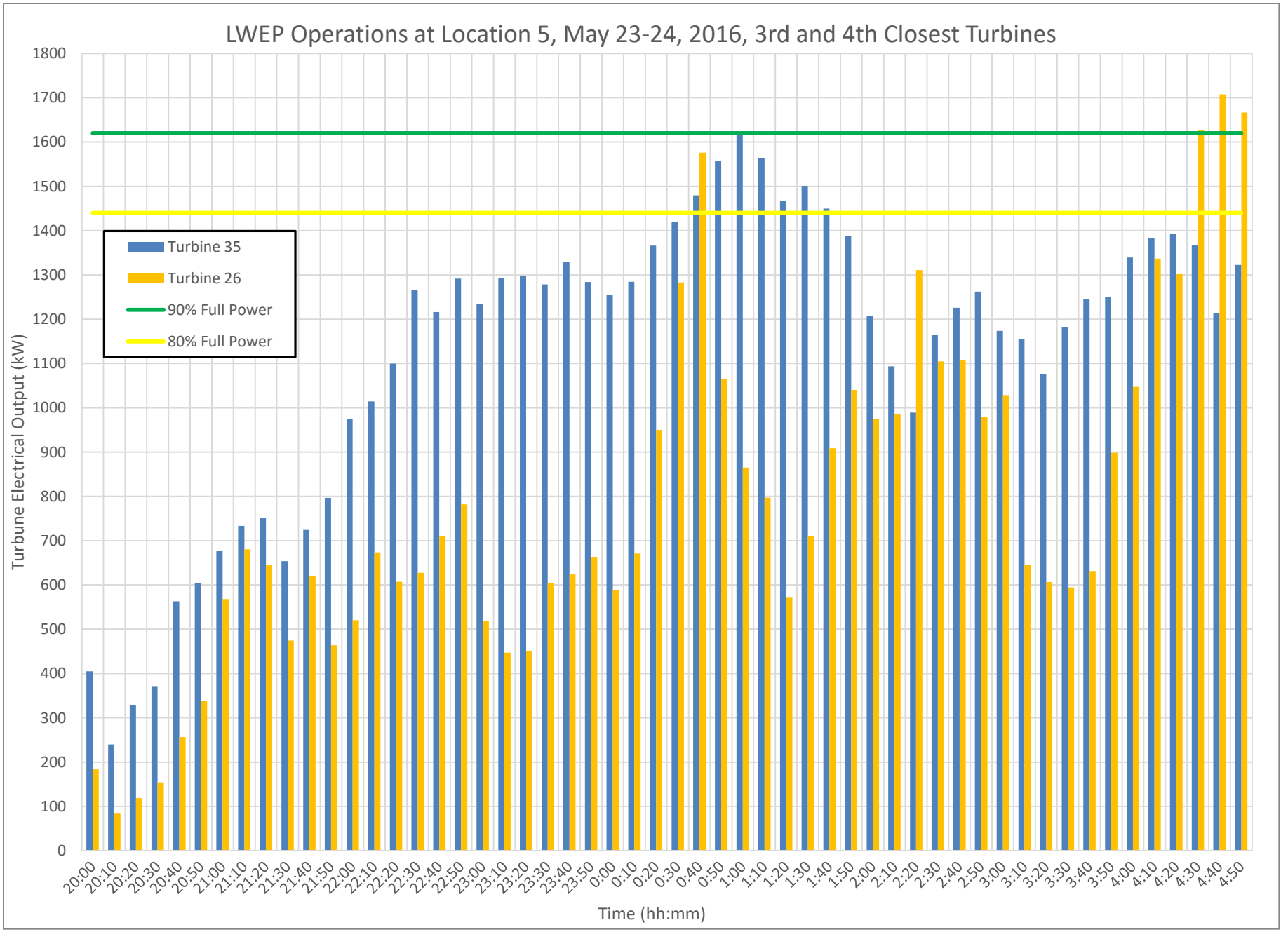
LWEP Operations at Location 5, May 23-24, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
Time (hh:mm)
Turbine 35
Turbine 26
90% Full Power
80% Full Power
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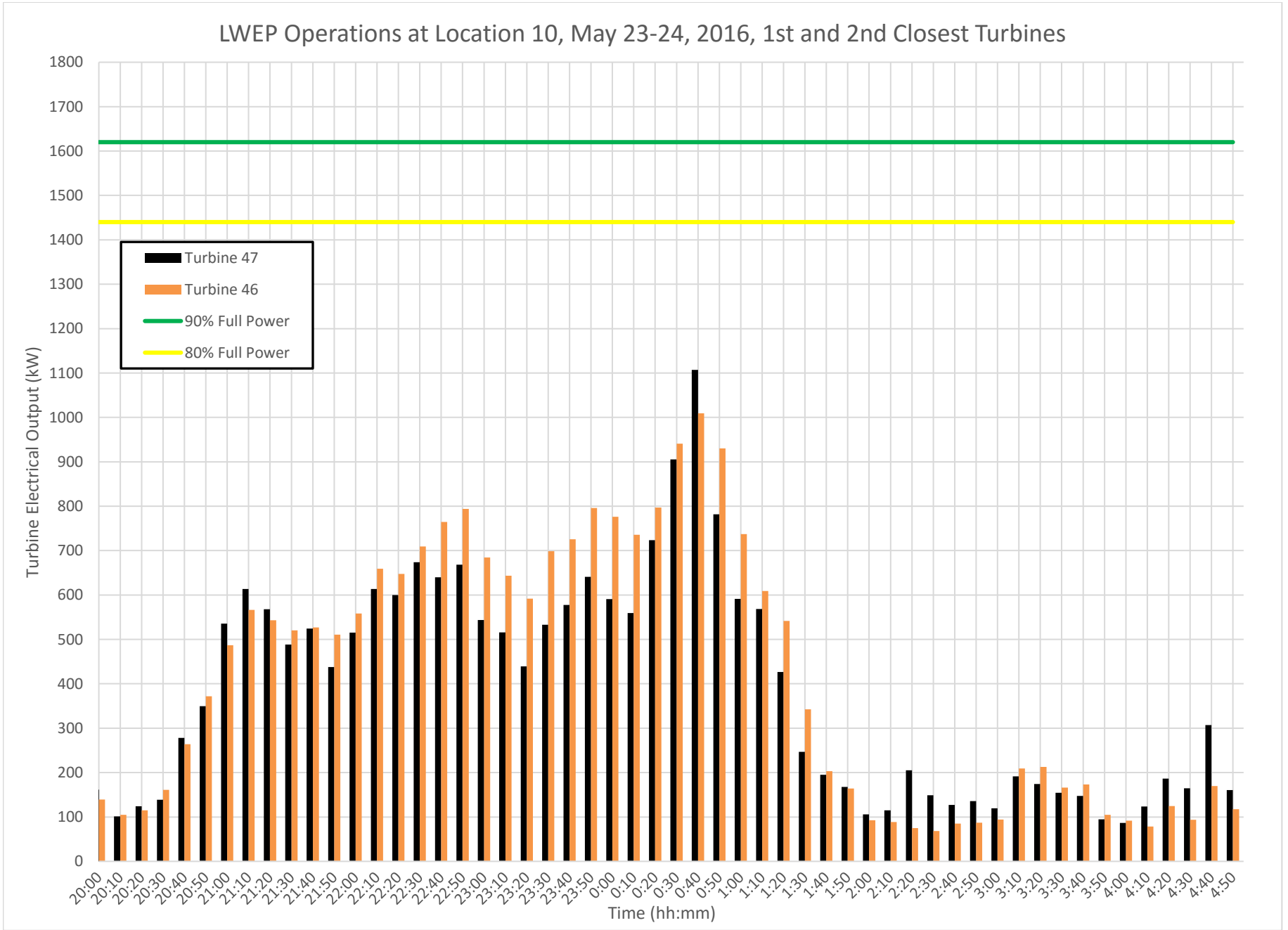
LWEP Operations at Location 10, May 23-24, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
Time (hh:mm)
Turbine 47
Turbine 46
