

APPENDIX B

FIELD SURVEY FORMS

INSTRUMENT OPERATIONAL CHECK OUT

SITE # _____

INSTRUMENT TYPE	_____	INSTRUMENT #	_____
DETECTOR TYPE	_____	DETECTOR #	_____
VOLTAGE	_____	INSTRUMENT EFFICIENCY	_____
		THRESHOLD	_____

Check Out Date/Time	Background (c/___m)	*Source Type: ID #: (c/___m)	**Source Type: ID #: (c/___m)	Checked Out By:	Comments (see reverse)
					ORAU Data
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					

Calibration Background Response: 2 σ limits _____ to _____ c/m, 3 σ limits _____ to _____ c/m

Site Redetermination: 2 σ limits _____ to _____ c/m, 3 σ limits _____ to _____ c/m

Site/Area Specific Background Response: See back of form

* Source Response Limits _____ to _____ c/m

**Source Response Limits _____ to _____ c/m Pre-survey Data Reviewed _____

Date _____

Post-survey Date Reviewed _____

Date _____

Figure B-1 (Front)

ELECTRONIC CALIBRATION RECORD

SITE _____

INSTRUMENT TYPE _____

INSTRUMENT NUMBER _____

PULSER TYPE/NUMBER _____

PULSER VOLTAGE	INSTRUMENT VOLTAGE

INSTRUMENT SCALE	PULSER SCALE	INITIAL INSTRUMENT READING (c/m)	ADJUSTED INSTRUMENT RESPONSE (c/m)
X1000 (1K)	400,000		
X100	40,000		
X10	4,000		
X1	400		
X1000	200,000		
X100	20,000		
X10	2,000		
X1	200		

REMARKS: _____

CALIBRATED BY: _____ DATE: _____

Data Reviewed _____

Date _____

CROSS CALIBRATION FORM

SITE: _____ PIC NUMBER: _____ SURVEYORS: _____

CALIBRATION POINT					
DATE					
PIC READINGS μR/hr					
MEAN: PIC					
OBSERVED READINGS IN K COUNTS/MINUTE					
METER NO. / DETECTOR NO.					
/					
/					
/					
/					
/					
/					
/					
MEAN: METER					
REMARKS: _____ _____			DATA REVIEWED _____ _____ DATE _____ _____		CALCULATIONS REVIEWED _____ DATE _____

Figure B-3

CALIBRATION DATA ALPHA/BETA

SITE _____

INSTRUMENT TYPE _____ INSTRUMENT NUMBER _____ CAL DUE DATE _____
 DETECTOR TYPE _____ DETECTOR NUMBER _____ (only required for 43-68 detectors)
 PURGE CHECK: 1ST COUNT _____ TIME _____
 (check source) 2ND COUNT _____ TIME _____

CALIBRATION SOURCE RADIONUCLIDE	SOURCE ID NUMBER	ALPHA CAL. SOURCE 2π EMISSION RATE (cpm) (q _{2π,sc})	GROSS INSTRUMENT COUNT RATE (cpm)	NET INSTRUMENT COUNT RATE (cpm)	ALPHA INSTRUMENT EFFICIENCY (ε _i)	CROSS TALK*

TOTAL ALPHA EFFICIENCY (ε_T)

CALIBRATION SOURCE RADIONUCLIDE	SOURCE ID NUMBER	BETA CAL. SOURCE 2π EMISSION RATE (cpm)* (q _{2π,sc})	GROSS INSTRUMENT COUNT RATE (cpm) (R _{s+b})	NET INSTRUMENT COUNT RATE (cpm)	BETA INSTRUMENT EFFICIENCY (ε _i)	CROSS TALK*

- Decay correction needs to be calculated for the following radionuclides: Sr/Y-90, Tl-204, and Ru-106.
- [Y:\ESSAP\ESSAP Tech\ESSAPTEC\CALIBRATION INFO\FIELD CALCS\Source Decay 2001-03.xls](#)

TOTAL BETA EFFICIENCY (ε_T)

