

**THE BOEING COMPANY
AREA 4
Meteorological Monitoring Program**

**ANNUAL REPORT
JANUARY – DECEMBER 2011**



EMC Environmental Monitoring Company, Inc.

580 Linne Rd., Suite 150 Paso Robles, CA 93446 USA

Tel (805) 226-2275 Fax (805) 226-2280

ANNUAL REPORT
JANUARY – DECEMBER 2011



Environmental Monitoring Company, Inc.

580 Linne Rd., Suite 150 Paso Robles, CA 93446 USA Tel (805) 226-2275 Fax (805) 226-2280

19 January 2012

The Boeing Company
Attn: Paul Costa
P.O. Box 7922
Canoga Park, CA 91309-7922

Re: Submission of Boeing 2011 Meteorological Data

Dear Paul:

Enclosed is the Boeing 2011 Meteorological Data.

1. CD-ROM with all Boeing SSFL Area 4 Station meteorological data for 2011 in a single file in ASCII format.
2. CD-ROM with all Boeing SSFL Area 4 Station meteorological data for 2011 in a single file in Excel format.
3. A yearly 2011 wind rose for the Boeing SSFL Area 4 Station.
4. A certificate stating that the Boeing SSFL Area 4 Station was run in compliance with the USEPA Guidelines, as stated in EPA-454/R-99-005, February 2000, including twice yearly calibrations by EMC, an independent party, and completion of a station log.
5. A hard copy of the station log, including Audit Result printouts.

Please give me a call at (805) 226-2275 or email at [REDACTED] if you have questions or need more information.

Sincerely,
Environmental Monitoring Company, Inc.

