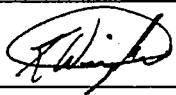
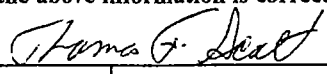




CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

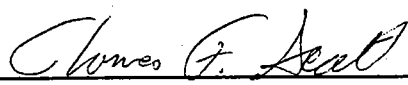
CUSTOMER INFORMATION		INSTRUMENT INFORMATION		
Customer Name: Enercon Services		Manufacturer: Ludlum		
Address: 1415 William Penn Hwy Murrys ville, PA 15668		Model: 19	Serial Number: 95469	
Contact Name: Gerry Williams		Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: PV102	Work Order Number: 2002-01195	Calibration Method: Electronic And Source		
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (Micro R/Hr)	Calibration Standard Value (μ R/Hr)	Instrument Response		Comments
		Before Calibration	After Calibration	
5000	4000 (Source/Pulse Cal)	2200 (>5000)	3950 (3800)	Pulser: 112860 Cal Due: 12/05/02
5000	2500(Source/Pulse Cal)	1400 (3200)	2500 (2400)	D-814: 2525 Cal Due: 02/18/03
5000	1000(Source/Pulse Cal)	600 (1400)	1050 (1000)	DVM: TW12662 Cal Due: 01/03/03
500	400 (Source/Pulse Cal)	210 (390)	395 (440)	Psychron: 7480 Cal Due: 05/17/03
500	250 (Source/Pulse Cal)	140 (260)	250 (270)	Temp: 23.5°C Humidity: 56%
500	100 (Source/Pulse Cal)	70 (140)	110 (105)	Pressure: 743mmHg
250	200 (Source/Pulse Cal)	110 (>250)	180 (190)	Calibrated IAW with RP-INS-I-231, Rev. 0.
250	100 (Source/Pulse Cal)	60 (130)	100 (95)	Geotropism: SAT Over Range: SAT
250	50 (Source/Pulse Cal)	35 (70)	55 (45)	Batteries: SAT Audio: SAT
50	40 (Pulse Calibrated)	(>50)	(39)	F/S Response: SAT Light: SAT
50	25 (Pulse Calibrated)	(32)	(25)	
50	10 (Pulse Calibrated)	(14)	(11)	Source: Cs-137 049711 Cert. Date: 3-27-02
25	20 (Pulse Calibrated)	(>25)	(19.5)	High Voltage As Found -610V As Left -800V (##) - Pulse Calibration Data
25	12 (Pulse Calibrated)	(16)	(12)	
25	5 (Pulse Calibrated)	(7)	(5.5)	cpm/ μ R/hr: As Found - 201 As Left - 192.3
Zero	0	2	0	Special Remarks: cpm/ μ R/hr = 192.3
STATEMENT OF CERTIFICATION				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument		I certify that the above information is correct:		
Calibrated By: 		Reviewed By: 		Date: 10-10-02
Calibration Date: 10/10/02			Calibration Due: 4/10/03	

LUDLUM 19 HIGH VOLTAGE PLATEAU DATA SHEET

Performed By: 

Date: October 10, 2002 Serial Number: 95469

High Voltage	$\mu\text{R/hr}$
550	200
600	700
650	1100
700	1300
750	1500
800 (Set)	1600
850	1700
900	2000
950	4200

Reviewed By: 

Date: 10-10-02



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CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			INSTRUMENT INFORMATION		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Rd Kingston, TN 37763			Model: 19	Serial Number: 95516	
Contact Name: Thomas F. Scott			Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: N/A		Work Order Number: 2002-00570	Calibration Method: Electronic And Source		
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range (Micro R/Hr)	Calibration Standard Value	Instrument Response		Comments	
		Before Calibration	After Calibration		
5000	4000 μ R/Hr	3,800	3,800	Pulser: 120935	Cal Due: 03/18/03
5000	2500 μ R/Hr	2,500	2,500	D-814: 2551	Cal Due: 09/12/02
5000	1000 μ R/Hr	1,050	1,050	Psychron: 5546	Cal Due: 06/12/02
500	400 (Pulse Calibrated)	400	400	Temp: 23.8°C	Humidity: 55%
500	250 (Pulse Calibrated)	250	250	Pressure: 741mmHg	
500	100 (Pulse Calibrated)	100	100		
250	200 (Pulse Calibrated)	200	200		
250	120 (Pulse Calibrated)	120	120	Geotropism: SAT	Over Range: SAT
250	50 (Pulse Calibrated)	50	50	Batteries: SAT	Mech. Zero: SAT
50	40 (Pulse Calibrated)	40	40	F/S Response: SAT	Audio: SAT
50	25 (Pulse Calibrated)	25	25	Light: SAT	
50	10 (Pulse Calibrated)	10	10	Source: Cs-137 049711	Cert. Date: 03/08/01
25	20 (Pulse Calibrated)	20	20	High Voltage As Found -900V As Left -900V	
25	12 (Pulse Calibrated)	12	12		
25	5 (Pulse Calibrated)	5	5	cpm/ μ R/hr: As Found -194 As Left -194	
Calibrated in accordance with RP-INS-I-231				Special Remarks: cpm/ μ R/hr = 194 HV = 860Volts	
STATEMENT OF CERTIFICATION					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument		I certify that the above information is correct:			
Calibrated By: <i>Anthony King</i>		Reviewed By: <i>Thomas F. Scott</i>		Date: 5-10-02	
Calibration Date: 05/09/02			Calibration Due: 11/09/02		