90% Full Power
80% Full Power
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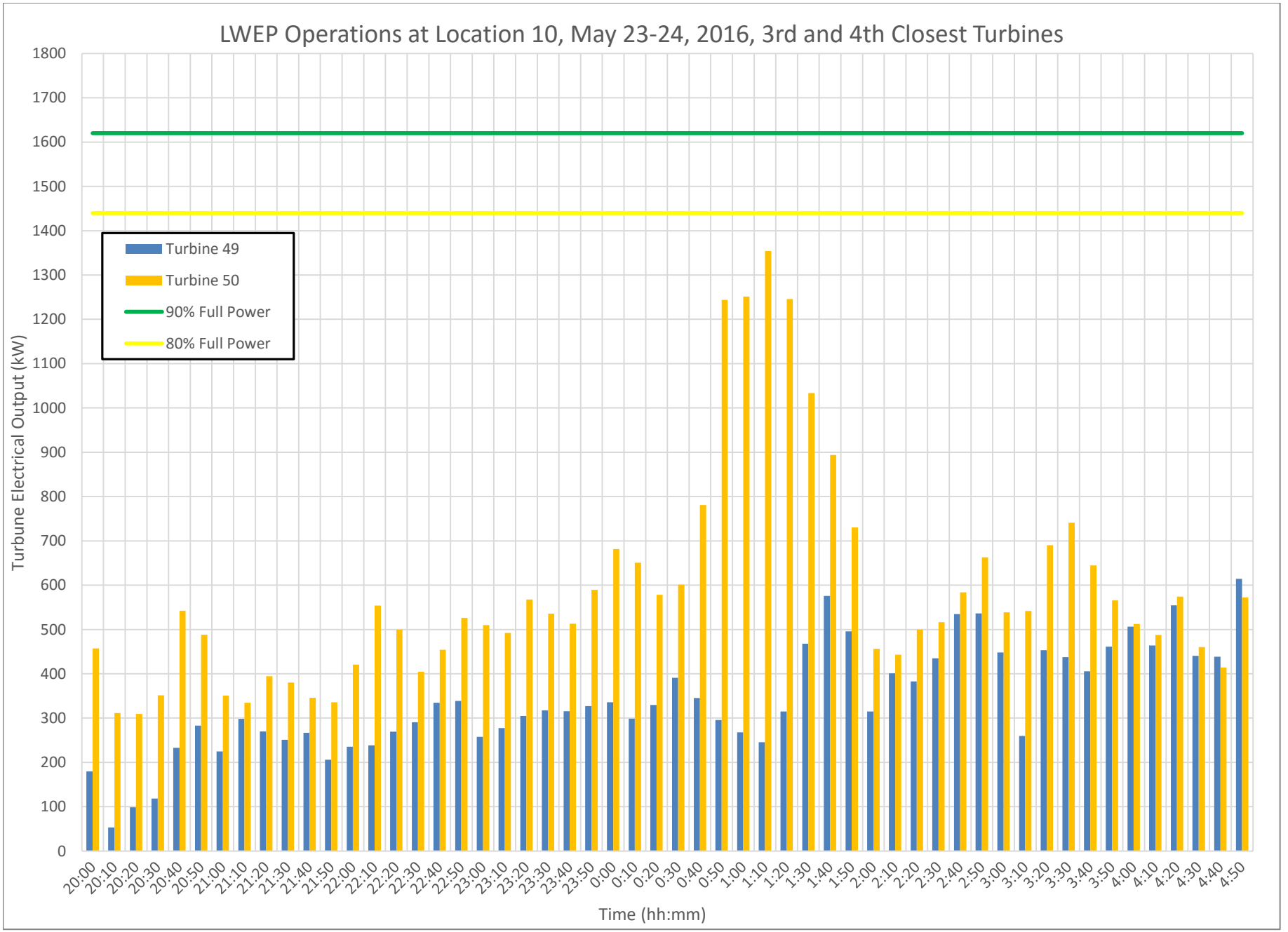
LWEP Operations at Location 10, May 23-24, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
Time (hh:mm)
Turbine 49
Turbine 50
90% Full Power
80% Full Power
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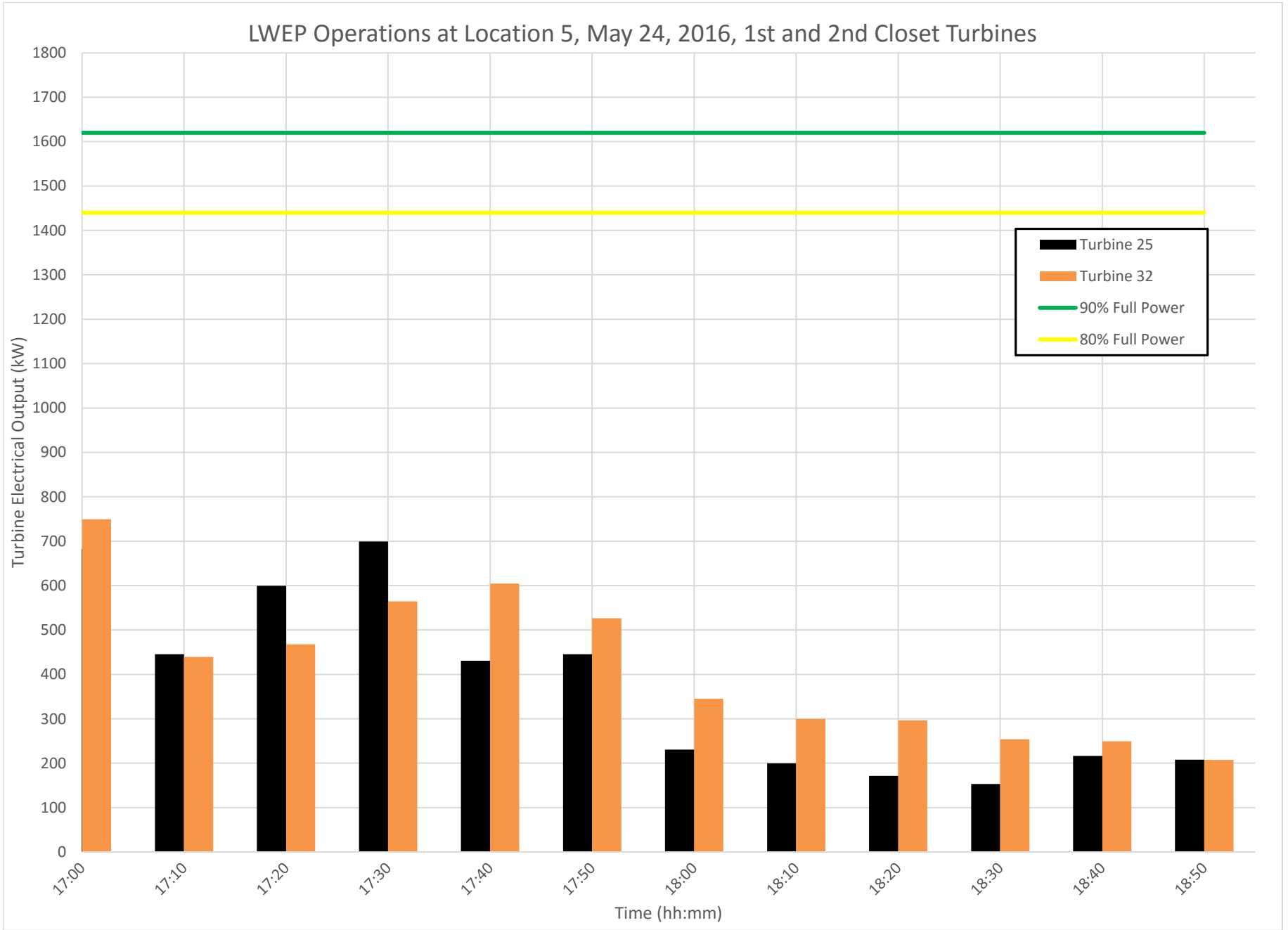
LWEP Operations at Location 5, May 24, 2016, 1st and 2nd Closet Turbines