* SEE REVERSE

ALPHA HIGH VOLTAGE _____ THRESHOLD _____ WINDOW _____
 BETA HIGH VOLTAGE _____ THRESHOLD _____ WINDOW _____
 POSITION OF CHECK SOURCE RELATIVE TO DETECTOR _____

$$\epsilon_i = \frac{R_{s+b} - R_B}{q_{2\pi,sc}}$$

	AVERAGE BACKGROUND			CHECK SOURCE RANGE	
	Counts	Time (m)	R _B (cpm)	Range of Counts (AVE ± 3σ/5%)	Time (m)
ALPHA					
BETA					

IMPORTANT: ALL OF THE ABOVE INFORMATION MUST BE PROVIDED

DATE : _____ CALIBRATED BY: _____

DATA REVIEWED _____

DATE _____

Figure B-4 (Front)

<p style="text-align: center;">CONTROL CHART CHECKOUT</p> <p>α _____ β _____</p> <p>LOCATION _____</p> <p>BKG. AVE (c/m) _____</p> <p>2σ LIMITS _____ TO _____</p> <p>3σ LIMITS _____ TO _____</p> <table border="1" style="width:100%; border-collapse: collapse; margin-bottom: 5px;"> <tr><td style="text-align: center;">c/___m</td></tr> <tr><td>1.</td></tr> </table> <p>WITHIN 2σ LIMITS <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>WITHIN 3σ LIMITS <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <table border="1" style="width:100%; border-collapse: collapse; margin-bottom: 5px;"> <tr><td>2.</td></tr> <tr><td>3.</td></tr> <tr><td>4.</td></tr> </table> <p>CRITERIA MET <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>MDC _____ dpm/100cm²</p> <p>PERFORMED BY: _____</p> <p>DATE: _____</p>	c/___m	1.	2.	3.	4.	<p style="text-align: center;">CONTROL CHART CHECKOUT</p> <p>α _____ β _____</p> <p>LOCATION _____</p> <p>BKG. AVE (c/m) _____</p> <p>2σ LIMITS _____ TO _____</p> <p>3σ LIMITS _____ TO _____</p> <table border="1" style="width:100%; border-collapse: collapse; margin-bottom: 5px;"> <tr><td style="text-align: center;">c/___m</td></tr> <tr><td>1.</td></tr> </table> <p>WITHIN 2σ LIMITS <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>WITHIN 3σ LIMITS <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <table border="1" style="width:100%; border-collapse: collapse; margin-bottom: 5px;"> <tr><td>2.</td></tr> <tr><td>3.</td></tr> <tr><td>4.</td></tr> </table> <p>CRITERIA MET <input type="checkbox"/> YES <input type="checkbox"/> NO</p> <p>MDC _____ dpm/100cm²</p> <p>PERFORMED BY: _____</p> <p>DATE: _____</p>	c/___m	1.	2.	3.	4.	<p style="text-align: center;">CHECK SOURCE REPRODUCIBILITY</p> <p>RADIONUCLIDE _____ RADIONUCLIDE _____</p> <p>SOURCE ID# _____ SOURCE ID# _____</p> <table style="width:100%;"> <tr> <td style="width:50%; text-align: center; vertical-align: top;"> <p>CHECK SOURCE REPRODUCIBILITY TEST (c/___m)</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td></tr> </table> </td> <td style="width:50%; text-align: center; vertical-align: top;"> <p>CHECK SOURCE REPRODUCIBILITY TEST (c/___m)</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td></tr> </table> </td> </tr> <tr> <td style="text-align: center;">AVE = _____</td> <td style="text-align: center;">AVE = _____</td> </tr> <tr> <td style="text-align: center;">3σ = _____ 5% = _____</td> <td style="text-align: center;">3σ = _____ 5% = _____</td> </tr> </table>	<p>CHECK SOURCE REPRODUCIBILITY TEST (c/___m)</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td></tr> </table>												<p>CHECK SOURCE REPRODUCIBILITY TEST (c/___m)</p> <table border="1" style="width:100%; border-collapse: collapse;"> <tr><td> </td></tr> </table>												AVE = _____	AVE = _____	3σ = _____ 5% = _____	3σ = _____ 5% = _____
c/___m																																								
1.																																								
2.																																								
3.																																								
4.																																								
c/___m																																								
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2.																																								
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AVE = _____	AVE = _____																																							
3σ = _____ 5% = _____	3σ = _____ 5% = _____																																							