#2 OLD

**DETECTOR
CERTIFICATE**

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-5	
Contact Name: Thomas Scott				Serial Number: 082642	
Customer Purchase Order Number: N/A		Work Order Number: 2002-00569		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
Source Nuclide	Serial Number: 119709		Activity: 2,442 dpm		Certification Date: 10/14/97
Source Nuclide	Serial Number: 119739		Activity: 18,600 dpm		Certification Date: 10/20/97
Source# 119709	As Found	As Left	Linearity Test		CPM
Gross CPM	N/A	261	Count 1 (Heel)		1,985
Background CPM	N/A	0	Count 2 (Center)		1,918
Net CPM	N/A	261	Count 3 (Toe)		1,998
Efficiency	N/A	10.7%	Average		1,967
Source# 119739	As Found	As Left	Tolerance $\pm 10\%$		PASS
Gross CPM	N/A	1,967	High Voltage		700V
Background CPM	N/A	0			
Net CPM	N/A	1,967			
Efficiency	N/A	10.6%			
Scaler Information			Detector Information		
Model	Serial Number	Due Date	Background	Operating Voltage	Threshold/Input Sens.
2350-1	168558	11/01/02	0 cpm	700V	10mV
Attachments			Comments		
Voltage Plateau: YES ☒ NO			Cable Length: 5ft.		
Dead Time and Cal Constant					
Low Sample Activity Source #		N/A	Dead Time (DT)		N/A
High Sample Activity Source #		N/A	Cal. Constant (CC)		N/A
Statement of Certification					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector		I certify that the above information is correct:			
Certified By: Mike Pauli		Reviewed By: Thomas F. Scott		Date: 5-10-02	
Certification Date: 05/09/02				Certification Due: 11/09/02	

LUDLUM MODEL 43-5 HIGH VOLTAGE PLATEAU DATA SHEET

Performed By: M. Pauli Date: 5/09/02 Serial Number: 082642

HIGH VOLTAGE	BACKGROUND	SOURCE
400	3	0
450	0	0
500	0	631
550	2	1,617
600	0	1,994
650	0	2,152
700 (SET)	2	2,136
750	1	2,164
800	4	2,155
850	15	2,218
900	270	2,531
950	N/A	N/A
1000	N/A	N/A
1050	N/A	N/A
1100	N/A	N/A
1150	N/A	N/A
1200	N/A	N/A
1250	N/A	N/A
1300	N/A	N/A
1350	N/A	N/A
1400	N/A	N/A
1450	N/A	N/A
1500	N/A	N/A

Reviewed By: _____

Date: _____



Duratek Instrument Services
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DETECTOR CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-5	
Contact Name: Thomas Scott				Serial Number: 117588	
Customer Purchase Order Number: N/A		Work Order Number: 2002-01269		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
Source Nuclide	Serial Number: 119709		Activity: 2,442 dpm	Certification Date: 10/14/97	
Source Nuclide	Serial Number: 119706		Activity: 21,240 dpm	Certification Date: 10/14/97	
Source# 119709	As Found	As Left	Linearity Test		CPM
Gross CPM	N/A	2,442	Count 1 (Heel)		2,560
Background CPM	N/A	4.2	Count 2 (Center)		2,468
Net CPM	N/A	2,438	Count 3 (Toe)		2,305
Efficiency	N/A	11.5%	Average		2,444
Source# 119706	As Found	As Left	Tolerance $\pm 10\%$		PASS
Gross CPM	N/A	329.8	High Voltage		650V
Background CPM	N/A	4.2			
Net CPM	N/A	325.6			
Efficiency	N/A	13.3%			
Scaler Information			Detector Information		
Model	Serial Number	Due Date	Background	Operating Voltage	Threshold/Input Sens.
2221	97830	04/29/03	4.2 cpm	650	10mV
Attachments			Comments		
Voltage Plateau: YES ☒ NO			Cable Length: 5ft.		
Dead Time and Cal Constant					
Low Sample Activity Source #		N/A	Dead Time (DT)		N/A
High Sample Activity Source #		N/A	Cal. Constant (CC)		N/A
Statement of Certification					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector					
Certified By: <i>M. Pauli</i>		Reviewed By: <i>Thomas G. Scott</i>		Date: 10-29-02	
Certification Date: 10/29/02				Certification Due: 04/29/03	