Turbine Electrical Output (kW)
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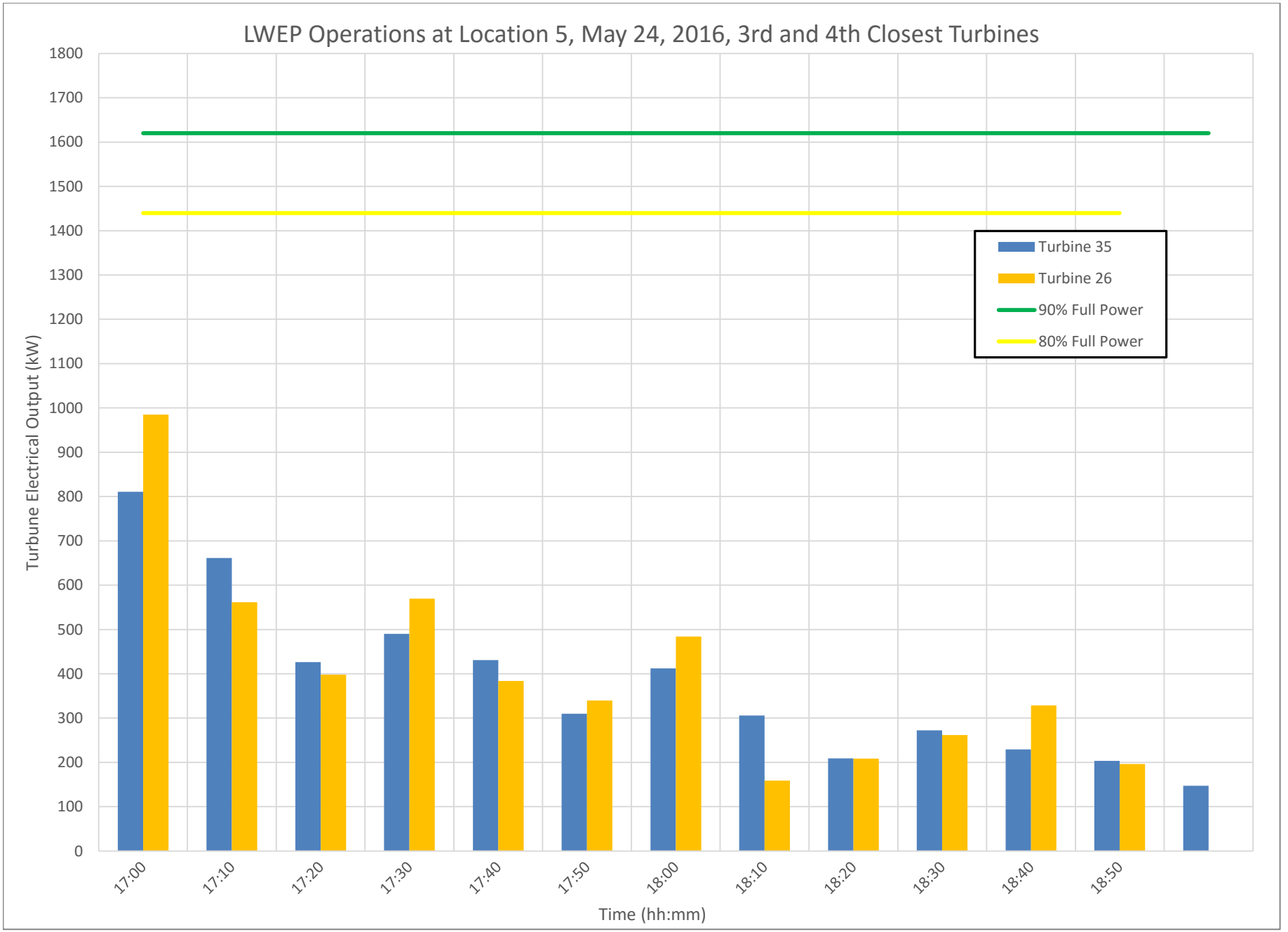
Time (hh:mm)
Turbine 25
Turbine 32
90% Full Power
80% Full Power


LWEP Operations at Location 5, May 24, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
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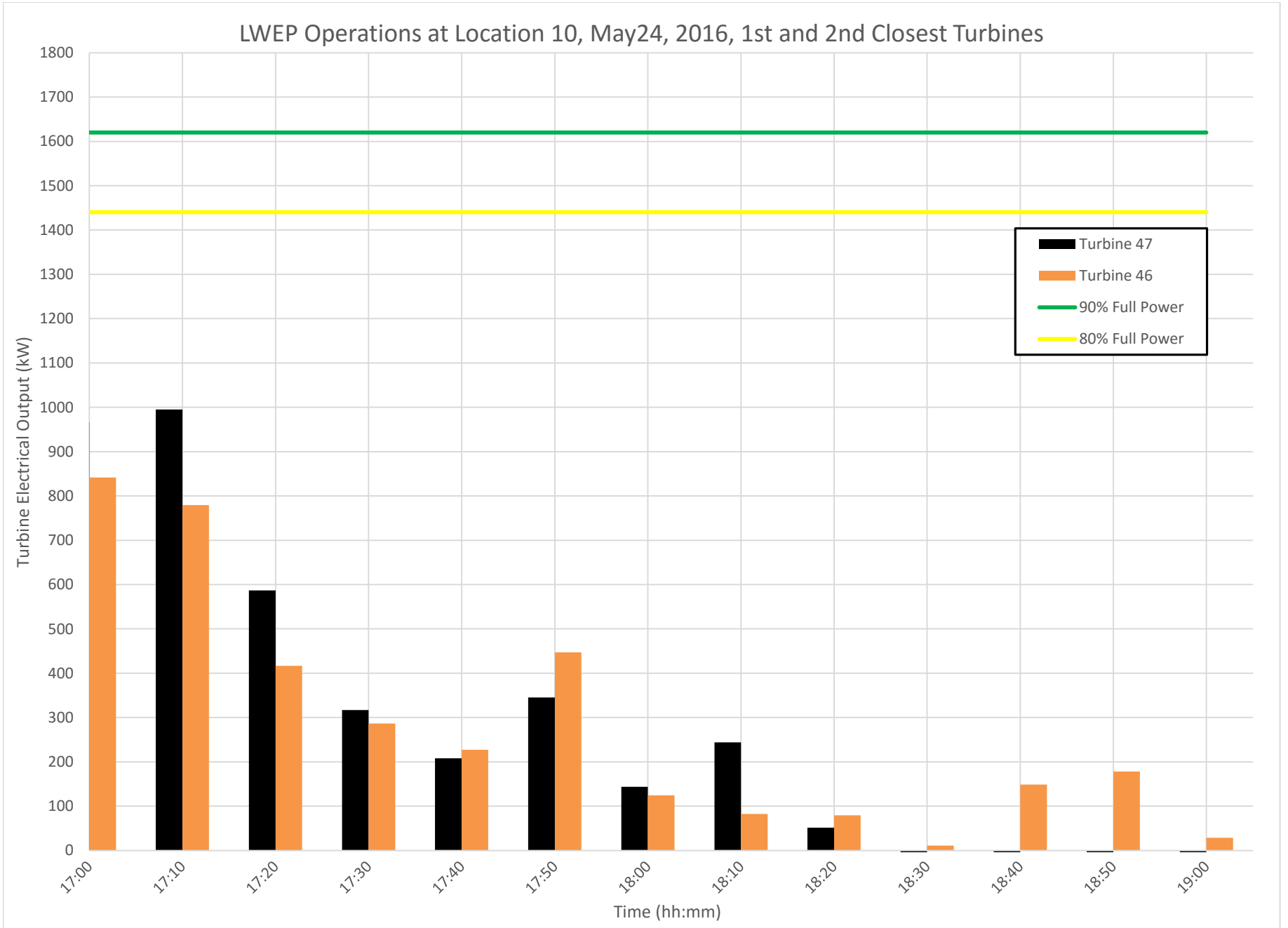
Time (hh:mm)
Turbine 35
Turbine 26
