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Department of Energy
Richland Operations Office
P.O. Box 550
Richland, Washington 99352

05-OD-0055

FEB 14 2005

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EDMC

Mr. Davis Zhen
Office of Air Quality
U.S. Environmental Protection Agency
Region 10
1200 Sixth Avenue
Seattle, Washington 98101

Dear Mr. Zhen:

TRANSMITTAL OF THE RADIOCHEMICAL PROCESSING LABORATORY (325 BUILDING) 2004 QUARTERLY TRAVERSE MEASUREMENTS REPLY TO ATTENTION OF OAQ-107

As requested in the U. S. Environmental Protection Agency (EPA) letter to K. A. Klein, DOE, from J. KenKnight, "Request for Alternate Method for Stack Flow Measurement at the Radiochemical Processing Laboratory (RPL) Emission Unit EP-325-01-S," dated 11 May 2004, the Calendar Year 2004 quarterly stack traverse reports for the RPL are enclosed. Each of the traverse reports indicate the flow rate out of the stack is within normal operating parameters.

If you have any questions, please contact Theresa Aldridge, Pacific Northwest Site Office Operations Division, on (509) 372-4508.

Sincerely,

Keith A. Klein
Manager

OD:TLA

Enclosure

cc w/encl:
Administrative Record:
325 Building
B. P. Atencio, PNNL
J. M. Barnett, PNNL
G. Bohnee, NPT
N. Ceto, EPA
A. W. Conklin, WDOH
Environmental Portal, LMSI
W. E. Green, FH
A. K. Ikenberry, PNNL
R. Jim, YN
J. H. Richards, CTUIR
O. S. Wang, WDOE

2004 Traverse Data for the Radiochemical Processing Laboratory Stack EP-325-01-S

Traverse point	Date	Flow Rate (cfm)	Expected Range (cfm)
TP-325-01-1	2/19/04 1:45 PM	142,900	129,000 – 145,000
	5/20/04 11:00 AM	143,100	
	8/12/04 9:05 AM	144,100	
	11/16/04 2:00 PM	134,800	

*Flow rate as measured by Effluent Management procedure EMS-AIR-016, PNNL Stack/Duct Velocity Traverse Method. This procedure is commensurate with 40 CFR 60, Appendix A, Methods 1 and 2.

Stack Velocity Traverse Data
TP-325-01-1

PART A

Traverse Performed: Date: 5/20/2004 Time: 11:00AM

Normal Operating Condition K Buck 5.20.04 Building Engineer Signature/Date

Test Personnel: Larry Martin, Mark Buchanan and Willis Rappe'

Pitot Tube Type: Standard ID No.: item 74 exp. 2-05

Manometer Type: 1" Oil Code No.: Item 8 Cal. Exp. Date: 05/2005

Temp. Probe Type: Unitherm Code No.: Item 53 Cal. Exp. Date: 05/2004

PART B

Traverse Point No.	Distance From Port Entrance (inches)*	Port A			Port B		
		V_{pt} ("$H^2$0)	$\sqrt{V_{pt}}$	T_s (°F)	V_{pt} ("$H^2$0)	$\sqrt{V_{pt}}$	T_s (°F)
1	2.5	0.430	0.656	80.0	0.500	0.707	80.0
2	7.9	0.530	0.728	80.0	0.570	0.755	80.0
3	14.0	0.540	0.735	80.0	0.580	0.762	80.0
4	21.7	0.540	0.735	80.0	0.620	0.787	80.0
5	32.8	0.530	0.728	80.0	0.580	0.762	80.0
6	63.2	0.470	0.686	80.0	0.520	0.721	80.0
7	74.3	0.520	0.721	80.0	0.500	0.707	80.0
8	82.0	0.440	0.663	80.0	0.480	0.693	80.0
9	88.1	0.400	0.632	80.0	0.480	0.693	80.0
10	93.5	0.370	0.608	80.0	0.410	0.640	80.0
Static Pressure	0.010	Ave. $\sqrt{V_{pt}}$=	**0.689**		Ave. $\sqrt{V_{pt}}$=	**0.723**	
Barometric Pressure	29.51	T_R=Ave. T_s + 460=		**540**	T_R=Ave. T_s + 460=		**540**
Calculated Absolute Pressure =	**29.51**	V_{port}A=	**2,780**	ft/min	V_{port}A=	**2,910**	ft/min
Duct Area:	50.3 sq ft	Volumetric Flow Rate (Q)= ([V_{port}A+V_{port}B]/2)*A_s=				**143,100** cfm	
Traverse Path Length:	96.0 inches						

