



March 15, 2016

Dr. Zi-qiang Chen
Pre-Regulatory Landfill Unit
1646 Mail Service Center
Raleigh, NC 27699-1646

**Subject: Gas Screening Letter Report (Month 1)
Task Order #653DP-13C1
Edgecombe County Landfill
NONCD0000653**

Dear Dr. Chen:

Schnabel Engineering South, P.C. (Schnabel) is pleased to present our Remedial Investigation – Gas Screening Letter Report (Month 1) for Edgecombe County Landfill (NONCD0000653) located on Colonial Road, Tarboro, North Carolina. This report was prepared in accordance with our Work Plan dated November 25, 2016 and the field investigation as authorized by the Pre-Regulatory Landfill Unit (Unit) Task Number 653DP-13C1 on February 23, 2016. Field activities were performed following Schnabel's Quality Assurance Standard Operating Procedures (SOPs) submitted on October 29, 2010.

Subsurface Landfill Gas Screening

Schnabel personnel performed landfill gas screening on February 17, 2016 from gas probes GP-21 through GP-24 and monitoring wells MW-A1, MW-A2, MW-4, MW-6, and MW-7. Instrumentation used included a Landtec Gem™ 2000+ (Manufacturer: CES Landtec, Serial Number: gm132587/11) for oxygen, carbon dioxide, methane percent lower explosive limit (LEL), percent methane by volume, and hourly barometric pressure readings. A MiniRAE 2000 (Manufacturer: RAE Systems, Serial Number: 110-012069) was utilized for volatile organic compounds (VOCs) in parts per million (ppm) and a QuesTemp (Instrument ID: TEF070008) was used to measure humidity on an hourly basis. Temperature was recorded for each hour during screening using data from a local weather station. Landfill gas screening was conducted under calm conditions and falling barometric pressure.

The Landtec Gem™ 2000+ was calibrated on February 16, 2016 by Pine Environmental Services prior to sending to the field. In addition, the MiniRAE 2000 and Landtec Gem™ 2000+ were calibrated or a bump test was done in the field before, during, and after the air screening to confirm continued calibration. Calibration specifics are included in the field forms in Appendix A.

Methane by percent volume ranged from 0.0% to 59.2%, and LEL ranged from 0% to greater than 100%. VOCs ranged from 0.0 to 0.6 ppm. Hydrogen sulfide ranged from 0.0 to 7.0%. Carbon dioxide ranged from 0.1 to 41.1% by volume, and oxygen readings ranged from 0.0 to 21.3%.

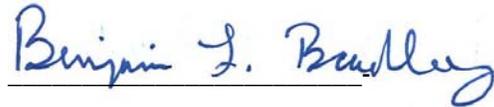
Where there was a 2% change in readings between gas probes, a second reading was collected. Second readings were collected from GP-21, GP-22, GP-23, GP-24 and MW-A1, MW-A2, MW-4, MW-6, and MW-7. For the second readings methane by percent volume ranged from 0% to 58.5%, and LEL ranged from 0.0 to greater than 100%. VOCs ranged from 0.0 to 5.4 ppm. Hydrogen sulfide ranged from 0.0 to 6%. Carbon dioxide ranged from 0.2 to 42.2% by volume, and oxygen readings ranged from 0 to 21.3%. The first and second readings at the gas probes were similar.

A background reading was collected during this air screening event. Methane by percent volume and LEL, carbon dioxide, and VOCs were at 0%. Oxygen was 21.3%. Refer to Figure 1 for air screening locations, Appendix A for air screening field forms and Table 1 for soil gas screening results.

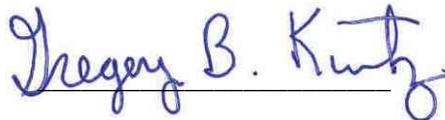
Sincerely,

SCHNABEL ENGINEERING SOUTH, P.C.