90% Full Power
80% Full Power


LWEP Operations at Location 10, May24, 2016, 1st and 2nd Closest Turbines
Turbine Electrical Output (kW)
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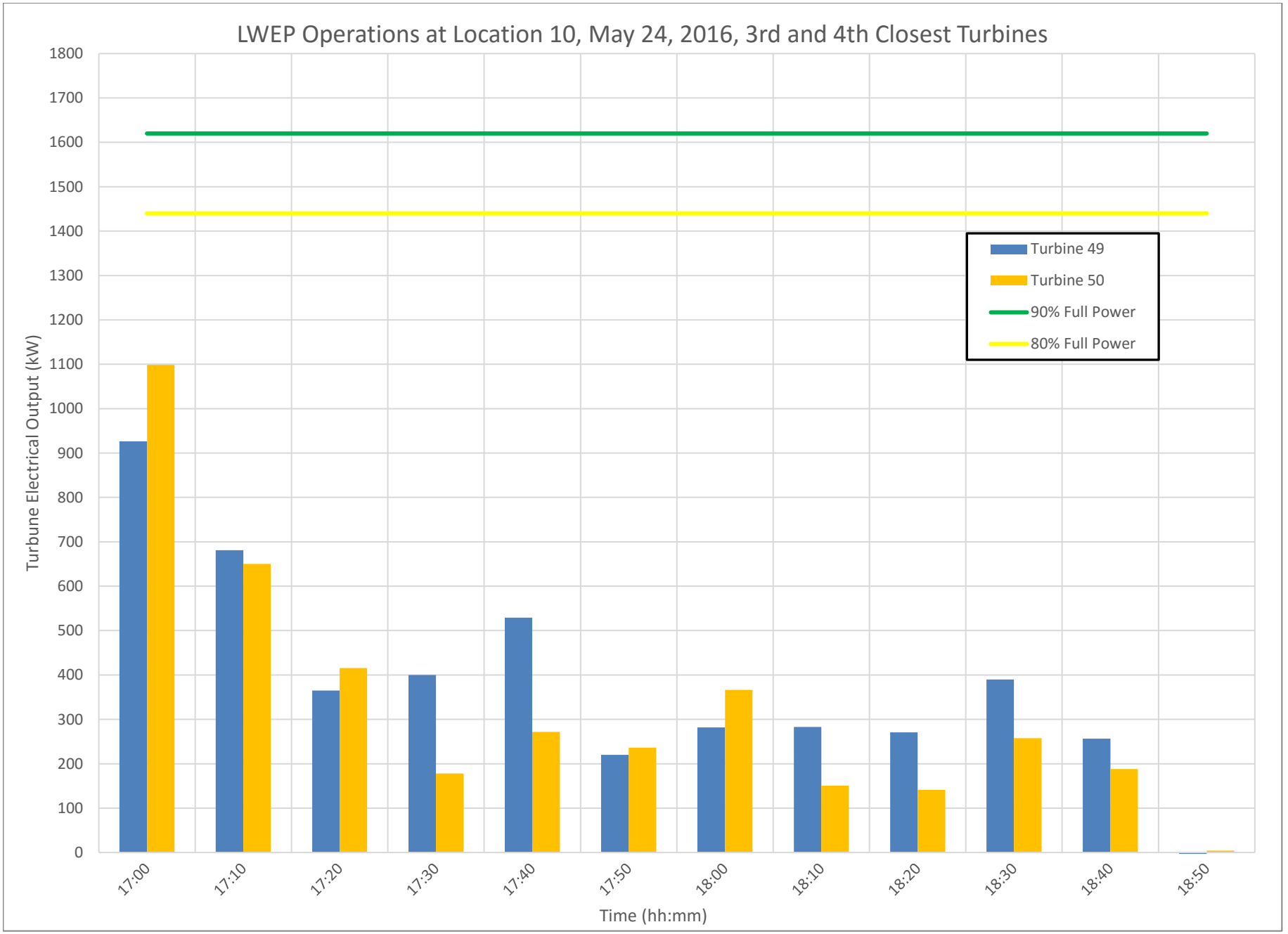
18:30
18:40
18:50
19:00
Time (hh:mm)
Turbine 47
Turbine 46
90% Full Power
80% Full Power


LWEP Operations at Location 10, May 24, 2016, 3rd and 4th Closest Turbines
Turbune Electrical Output (kW)
1800