SITE CRITERIA: α _____ dpm/100 cm²

SITE CRITERIA: β _____ dpm/100 cm²

$$* \text{CROSS TALK} = \frac{\text{NET } (\alpha \text{ or } \beta) \text{ CPM}}{\text{NET } \alpha + \beta} = \%$$

COMMENTS:

Figure B-4 (Back)

PIC/BICRON MICRO-REM METER FIELD CHECK-OUT FORM

INSTRUMENT # _____ SITE _____

Checkout Date	Background (μR/hr) or (μrem/hr)	Source Check # _____		PIC Battery Check	Performed by:	Comments (see reverse)
		Gross μR/hr	Net μR/hr*	% Charge**		
						ORAU DATA
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

* Response limits _____ to _____ μR/hr (NET).

** Response must be > 85% for the 300V PIC battery.

Figure B-6

TAPE CALIBRATION FORM

TAPE IDENTIFIER NUMBER _____

FULL TAPE LENGTH _____

LENGTH OR SECTION TO BE CALIBRATED _____

RECALIBRATION _____ OR NEW TAPE? _____

% OF LENGTH	TAPE POSITION (m or ft)	STANDARD POSITION (m or ft)	DIFFERENCE (m or ft)	% DIFFERENCE *
0				
1%				
5%				
10%				
25%				
50%				
75%				
100%				
OTHER				

*MUST BE LESS THAN 1.0% FOR ACCEPTANCE

REMARKS _____

CALIBRATED BY _____ DATE _____

REVIEWED BY _____ DATE _____

ROTAMETER CALIBRATION

SITE: _____

ROTAMETER NO.: _____

TEMPERATURE: _____

PRESSURE: _____

FULL SCALE ON ROTAMETER: _____

PERCENT OF FULL SCALE	ROTAMETER SETTING cfh or Lpm	TIME ____ft ³ or ____L*	PRESSURE DIFFERENTIAL inches H ₂ O	AVERAGE TIME	ACTUAL cfh or Lpm

* For rotameters with full scale values of 20, 50, and 100 cfh, use a total volume of 0.5, 1.0, and 2.0, respectively.

To Calculate Actual Flow Rate

$$\frac{\text{Total Volume (ft}^3 \text{ or L)}}{\text{Average Time (minutes or hours)}} = \text{Actual Time cfh or Lpm}$$