Steve Gersh
President

W/enclosures

EMC**Environmental Monitoring Company, Inc.**

580 Linne Rd., Suite 150 Paso Robles, CA 93446 USA Tel (805) 226-2275 Fax (805) 226-2280

19 January 2012

The Boeing Company
Attn: Paul Costa
P.O. Box 7922.
Canoga Park, CA 91309-7922

Re: Certificate of Operation for Boeing Area 4 Meteorological Monitoring Station

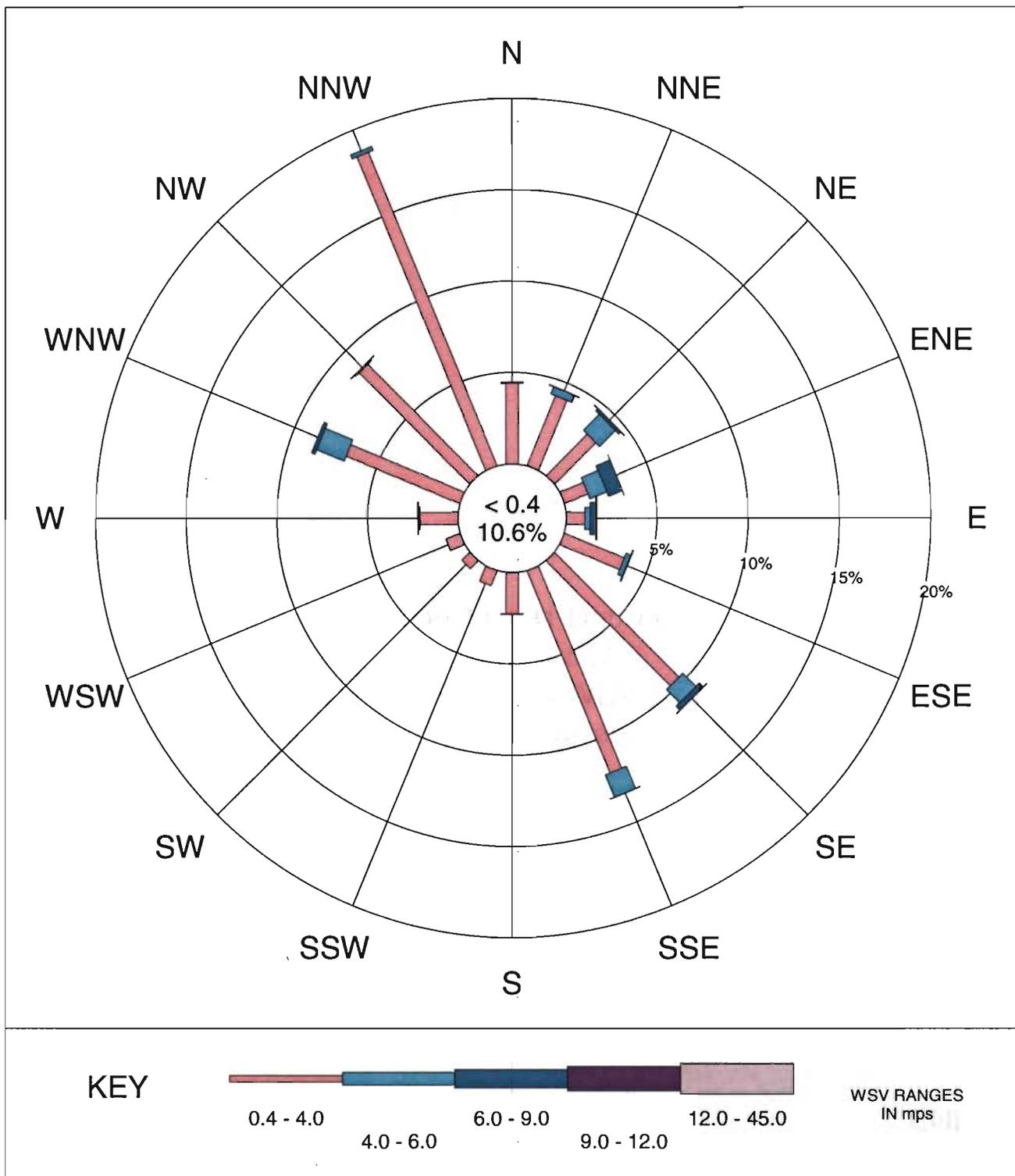
This certifies that during the year 2011, Environmental Monitoring Company, Inc. (EMC) performed calibrations and performance audits of the Boeing Area 4 meteorological monitoring station according to US EPA specifications contained in EPA-454/R-99-005, February 2000, including twice yearly calibrations, independent staff, and completion of a station log. During this period, EMC performed maintenance of the monitoring station as needed.

Sincerely,
Environmental Monitoring Company, Inc.

A handwritten signature in black ink, appearing to read "Steve Gersh", is written over the printed name.

Steve Gersh
President

01 Jan 11 - 31 Dec 11
 Station: Area4
 WSV versus WDV
 Frequency of Occurrence (%)



Site Notes

Monitoring Site: Boeing Area 4

Year: 2011

Date	Initials	Time	Notes:
28 Jan 11	CT	1150	Arrived Area 4. Weather cool, sunny, slight breeze.
		1151	Check rain gauge.
		1155	Swap battery and check solar panel.
		1215	Cal Nova Lynx rain gauge.
		1220	Depart.
		1226	Arrived Alfa.
		1227	Check rain gauge.
		1229	Swap battery and check solar panel.
		1235	Cal Nova Lynx rain gauge.
		1240	Depart.
		1244	Arrived LOXRG.
		1245	Check rain gauge.
		1247	Swap battery and check solar panel.
		1251	Cal Nova Lynx rain gauge.
		1255	Depart.
		1306	Arrived Canyon RG.
		1307	Swap battery and check solar panel.
		1312	Cal Nova Lynx rain gauge.
		1315	Depart.
		1317	Arrived Happy Valley.
		1318	Swap battery and check solar panel.
		1322	Cal Nova Lynx rain gauge.
		1325	Depart.
1328	Arrived 436.		
1329	Swap battery and check solar panel.		
1334	Cal Nova Lynx rain gauge.		
1338	Depart.		
30 Mar 11	CT	1130	Arrived Area 4. Weather warm, sunny, breezy.
		1133	Mark channels down.
		1202	Front bearing needs to be replaced, still works fine but you can hear it's giving out. Will replace next time.
		1211	Mark channels online.
		1215	Depart.
6 Jun 11	CT	1156	Arrived Area 4. Weather overcast, slight rain, cool, windy. Skipped Rain Gauge Audits do to rain as requested by Paul Costa. Will need to make up.
		1159	Mark channels down.
		1208	Start MET Audit.
		1242	Finish MET Audit.
		1245	Mark channels online.
		1249	Depart.
28 Jun 11	CT	0948	Arrived Area 4. Weather warm, sunny, slight breeze.
		0952	Audit Rain Gauge.
		0956	Depart.
		1002	Arrived Alfa.
		1004	Audit Rain Gauge.