1700
1600
1500
1400
1300
1200
1100
1000
900
800
700
600
500
400
300
200
100
0
Turbine 49
Turbine 50
90% Full Power
80% Full Power
17:00
17:10
17:20
17:30
17:40
17:50
18:00
18:10
18:20
18:30
18:40
18:50
Time (hh:mm)

# APPENDIX C

# CALCULATION OF MAXIMUM TURBINE NOISE LEVEL AT LOCATION 2

| TABLE C-1 | Actual Power Output | Actual Hub-height Wind Speed | PWL at Hub-height Wind Speed | Maximum PWL | Actual to Maximum Delta |
|---|---|---|---|---|---|
| Turbine | (kw) | (m/s) | (dBA) | (dBA) | (dBA) |
| T6 | 1553 | 9.0 | 104.0 | 105.0 | 1.0 |
| T15 | 969 | 8.0 | 102.0 | 105.0 | 3.0 |
| T4 | 965 | 7.6 | 101.5 | 105.0 | 3.5 |
| T18 | 1055 | 8.3 | 103.0 | 105.0 | 2.0 |
| T14 | 1502 | 8.5 | 103.2 | 105.0 | 1.8 |
| T19 | 1486 | 9.2 | 104.3 | 105.0 | 0.7 |

| TABLE C-2 | Actual PWL | Distance to Loc 2 | Validation Correction | Distance Correction | Turbine Predicted Level |