BACKGROUND PLATEAU 43-5#117588 5FT CABLE 10/29/02

400	1
450	0
500	0
550	0
600	3
650	5
700	11
750	54
800	183
850	1017
900	12303

ALPHA PLATEAU TH-230#119706 21,240DPM

400	1
450	145
500	1455
550	2049
600	2284
650	2305
700	2365
750	2823
800	5547
850	15031
900	48704



CALIBRATION CERTIFICATE

Page 1 of 2

Duratek Instrument Services
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This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services		Manufacturer: Ludlum	
Address: 628 Gallaher Road , Kingston TN 37763		Model: 2221	Serial Number: 97830
Contact Name: Tom Scott		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2002-01269	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Ratemeter Response		Scaler Response	
		As Found	As Left	As Found	As Left
X 1	100	100	100	100	100
X 1	250	250	250	251	251
X 1	400	400	400	402	402
X 10	1,000	1,000	1,000	999	999
X 10	2,500	2,500	2,500	2,507	2,507
X 10	4,000	4,000	4,000	4,020	4,020
X 100	10,000	10,000	10,000	9,991	9,991
X 100	25,000	25,000	25,000	25,068	25,068
X 100	40,000	40,000	40,000	40,178	40,178
X 1000	100,000	100,000	100,000	99,887	99,887
X 1000	250,000	250,000	250,000	250,720	250,720
X 1000	400,000	400,000	400,000	401,511	401,511

STATEMENT OF CERTIFICATION	
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).	
Instrument	
Calibrated By: <i>Nike Paul</i>	Reviewed By: _____ Date: _____
Calibration Date: 10/29/02	Calibration Due: 04/29/03

Model: 2221Serial Number: 97830

M&TE					Environmental Conditions		
Volt Meter	Due Date:	09/11/03	ID	101500	Barometer	Due Date: 02/18/03	ID: 2525
Pulser	Due Date:	09/11/03	ID	101500	Thermometer	Due Date: 02/18/03	ID: 2525
Timer	Due Date:	01/10/03	ID	02010806	Temp: 24.2°C	Pressure: 735mmHg	Humidity: 60%
INSTRUMENT CALIBRATION INFORMATION							
Special Test							
Geotropism		Sat (✓) Unsat ()		Hold		Sat (✓) Unsat ()	
BAT > 4.5		Sat (✓) Unsat ()		Volume Test		Sat (✓) Unsat ()	
Mechanical Zero		Sat (✓) Unsat ()		Audio Divide		Sat (✓) Unsat ()	
Digital Zero		Sat (✓) Unsat ()		Window Switch		Sat (✓) Unsat ()	
Count		Sat (✓) Unsat ()		Lamp		Sat (✓) Unsat ()	
High Voltage Calibration				Timer Calibration			
Voltage	Tolerance	As Found	As Left	Time (sec.)	Tolerance	As Found	As Left
400	390-410	406	406	300	290-310	300	300
1,000	990-1,010	1,006	1,006				
1,500	1,490-1,510	1,501	1,501				
1,900	1,890-1,910	1,898	1,898				
Threshold/Gain Calibration (Desired Ratio <u>10</u> mV/100)							
Input	As Found Value		As Found Ratio (mV/100)		As Left Value		As Left Ratio (mV/100)
10	97		10.3		97		10.3
20	189		10.6		189		10.6
30	291		10.3		291		10.3
40	392		10.2		392		10.2
Logmeter Scale Linearity Check							
Input	±20% Tolerance		As Found		As Left		
LOG	400		320-480		400		
LOG	4,000		3,200-4,800		4,000		
LOG	40,000		32,000-48,000		40,000		
LOG	400,000		320,000-480,000		350,000		
COMMENTS							
Caled in accordance with RP-INS-I-243.							
Instrument							
Calibrated By: <u>Nike Paul</u>				Reviewed By: <u>Clonius F. Scott</u>		Date: <u>10-29-02</u>	
Calibration Date: 10/29/02				Calibration Due: 04/29/03			



