ATTACHMENT 3

CALIBRATION CHECKS

RN: 102-610-102

CN: 602-820-599

BLUE RIDGE LANDFILL

FRESNO, FORT BEND COUNTY

INVESTIGATION # 1370033

OCTOBER 18, 2016 TO NOVEMBER 10, 2016

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 10-18-16	Staff Performing Calibration: Tom Pinkston	
Staff Signatures: Tom P		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 582-039895
Type of Investigation (LDAR/CT):		

Calibration Documentation

Calibration Gas: ~~10 ppm~~ 0	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: Ø	Concentration: 500 ppm	Concentration:
Serial No.: TMAP-1-7	Serial No.: TBAR-150A-500-1	Serial No.:
Expiration Date: 12-10-19	Expiration Date: 1-8-2020	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	500	0	5s
Trial 2	500	507	7	6s
Trial 3	500	506	6	6s
Average Diff			3.25	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 0.65 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date:	Staff Performing Calibration:	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.:
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes,** then PRESS **2=SETUP**. Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES,** to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press **(↑ and ↓) arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

113240

226.444

FID Zero counts:	3778	(Should be < 5,000 counts)	
FID 10 ppm counts:		Counts/ppm:	
FID 500 ppm counts:	117018	Counts/ppm:	226.
FID 10,000 ppm counts:		Counts/ppm:	

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 10/18/2016	Staff Performing Calibration: Hasanain Alameen	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 044460-01
Type of Investigation (LDAR/CT): 40 CFR 60, Subpart WWW		

Calibration Documentation

Calibration Gas: ~~10~~ 0 ppm	Calibration Gas: 500 ppm	Calibration Gas: 10,000 ppm
Concentration: 0 ppm	Concentration: 500 ppm	Concentration:
Serial No.: TMAP-1-7	Serial No.: FAO-150A-500-1	Serial No.:
Expiration Date: 12/10/2019	Expiration Date: 5/1/2018	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	~~500~~ 496	4	5
Trial 2	500	497	3	5
Trial 3	500	495	5	4
Average Diff	500		4	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 0.8 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 10/18/2016	Staff Performing Calibration: Hasaneln Alamcen	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 044460-01
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT**, wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes**, then PRESS **2=SETUP**. Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	4725	(Should be < 5,000 counts)	
FID 10 ppm counts:		Counts/ppm:	P
FID 500 ppm counts:	110134	Counts/ppm:	210.818
FID 10,000 ppm counts:		Counts/ppm:	

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 10.18.16	Staff Performing Calibration: LEANN KINCMO	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 052517-01
Type of Investigation (LDAR/CT): 40 CFR 60 WWW [60.755(c)]		

Calibration Documentation

Calibration Gas: ~~10 ppm~~ 0 ppm	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: 0 ppm	Concentration: 500 ppm	Concentration:
Serial No.: TMAP-1-7	Serial No.: FAO-150A-500-1	Serial No.:
Expiration Date: 12.10.2019	Expiration Date: 05.01.2018	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	~~499~~ 500	499	1	5
Trial 2	~~498~~ 500	498	2	5
Trial 3	~~491~~ 500	491	8	4
Average Diff			3.66	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 0.7 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 10.18.16	Staff Performing Calibration: LeAnn Kincaid	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 052517-01
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes,** then PRESS **2=SETUP**. Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	3322	(Should be < 5,000 counts)	
FID 10 ppm counts:	—	Counts/ppm:	—
FID 500 ppm counts:	113899	Counts/ppm:	221.154
FID 10,000 ppm counts:	—	Counts/ppm:	—

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 10/18/16	Staff Performing Calibration: Azucena Torres	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 582-037002
Type of Investigation (LDAR/CT):		

Calibration Documentation

Calibration Gas: ~~10 ppm~~ 0	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: 0 ppm	Concentration: 500 ppm	Concentration:
Serial No.: TM AP-1-7	Serial No.: TBAQ-150A 500-1	Serial No.:
Expiration Date: 12/10/2019	Expiration Date: 1/8/2020	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	~~4~~ 500	~~493~~ 492	8	9 sec
Trial 2	500	496	4	10 sec
Trial 3	500	497	3	12 sec
Average Diff			5	

