TECHNICAL ENVIRONMENTAL SERVICES, LLC

Mr. Jamie Foster
Department of Environmental Protection
Division of Solid Waste Services
16010 Frederick Road
Rockville, MD 20855

May 20, 2019

Dear Jamie,

Enclosed is your semi-annual calibration report for the meteorological calibration performed on May 15, 2019 at the East Gude Drive Landfill site. All instrumentation were compared against NIST certified test equipment and found to be functioning correctly.

Please let me know if you have any questions about the calibration.

Best regards,

Mark Abrams

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TECHNICAL ENVIRONMENTAL SERVICES, INC.
P.O. BOX 3253
GAITHERSBURG, MD 20885

MIDAS SYSTEM CALIBRATION RESULTS

FOR: MONTGOMERY COUNTY, MD (EAST GUDE DR)

LOCATION: ROCKVILLE, MD

LAT: 39°6.47'N/LONG: 77°8.42'W
MAGNETIC VARIATION: 4.0°W(-)
SITE ELEVATION: 400 FT MSL
TOWER HEIGHT: 3 M (10 ft)

DATE OF CALIBRATION: May 15, 2019

SYSTEM ID: 170630-001

SYSTEM TYPE: MIDAS/CLIMATRONICS/WM283

EQUIPMENT: CLIMATRONICS CORP:

101283	WIND SPEED
101283	WIND DIRECTION
HMP 60	TEMPERATURE
HMP 60	RELATIVE HUMIDITY
TE-525	PRECIPITATION
CR-300	DATA LOGGER; SN 5100

PROCEDURES USED: TECHNICAL ENVIRONMENTAL SERVICES 508 (series)

TEST EQUIPMENT USED FOR CALIBRATION:

TYPE	MODEL	SER NO.
Compass, digital	2074	1000057
Digital voltmeter	2030E	50811075
Torque Disc	18310	None
Thermometer, LIG	FP-10	3N8751
Hygro-Therm (RH/T)	445580	913785
Anemometer Drive	18801	CA 01550
Speedtech Instruments	Skymaster	3396

SYSTEM EQUIVALENTS

THIS IS DIGITAL DATA COLLECTION SYSTEM; THERE ARE NO VOLTAGE EQUIVALENTS

Signature of technician performing tests: _____ Date: 5/15/19

Reviewed by: _____ Date: 5/15/19

190521* * * * * * COVER SHEET * * * * * * * * * * * *

POWER SUPPLY AND MISC TESTS

PROCEDURE: 508.10

BATTERY TESTS:

1. UNLOADED VOLTAGE: 13.76
2. CHARGER VOLTAGE: 13.86
3. VOLTAGE AT DATA LOGGER: 13.87 (Should be 12.8>)
4. REMARKS: All instrumentation is working properly. Wind speeds are running about 10% higher than expected test results.
5. FINDINGS TO BE ADDRESSED BY OWNER: None

DATE OF ALL TESTS: 5/15/19

DATA SHEET - WIND SPEED

9.0 RECORD OF CALIBRATION

9.1 Serial Numbers: SENSOR: 154832

PROPELLER: NA

9.2 Torque Values Measured:

AS FOUND	AFTER BEARING/SENSOR REPLACEMENT
1.0 (gm-cm)	NA (gm-cm)

Bearings replaced: ☐ Yes ☑ No

[Note: 1.0 gm-cm = 1 mph; 3.8 gm-cm = 2.0 mph]

9.3 If new sensor or propeller are required record new serial numbers here:

SENSOR: _____ PROPELLER: _____

IF A COLLOCATED TRANSFER STANDARD METHOD IS USED TO CHECK THE VIABILITY OF THE OPERATIONAL SENSOR RECORD THE RESULTS BELOW.