Duratek Instrument Services
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DETECTOR CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-5	
Contact Name: Thomas Scott				Serial Number: 172236	
Customer Purchase Order Number: N/A		Work Order Number: 2002-01244		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
Source Nuclide	Serial Number: 119709		Activity: 2,442 dpm	Certification Date: 10/14/97	
Source Nuclide	Serial Number: 119738		Activity: 18,600 dpm	Certification Date: 10/20/97	
Source# 099612	As Found	As Left	Linearity Test		CPM
Gross CPM	N/A	2,279	Count 1 (Heel)		2,225
Background CPM	N/A	4	Count 2 (Center)		2,285
Net CPM	N/A	2,275	Count 3 (Toe)		2,327
Efficiency	N/A	12.2%	Average		2,279
Source# 119709	As Found	As Left	All Counts $\pm 10\%$ of Average		PASS
Gross CPM	N/A	336	High Voltage		600V
Background CPM	N/A	4			
Net CPM	N/A	332			
Efficiency	N/A	13.6%			
Scaler Information			Detector Information		
Model	Serial Number	Due Date	Background	Operating Voltage	Threshold/Input Sens.
2221	86330	05/14/03	4cpm	600V	10mV (100 on Display)
Attachments			Comments		
Voltage Plateau: YES ☒ NO			Cable Length: 5ft.		
Dead Time and Cal Constant					
Low Sample Activity Source #		N/A	Dead Time (DT)		N/A
High Sample Activity Source #		N/A	Cal. Constant (CC)		N/A
Statement of Certification					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector		I certify that the above information is correct:			
Certified By: <i>Thomas Scott</i>		Reviewed By: <i>Thomas F. Scott</i>		Date: 10-23-02	
Certification Date: 10/23/02				Certification Due: 04/23/03	

BACKGROUND PLATEAU 43-5 S/N 172236 10/22/02

400	0
450	0
500	0
550	0
600	1
650	1
700	3
750	14
800	27
850	106
900	246

SOURCE PLATEAU Th230 #119709 2,442DPM

400	1
450	748
500	1959
550	2360
600	2384
650	2560
700	2348
750	2460
800	2840
850	5062
900	12230



GRIFFIN INSTRUMENTS



CALIBRATION CERTIFICATE FOR

2221

SERIAL#

86330

SECTION 1

GENERAL INFORMATION

DATE: 05/14/02

LOCATION:

Griffin Inst

TECH: J. Glenn

DATE LAST CAL EXPIRES:

Reason For Calibration:

☐ Due For Calibration☐ Repair (See Remarks)☒ Other (See Remarks)☐ Due and Repair (See Remarks)

EQUIPMENT USED DURING CALIBRATION

MODEL: M-500

SERIAL #: 114512

CAL. DUE: 08/17/02

MODEL:

SERIAL #:

CAL DUE:

SECTION 2

AS FOUND DATA

CONDITION:

Sat

AF MECHANICAL ZERO:

0

AL MECHANICAL ZERO:

0

NEW BATTERIES:

☐

Yes

☒

No

BATTERY CHECK:

6.2

HV

AS FOUND HV

AS LEFT HV

600 V:

637

597

1200 V:

1252

1200

1800 V:

1858

1793

AF INPUT SENSITIVITY (mV):

10

AL INPUT SENSITIVITY (mV):

4

RATE METER

SCALER

SCALE	RATE CPM	AS FOUND	% ERROR	AS LEFT	% ERROR	AS FOUND	% ERROR	AS LEFT	% ERROR
x.1 or x1	100	100	0.0%	A.F.		250	0.0%		
	250	250	0.0%	A.F.					
	400	400	0.0%	A.F.					
x1 or x10	1000	1000	0.0%	A.F.					
	2500	2500	0.0%	A.F.					
	4000	4000	0.0%	A.F.					
x10 or x100	10K	10K	0.0%	A.F.					
	25K	25K	0.0%	A.F.					
	40K	40K	0.0%	A.F.					
x100 or x1000	100K	100K	0.0%	A.F.					
	250K	250K	0.0%	A.F.					
	400K	400K	0.0%	A.F.					

Is the As Found Data Within 20% of the Set Point?:

☒ Yes☐ No



GRIFFIN INSTRUMENTS



LOG SCALE

SCALE RATE CPM AS FOUND % ERROR AS LEFT % ERROR

Log	200	200	0.0%	A.F.	
	2000	2000	0.0%	A.F.	
	20K	20K	0.0%	A.F.	
	200K	200K	0.0%	A.F.	

Is the As Found Data Within 20% of the Set Point?:

☒ Yes ☐ No

SECTION 3

REPRODUCIBILITY

Serial #: 86330

x.1 or x1 Scale:	250	250	250
x1 or x10 Scale:	2500	2500	2500
x10 or x100 Scale:	25K	25K	25K
x100 or x1000 Scale:	250K	250K	250K

Are the Individual Counts Within 10% of the Average?:

☒ Yes ☐ No

Fast / Slow Response Switch Functions Properly?:

☒ Yes ☐ No

Audio Response:

☒ Sat ☐ Unsat

SECTION 4

FINAL ACCEPTANCE

Audio Divide: ☒ Sat ☐ Unsat

Push Buttons: ☒ Sat ☐ Unsat

Lamp: ☒ Sat ☐ Unsat

Scaler/Digital: ☒ Sat ☐ Unsat

Remarks: Owner requested calibration. Overload not adjusted. Geotroplism: Sat

Does Instrument Meet Final Acceptance Criteria?:

☒ Yes ☐ No

Calibration Sticker Attached?:

☒ Yes ☐ No

Date Instrument is Due For Next Calibration:

05/14/03

Performed by:

James Blessa

Reviewed by:

Seant

Date: 5-14-02

Entered in Computer Inventory By:

James Blessa

Date:

5/14/02



CALIBRATION CERTIFICATE

Duratek Instrument Services
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Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION				
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum				
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 44-10				
Contact Name: Thomas Scott				Serial Number: 310				
Customer Purchase Order Number: N/A		Work Order Number: 2002-00560		Evaluation Method: Source				
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION								
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019456		Activity: 5μCi		Certification Date: N/A (Used for Plateau Only)		
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711		Activity: Variable		Certification Date: 03/27/02		
Parameter				Precision Test		mR/Hr (Source #2)		
Count 1		N/A		Count 1		1.97		
Count 2		N/A		Count 2		2.0		
Count 3		N/A		Count 3		1.99		
Average		N/A		Average		1.99		
Background		N/A		Pass/Fail		Pass		
Net Counts		N/A				Tolerance ±10%		
Efficiency		N/A				Min: 1.791	Max: 2.189	
Low Sample Activity: Source #2: 63,229		High Sample Activity: Source #2: 219,821		Dead Time (DT): 2.079077E ⁻⁵		Calibration Constant (CC): 5.325586E ⁺¹⁰		
ATTACHMENTS				DETECTOR DATA: DOSE RATE PROBES (mR/Hr)				
Detector Setup Report		YES ✓	NO	Desired Exposure		Tolerance ±10%	As Found	As Left
Barcode Report		YES ✓	NO	0.400		0.360-0.440	N/A	0.398
Voltage Plateau:		YES ✓	NO	1		0.90-1.10	N/A	0.99
High Voltage: 1150V				2		1.8-2.2	N/A	2.0
COMMENTS								
Calibrated with 5ft. Cable:								
STATEMENT OF CERTIFICATION								
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).								
Detector				I certify that the above information is correct:				
Certified By: <i>Mike Paul</i>				Reviewed By: <i>Thomas F. Scott</i>		Date: 5-10-02		
Certification Date: 05/09/02				Certification Due: 11/09/02				

BACKGROUND PLATEAU 44-10 #310 5FT. CABLE 5/09/02

700	17
750	44
800	77
850	104
900	134
950	143
1000	182
1050	208
1100	240
1150	214
1200	224
1250	232
1300	223
1350	234

SOURCE PLATEAU Cs137 #019456 @5uCi

700	27
750	1042
800	1656
850	2158
900	2982
950	3348
1000	3658
1050	3746
1100	3979
1150	4023
1200	4186
1250	4255
1300	4256
1350	4236

James G. Scott
5-10-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D1 in the Model 2350.
Today's date is 05/09/2002.
The current time of day is: 11:35:29.

I have verified the list below
has NO discrepancies with the DETECTOR SETTINGS TABLE: M. Pauli

Comments:

Model 2350 Serial # =	126175.
User I.D. =	
High Voltage =	1150 volts.
Threshold =	250.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.079077E-05.
Detector Calibration Constant =	5.325586E+10.
Detector Model =	44-10.
Detector Serial # =	310.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	6.1 volts.

det1

Generated: 05/09/2002 11:36:09.

Model 2350 Serial #126175



H1150\$K

Set High Voltage: 1150



T250\$W

Set Threshold: 250



W1000\$WOFF\$P

Set Window: 1000,OFF



O400\$OOFF\$C

Set Overload: 400,OFF



F12\$E

Set Scaler Count Time: 12



SU4\$F

Set Readout Units = R



SB2\$.

Set Readout Time Base = hr



SM0\$3

Set Readout Range Multiplier = auto



SL2.079077E-05\$/

Set Dead Time: 2.079077E-05



SC5.325586E+10\$Y

Set Calibration Constant: 5.325586E+10



M44-10\$K

Set Detector Model: 44-10



N310\$N

Set Detector Serial #: 310



J1.000000E+09\$V

Set Ratemeter Alarm: 1.000000E+09



K1000000\$H

Set Scaler Alarm: 1000000



P1.000000E+09\$.