$$\text{Note: } \frac{\text{Lpm} \times 60}{28.3} = \text{cfh}$$

Calibrated By _____ Date _____

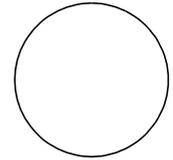
AREA SCAN AND RADIATION LEVEL SURVEY

SITE _____ INSTRUMENT _____
 DATE/TIME _____ DETECTOR _____
 SURVEYOR(S) _____

 GRID POINT

 GRID POINT

SCALE:
 1/2" = _____



REFERENCE
 DIRECTION

 GRID POINT

 GRID POINT

AVERAGE OR RANGE OF LEVELS: _____

ELEVATED READING			ELEVATED READING		
GRID LOCATION	cpm	?R/hr	GRID LOCATION	cpm	?R/hr

REMARKS: _____

CALCULATIONS BY: _____ . REVIEWED BY: _____

DATE: _____

DATE: _____

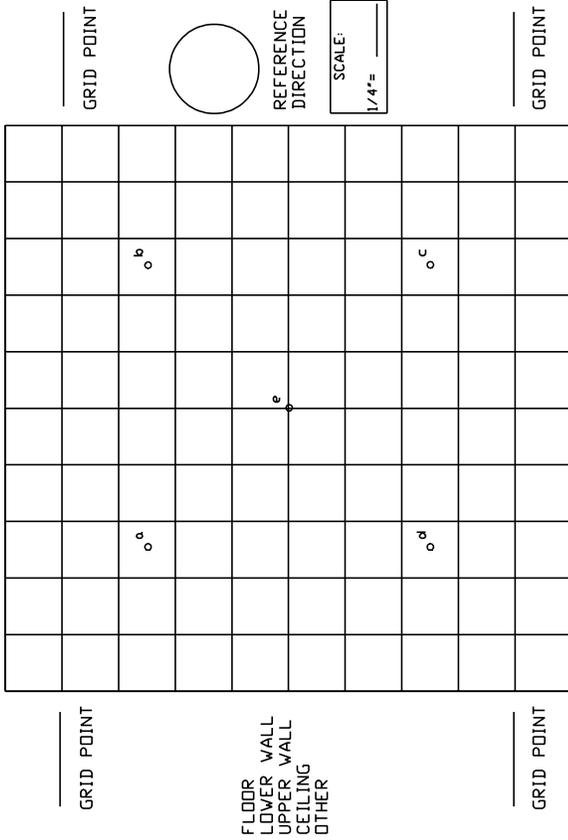
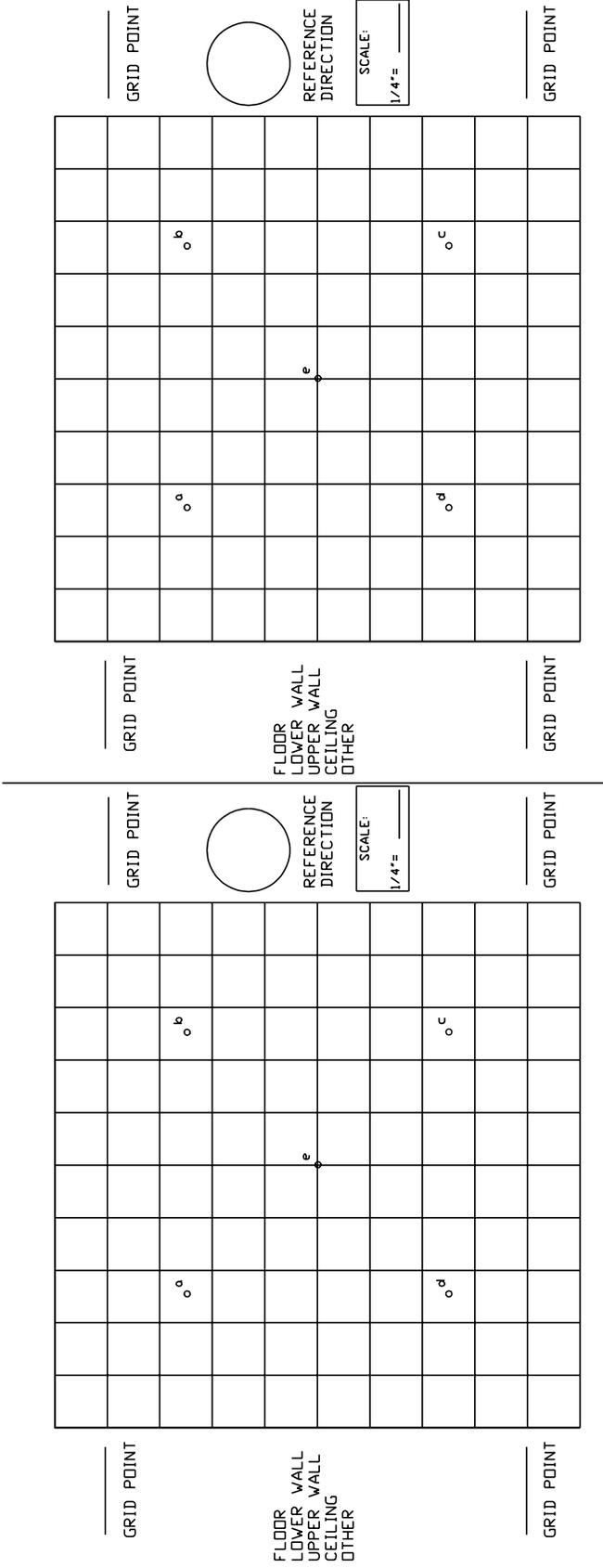