Benjamin L. Bradley, GIT
Project Scientist



Gregory B. Kuntz, PG
Senior Associate/Quality Assurance



Attachments: Table 1 – Soil Gas Screening
Figure 1 – Landfill Gas Screening Concentration Map
Appendix A - Field Forms

BB/GK

Table 1
Soil Gas Screening
NONCD0000653
Edgecombe County Landfill

WELL/GAS PROBE SCREENING							
Gas Probe ID	Date Collected	Oxygen O ₂ (%)	Carbon Dioxide CO ₂ (% by Volume)	Methane CH ₄ (% by Volume)	Methane CH ₄ (% LEL)	Hydrogen Sulfide H ₂ S (% by Volume)	VOCs (ppm)
GP-21	1/21/2016	20.0	4.3	1.9	38.0	0.0	0.4
	2/17/2016	21.2	0.2	0.0	0.0	0.0	0.4
GP-22	1/21/2016	0.1	45.5	> 100	> 100	2.0	0.0
	2/17/2016	0.0	41.1	58.8	> 100	7.0	0.0
GP-23	1/21/2016	21.1	1.0	0.8	16	0.0	2.1
	2/17/2016	20.8	0.4	0.1	0.2	0.0	0.0
GP-24	1/21/2016	20.3	1.7	0.0	0.0	0.0	1.6
	2/17/2016	19.3	2.1	0.0	0.0	0.0	0.0
MW-A1	1/21/2016	20.9	1.8	0.0	0.0	0.0	0.5
	2/17/2016	20.8	0.8	0.0	0.0	0.0	0.0
MW-A2	1/21/2016	0.3	42.8	> 100	> 100	1.0	0.0
	2/17/2016	0.0	40.7	59.2	> 100	0.0	0.0
MW-4	1/21/2016	21.5	0.0	0.0	0.0	0.0	1.1
	2/17/2016	21.3	0.1	0.0	0.0	0.0	0.2
MW-6	1/21/2016	16.8	4.0	0.0	0.0	0.0	0.0
	2/17/2016	21.2	0.3	0.0	0.0	0.0	0.3
MW-7	1/21/2016	8.4	25.3	43.3	> 100	0.0	0.0
	2/17/2016	17.1	10.7	10.2	> 100	0.0	0.6

Wells/Gas Probes with 2% Change in Reading

Gas Probe ID	Time Collected	Oxygen (O ₂)	Carbon Dioxide CO ₂ (% by Volume)	Methane CH ₄ (% by Volume)	Methane CH ₄ (% LEL)	Hydrogen Sulfide H ₂ S (% by Volume)	VOCs (ppm)
MW-4	1:26	9.1	14.8	5.9	> 100	0.0	5.4
MW-6	1:16	20.9	0.7	0.1	1.0	0.0	0.3
MW-7	1:06	17.0	9.8	9.6	> 100	0.0	0.0
MW-A1	12:53	21.3	0.2	0.0	0.0	0.0	0.0
MW-A2	2:00	0.0	41.1	58.5	> 100	0.0	0.6
GP-21	1:34	20.5	1.6	0.2	3.0	0.0	0.0
GP-22	1:39	0.0	42.2	58.0	> 100	6.0	1.1
GP-23	1:48	20.5	2.2	0.4	8.0	0.0	0.0
GP-24	12:58	18.9	2.5	0.0	0	0.0	0.0
Background 1	12:10	21.3	0.0	0.0	0.0	0.0	0.0

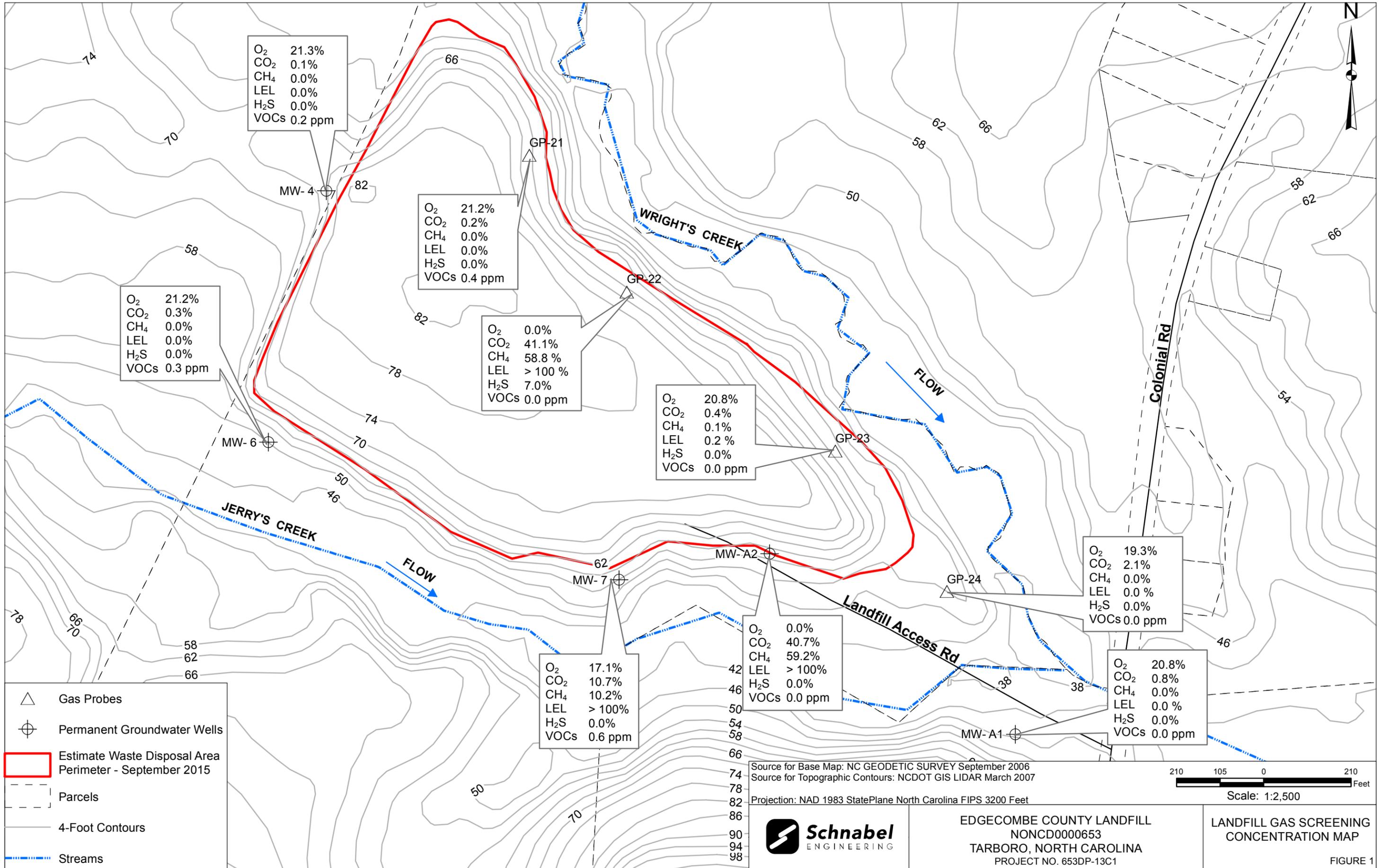
Notes:

Methane, carbon dioxide, oxygen, and barometric pressure measured with a Landtec Gem 2000+

VOC: Total Volatile Organic Compounds measured with a Mini RAE 2000

LEL: Lower Explosive Limit

PPM: Parts Per Million





DAILY FIELD REPORT FIELD FORM

Project:	<u>Edgecombe County LF</u>	Date:	<u>2/17/16</u>		
Location:	<u>Tarboro, NC</u>	Crew or Work Area:	<u>BLB + DR</u>		
Schnabel Project No.:	<u>6530P-12C1</u>	By:	<u>BLB</u>	Date:	<u>2/17/16</u>
Client Name:	<u>NODEQ</u>	Checked:	<u>BLB</u>	Date:	<u>3/2/16</u>
Attachments:	<u> </u>				

7:30 Depart Greensboro
10:30 Arrive Tarboro
11:00 Calibrate instruments
11:15 - 2:00 - Perform soil gas screening at gas probes & wells.
2:15 - Bump tests
2:30 - Depart site
5:00 - Arrive Greensboro

Benji D. Dunn



Project: Edgecombe County Landfill Screening Date: 2/17/16
 Location: Tarboro, NC By: BLB + DJL
 Schnabel Project No.: 6530P-13C1 Checked: BLB 3/2/16

Instrument: Mini Rae 2000 Serial No: 110-012069 Last Calibrated: 2-16-16
 Instrument: Landtec Gen 2000+ Serial No: GM132387/11 Last Calibrated: 2-16-16
 Instrument: Questar P Serial No: R5687587/11 Last Calibrated: 2-16-15
 Instrument: _____ Serial No: TEF070008 Last Calibrated: _____

Hourly Barometric Pressure, Humidity and Temperature				
Date	Time	Barometric Pressure (inches Hg)	Humidity (%)	Temperature (°C)
2/17/16	11:00	30.19	54	59 53
	12:00	30.09	53	56
	1:00	30.08	53	56.2
	2:00	30.06	53	56.4