Set Dose Alarm: 1.000000E+09



SP1\$7

SAVE PARAMETERS AS D1



CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 44-10			
Contact Name: Thomas Scott				Serial Number: 0533			
Customer Purchase Order Number: N/A		Work Order Number: 2002-00561		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019455		Activity: 5 μ Ci		Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711		Activity: Variable		Certification Date: 03/27/02	
Parameter				Precision Test		mR/Hr (Source #2)	
Count 1		N/A		Count 1		1.88	
Count 2		N/A		Count 2		1.90	
Count 3		N/A		Count 3		1.89	
Average		N/A		Average		1.89	
Background		N/A		Pass/Fail		Pass	
Net Counts		N/A				Tolerance $\pm 10\%$	
Efficiency		N/A				Min: 1.701 Max: 2.079	
Low Sample Activity: Source #2: 65,857		High Sample Activity: Source #2: 242,981		Dead Time (DT): 1.617999E ⁻⁵		Calibration Constant (CC): 5.420615E ⁺¹⁰	
ATTACHMENTS				DETECTOR DATA: DOSE RATE PROBES (mR/Hr)			
Detector Setup Report		YES ☒	NO ☐	Desired Exposure		Tolerance $\pm 10\%$	As Found As Left
Barcode Report		YES ☒	NO ☐	0.400		0.360-0.440	N/A 0.397
Voltage Plateau:		YES ☒	NO ☐	1		0.90-1.10	N/A 1.05
High Voltage: 1000V				2		1.8-2.2	N/A 1.90
COMMENTS							
Calibrated with 5ft. Cable							
STATEMENT OF CERTIFICATION							
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).							
Detector				I certify that the above information is correct:			
Certified By: <i>Mike Paul</i>				Reviewed By: <i>Thomas F. Scott</i>		Date: 5-10-02	
Certification Date: 05/09/02				Certification Due: 11/09/02			

BACKGROUND PLATEAU 44-10#0533 5FT CABLE 5/9/02

700	90
750	127
800	161
850	181
900	225
950	240
1000	246
1050	265
1100	279
1150	266
1200	263
1250	260
1300	280
1350	277

SOURCE PLATEAU CS-137#019455 @5uCi

700	1528
750	2020
800	2352
850	2698
900	2871
950	2913
1000	2987
1050	3185
1100	3123
1150	3196
1200	3256
1250	3236
1300	3188
1350	3281

Thomas G. Hart

5-10-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D1 in the Model 2350.

Today's date is 05/09/2002.

The current time of day is: 11:38:22.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE: M. Pauli

Comments:

Model 2350 Serial # =	126172.
User I.D. =	"
High Voltage =	1000 volts.
Threshold =	250.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.617999E-05.
Detector Calibration Constant =	5.420615E+10.
Detector Model =	44-10.
Detector Serial # =	0533.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	6.3 volts.

det1

Generated: 05/09/2002 11:39:14.

Model 2350 Serial #126172



H1000\$E
Set High Voltage: 1000



T250\$W
Set Threshold: 250



W1000\$WOFF\$P
Set Window: 1000,OFF



O400\$OOFF\$C
Set Overload: 400,OFF



F12\$E
Set Scaler Count Time: 12



SU4\$F
Set Readout Units = R



SB2\$.
Set Readout Time Base = hr



SM0\$3
Set Readout Range Multiplier = auto



SL1.617999E-05\$7
Set Dead Time: 1.617999E-05



SC5.420615E+10\$N
Set Calibration Constant: 5.420615E+10



M44-10\$K
Set Detector Model: 44-10



N0533\$U
Set Detector Serial #: 0533



J1.000000E+09\$V
Set Ratemeter Alarm: 1.000000E+09



K1000000\$H
Set Scaler Alarm: 1000000



P1.000000E+09\$.
Set Dose Alarm: 1.000000E+09



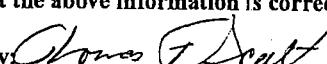
SP1 \$2
SAVE PARAMETERS AS D1



CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 44-10			
Contact Name: Thomas Scott				Serial Number: 074140			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01340		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019455		Activity: 5μCi		Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711		Activity: Variable		Certification Date: 03/27/02	
Parameter				Precision Test		mR/Hr (Source #2)	
Count 1		N/A		Count 1		2.00	
Count 2		N/A		Count 2		2.00	
Count 3		N/A		Count 3		2.00	
Average		N/A		Average		2.00	
Background		N/A		Pass/Fail		Pass	
Net Counts		N/A				Tolerance ±10%	
Efficiency		N/A				Min: 1.800	Max: 2.200
Low Sample Activity: Source #2: 92,584		High Sample Activity: Source #2: 240,113		Dead Time (DT): 3.006761E ⁻⁵		Calibration Constant (CC): 9.041192E ⁺¹⁰	
ATTACHMENTS				DETECTOR DATA: DOSE RATE PROBES (mR/Hr)			
Detector Setup Report		YES ✓	NO	Desired Exposure	Tolerance ±10%	As Found	As Left
Barcode Report		YES ✓	NO	0.400	0.360-0.440	0.389	0.397
Voltage Plateau:		YES ✓	NO	1	0.90-1.10	0.961	0.968
High Voltage: 1250V				2	1.8-2.2	2.02	2.00
COMMENTS							
Calibrated with 5ft. Cable							
STATEMENT OF CERTIFICATION							
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).							
Detector		I certify that the above information is correct:					
Certified By: 		Reviewed By: 		Date: 11-15-02			
Certification Date: 11/15/02				Certification Due: 11/15/03			