15

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 1 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 10/18/16	Staff Performing Calibration: Azucena Torres	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 582-037002
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes,** then PRESS **2=SETUP.** Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES,** to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press **(↑ and ↓) arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

97494
− 4370
93124

FID Zero counts:	4370	(Should be < 5,000 counts)	
FID 10 ppm counts:	97494	Counts/ppm:	186.248
FID 500 ppm counts:		Counts/ppm:	
FID 10,000 ppm counts:		Counts/ppm:	

186.24
500 | 93124.0
500
4312
4000
5124
3000
1240

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 10/19/16	Staff Performing Calibration: Gary Akerman	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 115 249419
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes,** then PRESS **2=SETUP**. Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE**.

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	3316	(Should be < 5,000 counts)	
FID 10 ppm counts:		Counts/ppm:	
FID 500 ppm counts:	101168	Counts/ppm:	195.704
FID 10,000 ppm counts:		Counts/ppm:	

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 10/18/16	Staff Performing Calibration: Gary Ackerman	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 115249419
Type of Investigation (LDAR/CT):		

Calibration Documentation

Calibration Gas: **10 ppm**	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration:	Concentration: 500 ppm	Concentration:
Serial No.:	Serial No.: FJ0070234	Serial No.:
Expiration Date:	Expiration Date: 1/8/2020	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	500	0	
Trial 2	500	505	5	
Trial 3	500	487	13	
Average Diff			6	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 1.2 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 10/19/16	Staff Performing Calibration: J. Eson	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 044460 – 01
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes**, then PRESS **2=SETUP**. Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	4681	(Should be < 5,000 counts)
FID 10 ppm counts:		Counts/ppm:
FID 500 ppm counts:	109948	Counts/ppm:
FID 10,000 ppm counts:		Counts/ppm:

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 10/19/16	Staff Performing Calibration:	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 044460-1
Type of Investigation (LDAR/CT): LDAR		

Calibration Documentation

Calibration Gas: **10 ppm**	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration:	Concentration: 500	Concentration:
Serial No.:	Serial No.: FS0070234	Serial No.:
Expiration Date:	Expiration Date: 1/8/2020	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	~~492~~ 500 10/19/16	492	8	5
Trial 2		494	6	6
Trial 3		497	3	5
Average Diff			5	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 1 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 10-19-2016	Staff Performing Calibration: Tom Pinkay	
Staff Signatures: [illegible]		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 582-037-002
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen; Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes,** then PRESS **2=SETUP.** Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press **(↑ and ↓) arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	4548	(Should be < 5,000 counts)	
FID 10 ppm counts:		Counts/ppm:	
FID 500 ppm counts:	97455	Counts/ppm:	185.81
FID 10,000 ppm counts:		Counts/ppm:	

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 10-19-16	Staff Performing Calibration: Tom Pinkerton	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 582-037002
Type of Investigation (LDAR/CT):		

Calibration Documentation

Calibration Gas: **10 ppm**	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration:	Concentration: 500 ppm	Concentration:
Serial No.:	Serial No.: FJ0070234	Serial No.:
Expiration Date:	Expiration Date: 1/8/2020	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value ppm	Difference	Response Time (90%) Range
Trial 1	504	500	4	
Trial 2	510	500	10	
Trial 3	504	500	4	
Average Diff			6	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 1.2 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date:	Staff Performing Calibration:	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 582-0398-95
Gas Used: Methane	Gas Certification attached: YES or NO	

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes**, then PRESS **2=SETUP.** Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each, Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	381	(Should be < 5,000 counts)	
FID 10 ppm counts:		Counts/ppm:	
FID 500 ppm counts:	115045	Counts/ppm:	222,468
FID 10,000 ppm counts:		Counts/ppm:	

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 10/19/16	Staff Performing Calibration: Tom Pinkston	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 582 039895
Type of Investigation (LDAR/CT):		