		1008	Depart.
		1012	Arrived LOXRG.
		1015	Audit Rain Gauge.
		1020	Depart.
		1031	Arrived Canyon RG.
		1039	Audit Rain Gauge.
		1047	Depart.
		1050	Arrived Happy Valley.
		1053	Audit Rain Gauge.
		1057	Depart.
		1101	Arrived 436.
		1103	Audit Rain Gauge.
		1109	Depart.
20 Sep 11	CT	1142	Arrived 436. Weather cool, partly cloudy, slight breeze.
		1145	Cal rain gauge.
		1201	Depart.
		1210	Arrived Canyon RG.
		1213	Cal rain gauge.
		1222	Depart.
		1225	Arrived Happy Valley.
		1228	Cal rain gauge.
		1236	Depart.
		1244	Arrived LOX RG.
		1246	Cal rain gauge.
		1250	Depart.
		1257	Arrived Alfa.
		1259	Cal rain gauge.
		1301	Depart.
		1307	Arrived Area 4.
		1321	MET Cal.
		1357	Depart.
5 Dec 11	CT	1239	Arrived 436. Weather cool, partly cloudy, slight breeze.
		1241	Cal rain gauge.
		1208	Depart.
		1246	
		1242	Arrived Canyon RG.
		1254	
		1245	Cal rain gauge.
		1257	
		1249	Depart.
		1259	
		1306	Arrived Happy Valley.
		1308	Cal rain gauge.
		1311	Depart.
		1321	Arrived LOX RG.
		1323	Cal rain gauge.
		1326	Depart.
		1334	Arrived Alfa.
		1336	Cal rain gauge.
		1339	Depart.
		1346	Arrived Area 4.
		1351	Mark channels down.
		1353	Change time from 13:43 to 13:53. Start MET Audit.
		1446	Mark channels online.
		1447	Depart.
			Arrived Area 4. Weather overcast, slight rain, cool, windy. Skipped Rain Gauge Audits do to rain as requested by Paul Costa. Will need to make up.

			Mark channels down.
			Start MET Audit.
			Finish MET Audit.
			Mark channels online.
			Depart.

Meteorological Calibration

Rainfall Sensor

Station: Boeing Area 4

Tech: Charlie Tsou & Walter Wright

Date: 30-Mar-2011

Meteorological Calibration Device

Station Sensor

Make/Model: Graduated Cylinder - NIST	Make/Model: Texas Electronics 525I
Serial Number: 39269	Serial Number: 42042407
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 28 September 2010

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (Happy Valley)

Tech: Charlie Tsou

Date: 28-Jan-2011

Meteorological Calibration Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2480
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 28 Sep 2010

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (436)

Tech: Charlie Tsou

Date: 28-Jan-2011

Meteorological Calibration Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2487
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 28 Sep 2010

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (Alfa)

Tech: Charlie Tsou

Date: 28-Jan-2011

Meteorological Calibration Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2486
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 28 Sep 2010