BACKGROUND PLATEAU 44-10 #074140 5FT CABLE 11/15/02

700	127
750	1619
800	2391
850	3337
900	4344
950	5236
1000	5782
1050	6177
1100	6479
1150	6352
1200	6542
1250	6759
1300	6708
1350	6764

SOURCE PLATEAU Cs137 #019455 5uCi BUTTON

700	1
750	1
800	8
850	20
900	50
950	142
1000	285
1050	565
1100	937
1150	1124
1200	1307
1250	1335
1300	1295
1350	1263

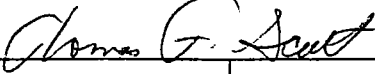
James G. Sealt

11-15-02

**CALIBRATION
CERTIFICATE**

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			DETECTOR INFORMATION		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Rd Kingston, TN 37763			Detector Model: 44-10		
Contact Name: Thomas Scott			Serial Number: 185844		
Customer Purchase Order Number: N/A		Work Order Number: 2002-01144	Evaluation Method: Source		
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019454	Activity: 5 μ Ci	Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711	Activity: Variable	Certification Date: 03/27/02	
Parameter		Precision Test		mR/Hr (Source #2)	
Count 1	N/A	Count 1		2.01	
Count 2	N/A	Count 2		2.02	
Count 3	N/A	Count 3		2.00	
Average	N/A	Average		2.00	
Background	N/A	Pass/Fail		Pass	
Net Counts	N/A			Tolerance $\pm 10\%$	
Efficiency	N/A			Min: 1.800	Max: 2.200
Low Sample Activity: Source #2: 92,189		High Sample Activity: Source #2: 256,064	Dead Time (DT): 2.603729E ⁻⁵	Calibration Constant (CC): 8.643039E ⁺¹⁰	
ATTACHMENTS		DETECTOR DATA: DOSE RATE PROBES (mR/Hr)			
Detector Setup Report	YES ☒ NO	Desired Exposure	Tolerance $\pm 10\%$	As Found	As Left
Barcode Report	YES ☒ NO	0.400	0.360-0.440	.407	.404
Voltage Plateau:	YES ☒ NO	1	0.90-1.10	.97	.96
High Voltage: 1050V		2	1.8-2.2	2.01	2.00
COMMENTS					
Calibrated with 5ft. Cable			Calibrated in accordance with RP-INS-I-245.		
STATEMENT OF CERTIFICATION					
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).					
Detector		I certify that the above information is correct:			
Certified By: 		Reviewed By: 		Date: 9-27-02	
Certification Date: 09/27/02			Certification Due: 03/27/03		

BACKGROUND PLATEAU 44-10 S/N:185844 09/27/02

750	143
800	264
850	462
900	723
950	1038
1000	1153
1050	1282
1100	1352
1150	1366
1200	1341
1250	1432
1300	3577
1350	37032

SOURCE PLATEAU CS137 S/N:019455 @5uCi

700	1152
750	1681
800	2325
850	2949
900	3538
950	4006
1000	4172
1050	4229
1100	4544
1150	4446
1200	4438
1250	4478
1300	4932
1350	11081

Thomas F. Galt

9-27-02



CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 44-10			
Contact Name: Thomas Scott				Serial Number: 192593			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01340		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019455		Activity: 5 μ Ci		Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711		Activity: Variable		Certification Date: 03/27/02	
Parameter		Precision Test		mR/Hr. (Source #2)			
Count 1	N/A	Count 1		2.02			
Count 2	N/A	Count 2		2.00			
Count 3	N/A	Count 3		2.01			
Average	N/A	Average		2.01			
Background	N/A	Pass/Fail		Pass			
Net Counts	N/A			Tolerance $\pm 10\%$			
Efficiency	N/A			Min: 1.809		Max: 2.211	
Low Sample Activity: Source #2: 93,673		High Sample Activity: Source #2: 258,843		Dead Time (DT): 2.592389E ⁻⁵		Calibration Constant (CC): 8.807871E ⁺¹⁰	
ATTACHMENTS				DETECTOR DATA: DOSE RATE PROBES (mR/Hr)			
Detector Setup Report	YES ☒ NO	Desired Exposure	Tolerance $\pm 10\%$	As Found	As Left		
Barcode Report	YES ☒ NO	0.400	0.360-0.440	0.399	0.402		
Voltage Plateau:	YES ☒ NO	1	0.90-1.10	0.958	0.960		
High Voltage: 1100V		2	1.8-2.2	2.05	2.01		
COMMENTS							
Calibrated with 5ft. Cable							
STATEMENT OF CERTIFICATION							
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).							
Detector		I certify that the above information is correct:					
Certified By:		Reviewed By: <i>Thomas F. Scott</i>			Date: 11-15-02		
Certification Date: 11/15/02				Certification Due: 11/15/03			