Gas Probe Field Screening							
Gas Probe No.	Time	Oxygen (O ₂) in % Volume	Carbon Dioxide (CO ₂) in % Volume	Methane (CH ₄) in % Volume	Methane (CH ₄) in % LEL	Hydrogen Sulfide (H ₂ S) in % Volume	Total VOCs (ppm)
MW-4	11:41	21.3	0.1	0.0	0.0	000	0.2
MW-6	11:34	21.2	0.3	0.0	0.0	000	0.3
MW-7	11:26	17.1	10.7	10.2	7/100	000	0.6
MW-A1	11:10	20.8	0.8	0.0	0.0	000	0.0
MW-A2	11:20	0.0	40.7	59.2	7/100	000	0.0
GP-21	11:53	21.7	0.2	0.0	0.0	000	0.4
GP-22	11:59	0.0	41.1	58.8	7/100	007	0.0
GP-23	12:07	20.8	0.4	0.1	0.2	000	0.0
GP-24	11:15	19.3	2.1	0.0	0.0	000	0.0
Background	12:10	21.3	0.0	0.0	0.0	000	0.0

Hg = Mercury; LEL = Lower Explosive Limit

Notes: _____



Project: Edgecombe County Landfill **Screening Date:** 2/17/16
Location: Tarboro, NC **By:** BLB + DR
Schnabel Project No.: 6SSDP-1301 **Checked:** BLB 3/2/16

Instrument: Mylar Gas 2000 **Serial No:** 110-012069 **Last Calibrated:** 2-16-16
Instrument: Lambert Gas 2000T **Serial No:** GM13258711 **Last Calibrated:** 2-16-16
Instrument: Questar **Serial No:** TEF070008 **Last Calibrated:** 7-10-15
Instrument: _____ **Serial No:** _____ **Last Calibrated:** _____

Hourly Barometric Pressure, Humidity and Temperature				
Date	Time	Barometric Pressure (inches Hg)	Humidity (%)	Temperature (°C)
2/12/16	11:00	30.08	53	56.2
	22:00	30.06	53	56.4

Gas Probe Field Screening							
Gas Probe No.	Time	Oxygen (O ₂) in % Volume	Carbon Dioxide (CO ₂) in % Volume	Methane (CH ₄) in % Volume	Methane (CH ₄) in % LEL	Hydrogen Sulfide (H ₂ S) in % Volume	Total VOCs (ppm)
MW-4	1:26	9.1	14.8	5.9	>100	000	5.4
MW-6	1:16	20.9	0.7	0.1	1.0	000	0.3
MW-7	1:06	17.0	9.8	9.6	>100	000	0.0
MW-A1	12:53	21.3	0.2	0.0	0.0	000	0.0
MW-A2	2:00	0.0	41.1	58.5	>100	000	0.6
GP-21	1:34	20.5	1.6	0.2	3.0	000	0.0
GP-22	1:39	0.0	42.2	58.0	>100	006	1.1
GP-23	1:48	20.5	2.2	0.4	8.0	006	0.0
GP-24	12:58	18.9	2.5	0.0	0.0	000	0.0

Hg = Mercury; LEL = Lower Explosive Limit

Notes: 2% readings



EQUIPMENT CALIBRATION LOG FIELD FORM

Project: Edgecombe County Landfill
 Location: Tarboro, NC
 Schnabel Project No.: 6530P.13C1
 Client Name: NCDEQ
 Attachments: _____
 Date: 2/17/16
 Recorded By: BLS
 Checked by: BLS
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Date	Time	Instrument	Serial Number	Cal Gas Used	Cal Gas Expiration Date	Cal Standard	Barometric Pressure (Hg)	Temperature (F)	Humidity (%)	Calibrated (Y/N)	Bump Test	Initials
2/17/16	11:00	Mini-Rae 2600	117-012069	Isobutylene	4/8/19	100 ppm	30.19	53	54	Y	101	OK
		Handheld Gas Test	GM13258711	CO2	11/16	35 ppm				Y	34.4	
				CH4	11/16	50 ppm				Y	50	
	12:30	" "	" "	H2S	9/16	25 ppm	30.09	56	53	Y	248	
		" "	" "	" "	" "	" "						
		" "	" "	" "	" "	" "						
		" "	" "	" "	" "	" "						
	2:15	" "	" "	" "	" "	" "	30.06	56.4	53	Y		
		" "	" "	" "	" "	" "						
		" "	" "	" "	" "	" "						
		" "	" "	" "	" "	" "						

Comments: Calibrate all instruments according to manufacturers specifications.
 Enter units within parentheses as appropriate in data column title