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (Canyon RG)

Tech: Charlie Tsou

Date: 28-Jan-2011

Meteorological Calibration Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2480
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 28 Sep 2010

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (LOXRG)

Tech: Charlie Tsou

Date: 28-Jan-2011

Meteorological Calibration Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2479
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 28 Sep 2010

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

ATM

Station: Boeing Area 4

Tech: Charlie Tsou & Walter Wright

Date: 30-Mar-2011

Meteorological Calibration

Device

Station Sensor

Make/Model: Thermometer	Make/Model: Met One
Serial Number: N/A	Serial Number: 060A
Range: N/A	Range: 0 - 50 Degrees C
Date of Last Calibration: NIST	Date of Last Calibration: 28 September 2010
	Site Declination: 14 degrees

Parameter	Point	DAS			Criteria (Max Error)	Pass	Fail
		Source Value	As Is Resp.	Diff			
ATM	1	0.45	0.02	-0.43	1.0 deg C +	X	
	2	19.34	18.60	-0.74			
	3	44.30	44.75	0.45			

Meteorological Calibration

Barometric Pressure Sensor

Station: Boeing Area 4

Tech: Charlie Tsou & Walter Wright

Date: 30-Mar-2011

Meteorological Calibration

Device	Station Sensor
Make/Model: Barigo	Make/Model: Climatronics
Serial Number: N/A	Serial Number: N/A
Range: N/A	Range: 0 -50 Degrees C
Date of Last Calibration: NIST	Date of Last Calibration: 28 September 2010
	Site Declination: 14 degrees

Parameter	Point	DAS			Criteria (Max Error)	Pass	Fail
		Source Value	As Is Resp.	Diff			
BP	1	966.50	967.30	-0.80	10 MB	X	

Meteorological Calibration

Horizontal Wind Speed Sensor

Station: Boeing Area 4

Tech: Charlie Tsou & Walter Wright

Date: 30-Mar-2011

Meteorological Calibration Device

Station Sensor

Make/Model: R.M.Young Anemometer	Make/Model: R.M. Young
Serial Number:	Serial Number: WM86117
Range: 200 to 15000 RPM	Range: 0 - 50 mps
Date of Last Calibration:	Date of Last Calibration: 28 September 2010
	Site Declination: 14 Degrees

Parameter	Point	DAS			Diff	Criteria (Max Error)	Pass	Fail
		Source	Source Value	As Is Resp.				
Horiz. WS	1	0	0.20	0.30	0.10	0.300 + m/s when w/s <5 m/s _ 5% of source when w/s >5	X	
	2	1500	7.80	7.80	0.00			
	3	3000	15.40	15.50	0.10			
	4	6000	30.70	31.00	0.30			

Meteorological Calibration

Horizontal Wind Direction Sensor

Station: Boeing Area 4
 Tech: Charlie Tsou & Walter Wright
 Date: 30-Mar-2011

Meteorological Calibration Device

Station Sensor

Make/Model: Compass	Make: R.M Young
Serial Number: N/A	Serial Number: WM86117
Range: N/A	Range: 0 -360 Degrees Asimuth
Date of Last Calibration: NIST	Date of Last Calibration: 28 September 2010
	Site Declination: 14 Degrees

Parameter	Point	DAS			Criteria (Max Error)	Pass	Fail
		Source Value	As Is Resp.	Diff			
Horiz. WD	1	90	90.8	0.80	< 5 deg	X	
	2	180	180.8	0.80			
	3	270	271.4	1.40			
	4	360	360.4	0.40			

Meteorological Audit

Rainfall Sensor

Station: Boeing (Area 4 Backup)

Auditor: Charlie Tsou

Date: 28-Jun-2011

Audit Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2489
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 Mar 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	0.1	0.1	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (Happy Valley)