Calibration Documentation

Calibration Gas: **10 ppm**	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration:	Concentration: 500 ppm	Concentration:
Serial No.:	Serial No.: F307 0234	Serial No.:
Expiration Date:	Expiration Date: 1-8-2020	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value _____ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	495		
Trial 2		500		
Trial 3		500		
Average Diff				

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 0.3 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 11.10.16	Staff Performing Calibration: Samuel Jirasek	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 0444660-01
Type of Investigation (LDAR/CT): 40 CFR 60 WWW @ BLUE RIDGE LANDFILL		

Calibration Documentation

Calibration Gas: ~~10 ppm~~ 0 ppm	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: 0 ppm	Concentration: 500 ppm	Concentration:
Serial No.: TBAQ-1-1	Serial No.: TBAQ-1504-500-1	Serial No.:
Expiration Date: 1/8/2020	Expiration Date: 1/8/2020	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	496	4	~5 sec
Trial 2	500	492	8	~5 sec
Trial 3	500	502	2	~5 sec
Average Diff			4.66	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 0.93 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 11.10.16	Staff Performing Calibration: Samuel Jirasek	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 044460-01
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes,** then PRESS **2=SETUP.** Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES,** to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	4758	(Should be < 5,000 counts)	
FID 10 ppm counts:	—	Counts/ppm:	—
FID 500 ppm counts:	~~196.29~~ 102905	Counts/ppm:	196.29
FID 10,000 ppm counts:	—	Counts/ppm:	—

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 11/10/16	Staff Performing Calibration: William Austin Jorn	
Staff Signatures: W. Austin Jorn		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 70898-367
Type of Investigation (LDAR/CT): 40 CFR 60 www @ Blue Ridge Landfill		

Calibration Documentation

Calibration Gas: ~~10~~ 0 ppm	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: 0 ppm	Concentration: 500 ppm	Concentration:
Serial No.: TMAP-1-7	Serial No.: FAO-150A-500-1	Serial No.:
Expiration Date: 12/10/2019	Expiration Date: 5/1/2018	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value ____ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	480	20	5 sec
Trial 2	500	485	15	5 sec
Trial 3	500	484	16	5 sec
Average Diff			17	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 3.4 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 11/10/16	Staff Performing Calibration: William Austin Jorn	
Staff Signatures: W. Austin Jorn		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 70898-367
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes,** then PRESS **2=SETUP.** Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES,** to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	4071	(Should be < 5,000 counts)	
FID 10 ppm counts:		Counts/ppm:	
FID 500 ppm counts:	97071	Counts/ppm:	186
FID 10,000 ppm counts:		Counts/ppm:	

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 11.10.16	Staff Performing Calibration: LEANN KINCAID	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 052517-01
Type of Investigation (LDAR/CT): 40 CFR 60 NNN @ BLUE RIDGE		

Calibration Documentation

Calibration Gas: ~~10 ppm~~ ZERO	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: 0 ppm	Concentration: 500 ppm	Concentration:
Serial No.: TBAQ-1-1	Serial No.: TBAQ-150A-500-1	Serial No.:
Expiration Date: 01.08.2020	Expiration Date: 01.08.2020	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	503	3	4 SEC
Trial 2	500	495	5	5 SEC
Trial 3	500	497	3	5 SEC
Average Diff			3.6	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 0.7 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 11.10.16	Staff Performing Calibration: LEANN KINCHNA	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 052517-01
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes,** then PRESS **2=SETUP.** Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts: 3406 (Should be < 5,000 counts)

FID 10 ppm counts: — Counts/ppm: —

FID 500 ppm counts: ~~92,717~~ 91,746 Counts/ppm: ~~178.622~~ 176.68

FID 10,000 ppm counts: — Counts/ppm: —

91,746

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 11/10/16	Staff Performing Calibration: Bianca Lopez	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 582-039895
Type of Investigation (LDAR/CT):		