|---|---|---|---|---|---|
| Turbine | (dBA) | (feet) | (dB) | (dB) | (dBA) |
| T6 | 104.0 | 1040 | -4.9 | -58 | 41 |
| T15 | 102.0 | 1650 | -4.9 | -62 | 35 |
| T4 | 101.5 | 2040 | -4.9 | -64 | 32 |
| T18 | 103.0 | 2100 | -4.9 | -64 | 34 |
| T14 | 103.2 | 2500 | -4.9 | -66 | 32 |
| T19 | 104.3 | 3650 | -4.9 | -69 | 30 |
| | | | | **Total Predicted Level** | **43.4** |

| TABLE C-3 | Maximum PWL | Distance to Loc 2 | Validation Correction | Distance Correction | Turbine Predicted Level |
|---|---|---|---|---|---|
| Turbine | (dBA) | (feet) | (dB) | (dB) | (dBA) |
| T6 | 105 | 1040 | -4.9 | -58 | 42 |
| T15 | 105 | 1650 | -4.9 | -62 | 38 |
| T4 | 105 | 2040 | -4.9 | -64 | 36 |
| T18 | 105 | 2100 | -4.9 | -64 | 36 |
| T14 | 105 | 2500 | -4.9 | -66 | 34 |
| T19 | 105 | 3650 | -4.9 | -69 | 31 |
| | | | | **Total Predicted Level** | **45.1** |