Auditor: Charlie Tsou

Date: 28-Jun-2011

Audit Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2488
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 Mar 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	0.1	0.1	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (436)

Auditor: Charlie Tsou

Date: 28-Jun-2011

Audit Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2487
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 Mar 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	0.1	0.1	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (Alfa)

Auditor: Charlie Tsou

Date: 28-Jun-2011

Audit Device

Station Sensor

Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2486
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 Mar 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	0.1	0.1	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (CanyonRG)
 Auditor: Charlie Tsou
 Date: 28-Jun-2011

Audit Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2480
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 Mar 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	0.1	0.1	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (LOXRG)

Auditor: Charlie Tsou

Date: 28-Jun-2011

Audit Device

Station Sensor

Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2479
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 Mar 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	0.1	0.1	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

ATM

Station: Boeing Area 4
 Auditor: Charlie Tsou & Walter Wright
 Date: 6-Jun-2011

Audit Device

Station Sensor

Make/Model: VWR 61027-205	Make/Model: Met One
Serial Number: 01490	Serial Number: 060A
Range: -1.0 to +51.0 DegC	Range: 0 -50 Degrees C
Date of Last Calibration: NIST	Date of Last Calibration: 30 Mar 2011
	Site Declination: 14 Degree

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Temp DegC	DAS	Error (Diff)			
ATM	1	0.32	-0.10	-0.42	Maximum Error + 1.0 DegC	X	
	2	17.45	17.90	0.45			
	3	44.52	44.00	-0.52			

Meteorological Audit

Barometric Pressure Sensor

Station: Boeing Area 4
 Auditor: Charlie Tsou & Walter Wright
 Date: 6-Jun-2011

Audit Device	Station Sensor
Make/Model: Barigo	Make/Model: Climatronics
Serial Number: N/A	Serial Number: N/A
Range: N/A	Range: 850.0 to 1100.0 MBR
Date of Last Calibration: N/A	Date of Last Calibration: 30 Mar 2011

Parameter	Audit Input		Audit Results			Audit Criteria (Max Error)	Pass	Fail
	mmHg	mBar	DAS	Actual (Diff)	Percent (Diff)			
BP	28.56	966.0	966.6	0.6	0.06%	Maximum Error + 1.0 MB	X	

Meteorological Audit

Horizontal Wind Speed Sensor

Station: Boeing Area 4
 Auditor: Charlie Tsou & Walter Wright
 Date: 6-Jun-2011

Audit Device	Station Sensor
Make/Model: R.M.Young Anemometer	Make/Model: R.M Young
Serial Number:	Serial Number: WM86117
Range: 200 to 15000 RPM	Range: 0 - 50 mps
Date of Last Calibration:	Date of Last Calibration: 30 Mar 2011
	Site Declination: 14 Degrees

Parameter	Audit Input		Audit Results			Audit Criteria (Max Error)	Slope Criteria	Pass	Fail
	Speed	Met-1	DAS	Actual (Diff)	Percent (Diff)				
	RMP	010B							
Horiz. WS	0	0.3	0.30	0.00	0.00%	>5 m/s max. Error 2.5 m/s	Between 1.0500 and 0.9500	X	
	1500	7.40	7.80	0.40	5.41%				
	3000	14.70	15.50	0.80	5.44%	<5 m/s max. Error 0.25 m/s			
	6000	29.30	31.00	1.70	5.80%				
	Strating Threshold: 0.5 m/s			Torque 0.3 gm/cm		Audit Criteria: 0.5 m/s			

AUDIT SLOPE: 1.0597

Meteorological Audit

Horizontal Wind Direction Sensor

Station: Boeing Area 4
 Auditor: Charlie Tsou & Walter Wright
 Date: 6-Jun-2011

Audit Device	Station Sensor
Make/Model: Compass	Make/Model: R.M. Young
Serial Number: N/A	Serial Number: WM86117
Range: N/A	Range: 0 -360 Degrees Asimuth
Date of Last Calibration: NIST	Date of Last Calibration: 30 Mar 2011
	Site Declination: 14 Degrees