Calibration Documentation

Calibration Gas: ~~10 ppm~~ ZERO	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: 0 ppm	Concentration: 500 ppm	Concentration:
Serial No.: TMAP-1-7	Serial No.: FNCP-150A-500-1	Serial No.:
Expiration Date: 12/10/2019	Expiration Date: 05/01/2018	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500 ppm	497 ppm	3	5 sec
Trial 2	500 ppm	502 ppm	2	5 sec
Trial 3	500 ppm	508 ppm	8	6 sec
Average Diff			4.3	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= .86 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 11/10/16	Staff Performing Calibration: Bianca Lopez	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 5B2-039895
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes,** then PRESS **2=SETUP.** Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES,** to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press **(↑ and ↓) arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	3656	(Should be < 5,000 counts)
FID 10 ppm counts:	—	Counts/ppm: —
FID 500 ppm counts:	105435	Counts/ppm: 203.6
FID 10,000 ppm counts:	—	Counts/ppm: —

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 11/9/16	Staff Performing Calibration: William Austin Jorn	
Staff Signatures: W. Austin Jorn		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 70898-367
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes**, then PRESS **2=SETUP**. Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE**.

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	4201	(Should be < 5,000 counts)	
FID 10 ppm counts:		Counts/ppm:	
FID 500 ppm counts:	94355	Counts/ppm:	180
FID 10,000 ppm counts:		Counts/ppm:	

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 11/9/16	Staff Performing Calibration: William Austin Jorn	
Staff Signatures: W. Austin Jorn		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 70898-367
Type of Investigation (LDAR/CT):		

Calibration Documentation

Calibration Gas: ~~10~~ 0 ppm	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: 0 ppm	Concentration: 500 ppm	Concentration:
Serial No.: TMAP-1-7	Serial No.: FAO-150A-500-1	Serial No.:
Expiration Date: 12/10/2019	Expiration Date: 05/01/2018	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value _____ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	504	4	5 sec
Trial 2	500	508	8	4 sec
Trial 3	500	503	3	4 sec
Average Diff			5	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 1 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 11/19/2016	Staff Performing Calibration: Samuel Jiraset	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: ~~077893-387~~ 582-039895
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes**, then PRESS **2=SETUP**. Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE**.

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	3612	(Should be < 5,000 counts)	
FID 10 ppm counts:		Counts/ppm:	
FID 500 ppm counts:	112116	Counts/ppm:	217 ppm
FID 10,000 ppm counts:		Counts/ppm:	

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 11/9/2016	Staff Performing Calibration: Samuel Jirasek	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 582-039895
Type of Investigation (LDAR/CT):		

Calibration Documentation

Calibration Gas: ~~10 ppm~~ AB 0 ppm	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: ~~10 ppm~~ 0 ppm	Concentration: 500 ppm	Concentration:
Serial No.: TBAQ-1-1	Serial No.: TBAQ-150A-500-1	Serial No.:
Expiration Date: 1/8/2020	Expiration Date: 1/8/2020	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	497	3	~5sec
Trial 2	500	499	1	~5sec
Trial 3	500	499	1	~5sec
Average Diff			1.66	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

=0.332 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 11.9.2016	Staff Performing Calibration: LEANN KINCAID	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 044460-01
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes,** then PRESS **2=SETUP.** Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press **(↑ and ↓) arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	4703	(Should be < 5,000 counts)	
FID 10 ppm counts:	—	Counts/ppm:	—
FID 500 ppm counts:	105,462	Counts/ppm:	201.518
FID 10,000 ppm counts:	—	Counts/ppm:	—

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 11.9.2016	Staff Performing Calibration: LEANN KINCAID	
Staff Signatures:		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 044460-01
Type of Investigation (LDAR/CT): 40 CFR 60 WWW		

Calibration Documentation

Calibration Gas: ~~10 ppm~~ ZERO	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: ZERO	Concentration: 500 ppm	Concentration:
Serial No.: TBAQ-1-1	Serial No.: TBAQ-150A-500-1	Serial No.:
Expiration Date: 01.08.2020	Expiration Date: 01.08.2020	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value 500 ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	494	6	3 SEC
Trial 2	500	479	21	5 SEC
Trial 3	500	506	6	5 SEC
Average Diff			~~33~~ 11	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 2.2 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.

TCEQ TVA 1000B Calibration Analyzer Procedure

Calibrate analyzer in the manual mode and record the following after warm up

Date: 11/9/16	Staff Performing Calibration: William Austin Torn	
Staff Signatures: W. Austin Torn		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 115249419
Gas Used: Methane		Gas Certification attached: YES or NO

Step 1: Install filled Hydrogen, Turn on TVA 1000B Analyzer and Hydrogen supply valve.

Step 2: Wait 4-5 minutes for proper Hydrogen flow, then PRESS **1=RUN.** The unit will ignite & display readings. If flame out message appears, clear the message by PRESSING **EXIT,** wait a minute and repeat Step 2.

Step 3: PRESS **EXIT** until **MAIN MENU** appears. Allow unit to warm up for **20 Minutes**, then PRESS **2=SETUP.** Calibration can now be performed.

Step 4: PRESS **1=CALIB,** then PRESS **3=ZERO** to start the calibration process.

Step 5: Introduce **ZERO** gas into the analyzer, PRESS **ENTER** to start. Wait for value to stabilize (about 15 seconds/ look for the first two numbers to stabilize) and PRESS **ENTER** to accept, if < 5000.

Step 6: Exit Once to the SETUP Menu, PRESS **1=CALIB.**

Step 7: Calibrate with the span 10 ppm methane (pt 1). PRESS **4=SPAN** and **ENTER.** Follow screen prompts. Wait for analyzer to stabilize. PRESS **1=YES**, to save. (NOTE: pt2 = 500 ppm & pt3 = 10,000 ppm)

NOTE: EXIT ONCE

Step 8: Repeat Calibration steps for 500 ppm (pt 2) & 10,000 ppm (pt 3) methane using steps 6 & 7. NOTE: Press (↑ and ↓) **arrow keys** to select the correct span gas concentration.

Step 9: Follow the screen prompts. Wait for the reading to stabilize for each span gas. PRESS **1=YES** to save each. Exit one time

Step 10: PRESS **5=RF** to verify proper response factor. CONFIRM **RFO: DEFAULT.**

Step 11: Press exit 3x to return to Main Menu and PRESS **1=RUN.** The Instrument is now in **SURVEY MODE.**

EXAMPLE: COUNTS/PPM = $\frac{\text{Span Counts} - \text{Zero Counts}}{\text{Span Concentrations}}$

Counts Must be between 175 to 250 ppm methane

FID Zero counts:	3179	(Should be < 5,000 counts)	
FID 10 ppm counts:		Counts/ppm:	
FID 500 ppm counts:	94462	Counts/ppm:	182
FID 10,000 ppm counts:		Counts/ppm:	

TCEQ Method 21 Calibration Documentation Precision & Response Time Check

17March2011 (Revise Date)

Date: 11/9/16	Staff Performing Calibration: William Austin Jorn	
Staff Signatures: W. Austin Jorn		
Analyzer Make: Thermo Enviro	Model: TVA 1000B	Serial No.: 115249419
Type of Investigation (LDAR/CT):		

Calibration Documentation

Calibration Gas: ~~10~~ 0 ppm	Calibration Gas: **500 ppm**	Calibration Gas: **10,000 ppm**
Concentration: 0 ppm	Concentration: 500 ppm	Concentration:
Serial No.: TMAP-1-7	Serial No.: FA0-150A-500-1	Serial No.:
Expiration Date: 12/10/2019	Expiration Date: 05/01/2018	Expiration Date:

TVA 1000B Precision & Response Time Check

	Expected Value ____ppm	Actual Value	Difference	Response Time (90%) Range
Trial 1	500	530	30	5 sec
Trial 2	500	504	4	4 sec
Trial 3	500	498	2	4 sec
Average Diff			12	

Calibration Precision = 100 X $\frac{\text{average diff}}{\text{Expected Value}}$

= 2.4 percent (Must be less than 10% for LDAR and greater for CT)

NOTE: Your **CONCENTRATION** should be approximately equal to the leak definition, such as **500** or **10,000 ppm** for **LDAR** and **10 ppm** for **CT**.