***Be sure to include distance from port entrance to inside wall.**

C_p = Pitot tube coefficient =0.99 (Std Probe): Cp=0.84 (Type-S)
V_{pt} = Velocity pressure at traverse point ("$H_2$0)
Ave.$\sqrt{V_{pt}}$ = Ave. square root of the velocity pressure at a traverse point
P_{abs} = Absolute stack pressure ("Hg) = P_{stack}/13.6 + P_b
T_s = Stack gas temperature (°F)
T_R = Stack gas temp (°R) = T_s + 460
Vport=952*Cp*(Ave.√Vpt)*√(TR/Pabs)
A_s = Area of stack at sample location (sq.ft.)
Q = Average stack volumetric flow rate (cfm) = (Ave. Vport) * As

PART C

Leak Test: Pass: x Fail: _____

Plug Test Results: VP: before back-purge: 0.50 after back-purge: 0.50

VP (after)/ VP (before) = 1.00 >1.05 test failed - perform again

Comments: (If more space is needed, use the back of this page)

Form Completed by: [signature] Date: 5-20-04

Verified by: Larry S. Martin Date: 5-20-04

Effluent Management: Betty D. Anderson Date: 5/20/04

Stack Velocity Traverse Data
TP-325-01-1

PART A

Traverse Performed: Date: 2/19/2004 Time: 1:45 PM

Normal Operating Condition FgBuck Building Engineer Signature/Date

Test Personnel: Martin, Buchanan and Blalylock

Pitot Tube Type: Standard ID No.: item 74 2/2004

Manometer Type: 1" Oil Code No.: item 9 Cal. Exp. Date: 06/2004

Temp. Probe Type: unitherm Code No.: item 53 Cal. Exp. Date: 05/2004

PART B

Traverse Point No.	Distance From Port Entrance (inches)*	Port A			Port B		
		V_{pt} ("$H^2$0)	$\sqrt{V_{pt}}$	T_s (°F)	V_{pt} ("$H^2$0)	$\sqrt{V_{pt}}$	T_s (°F)
1	2.5	0.400	0.632	71.0	0.480	0.693	71.0
2	7.9	0.480	0.693	71.0	0.500	0.707	71.0
3	14.0	0.500	0.707	71.0	0.520	0.721	71.0
4	21.7	0.470	0.686	71.0	0.540	0.735	71.0
5	32.8	0.510	0.714	71.0	0.570	0.755	71.0
6	63.2	0.510	0.714	71.0	0.560	0.748	71.0
7	74.3	0.520	0.721	71.0	0.560	0.748	71.0
8	82.0	0.530	0.728	71.0	0.560	0.748	71.0
9	88.1	0.510	0.714	71.0	0.570	0.755	71.0
10	93.5	0.420	0.648	71.0	0.480	0.693	71.0
Static Pressure	0.020	Ave. $\sqrt{V_{pt}}$=	**0.696**		Ave. $\sqrt{V_{pt}}$=	**0.730**	
Barometric Pressure	29.78	T_R=Ave. T_s + 460=		**531**	T_R=Ave. T_s + 460=		**531**
Calculated Absolute Pressure =	**29.78**	V_{port}A=	**2,770**	ft/min	V_{port}A=	**2,910**	ft/min
Duct Area:	50.3 sq ft	Volumetric Flow Rate (Q)= ([V_{port}A+V_{port}B]/2)*A_s=				**142,900** cfm	
Traverse Path Length:	96.0 inches						

***Be sure to include distance from port entrance to inside wall.**

C_p = Pitot tube coefficient =0.99 (Std Probe); Cp=0.84 (Type-S)
V_{pt} = Velocity pressure at traverse point ("$H_2$0)
Ave.$\sqrt{V_{pt}}$ = Ave. square root of the velocity pressure at a traverse point
P_{abs} = Absolute stack pressure ("Hg) = P_{stack}/13.6 + P_b
T_s = Stack gas temperature (°F)
T_R = Stack gas temp (°R) = T_s + 460
Vport=952*Cp*(Ave.√Vpt)*√(TR/Pabs)
A_s = Area of stack at sample location (sq.ft.)
Q = Average stack volumetric flow rate (cfm) = (Ave. Vport) * As

PART C

Leak Test: Pass: x Fail: _____

Plug Test Results: VP: before back-purge: 0.56 after back-purge: 0.56

VP (after)/ VP (before) = **1.00** >1.05 test failed - perform again

Comments: (If more space is needed, use the back of this page)

Form Completed by: Bob Blaylock Date: 2/19/04

Verified by: Jerry S. Martin Date: 2-19-04

Effluent Management: Betty G Anderson Date: 2/23/04

Stack Velocity Traverse Data
TP-325-01-1

PART A

Traverse Performed: Date: 8/12/2004 Time: 9:05 AM

Normal Operating Condition [signature] 8.12.04 Building Engineer Signature/Date

Test Personnel: Blaylock, Buchanan and Rappe

Pitot Tube Type: Standard ID No.: item # 74 expires 2,2005

Manometer Type: 1" Oil Code No.: item # 17 Cal. Exp. Date: 07/2005

Temp. Probe Type: unitherm Code No.: item # 53 Cal. Exp. Date: 07/2005

PART B

Traverse Point No.	Distance From Port Entrance (inches)*	Port A			Port B		
		V_{pt} ("$H^2$0)	$\sqrt{V_{pt}}$	T_s (°F)	V_{pt} ("$H^2$0)	$\sqrt{V_{pt}}$	T_s (°F)
1	2.5	0.380	0.616	81.0	0.450	0.671	81.0
2	7.9	0.450	0.671	81.0	0.570	0.755	81.0
3	14.0	0.480	0.693	81.0	0.560	0.748	81.0
4	21.7	0.500	0.707	81.0	0.570	0.755	81.0
5	32.8	0.500	0.707	81.0	0.540	0.735	81.0
6	63.2	0.520	0.721	81.0	0.530	0.728	81.0
7	74.3	0.530	0.728	81.0	0.540	0.735	81.0
8	82.0	0.520	0.721	81.0	0.530	0.728	81.0
9	88.1	0.500	0.707	81.0	0.520	0.721	81.0
10	93.5	0.450	0.671	81.0	0.480	0.693	81.0
Static Pressure	0.010	Ave. $\sqrt{V_{pt}}$=	**0.694**		Ave. $\sqrt{V_{pt}}$=	**0.727**	
Barometric Pressure	29.51	T_R=Ave. T_s + 460=		**541**	T_R=Ave. T_s + 460=		**541**
Calculated Absolute Pressure =	**29.51**	$V_{port}A$=	**2,800**	ft/min	$V_{port}A$=	**2,930**	ft/min
Duct Area:	50.3 sq ft	Volumetric Flow Rate (Q)= ([$V_{port}A$+$V_{port}B$]/2)*A_s=				**144,100** cfm	
Traverse Path Length:	96.0 inches						

***Be sure to include distance from port entrance to inside wall.**

C_p = Pitot tube coefficient =0.99 (Std Probe); Cp=0.84 (Type-S)
V_{pt} = Velocity pressure at traverse point ($H_2$0)
Ave.$\sqrt{V_{pt}}$ = Ave. square root of the velocity pressure at a traverse point
P_{abs} = Absolute stack pressure (Hg) = P_{stack}/13.6 + P_b
T_s = Stack gas temperature (°F)
T_R = Stack gas temp (°R) = T_s + 460
Vport=952*Cp*(Ave.√Vpt)*√(TR/Pabs)
A_s = Area of stack at sample location (sq.ft.)
Q = Average stack volumetric flow rate (cfm) = (Ave. Vport) * As

Stack Velocity Traverse Data
TP-325-01-1

PART C

Leak Test: Pass: X Fail: ____

Plug Test Results: VP: before back-purge: 0.50 after back-purge: 0.50

VP (after)/ VP (before) = **1.00** >1.05 test failed - perform again

Comments: (If more space is needed, use the back of this page)

Form Completed by: Bob Blaylock Date: 8/12/04

Verified by: [illegible] Date: 8-12-04

Effluent Management: Betty G. Anderson Date: 8/12/04

Stack Velocity Traverse Data
TP-325-01-1

PART A

Traverse Performed: Date: 11/16/2004 Time: 2:00 PM

Normal Operating Condition FG Buck 11-16-04 Building Engineer Signature/Date

Test Personnel: Blaylock, Buchanan, Rappe and Martin

Pitot Tube Type: **Standard** ID No.: item #77 expires 2/2005

Manometer Type: **1" Oil** Code No.: item #18 Cal. Exp. Date: 07/2005

Temp. Probe Type: **Unitherm** Code No.: item #53 Cal. Exp. Date: 07/2005

PART B

Traverse Point No.	Distance From Port Entrance (inches)*	Port A			Port B		
		V_{pt} ("$H^2$0)	$\sqrt{V_{pt}}$	T_s (°F)	V_{pt} ("$H^2$0)	$\sqrt{V_{pt}}$	T_s (°F)
1	2.5	0.330	0.574	77.0	0.390	0.624	77.0
2	7.9	0.440	0.663	77.0	0.450	0.671	77.0
3	14.0	0.430	0.656	77.0	0.460	0.678	77.0
4	21.7	0.430	0.656	77.0	0.460	0.678	77.0
5	32.8	0.450	0.671	77.0	0.460	0.678	77.0
6	63.2	0.460	0.678	77.0	0.500	0.707	77.0
7	74.3	0.450	0.671	77.0	0.510	0.714	77.0
8	82.0	0.490	0.700	77.0	0.490	0.700	77.0
9	88.1	0.460	0.678	77.0	0.490	0.700	77.0
10	93.5	0.400	0.632	77.0	0.400	0.632	77.0
Static Pressure	0.020	Ave. $\sqrt{V_{pt}}$=	**0.658**		Ave. $\sqrt{V_{pt}}$=	**0.678**	
Barometric Pressure	29.73	T_R=Ave. T_s + 460=		**537**	T_R=Ave. T_s + 460=		**537**
Calculated Absolute Pressure =	**29.73**	$V_{port}A$=	**2,640**	ft/min	$V_{port}A$=	**2,720**	ft/min
Duct Area:	50.3 sq ft	Volumetric Flow Rate (Q)= ([$V_{port}A$+$V_{port}B$]/2)*A_s=				**134,800** cfm	
Traverse Path Length:	96.0 inches						

***Be sure to include distance from port entrance to inside wall.**

C_p = Pitot tube coefficient =0.99 (Std Probe); Cp=0.84 (Type-S)
V_{pt} = Velocity pressure at traverse point ("$H_2$0)
Ave.$\sqrt{V_{pt}}$ = Ave. square root of the velocity pressure at a traverse point
P_{abs} = Absolute stack pressure ("Hg) = P_{stack}/13.6 + P_b
T_s = Stack gas temperature (°F)
T_R = Stack gas temp (°R) = T_s + 460
Vport=952*Cp*(Ave.√Vpt)*√(TR/Pabs)
A_s = Area of stack at sample location (sq.ft.)
Q = Average stack volumetric flow rate (cfm) = (Ave. Vport) * As

Stack Velocity Traverse Data
TP-325-01-1

PART C

Leak Test: Pass: x Fail: ____

Plug Test Results: VP: before back-purge: 0.46 after back-purge: 0.46

VP (after)/ VP (before) = **1.00** >1.05 test failed - perform again

Comments: (If more space is needed, use the back of this page)

Form Completed by: [signature] Date: 11/16/04

Verified by: [signature] Date: 11-16-04

Effluent Management: [signature] Date: 11-23-04

[signature] 11-16-04