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

0072125

FEB 15 2007

07-SED-0125

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

RECEIVED
FEB 23 2007
EDMC

Dear Mr. Zhen:

TRANSMITTAL OF THE RADIOCHEMICAL PROCESSING LABORATORY (325 BUILDING) 2006 QUARTERLY TRAVERSE MEASUREMENTS REPLY TO ATTENTION OF OAQ-107

The purpose of this letter is to submit measurement data as requested in the Environmental Protection Agency letter to K. A. Klein, RL, from J. Ken Knight, "Request for Alternate Method for Stack Flow Measurement at the Radiochemical Processing Laboratory (RPL) Emission Unit EP-325-01-S," dated May 11, 2004. Each of the attached traverse reports indicate the flow rate out of the stack is within normal operating parameters as shown in Table 1 below:

Table 1. 2006 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	3/1/2006 2:45 PM	139,100	129,000 – 145,000
	5/2/2006 2:00 PM	143,100	
	8/9/2006 10:30 AM	139,100	
	11/21/2006 10:30 AM	142,100	

*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.

If you have any questions, please contact Pete J. Garcia, Jr., Director, Safety and Engineering Division, on (509) 372-1909.

Sincerely,

Doug S. Shoop, Assistant Manager
for Safety and Engineering

SED:MFJ

Attachment
1. Stack Velocity Traverse Data

cc w/attach:
J. M. Barnett, PNNL
G. Bohnee, NPT
L. J. Brandon, PNNL
S. Harris, CTUIR
N. A. Homan, FHI
A. K. Ikenberry, PNNL
R. Jim, YN
P. J. Martell, WDOH
O. S. Wang, WDOE
Administrative Record: 325 Building
Environmental Portal, LMSI

Stack Velocity Traverse Data
TP-325-01-1

PART A

Traverse Performed: Date: 3/1/2006 Time: 2:45pm

Normal Operating Condition _____ Building Engineer Signature/Date

Test Personnel: Martin, Blaylock, Rappe and tolnud

Pitot Tube Type: Standard ID No.: Item #77 ex.2-07

Manometer Type: 1" Oil Code No.: Item #18 Cal. Exp. Date: 07/2007

Temp. Probe Type: Unitherm Code No.: Item #53 Cal. Exp. Date: 08/2006

PART B

Traverse Point No.	Distance From Port Entrance (inches)*	Port A			Port B		
		V_{pt} ("H^2O)	$\sqrt{V_{pt}}$	T_s (°F)	V_{pt} ("H^2O)	$\sqrt{V_{pt}}$	T_s (°F)
1	2.5	0.420	0.648	76.0	0.450	0.671	76.0
2	7.9	0.480	0.693	76.0	0.530	0.728	76.0
3	14.0	0.500	0.707	76.0	0.580	0.748	76.0
4	21.7	0.500	0.707	76.0	0.580	0.762	76.0
5	32.8	0.480	0.693	76.0	0.570	0.755	76.0
6	83.2	0.470	0.686	76.0	0.470	0.686	76.0
7	74.3	0.470	0.686	76.0	0.500	0.707	76.0
8	82.0	0.470	0.686	76.0	0.470	0.686	76.0
9	88.1	0.400	0.632	76.0	0.450	0.671	76.0
10	93.5	0.350	0.592	76.0	0.400	0.632	76.0
Static Pressure	0.000	Ave. $\sqrt{V_{pt}}$=	0.673		Ave. $\sqrt{V_{pt}}$=	0.705	
Barometric Pressure	29.48	T_R=Ave. T_s + 460=		536	T_R=Ave. T_s + 460=		536
Calculated Absolute Pressure =	29.48	$V_{port}A$=	2,700	ft/min	$V_{port}A$=	2,830	ft/min
Duct Area:	50.3 sq ft	Volumetric Flow Rate (Q)= ([$V_{port}A$+$V_{port}B$]/2)*A_s=				139,100 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_2O)
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: 0.47 after back-purge: 0.47

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: 3-1-06

Verified by: [signature] Date: 3-1-06

Effluent Management: [signature] Date: 3/2/06

Stack Velocity Traverse Data
TP-325-01-1

PART A

Traverse Performed: Date: 5/2/2006 Time: 2:00 PM

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

Test Personnel: Martin, Blayfock, Tolrud and Shockey

Pitot Tube Type: Standard ID No.: Item # 73 expires 2/2007

Manometer Type: 1" Oil Code No.: item # 18 Cal. Exp. Date: 07/2006

Temp. Probe Type: Unitherm Code No.: item # 53 Cal. Exp. Date: 07/2006

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	78.0	0.450	0.671	79.0
2	7.9	0.500	0.707	78.0	0.540	0.735	79.0
3	14.0	0.480	0.693	78.0	0.560	0.748	79.0
4	21.7	0.500	0.707	79.0	0.570	0.755	79.0
5	32.8	0.480	0.693	79.0	0.530	0.728	79.0
6	63.2	0.470	0.686	79.0	0.530	0.728	79.0
7	74.3	0.530	0.728	78.0	0.560	0.748	79.0
8	82.0	0.500	0.707	78.0	0.550	0.742	79.0
9	88.1	0.500	0.707	78.0	0.520	0.721	79.0
10	93.5	0.490	0.700	78.0	0.450	0.671	79.0
Static Pressure	0.030	Ave. $\sqrt{V_{pt}}$=	0.696		Ave. $\sqrt{V_{pt}}$=	0.725	
Barometric Pressure	29.85	T_R=Ave. T_s + 460=		538.3	T_R=Ave. T_s + 460=		539
Calculated Absolute Pressure =	29.85	V_{port}A=	2,790	ft/min	V_{port}A=	2,900	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:	86.0 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.$\sqrt{Vpt}$)*$\sqrt{(TR/Pabs)}$
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: 0.53 after back-purge: 0.53

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: 5-2-06

Verified by: [signature] Date: 5-2-06

Effluent Management: [signature] Date: 5/4/06

Stack Velocity Traverse Data
TP-325-01-1

PART A

Traverse Performed: Date: 8/9/2006 Time: 10:30 AM

Normal Operating Condition [signature] 8.9.06 Building Engineer Signature/Date

Test Personnel: Blaylock, Martin, Tolrud and Shockey

Pitot Tube Type: Standard ID No.: Item # 73 expires 2/2006

Manometer Type: 1" Oil Code No.: Item # 10 Cal. Exp. Date: 06/2006

Temp. Probe Type: ADM 870 Code No.: Item # 92 Cal. Exp. Date: 06/2008

PART B

Traverse Point No.	Distance From Port Entrance (inches)*	Port A			Port B		
		V_{pt} ("H^2O)	$\sqrt{V_{pt}}$	T_s (°F)	V_{pt} ("H^2O)	$\sqrt{V_{pt}}$	T_s (°F)
1	2.5	0.400	0.632	79.0	0.440	0.663	79.0
2	7.9	0.450	0.671	79.0	0.500	0.707	79.0
3	14.0	0.450	0.671	79.0	0.520	0.721	79.0
4	21.7	0.470	0.686	79.0	0.540	0.735	79.0
5	32.8	0.480	0.693	79.0	0.500	0.707	79.0
6	63.2	0.480	0.693	79.0	0.500	0.707	79.0
7	74.3	0.480	0.693	79.0	0.480	0.693	79.0
8	82.0	0.480	0.693	79.0	0.500	0.707	77.0
9	88.1	0.500	0.707	79.0	0.470	0.686	79.0
10	93.5	0.400	0.632	79.0	0.450	0.671	79.0
Static Pressure	0.020	Ave. $\sqrt{V_{pt}}$=	0.677		Ave. $\sqrt{V_{pt}}$=	0.700	
Barometric Pressure	29.62	T_R=Ave. T_s + 460=		539	T_R=Ave. T_s + 460=		538.8
Calculated Absolute Pressure =	29.62	$V_{port}A$=	2,720	ft/min	$V_{port}A$=	2,810	ft/min
Duct Area:	50.3 sq ft	Volumetric Flow Rate (Q)= ([$V_{port}A$+$V_{port}B$]/2)*A_s=				139,100 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_2O)
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.$\sqrt{Vpt}$)*$\sqrt{(TR/Pabs)}$
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: 0.48 after back-purge: 0.48

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 Blanford Date: 8-9-06

Verified by: Loretta Shockey Date: 8-9-06

Effluent Management: Betty L. Anderson Date: 8/15/06

Stack Velocity Traverse Data
TP-325-01-1

PART A

Traverse Performed: Date: 11/21/2006 Time: 10:30 AM

Normal Operating Condition [illegible] 11/22/06 [illegible] Building Engineer Signature/Date

Test Personnel: Bob Blaylock, Larry Martin and Loretta Shockey

Pitot Tube Type: Standard ID No.: item # 73 expires 2/2007

Manometer Type: 1" Oil Code No.: item # 10 Cal. Exp. Date: 06/2007

Temp. Probe Type: Hot Wire Code No.: item # 103 Cal. Exp. Date: 01/2007

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	0.390	0.624	69.0	0.490	0.700	69.0
2	7.9	0.480	0.693	69.0	0.540	0.735	69.0
3	14.0	0.500	0.707	69.0	0.560	0.748	69.0
4	21.7	0.500	0.707	69.0	0.550	0.742	69.0
5	32.8	0.480	0.693	69.0	0.520	0.721	69.0
6	63.2	0.480	0.693	69.0	0.500	0.707	69.0
7	74.3	0.520	0.721	69.0	0.530	0.728	69.0
8	82.0	0.520	0.721	69.0	0.520	0.721	69.0
9	88.1	0.500	0.707	69.0	0.500	0.707	69.0
10	93.5	0.450	0.671	69.0	0.430	0.656	69.0
Static Pressure	0.000	Ave. $\sqrt{V_{pt}}$=	0.694		Ave. $\sqrt{V_{pt}}$=	0.716	
Barometric Pressure	29.25	T_R=Ave. T_s + 460=		529	T_R=Ave. T_s + 460=		529
Calculated Absolute Pressure =	29.25	$V_{port}A$=	2.780	ft/min	$V_{port}A$=	2.870	ft/min
Duct Area:	50.3 sq ft	Volumetric Flow Rate (Q)= ([$V_{port}A$+$V_{port}B$]/2)*A_s=				142.100 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.$\sqrt{Vpt}$)*$\sqrt{(TR/Pabs)}$
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: 0.52 after back-purge: 0.52

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: Robert D. Blanlock Date: 11-21-06

Verified by: Loretta Shockey Date: 11-21-06

Effluent Management: Betty D. Anderson Date: 12/18/06