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Reference Degrees	DAS	Error (Diff)			
Horiz. WD	1	90	90.3	0.30	Maximum Error <5 Deg	X	
	2	180	180.9	0.90			
	3	270	270.6	0.60			
	4	360	359.1	-0.90			
	Starting Threshold: 0.5gm/cm		Torque: 2.0gm/cm		Audit Criteria: 0.5gm/cm		

Meteorological Audit

Relative Humidity Sensor

Station: Boeing Area 4
 Auditor: Charlie Tsou & Walter Wright
 Date: 6-Jun-2011

Audit Device	Station Sensor
Make/Model: Weksler 5211	Make/Model: RM Young 41375C/VF
Serial Number: 20943	Serial Number: None
Range: -30 to +50 DegC	Range: 0-100 %
Date of Last Calibration: N/A	Date of Last Calibration: 30 Mar 2011

Parameter	Reference		Response		Audit Criteria (Max Error)	Pass	Fail
	Point	Reading	DAS	Error (Diff)			
RH	1	65.7	66.5	1.20%	Maximum Error \pm 5.0 percent	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (Area 4)

Tech: Charlie Tsou & Walter Wright

Date: 20-Sep-2011

Meteorological Calibration Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2489
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 March 2011

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (Happy Valley)
 Tech: Charlie Tsou & Walter Wright
 Date: 20-Sep-2011

Meteorological Calibration Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2480
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 March 2011

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (436)

Tech: Charlie Tsou & Walter Wright

Date: 20-Sep-2011

Meteorological Calibration Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2487
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 March 2011

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (Alfa)

Tech: Charlie Tsou & Walter Wright

Date: 20-Sep-2011

Meteorological Calibration Device

Station Sensor

Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2486
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 March 2011

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (Canyon RG)
 Tech: Charlie Tsou & Walter Wright
 Date: 20-Sep-2011

Meteorological Calibration Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2480
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 March 2011

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

Rainfall Sensor

Station: Boeing (LOXRG)

Tech: Charlie Tsou & Walter Wright

Date: 20-Sep-2011

Meteorological Calibration Device

Station Sensor

Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2479
Range: 0 - 50 ml @ 5 Tips/Min	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 30 March 2011

Parameter	Source input		Response		Criteria (Max Error)	Pass	Fail
	Point	Tips/Min	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Calibration

ATM

Station: Boeing Area 4

Tech: Charlie Tsou & Walter Wright

Date: 20-Sep-2011

Meteorological Calibration

Device	Station Sensor
Make/Model: Thermometer	Make/Model: Met One
Serial Number: N/A	Serial Number: 060A
Range: N/A	Range: 0 - 50 Degrees C
Date of Last Calibration: NIST	Date of Last Calibration: 30 March 2011
	Site Declination: 14 degrees

Parameter	Point	DAS			Criteria (Max Error)	Pass	Fail
		Source Value	As Is Resp.	Diff			
ATM	1	0.33	-0.10	-0.43	1.0 deg C +	X	
	2	18.20	17.70	-0.50			
	3	43.41	42.80	-0.61			

Meteorological Calibration

Barometric Pressure Sensor

Station: Boeing Area 4
 Tech: Charlie Tsou & Walter Wright
 Date: 20-Sep-2011

Meteorological Calibration Device

Station Sensor

Make/Model: Barigo	Make/Model: Climatronics
Serial Number: N/A	Serial Number: N/A
Range: N/A	Range: 0 -50 Degrees C
Date of Last Calibration: NIST	Date of Last Calibration: 30 March 2011
	Site Declination: 14 degrees

Parameter	Point	DAS			Criteria (Max Error)	Pass	Fail
		Source Value	As Is Resp.	Diff			
BP	1	946.00	965.10	-19.10	10 MB		X