FIGURE B-12

EXPOSURE RATE MEASUREMENTS AND SOIL SAMPLES

SURVEYOR(S) _____
 SITE _____
 AREA _____
 DATE _____
 START TIME _____ END TIME _____

PIC/micro-rem meter			
TYPE	INSTRUMENT	DETECTOR	BACK-GROUND

SOIL SAMPLE									
LOCATION		LOCATION		LOCATION		LOCATION		LOCATION	
SCINTILLATION Kcpm		SCINTILLATION Kcpm		SCINTILLATION Kcpm		SCINTILLATION Kcpm		SCINTILLATION Kcpm	
1 METER	CONTACT								
READINGS μ R/hr		READINGS μ R/hr		READINGS μ R/hr		READINGS μ R/hr		READINGS μ R/hr	
MEAN:		MEAN:		MEAN:		MEAN:		MEAN:	

REMARKS: _____ DATE REVIEWED _____ CALCULATIONS REVIEWED _____
 _____ DATE _____ DATE _____

Figure B-15

ORISE
P.O. BOX 117
OAK RIDGE, TN 37830

CHAIN-OF-CUSTODY
RECORD

EMERGENCY CONTACTS
Survey Projects Manager (865) 241-8893
Laboratory Manager (865) 241-3242
FTD-TSS (865) 241-5947

Sampler (s) _____

Project/Task Name _____

SAMPLE NUMBER	SAMPLE MATRIX	SAMPLE INFORMATION	COLLECTED		REMARKS
			DATE	TIME	

Relinquished By	Received By	Date	Time	Received in Good Condition?	
1. Sampler:				Yes <input type="checkbox"/>	No <input type="checkbox"/>
2.				Yes <input type="checkbox"/>	No <input type="checkbox"/>
3.				Yes <input type="checkbox"/>	No <input type="checkbox"/>
4.				Yes <input type="checkbox"/>	No <input type="checkbox"/>

Shipping Instructions: Include yellow copy of form in shipping container.
If shipping samples, enter carrier name in "Received By" space.

Receiving Instructions: If receiving samples from a carrier, enter the carrier name in "Relinquished By" space.
If integrity of samples and/or sample packaging is in question, enter a description of the condition below:

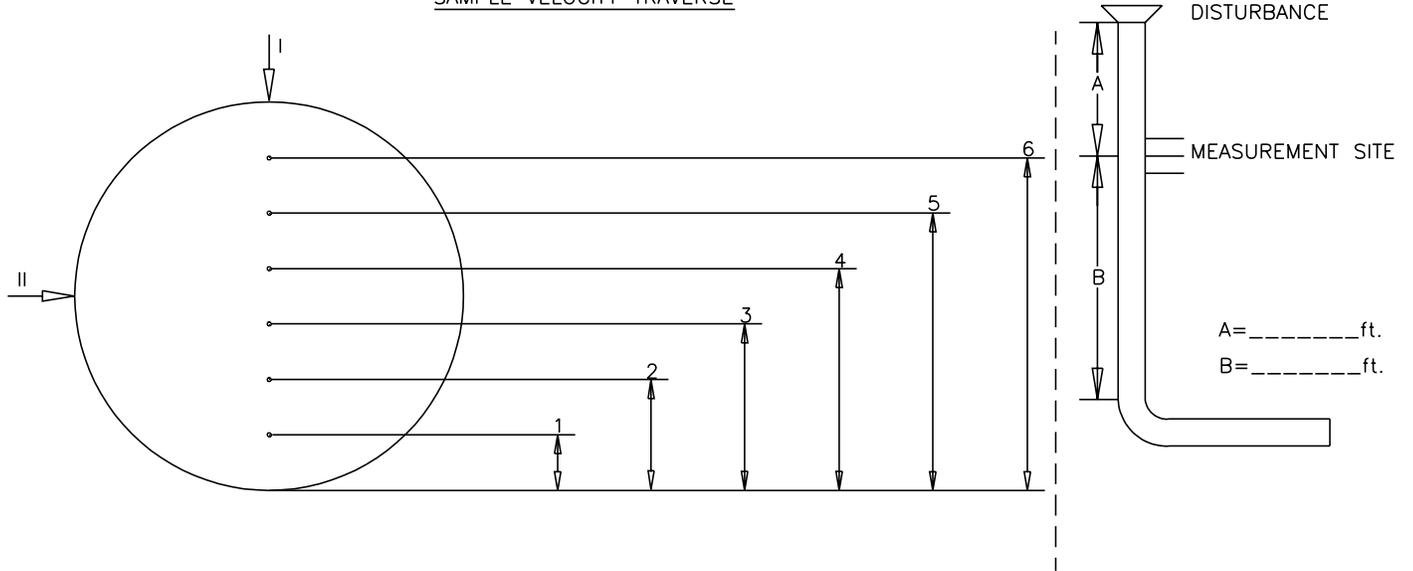
Comments:

FIGURE B-16

STACK VELOCITY WORKSHEET

SITE _____ DATE _____
 PERSONNEL _____
 STACK NAME OR DESCRIPTION _____
 STACK DIAMETER _____ INCHES _____

SAMPLE VELOCITY TRAVERSE

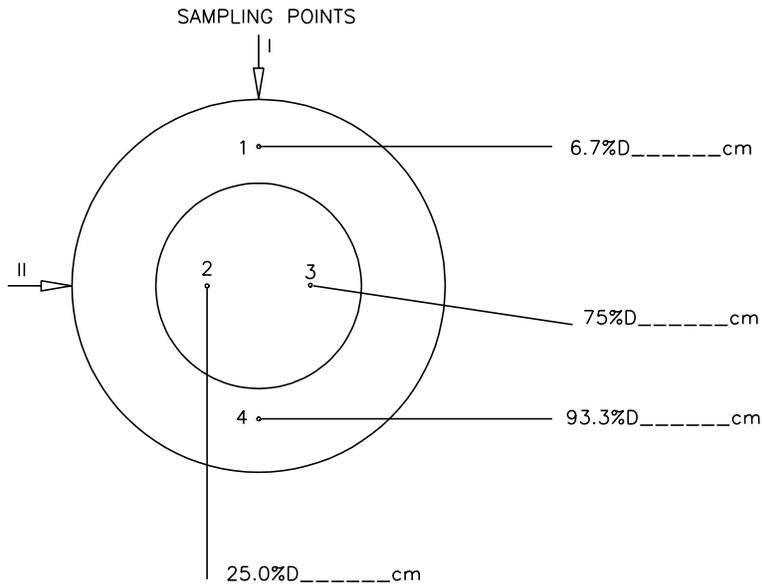


LOOKING DOWN ONTO STACK OR DUCT

8 POINTS (<61 CM/24 IN. DIAMETER)				
POINT	% DISTANCE FROM WALL	DISTANCE (in.) FROM WALL	PORT I VELOCITY (ft/m)	PORT II VELOCITY (ft/m)
1	0.032			
2	0.105			
3	0.194			
4	0.323			
5	0.677			
6	0.806			
7	0.895			
8	0.968			
12 POINTS (>61 CM/24 IN. DIAMETER)				
1	0.021			
2	0.067			
3	0.118			
4	0.177			
5	0.250			
6	0.356			
7	0.644			
8	0.750			
9	0.823			
10	0.882			
11	0.933			
12	0.979			

STACK NAME _____

STACK SAMPLING RATE WORKSHEET



SAMPLING RATES				
SAMPLING POINT	VELOCITY (ft/m) (V)	NOZZLE DIAMETER (in.)	NOZZLE NUMBER	SAMPLING RATE (L/min)
1				
2				
3				
4				

Calculation of nozzle size and actual sampling rate:

Velocity Required (V) _____ = _____ ft/m

Approximate Sampling Rate Desired (Q_T) = _____ L/min

Required Nozzle Diameter _____ = $\sqrt{\frac{6.47 Q_T \text{ inches}}{V}}$

Selected Nozzle Size Number _____ and Diameter (D) _____ in.

