



The Alpha and Omega of Stack Test Validation

From Test Protocol to Test Report Review



ALPHA– Test Protocol

- What is this?
- Legal Document – defensible in court
 - Written declaration of the testing to be performed

Key Items in Test Protocol

- **If the field is there – it is required information**
- Dates/Times (timeliness of the submittal?)
- Facility Information
- Unit(s) to be Tested
 - Operating and Control Information
- Stack Diagram
- Methods
 - Modifications
 - Listed in the method as written
 - Proposed (who has the authority to approve?)

Reviewing the Test Protocol

- Field by Field

<http://www.epa.state.oh.us/portals/27/files/ITT.pdf>

- Pre-ALPHA

- Rules/Regulations
- Permits
- Previous Testing History

Reviewing the Test Protocol -2



- Verify the information
- Request revision as needed

PRE-TEST Meeting

- WHY?
- WHO?
- WHERE?
- WHAT?
- WHEN?



WHY a Pre-test Meeting?

- Smooth Testing
- Preview facility: emissions unit and control
- Discuss ITT – request changes



WHO Attends the Pre-Test Meeting?



- Regulatory Personnel
- Facility Personnel
 - Environmental/Safety
 - Equipment Operators
- Stack Testers
- Other (lawyers, consultants, etc...)

WHERE to Have the Pre-Test Meeting?

- On-Site
- Verification of port siting (Method 1)



WHAT is the Point of Pre-Test Meeting?

- Discuss the test protocol and operating conditions to meet during the test
- View the emissions source and control equipment
- Discuss safety issues and required PPE

WHEN Should the Pre-Test Meeting Be?

- A couple weeks prior to the scheduled test date
- Prior to the submittal of the test protocol
- Give everyone enough time to acquire what is needed for the day of the test



Day of Testing

- Be Prepared
- Take Note
- Be on the Lookout....



Day of Testing – Be Prepared



- Test Protocol
- PPE
- Observation Forms
- Camera (if allowed)
- Paperwork (copies)
 - Methods
 - Permits
 - Rules

Day of Testing - Take Note

- Job site organization
- Operating and Control Equipment Parameters
- Implementation of Test Methods



Day of Testing – Take Note (3)

- Calibration and span gases used
- Manometers to scale
- Meter Box Values : $\Delta H@$, γ and calibration dates
- Static and barometric pressures



Day of Testing – Take Note (4)

- Silica Gel



- Leak checks

- Probe and nozzle clean up

- Filter

- Instrumental Methods



Day of Testing – Be on the Lookout

- Cheating
 - Umbilical cord crimping
 - Adjusting impinger connections during leak checks
 - Turning off the pump
 - Not using highest vacuum during leak check
 - Adjusting instrument based on readings
 - Fabricating data on field data sheets
 - Not traversing the stack

OMEGA - Test Report Review



- Names, Dates, etc...
- Summary of test
- **Calculations**
 - Field Data Sheets
- Calibrations
- Operating Rates

Field Data Sheet

Custom Stack Analysis, LLC
Method 26A

TEST NO. 3 PLANT Knox Community Hospital DATE 1-10-08

LOCATION Incinerator Outlet BY APL/MLL

BAROMETER (P_B) 29.82 AMBIENT TEMP 45 ASSUMED MOISTURE 999

MODULE NO. 002 PROBE NO. 3P-2 FILTER NO. 366 HEATER NO. 6 NOZZLE DIA. .312

TEST POINT	METER VOLUME (V _m)	METER TEMP (T _m) IN	METER TEMP (T _m) OUT	COND TEMP °F	FILTER HEATER TEMP °F	PROBE TEMP °F	STACK TEMP °F (T _s)	STACK PRESS. (Ps)	VACUUM "Hg	ORIFICE "H ₂ O (ΔH) (Pm)	VT. HEAD (ΔP)	TIME
start	625.425	57	57	21	255	265	116	.27	4.0	x	x	0
1	629.56	56	53	21	260	260	114		4.0	1.8	.31	5
2	633.04	56	57	24	259	262	117		3.5	1.6	.27	10
3	635.92	56	60	26	258	263	119		2.5	1.1	.19	15
4	638.57	57	62	27	249	266	121		2.0	.89	.15	20
5	642.67	60	64	29	248	263	119		4.5	1.9	.32	25
6	646.28	58	66	32	248	263	119		4.5	2.2	.37	30
start	646.29	59	63	33	260	266	124		5.5	x	x	30:5
1	650.29	59	66	35	260	265	123		5.5	2.2	.36	35
2	653.81	59	65	38	253	264	127		4.0	1.6	.27	40
3	657.31	60	68	39	251	266	129		4.0	1.6	.26	45
4	660.59	60	67	40	248	265	131		4.5	1.7	.29	50
5	664.32	61	69	41	248	262	126		4.5	1.7	.28	55
6	667.691	61	69	42	254	264	127		4.0	1.5	.25	60