Meteorological Calibration

Horizontal Wind Speed Sensor

Station: Boeing Area 4

Tech: Charlie Tsou & Walter Wright

Date: 20-Sep-2011

Meteorological Calibration Device

Station Sensor

Make/Model: R.M.Young Anemometer	Make/Model: R.M. Young
Serial Number:	Serial Number: WM86117
Range: 200 to 15000 RPM	Range: 0 - 50 mps
Date of Last Calibration:	Date of Last Calibration: 30 March 2011
	Site Declination: 14 Degrees

Parameter	Point	DAS				Criteria (Max Error)	Pass	Fail
		Source	Source Value	As Is Resp.	Diff			
Horiz. WS	1	0	0.20	0.30	0.10	0.300 + m/s when w/s <5 m/s - 5% of source when w/s >5	X	
	2	1500	7.80	7.80	0.00			
	3	3000	15.40	15.50	0.10			
	4	6000	30.70	31.00	0.30			

Meteorological Calibration

Horizontal Wind Direction Sensor

Station: Boeing Area 4

Tech: Charlie Tsou & Walter Wright

Date: 20-Sep-2011

Meteorological Calibration Device

Station Sensor

Make/Model: Compass	Make: R.M Young
Serial Number: N/A	Serial Number: WM86117
Range: N/A	Range: 0 -360 Degrees Asimuth
Date of Last Calibration: NIST	Date of Last Calibration: 30 March 2011
	Site Declination: 14 Degrees

Parameter	Point	DAS			Criteria (Max Error)	Pass	Fail
		Source Value	As Is Resp.	Diff			
Horiz. WD	1	90	91.5	1.50	< 5 deg	X	
	2	180	180.3	0.30			
	3	270	271.2	1.20			
	4	360	360.4	0.40			

Meteorological Calibration

Relative Humidity Sensor

Station: Boeing Area 4
 Tech: Charlie Tsou & Walter Wright
 Date: 20-Sep-2011

Meteorological Calibration Device	Station Sensor
Make/Model: Weksler 5211	Make/Model: RM Young 41375C/VF
Serial Number: 20943	Serial Number: None
Range: -30 to +50 DegC	Range: 0-100 %
Date of Last Calibration: N/A	Date of Last Calibration: 30 March 2011

Parameter	Reference		Response		Criteria (Max Error)	Pass	Fail
	Point	Reading	DAS	Error (Diff)			
RH	1	28.7	28.5	-0.70%	Maximum Error \pm 5.0 percent	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (Area 4 Backup)
 Auditor: Charlie Tsou & Walter Wright
 Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2489
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 20 Sep 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (Happy Valley)
 Auditor: Charlie Tsou & Walter Wright
 Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2488
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 20 Sep 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (436)

Auditor: Charlie Tsou & Walter Wright

Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2487
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 20 Sep 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (Alfa)
 Auditor: Charlie Tsou & Walter Wright
 Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2486
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 20 Sep 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (CanyonRG)

Auditor: Charlie Tsou & Walter Wright

Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2480
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 20 Sep 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

Rainfall Sensor

Station: Boeing (LOXRG)
 Auditor: Charlie Tsou & Walter Wright
 Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: Graduated Cylinder - NIST	Make/Model: NOVA Lynx 260-2501
Serial Number: 39269	Serial Number: 2479
Range: 0 - 50 ml	Range: 0 - 10 in/hr
Date of Last Calibration: NIST	Date of Last Calibration: 20 Sep 2011

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Tips	DAS	Error (Diff)			
Rainfall	1	10	10	0.0	Maximum Error + 1.0 in/hr	X	

Meteorological Audit

ATM

Station: Boeing Area 4

Auditor: Charlie Tsou & Walter Wright

Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: VWR 61027-205	Make/Model: Met One
Serial Number: 01490	Serial Number: 060A
Range: -1.0 to +51.0 DegC	Range: 0 -50 Degrees C
Date of Last Calibration: NIST	Date of Last Calibration: 20 Sep 2011
	Site Declination: 14 Degree

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Temp DegC	DAS	Error (Diff)			
ATM	1	0.10	-0.50	-0.60	Maximum Error + 1.0 DegC	X	
	2	18.80	17.90	-0.90			
	3	44.60	43.70	-0.90			

Meteorological Audit

Barometric Pressure Sensor

Station: Boeing Area 4

Auditor: Charlie Tsou & Walter Wright

Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: Barigo	Make/Model: Climatronics
Serial Number: N/A	Serial Number: N/A
Range: N/A	Range: 850.0 to 1100.0 MBR
Date of Last Calibration: N/A	Date of Last Calibration: 20 Sep 2011

Parameter	Audit Input		Audit Results			Audit Criteria (Max Error)	Pass	Fail
	mmHg	mBar	DAS	Actual (Diff)	Percent (Diff)			
BP	28.21	954.0	967.6	13.6	1.43%	Maximum Error + 1.0 MB		X

Meteorological Audit

Horizontal Wind Speed Sensor

Station: Boeing Area 4

Auditor: Charlie Tsou & Walter Wright

Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: R.M.Young Anemometer	Make/Model: R.M Young
Serial Number:	Serial Number: WM86117
Range: 200 to 15000 RPM	Range: 0 - 50 mps
Date of Last Calibration:	Date of Last Calibration: 20 Sep 2011
	Site Declination: 14 Degrees

Parameter	Audit Input		Audit Results			Audit Criteria (Max Error)	Slope Criteria	Pass	Fail
	Speed	Met-1	DAS	Actual (Diff)	Percent (Diff)				
	RMP	010B							
Horiz. WS	0	0.3	0.30	0.00	0.00%	>5 m/s max. Error 2.5 m/s	Between 1.0500 and 0.9500	X	
	1500	7.40	7.80	0.40	5.41%				
	3000	14.70	15.50	0.80	5.44%	<5 m/s max. Error 0.25 m/s			
	6000	29.30	31.00	1.70	5.80%				
	Strating Threshold: 0.5 m/s		Torque 0.3 gm/cm			Audit Criteria: 0.5 m/s			

AUDIT SLOPE: 1.0597

Meteorological Audit

Horizontal Wind Direction Sensor

Station: Boeing Area 4
 Auditor: Charlie Tsou & Walter Wright
 Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: Compass	Make/Model: R.M. Young
Serial Number: N/A	Serial Number: WM86117
Range: N/A	Range: 0 -360 Degrees Asimuth
Date of Last Calibration: NIST	Date of Last Calibration: 20 Sep 2011
	Site Declination: 14 Degrees

Parameter	Audit Input		Audit Results		Audit Criteria (Max Error)	Pass	Fail
	Point	Reference Degrees	DAS	Error (Diff)			
Horiz. WD	1	90	91.1	1.10	Maximum Error <5 Deg	X	
	2	180	181.4	1.40			
	3	270	271.9	1.90			
	4	360	361.9	1.90			
	Starting Threshold: 0.5gm/cm		Torque: 2.0gm/cm		Audit Criteria: 0.5gm/cm		

Meteorological Audit

Relative Humidity Sensor

Station: Boeing Area 4
 Auditor: Charlie Tsou & Walter Wright
 Date: 5-Dec-2011

Audit Device	Station Sensor
Make/Model: Weksler 5211	Make/Model: RM Young 41375C/VF
Serial Number: 20943	Serial Number: None
Range: -30 to +50 DegC	Range: 0-100 %
Date of Last Calibration: N/A	Date of Last Calibration: 20 Sep 2011

Parameter	Reference		Response		Audit Criteria (Max Error)	Pass	Fail
	Point	Reading	DAS	Error (Diff)			
RH	1	15.4	15.24	-1.04%	Maximum Error \pm 5.0 percent	X	