Actual Sampling Rate = $0.1545 VD^2$ _____ = _____ L/min

NOZZLE IN INCHES VS. NOZZLE NUMBER					
SIZE (D) (in.)	NUMBER	SIZE	NUMBER	SIZE	NUMBER
.125	4				
.150	5	.2813	9		
.1825	6	.3125	10	.375	12
.250	8			.4063	13
				.500	16

REMARKS _____

STACK SAMPLING RECORD

SITE _____

STACK NAME _____

DATE(S) _____

SURVEYOR(S) _____

SAMPLING POINT AND PROBE DISTANCE	START			PERIODIC FLOW RATE CHARTS						FINISH			REMARKS
	DATE	TIME	CFH	DATE	TIME	CFH	DATE	TIME	CFH	DATE	TIME	CFH	

REMARKS: _____

DATE REVIEWED _____ CALCULATIONS REVIEWED _____
 DATE _____ DATE _____

PIC/BICRON MICRO-REM METER TRACKING FORM

INSTRUMENT # _____

	Checkout Date	Background ($\mu\text{R/hr}$)	Source Check # -----		Pic Battery Check	Performed By	Comments (see reverse)
			Gross	Net $\mu\text{R/hr}^*$	% Charge**		
							Initial Operational
1							
2							
3							
4							
5							
6							
7							
8							
9							
10							
11							
12							
13							
14							

* Response limits _____ to _____ $\mu\text{R/hr}$ (NET)

** Response must be >85% for the 300V battery.

NOTE: This form is kept in the ESSAP instrument room files.

Figure B-24

PIPE MONITOR OPERATIONAL CHECK OUT

SITE # _____

INSTRUMENT TYPE	_____	INSTRUMENT #S	_____
DETECTOR TYPE	_____	DETECTOR #S	_____
VOLTAGE	_____	TOTAL EFFICIENCIES	_____
		ARRAY TOTAL EFFICIENCIES	_____
		THRESHOLD	_____

Check Out Date/Time	Backgrounds (c/___m)	Source Type: ID #:	(c/___m)		Checked Out By:	Comments (see reverse)
		Detector #	Detector #	Detector #		
						ORAU Data
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						

Calibration Background Response: 2 σ limits _____ to _____ c/m, 3 σ limits _____ to _____ c/m

Site Redetermination: 2 σ limits _____ to _____ c/m, 3 σ limits _____ to _____ c/m

Site/Area Specific Background Response: See back of form

Source Response Limits Detector # _____ _____ to _____ c/m

Source Response Limits Detector # _____ _____ to _____ c/m Pre-survey Data Reviewed _____

Source Response Limits Detector # _____ _____ to _____ c/m Date _____

Source Response Limits Detector # _____ _____ to _____ c/m Post-survey Data Reviewed _____

Source Response Limits Detector # _____ _____ to _____ c/m Date _____

Figure B-26 (Front)

SITE BACKGROUND DETERMINATION

Location _____

Location _____

Location _____

c/___m

c/___m

c/___m

AVE _____

AVE _____

AVE _____

2σ _____

2σ _____

2σ _____

Range _____ to _____

Range _____ to _____

Range _____ to _____

3σ _____

3σ _____

3σ _____

Range _____ to _____

Range _____ to _____

Range _____ to _____

MDC _____ dpm/100cm²

MDC _____ dpm/100cm²

MDC _____ dpm/100cm²

Performed By: _____

Performed By: _____

Performed By: _____

Date: _____

Date: _____

Date: _____

COMMENTS: