June 19, 2008 Meteorological Calibration Report

Yerington Mine Site

AM-1 (wind only)

The AM-1 tower was visited at 09:00 on June 19, 2008 to test and remove the RM Young Wind Monitor AQ wind speed and direction sensor. This air monitoring station has been taken out of active service, although the data logging and telemetry systems have been left in-place and are functioning. The station and tower were found in good condition and the Wind Monitor AQ was operating correctly when removed and the bearings (speed and direction) and signal outputs were within specifications.

AM-3 (wind only)

The AM-3 tower was visited at 07:30 on June 19, 2008 to test and remove the RM Young Wind Monitor AQ wind speed and direction sensor. This air monitoring station has been taken out of active service, although the data logging and telemetry systems have been left in-place and are functioning. The station and tower were found in good condition and the Wind Monitor AQ was operating correctly when removed and the bearings and signal outputs were within specifications.

AM-6

The meteorological sensors at AM-6 were tested on June 19, 2008 between about 10:30 and 17:00. The tower was lowered between 11:00 to 16:45for testing sensors and exchanging the wind speed and direction sensor. The installed Wind Monitor AQ wind sensor was found in good condition and operating correctly. The wind speed and direction bearings were well within threshold specifications and no “dead band” issues were observed as noted during previous visits.

The replacement Wind Monitor AQ wind sensor was installed and tested and found to be operating within specifications. No dead band direction issues were observed with the replacement sensor.

Barometric pressure, solar radiation, and relative humidity readings matched co-located sensors within acceptable tolerances. The 2 meter and 10 meter temperature sensors were tested in a circulating water batch and matched each other (statistically different by less than 0.01 degrees) and a NIST traceable thermometer very well. The tipping bucket rain gage was testing by dripping a known volume over time while monitoring the number of tips. In two repetitions of the test the number of tips was greater than expected (61 and 62 tips versus 57 expected). No rain gauge adjustments were made on this visit; a closer inspection and adjustment may be needed on the next visit

Station AM-1 Meteorological Instrumentation, 06/19/08

Parameter	Sensor height, meters	Manufacturer	Model	Serial Numbers	
AS FOUND					
Wind Speed/Direction	10	RM Young	05305 Wind Monitor AQ	body	83215
				propeller	64358
				board	05178A RevA20-07
AS LEFT					
Wind Speed/Direction	10	RM Young	05305 Wind Monitor AQ	body	
** SENSOR REMOVED, STATION INACTIVE**				propeller	
				Board	

SITE VISIT CHECK LIST
Meteorological Tower

DATE: 19-Jun-08
TIME: 9:00 PDT__ PST_*X*_
SITE NAME:
AM-1 Yerington Mine Site

SITE VISIT ACTIVITY:
Site Inspection and Wind Sensor Check
Wind Sensor Removed
Station Inactive

Physical Inspection Items		**Check Box**	**Comments**
1	Inspect fencing, gate, and lock	ok	
2	Visually check vertical alignment of tower and its physical condition	ok	
3	Inspect tower for loose or broken cables	ok	
4	Confirm tight connection to grounding rod	ok	
5	Confirm simultaneous movement of wind sensors	n/a	one sensor
6	Visually check alignment of wind sensor mounting bar	ok	
7	Clean and check level of solar radiation sensor	n/a	
8	Verify cleanliness and alignment of solar panels	n/a	
9	Open instrumentation enclosures. Check dessicant and wire connections	ok	Instrument enclosure inside shed
10	Verify operation of lower radiation shield fan	n/a	
10	Verify operation of upper radiation shield fan	n/a	
11	Check rain gauge for cleanliness and alignment	n/a	
12	Clean up site, as required	ok	

Data Observations (remote or onsite ?) 19-Jun-08 Time: _____

	ONSITE	**Value**	**Comments**
a	Temperature at 2 meters	n/a	
b	Temperature at 10 meters	n/a	
c	Delta-T, 1-minute average:	n/a	
d	Wind Speed A	1.3	
e	On Tower Wind Direction: North	358	tower tilted down, rough alignments
f	On Tower Wind Direction: South	179	
g	On Tower Wind Direction: West	285	
h	On Tower Wind Direction: East	104	
I			
j	Solar Radiation	n/a	
k	Relative Humidity	n/a	
l	Barometric Pressure	n/a	
m	Solar Panel Output for Internal Battery	n/a	
n	Solar Panel Output for External Battery (if applicable)	n/a	
o	Internal Battery Voltage	13.26	
p	External Battery Voltage (if applicable)	n/a	
q	Rain Gauge Output (15 min, 60 min, 24 hr)	n/a	

COMMENTS

This station is inactive
Wind Monitor Sensor tested as found and removed from tower

Data logger and telemetry left in-place and functional

Checked By: Rhys McDonald

Jun-02

WIND SENSOR VALIDATION SHEET

DATE:	*19-Jun-08*		As Found	No changes	Made Change
TIME:		**CALIBRATION ACTIVITY:**	*X*		*X*
SITE NAME:	*AM-1 Yerington Mine Site*				
PROJECT:					

INSTRUMENT DESCRIPTION

					body	propeller
Manufacturer:	*RM Young*	Model: *05305 AQ*	As Found:	Serial Number:	83215	64358
Reporting Units	wind speed:	*meters per second*	As Left:	Serial Number:	*REMOVED*	
	wind direction:	*degrees True*		Sensor Height:	*10 meters above ground*	

CALIBRATION EQUIPMENT

Torque Disc:	*RM Young 18370*	Vane Angle Degree Fixture:	*RM Young 18212*
Anemometer Drive:		Torque Gauge:	*RM Young 18331*
Vane Alignment Rod:	*RM Young 18301*	Compass:	*Silva Ranger Type 15 sighting compass*

SITE AND TOWER DATA

	Installed	As Found	As Left
Crossarm alignment (relative to true north):		*slightly shifted (<1 deg)*	*aligned relative to stake*

Declination of site: *14 deg 29" E*

Description of ground reference mark for crossarm alignment: *Painted/flagged stakes on north side of tower*

Solar Noon Alignment Check? *NO* Time of Solar Noon: _____

CALIBRATION

Wind Speed Sensor

Starting Torque Criteria: RM Young 5305 <= 1.0 gm-cm for wind threshold 0.5 m/s

Starting Torque (gm-cm): **As Found:** *0.35* **AS Left**

Criteria Met? *Yes* *(note:Sensor Removed)*

Anemometer Drive, RPM	**AS FOUND** CR1000 Datalogger RPM	mph	RPM to mph factor 0.01145 rpm % diff		**AS LEFT** CR1000 Datalogger RPM	mph	rpm % diff	
500	*500*	*5.72*	0%					
1000	*1000*	*11.45*	0%					
2500	*2500*	*28.63*	0%					
5000	*5000*	*57.25*	0%					
7500	*7500*	*85.88*	0%					
10000	*10000*	*114.5*	0%					

Criteria Met? *Yes* **Wind Speed Criteria:** acceptable within 5% of anemometer drive speed

Wind Direction Sensor

Starting Torque Criteria: RM Young 5305 <= 11.0 gm-cm for wind threshold 0.5 m/s

Starting Torque (gm-cms): **As Found:** *6.9* **AS Left**

Criteria Met? *yes*

Vane Angle, Degrees	**AS FOUND** CR1000 Datalogger Degrees	Difference	Calibration adjustment slope, m *0.142*	offset, b *0*	**AS LEFT** CR1000 Datalogger Degrees	Difference	Calibration adjustment slope, m 0.142	offset, b 0
0	*358*	2						
30	*27.4*	2.6						
60	*57.8*	2.2						
90	*88.7*	1.3	*add'tnl readings*					
120	*120.3*	-0.3	*355*	352.03				
150	*150.6*	-0.6	*356*	*353.1*				
180	*180.6*	-0.6	*357*	354.15				
210	*210.3*	-0.3	*358*	*354.7*				
240	*239.7*	0.3	359	*354.8*				
270	*268.7*	1.3	1	*358*				
300	*297.8*	2.2	2	*0.1*				
330	*327.2*	2.8	3	*0.19*				
360	*358*	2	4	*1*				
Average Difference:		1.42				0.00		

Criteria Met? *Yes* **Criteria Met?**

Criteria: acceptable within 3 degrees of alignment vane

COMMENTS

Tower Dropped, Wind Monitor Tested and Removed from Tower

This station is inactive

Calibrated By: *Rhys McDonald* **Observer:**

Jul-05

Station AM-3 Meteorological Instrumentation, 06/19/08

Parameter	Sensor height, meters	Manufacturer	Model	Serial Numbers	
AS FOUND					
Wind Speed/Direction	10	RM Young	05305 Wind Monitor AQ	body	75751
				propeller	64365
				board	05178A RevA16-06
AS LEFT					
Wind Speed/Direction	10	RM Young	05305 Wind Monitor AQ	body	
** SENSOR REMOVED, STATION INACTIVE**				propeller	
				Board	

SITE VISIT CHECK LIST
Meteorological Tower

DATE: 19-Jun-08
TIME: 7:35 PDT__ PST_*X*_
SITE NAME:
AM-3 Yerington Mine Site

SITE VISIT ACTIVITY:
Site Inspection and Wind Sensor Check
Wind Sensor Removed
Station Inactive

Physical Inspection Items		**Check Box**	**Comments**
1	Inspect fencing, gate, and lock	ok	
2	Visually check vertical alignment of tower and its physical condition	ok	
3	Inspect tower for loose or broken cables	ok	(no guy wires)
4	Confirm tight connection to grounding rod	ok	
5	Confirm simultaneous movement of wind sensors	n/a	one sensor
6	Visually check alignment of wind sensor mounting bar		Neglected to note - pretty sure ok
7	Clean and check level of solar radiation sensor	n/a	
8	Verify cleanliness and alignment of solar panels	n/a	
9	Open instrumentation enclosures. Check dessicant and wire connections	ok	Instrument enclosure inside shed
10	Verify operation of lower radiation shield fan	n/a	
10	Verify operation of upper radiation shield fan	n/a	
11	Check rain gauge for cleanliness and alignment	n/a	
12	Clean up site, as required	ok	

Data Observations (remote or onsite ?) 19-Jun-08 Time: _____

	ONSITE	**Value**	**Comments**
a	Temperature at 2 meters	n/a	
b	Temperature at 10 meters	n/a	
c	Delta-T, 1-minute average:	n/a	
d	Wind Speed A	3.6 mph	
e	On Tower Wind Direction: North	0.9	tower tilted down, rough alignments
f	On Tower Wind Direction: South	180.49	
g	On Tower Wind Direction: West	273.13	
h	On Tower Wind Direction: East	122?	
I			
j	Solar Radiation	n/a	
k	Relative Humidity	n/a	
l	Barometric Pressure	n/a	
m	Solar Panel Output for Internal Battery	n/a	
n	Solar Panel Output for External Battery (if applicable)	n/a	
o	Internal Battery Voltage	13.16	
p	External Battery Voltage (if applicable)	n/a	
q	Rain Gauge Output (15 min, 60 min, 24 hr)	n/a	

COMMENTS

Wind Monitor Sensor tested as found and removed from tower
This Station is inactive

Data logger and telemetry left in-place and functional

Checked By: Rhys McDonald

Jun-02

WIND SENSOR VALIDATION SHEET

DATE:	*19-Jun-08*		As Found	No changes	Made Change
TIME:		**CALIBRATION ACTIVITY:**	*X*		*X*
SITE NAME:	*AM-3 Yerington Mine Site*				
PROJECT:					

INSTRUMENT DESCRIPTION

					body	propeller
Manufacturer:	*RM Young*	Model: *05305 AQ*	As Found:	Serial Number:	75751	64365
Reporting Units	wind speed:	*meters per second*	As Left:	Serial Number:	*SENSOR REMOVED*	
	wind direction:	*degrees True*		Sensor Height:	*10 meters above ground*	

CALIBRATION EQUIPMENT

Torque Disc:	*RM Young 18370*	Vane Angle Degree Fixture:	*RM Young 18212*
Anemometer Drive:	*not available*	Torque Gauge:	*RM Young 18331*
Vane Alignment Rod:	*RM Young 18301*	Compass:	*Silva Ranger Type 15 sighting compass*

SITE AND TOWER DATA

	Installed	As Found	As Left
Crossarm alignment (relative to true north):		*aligned*	*aligned relative to stake*

Declination of site: *14 deg 29" E*

Description of ground reference mark for crossarm alignment: *Painted/flagged stakes on north side of tower*

Solar Noon Alignment Check? *NO* Time of Solar Noon: _____

CALIBRATION

Wind Speed Sensor

Starting Torque Criteria: RM Young 5305 <= 1.0 gm-cm for wind threshold 0.5 m/s

Starting Torque (gm-cm): **As Found:** *0.3* **AS Left**

Criteria Met? *Yes* *(note:Removed Sensors)*

Anemometer Drive, RPM	**AS FOUND** CR1000 Datalogger RPM	mph	RPM to mph factor 0.01145 rpm % diff		**AS LEFT** CR1000 Datalogger RPM	mph	rpm % diff	
							0%	
500	*500*	*5.72*	0%				0%	
1000	*1000*	*11.45*	0%				0%	
2500	*2500*	*28.63*	0%				0%	
5000	*5000*	*57.25*	0%				0%	
7500	*7500*	*85.88*	0%				0%	
10000	*10000*	*114.5*	0%				0%	

Criteria Met? *Yes* **Wind Speed Criteria:** acceptable within 5% of anemometer drive speed

Wind Direction Sensor

Starting Torque Criteria: RM Young 5305 <= 11.0 gm-cm for wind threshold 0.5 m/s

Starting Torque (gm-cms):

As Found: *6.3* **AS Left**

Criteria Met? *yes* *(note:removed Sensors)*

Vane Angle, Degrees	**AS FOUND** CR1000 Datalogger Degrees	Difference	Calibration adjustment slope, m *0.142*	offset, b *0*	**AS LEFT** CR1000 Datalogger Degrees	Difference	Calibration adjustment slope, m 0.142	offset, b 0
0	*0.97*		*add'tnl readings*					
30	*31.63*	-1.63						
60	*61.47*	-1.47	355	354.46				
90	*91.42*	-1.42	356	354.46				
120	*121.26*	-1.26	357	358				
150	*152.58*	-2.58	*358*	0.01				
180	*181*	-1	*359*	0.01				
210	*211.13*	-1.13						
240	*240.3*	-0.3						
270	*269.66*	0.34						
300	*299.6*	0.4						
330	*329.6*	0.4						
360	*0.24*							
Average Difference:		0.92				0.00		

Criteria Met? *Yes* **Criteria Met?**

Criteria: acceptable within 3 degrees of alignment vane

COMMENTS

Tested Wind Monitor and removed sensor
This Station is inactive

Calibrated By: *Rhys McDonald* **Observer:**

Jul-05

Station AM-6 Meteorological Instrumentation
19-Jun-08

Parameter	Sensor height, meters	Manufacturer	Model	Serial Numbers	
Wind Speed/Direction	10	RM Young	05305 Wind Monitor AQ	**AS FOUND** body 83216 propeller 64394 Board 05178A Rev A20-07 **AS LEFT** body 75753 propeller 64353 Board 05178A Rev A16-06	
Air Temperature	2	RM Young RM Young	43347 RTD 43308 aspirated radiation shield	12065	
Air Temperature	10	RM Young RM Young	43347 RTD 43308 aspirated radiation shield	12066	
RelativeHumidity / Temperature	2	Vaisala RM Young	HMP45C 41003-5 12-plate radiation shield	B4940094	
Solar Radiation	3	Kipp & Zonen	CM3 Pyranometer	1159	
Barometric Pressure	1.5	Vaisala	CS105/PTB101B	Z4140044	
Rainfall	0.5	Texas Electronics	TE525 tipping bucket with heater		need serial number

SITE VISIT CHECK LIST
Meteorological Tower

DATE: 19-Jun-08
TIME: 10:30 - 17:30 PDT__ PST_*X*_
SITE NAME: *AM-6 Yerington Mine Site*

SITE VISIT ACTIVITY: Site Inspection and Data Validation Visit

Physical Inspection Items		**Check Box**	**Comments**
1	Inspect fencing, gate, and lock	n/a	not applicable
2	Visually check vertical alignment of tower and its physical condition	ok	
3	Inspect tower for loose or broken cables	ok	no cables
4	Confirm tight connection to grounding rod	ok	
5	Confirm simultaneous movement of wind sensors	n/a	(single sensor)
6	Visually check alignment of wind sensor mounting bar	ok	slightly off to the east from north - not adjusted
7	Clean and check level of solar radiation sensor	ok	
8	Verify cleanliness and alignment of solar panels	n/a	no solar panels
9	Open instrumentation enclosures. Check dessicant and wire connections	ok	Instrument enclosure inside shed
10	Verify operation of lower radiation shield fan	ok	
10	Verify operation of upper radiation shield fan	ok	
11	Check rain gauge for cleanliness and alignment	ok	cleaned, checked level
12	Clean up site, as required	ok	

Data Observations	**(remote or onsite ?)**	**As-Found**	
	Onsite	**Value**	**Comments**
a	Temperature at 2 meters	23.13	tower tilted down, rough alignments, as found
b	Temperature at 10 meters	23.01	
c	Delta-T, 1-minute average:	-0.87	
d	Wind Speed	3 mph	
e	On Tower Wind Direction: North	1.19	As Left: 2
f	On Tower Wind Direction: South	183	179
g	On Tower Wind Direction: West	273	270
h	On Tower Wind Direction: East	95	94.1
I			
j	Solar Radiation	.862kw	level, some splotches on sensor, cleaned
k	Relative Humidity	15.5	
l	Barometric Pressure	872.3 mb	
m	Solar Panel Output for Internal Battery	n/a	
n	Solar Panel Output for External Battery (if applicable)	n/a	
o	Internal Battery Voltage	13.05	
p	External Battery Voltage (if applicable)		
q	Rain Gauge Output (15 min, 60 min, 24 hr)		

COMMENTS

Switched on Data Flag 10:47
Tower Down soon after

Clock check:
Computer 13:59 PDT
CR1000 1258:42 PST

Switched off Data Flag 17:16
Tower up 16:45

Swapped out Wind Monitor

Checked By: Rhys McDonald

Jun-02

WIND SENSOR VALIDATION SHEET

DATE:	*19-Jun-08*		As Found	No changes	Made Change
TIME:		**CALIBRATION ACTIVITY:**	*X*		*X*
SITE NAME:	*AM-6 Yerington Mine Site*				
PROJECT:					

INSTRUMENT DESCRIPTION

				body	board	propeller
Manufacturer: *RM Young*	Model: *05305 AQ*	**As Found:**	Serial Number:	*83216*	*Rev A20-07*	*64394*
Reporting Units	wind speed: *meters per second*	**As Left:**	Serial Number:	*75753*	*Rev A16-06*	*64353*
	wind direction: *degrees True*	Sensor Height:	*10 meters above ground*			

CALIBRATION EQUIPMENT

Torque Disc:	*RM Young 18370*	Vane Angle Degree Fixture:	*RM Young 18212*
Anemometer Drive:		Torque Gauge:	*RM Young 18331*
Vane Alignment Rod:	*RM Young 18301*	Compass:	*Silva Ranger Type 15 sighting compass*

SITE AND TOWER DATA

	Installed	As Found	As Left
Crossarm alignment (relative to true north):	*Aligned N-S*	*Aligned N-S*	*Aligned N-S*

Declination of site: *14 deg 29" E*

Description of ground reference mark for crossarm alignment: *Painted/flagged stakes on north side of tower*

Solar Noon Alignment Check? *no* Time of Solar Noon: _____

CALIBRATION

Wind Speed Sensor

Starting Torque Criteria: RM Young 5305 <= 1.0 gm-cm for wind threshold 0.5 m/s

Starting Torque (gm-cm): **As Found:** *0.3* **AS Left** 0.3

Criteria Met? *Yes* *Yes* *(note:Swapped Sensors)*

Anemometer Drive, RPM	**AS FOUND** CR10X Datalogger RPM	mph	RPM to mph factor 0.01145 rpm % diff		**AS LEFT** CR10X Datalogger RPM	mph	rpm % diff	
500	*500*	*5.72*	0%		*500*	*5.72*	0%	
1000	*1000*	*11.45*	0%		*1000*	*11.45*	0%	
2500	*2500*	*28.63*	0%		*2500*	*28.63*	0%	
5000	*5000*	*57.25*	0%		*5000*	*57.25*	0%	
7500	*7500*	*85.88*	0%		*7500*	*85.88*	0%	
10000	*10000*	*114.5*	0%		*10000*	*114.5*	0%	

Criteria Met? *yes -* **Wind Speed Criteria:** acceptable within 5% of anemometer drive speed

Wind Direction Sensor

Starting Torque Criteria: RM Young 5305 <= 11.0 gm-cm for wind threshold 0.5 m/s

Starting Torque (gm-cms):

As Found: *8.5* **AS Left** *5.4*

Criteria Met? *Yes* *Yes*

Vane Angle, Degrees	**AS FOUND** CR10X Datalogger Degrees	Difference	Calibration adjustment slope, m *0.142*	offset, b *0*	**AS LEFT** CR10X Datalogger Degrees	Difference	Calibration adjustment slope, m 0.142	offset, b 0
0	*0.1*	-0.1			*0.15*	-0.15		
30	*29.7*	0.3			*30.29*	-0.29	*add'tnl readings*	
60	*60.19*	-0.19			*60.33*	-0.33		
90	*91*	-1			*90.91*	-0.91	355	354.04
120	*121*	-1			*121.5*	-1.5	356	354.42
150	*151.2*	-1.2	*add'tnl readings*		*151.6*	-1.6	357	354.52
180	*180.9*	-0.9	355	354.22	*181.4*	-1.4	358	0
210	*210.1*	-0.1	356	354.93	*211.1*	-1.1	359	0.15
240	*240.3*	-0.3	357	354.9	*240.4*	-0.4	360	0.15
270	*269.5*	0.5	*358*	0.07	*269.2*	0.8	1	0.19
300	*298.8*	1.2	*359*	0.01	*299.1*	0.9		
330	*329*	1	1	0.34	*329.13*	0.87		
360	*0.12*	0.12			*0.15*	0.15		
Average Difference:		0.61				0.80		

Criteria Met? *Yes* **Criteria Met?** *Yes*

Criteria: acceptable within 3 degrees of alignment vane

COMMENTS

Swapped Wind Monitor; as-found Wind Monitor within specifications

Calibrated By: *Rhys McDonald* **Observer:**

Jul-05

TEMPERATURE / DELTA_T VALIDATION SHEET

DATE:	*6/19/2008*		As Found	No changes	Made Change
TIME:		**CALIBRATION ACTIVITY:**		*X*	
SITE NAME:	*AM-6 Yerington Mine Site*				
PROJECT:					

INSTRUMENT DESCRIPTION

Manufacturer:__ *RM Young*	Model: ____ *43347*		Sensor 1	Sensor 2
Reporting Units: _____ *Temperature - degrees C*		Serial Number:	*12065*	12066
		Sensor Height:	*2 meters*	10 meters

CALIBRATION EQUIPMENT

Circulating Water Bath
Thermometer
Digital Thermometer
Humidity

CALIBRATION

AS FOUND

NOTE: See The worksheet "ChartRTD 2m vs 10m"

		2m Temperature Sensor 1			10m Temperature Sensor 2			Delta-T	
		Calibration adjustment			Calibration adjustment				
		slope, m	offset, b		slope, m	offset, b			
Time	Reference Temperature, C	Sensor 1 Reading, C	Difference Snsr1-Ref, C		Sensor 2 Reading, C	Difference Snsr2-Ref, C		Sensor 1 - Sensor 2 C	
1308	0	-0.005	*-0.005*		0.045	0.045		`	0.0004
1337	2.2	2.867	*0.667*		2.872	0.672			0.0165
1357	10	10.33	*0.33*		10.33	0.33			0.0188
1409	16.02	16.33	*0.31*		16.34	0.32			0.0078
1415	21.01	21.51	*0.5*		21.53	0.52			0.0223
1424	24	24.34	*0.34*		24.31	0.31			0.0390
1443	33.58	34.04	*0.46*		34.08	0.5			0.0358
1457	43.5	43.71	*0.21*		43.71	0.21			0.0373
		Average:	*0.3515*		Average:	*0.363375*		Average:	*0.0222*

Criteria Met? *YES*

Criteria: acceptable within 0.5 degress C of audit temperature sensor (0.9 degrees F)