CTS READING:	COMPUTER READS:	RPMS:
11.1 mph	11.4 mph	1000 rpms
33.3	34.1	3000
55.6	57.2	5000
77.5	80.1	7000

ALLOWABLE TOLERANCE IS ±0.5 mph

DATA SHEET - WIND DIRECTION

9.0 RECORD OF CALIBRATION

9.1 Serial Numbers:

SENSOR: 154832

9.2 Torque Values Measured:

AS FOUND	AFTER BEARING/SENSOR REPLACEMENT
5.0 (gm-cm)	NA (gm-cm)

Bearings replaced: ☐ Yes ☒ No

[Note: 11 gm-cm = 1.0 mph; 25 gm-cm = 2 mph]

9.3 If new sensor is required record new serial number here:

SENSOR: NA

9.4 Linearity test of direction sensor; "as found" or "new", (circle one):

Expected	Degrees (At Computer)
360 deg	360
090 deg	91
180 deg	179
270 deg	271

ALLOWABLE TOLERANCE IS ±5°

DATA SHEET - WIND DIRECTION ALIGNMENT

9.0 RECORD OF CALIBRATION

9.1 Serial Numbers: 154832

9.2 Reference orientation point: North or South (true) by compass.

Magnetic variation: 4.0°W (-);4°Mag = 360°True/184° = 180°True

9.3 "As Found" alignment before any adjustments; ALLOWABLE TOLERANCE IS

360°

9.4 "After Adjustment" alignment (see note):

NA

Note: If any repairs to a sensor are accomplished or if a replacement sensor is installed indicate action(s) here and perform tests on the new or refurbished sensor and complete a second test of alignment and linearity.

DATA SHEET - TEMPERATURE

PROCEDURE: 508.3

9.0 RECORD OF TEMPERATURE VERIFICATION TESTS

9.1 Serial Numbers:

SENSOR: J4/850017

9.1 Ambient test of system:

Ambient = 66.4 °F; system read: 65.9 °F

(Allowable tolerance is ±0.9°F)

NOTES OR REMARKS AND ANY ADDITIONAL TESTS; RECORD RESULTS HERE:

DATA SHEET - RELATIVE HUMIDITY

9.0 RECORD OF HUMIDITY COMPARISON TESTS

9.1 Serial Numbers:

SENSOR: J4850017

9.2 Ambient humidity calculation at: 1215 1310 (Time)

Relative Humidity from co-located transfer standard: 42.6 39 %

System relative humidity from computer display/keypad: 40.2 39 %

Allowable tolerance is ± 5% between the derived value and the computer value for RH at temperatures above 32°F.

Note: If any repairs are made or the humidity sensor is replaced indicate action(s) here and perform tests on new or repaired equipment on a second datasheet.

DATA SHEET - PRECIPITATION

PROCEDURE: 508.12

9.0 RECORD OF PRECIPITATION GAUGE TESTS

9.1 Serial Numbers:

GAUGE: 72000-217

9.2 Measured amount of water deposited in the catch opening: 5.2 ml

Left	Right
5.2	5.2

ALLOWABLE TOLERANCE ±10% OF OBSERVED OR ±0.5MM

Test Equipment Certification Record
Technical Enviromental Services, LLC

5-Feb-19

Instrument	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Anemometer Drive	R.M. Young Co.	1801	CA 01550	2/1/2019	2/1/2020
Digital Compass	Autohelm	2074	810753	Fixed Device	NA
Digital Multimeter	Wavetek	2030E	50811075	1/4/2018	1/4/2020
Thermometer LIG	Miller & Weber Inc	12" Precision	3N8751	11/28/2016	11/28/2018
Psychrometer	Belfort Instruments	566-2 (T3 & 4)	85-608	1/15/2017	1/15/2019
Torque Disc	R.M. Young Co.	18310	None	Fixed Device	NA
Torque Gauge	R.M. Young Co.	18331	None	Fixed Device	NA
Barometer	Baltic	2215	None	Fixed Device	NA
Hygro-Therm Device	Extech Instruments	445582	913785	2/4/2019	2/4/2020
Ambient Weather	Ambient Weather	WM-4	NA	4/23/2017	4/23/2019
Global Radiometer	Solar Light Co.	PMA1140	6475	1/21/2019	1/21/2020