(V_m) 41.866

AVERAGE 61 ***** 122 MAX 1.6 60 MINUTES

INTEGRATED GAS SAMPLE				AVG	N ₂ = <u>81.7</u>	CONDENSATE COLLECTED		
CO ₂	CO	O ₂	H ₂ O			FINAL	INITIAL	TOTAL
<u>6.0</u>	<u>6.5</u>	<u>6.5</u>	<u>6.3</u>			<u>78.5</u>	<u>696</u>	<u>12.5</u>
	<u>12.0</u>	<u>12.0</u>	<u>12.0</u>			<u>558.7</u>	<u>400</u>	<u>158.7</u>
FILTER WT				IMPINGER CATCH		GRAND TOTAL		
PROBE WASH WT				HCl WT. <u>1.4</u>		LEAK RATE @ 6.0" Hg = <u>.025</u>		
GROSS				Cl ₂ WT.		STACK AREA (As) <u>785 ft²</u>		
TARE						AVG SQ RT Δ P <u>.5276</u>		
NET								

TOTAL PARTICULATE WT (Mn) Mg

41.866 $(.025 \times .02) = .005$

13 correct for leak

Orsat Field Data Sheet

Method 3 Orsat Field Data

Plant Name: Youngstown Thermal Energy Fuel Type: —
 Sampling Location: Boiler #3 Exhaust Stack
 Pre-Test Leak Check: Post-Test Leak Check:

Run Number: 1		Date: 1-29-04			Operator: MS		
Time of Sample Collection	Time of Analysis	CO ₂ Reading (A)	O ₂ Reading (B)	CO Reading (C)	%O ₂ (B-A)	%CO (C-B)	%N ₂ (100-C)
9:22	13:36	9.6	19.4	19.4	9.2	0.0	80.6
↓	13:49	10.0	19.1	19.1	9.1	0.0	80.9
10:26	14:00	10.0	19.6	19.0	9.0	0.0	81.0
Average		9.87	-	-	9.3	0.00	80.83

Analyzer I.D. - A-ORS-001 Tedlar Bag I.D. - 040114-1-UR F_o = 1.175

Lab Data Sheet

Lab Data Sheet For Knox Community Hospital Date 1-10-06 By MP Little

Moisture Weights Impinger Number
26A

	Box	1	2	3	4	5	6	Drierite	Test
Gross		672.4	694.5	598.7	602.6			689.3	Test 1
Tare	5	579.6	612.1	578.7	577.5			672.6	
Net		92.8	72.4	20.0	5.1			15.7	

Initial Imp ML = 400 Impinger Total = 190.3 Total = 206.0

	Box	1	2	3	4	5	6	Drierite	Test
Gross		686.9	664.8	585.8	589.2			703.8	Test 2
Tare	3	585.4	608.2	568.1	583.5			688.3	
Net		101.5	56.6	17.7	5.7			15.5	

Impinger Total = 181.5 Total = 197.0

	Box	1	2	3	4	5	6	Drierite	Test
Gross		657.4	629.1	626.4	587.7			708.5	Test 3
Tare	6	579.0	574.7	607.9	580.3			696.0	
Net		78.4	54.4	18.5	7.4			12.5	

Impinger Total = 158.7 Total = 171.2

	Box	1	2	3	4	5	6	Drierite	Test
Gross									Test 4
Tare									
Net									

Impinger Total = Total =

Probe Wash Weight

Box	Test	Gross	Tare	Net	Acetone Blank	Total
5	1	113364.2	113353.1	11.1	.15	10.95
3	2	113402.7	113394.2	8.5	.15	8.35
6	3	78599.7	78592.1	7.6	.15	7.45

Filter Weight

No.	Test	Gross	Tare	Net
364	1	640.0	638.2	1.8
365	2	634.7	632.9	1.8
366	3	642.0	639.7	2.3

Test	Probe + Filter
1	12.75
2	10.15
3	9.75
4	

Total PM Weight

After the OMEGA – Thumbs Up or Thumbs Down

- Valid
 - Pass
 - Fail
 - Enforcement
- Invalid
 - Enforcement



Questions Down the Road?

Dawn Mays – Testing/Evaluation Supervisor

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