AS LEFT

no changes

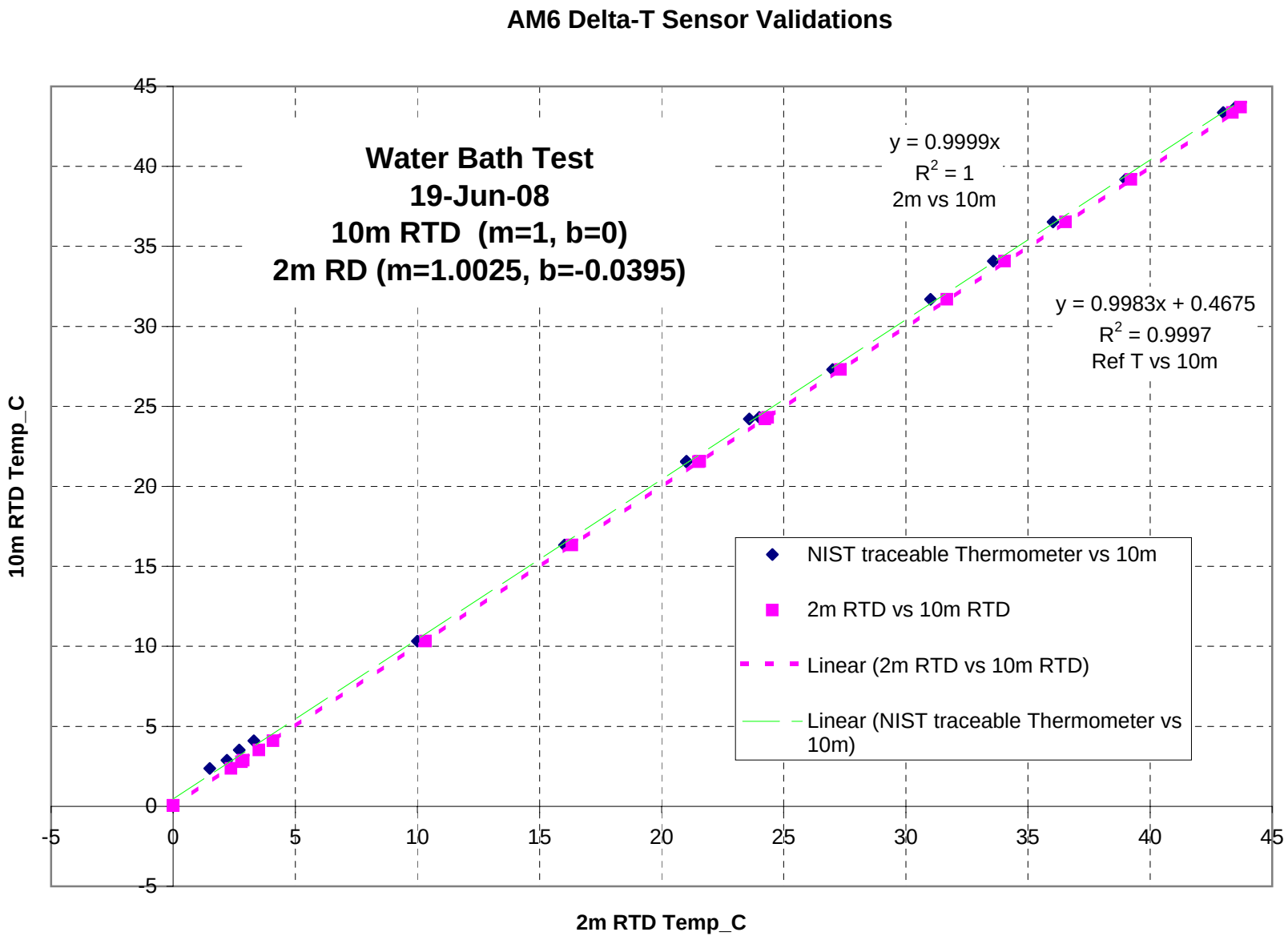
	Sensor 1			Sensor 2			Delta-T
	Calibration adjustment			Calibration adjustment			
	slope, m	offset, b		slope, m	offset, b		
Reference Temperature, C	Sensor 1 Reading, C	Difference Snsr1-Ref, C		Sensor 2 Reading, C	Difference Snsr2-Ref, C		Sensor 1 - Sensor 2 C
							`
	Average:			Average:			Average:

COMMENTS

The results of the water bath delta T test are shown on sheet "ChartRTD 2m vs 10m"

Calibrated By: *Rhys McDonald* **Observer:**

Jul-05


AM6 Delta-T Sensor Validations
Water Bath Test
19-Jun-08
10m RTD (m=1, b=0)
2m RD (m=1.0025, b=-0.0395)
y = 0.9999x
R2 = 1
2m vs 10m
y = 0.9983x + 0.4675
R2 = 0.9997
Ref T vs 10m
NIST traceable Thermometer vs 10m
2m RTD vs 10m RTD
Linear (2m RTD vs 10m RTD)
Linear (NIST traceable Thermometer vs 10m)
10m RTD Temp_C
2m RTD Temp_C
45
40
35
30
25
20
15
10
5
0
-5
-5
0
5
10
15
20
25
30
35
40
45

TEMPERATURE / RH SENSOR VALIDATION SHEET

DATE: *6/19/2008*		As Found	No changes	Made Change
TIME:	**CALIBRATION ACTIVITY:**		*X*	
SITE NAME: *AM-6 Yerington Mine Site*				
PROJECT:				

INSTRUMENT DESCRIPTION

			Sensor 1	Sensor 2
Manufacturer:__ *Vaisala*	Model: _____ *HMP45AC*			
Reporting Units: _____ *Temperature - degrees C; Humidity - percent*		Serial Number:	*B4940094*	
		Sensor Height:	*2 meters*	

CALIBRATION EQUIPMENT

Circulating Water Bath	
Thermometer	
Digital Thermometer	*Campbell Scientific T107 Temperature Sensor on CR10X datalogger (no serial number)*
Humidity	*Sling psychrometer (no serial number)*

CALIBRATION

(Note: HMP45AC cannot be immersed in water bath)

AS FOUND

		Sensor 1			Sensor 2			Delta-T
		Calibration adjustment			Calibration adjustment			
		slope, m	offset, b		slope, m	offset, b		
Time	Reference Temperature, C	Sensor 1 Reading, C	Difference Snsr1-Ref, C		Sensor 2 Reading, C	Difference Snsr2-Ref, C		Sensor 1 - Sensor 2 C
			0					`
	(exposed)	*(in sun shield)*						
		Average:	*0*		Average:			Average:

Criteria Met? *n/a*

Criteria: acceptable within 0.5 degress C of audit temperature sensor (0.9 degrees F)

AS LEFT

	Sensor 1			Sensor 2			Delta-T
	Calibration adjustment			Calibration adjustment			
	slope, m	offset, b		slope, m	offset, b		
Reference Temperature, C	Sensor 1 Reading, C	Difference Snsr1-Ref, C		Sensor 2 Reading, C	Difference Snsr2-Ref, C		Sensor 1 - Sensor 2 C
							`
	no changes						
	Average:			Average:			Average:

COMMENTS

Checked relative Humidity by Sling psychrometer

	HMP45 Readings		Sling Pyschrometer	
Time	RH_percent	Temp_F	RH_percent	Difference
13:05	*8.6*	*89*	*6*	2.6

Criteria Met? *Yes* **Average Difference:** *2.6*

Criteria: acceptable difference 3% (10-90%); 5% (0-10%, >90%)

Calibrated By: *Rhys McDonald* **Observer:**

Jul-05

Precipitation / Solar Radiation / Barometric Pressure VALIDATION SHEET

			As Found	No change	Made Change
DATE:	*6/19/2008*				
TIME:		**CALIBRATION ACTIVITY:**	***X***		
SITE NAME:	*AM-6 Yerington Mine Site*				
PROJECT:					

PRECIPITATION

Rain Gage

Model TE 525 USW-RS **Manufacturer:** Texas Electronics
Serial # *na*
8-inch collector
1-tip = .01 " rain

TESTS Test 1 - Dripped 1-pint of water into collector : 61 counts
Test 2 - Dripped 1-pint of water into collector : 62 counts

Criteria Met? *almost* **Criteria:** Acceptable counts = 57 +- 2 counts

NOTES: *Made no changes- check closer on next visit*

Solar Radiation

Model CM3 Pyranometer **Manufacturer:** Kipp and Zonen
Serial # 1159

Criteria Met? ***yes*** **Criteria:** acceptable within 5 % of reference

Reference Sensor:
Model LI200X Pyranometer
Serial # PY45495
Manufacturer Licor
Connected to CR10X datalogger

Time	Tower Mounted CM3 KJm^2	Reference Co-located Sensor KJm^2	Percent difference
16:27	602	626	-3.8%
	611	631	-3.2%
	619	636	-2.7%
	633	660	-4.1%
	600	621	-3.4%
		Average:	-3.4%

Barometric Pressure

Model PTB101B **Manufacturer:** Vaisala
Serial # Z4140044
range 600-1060 hPa

Criteria Met? ***YES*** **Criteria:** acceptable within 3 mb or 0.3 kPa

Reference Sensor:
Model PTB101B
Serial # Y1220016
Manufacturer Vaisala
Connected to CR10X datalogger

Time	Tower Mounted mb	Reference Co-located mb	Difference mb
14:55	869.31	868.6	-0.71
16:50	868.31	867.44	-0.87
		Average:	-0.79