BACKGROUND PLATEAU 44-10 #192593 5FT 10/01/02

700	123
750	212
800	435
850	635
900	847
950	1057
1000	1008
1050	1067
→ 1100	1072
1150	1119
1200	1174
1250	1122
1300	1146
1350	1124

SOURCE PLATEAU #019455 @5uCi

700	1263
750	1780
800	2323
850	2837
900	3167
950	3358
1000	3627
1050	3553
→ 1100	3682
1150	3783
1200	3783
1250	3679
1300	3689
1350	3724

Charles G. Scott

11-15-02

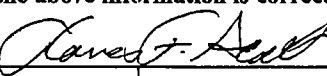


CALIBRATION CERTIFICATE

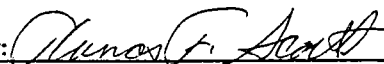
Page 1 of 2

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			INSTRUMENT INFORMATION		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Road , Kingston TN 37763			Model: 2221	Serial Number: 168558	
Contact Name: Tom Scott			Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: N/A		Work Order Number: 2002-00511	Calibration Method: Electronic		
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Ratemeter Response		Scaler Response	
		As Found	As Left	As Found	As Left
X 1	100	100	100	100	100
X 1	250	250	250	250	250
X 1	400	400	400	400	400
X 10	1,000	1,000	1,000	1,002	1,002
X 10	2,500	2,500	2,500	2,519	2,519
X 10	4,000	4,000	4,000	4,026	4,026
X 100	10,000	10,000	10,000	10,021	10,021
X 100	25,000	25,000	25,000	25,194	25,194
X 100	40,000	40,000	40,000	40,094	40,094
X 1000	100,000	100,000	100,000	100,235	100,235
X 1000	250,000	250,000	250,000	251,976	251,976
X 1000	400,000	400,000	400,000	401,842	401,842
STATEMENT OF CERTIFICATION					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument		I certify that the above information is correct:			
Calibrated By: 		Reviewed By: 		Date: 5-2-02	
Calibration Date: 05/01/02			Calibration Due: 11/01/02		

Model: 2221Serial Number: 168558

M&TE					Environmental Conditions		
Volt Meter	Due Date:	03/18/03	ID	120935	Barometer	Due Date: 09/12/02	ID: 2551
Pulser	Due Date:	03/18/03	ID	120935	Thermometer	Due Date: 09/12/02	ID: 2551
Timer	Due Date:	01/10/03	ID	02010806	Temp: 19.9°C	Pressure: 737mmHg	Humidity: 56%
INSTRUMENT CALIBRATION INFORMATION							
Special Test							
Geotropism	Sat (✓) Unsat ()			Hold		Sat (✓) Unsat ()	
BAT > 4.5	Sat (✓) Unsat ()			Volume Test		Sat (✓) Unsat ()	
Mechanical Zero	Sat (✓) Unsat ()			Audio Divide		Sat (✓) Unsat ()	
Digital Zero	Sat (✓) Unsat ()			Window Switch		Sat (✓) Unsat ()	
Count	Sat (✓) Unsat ()			Lamp		Sat (✓) Unsat ()	
High Voltage Calibration				Timer Calibration			
Voltage	Tolerance	As Found	As Left	Time (sec.)	Tolerance	As Found	As Left
400	390-410	405	405	300	290-310	300	300
1,000	990-1,010	1,002	1,002				
1,500	1,490-1,510	1,500	1,500				
1,900	1,890-1,910	1,899	1,899				
Threshold/Gain Calibration (Desired Ratio <u>4</u> mV/100)							
Input	As Found Value		As Found Ratio (mV/100)		As Left Value		As Left Ratio (mV/100)
10	105		10.5		241		4.1
20	210		10.5		494		4.1
30	300		10.0		750		4.0
40	400		10.0		1010		4.0
Logmeter Scale Linearity Check							
Input	±20% Tolerance		As Found		As Left		
LOG	400		320-480		400		400
LOG	4,000		3,200-4,800		4,100		4,100
LOG	40,000		32,000-48,000		41,000		41,000
LOG	400,000		320,000-480,000		400,000		400,000
COMMENTS							
Caled in accordance with RP-INS-I-243.							
Instrument				I certify that the above information is correct:			
Calibrated By: 				Reviewed By:  Date: <u>5-2-02</u>			
Calibration Date: 05/01/02				Calibration Due: 11/01/02			

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D1 in the Model 2350.
Today's date is 09/30/2002.
The current time of day is: 10:34:04.

I have verified the list below
has NO discrepancies with the DETECTOR SETTINGS TABLE: JK

Comments:

Model 2350 Serial # =	95358.
User I.D. =	
High Voltage =	1050 volts.
Threshold =	250.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.603729E-05.
Detector Calibration Constant =	8.643039E+10.
Detector Model =	44-10.
Detector Serial # =	185844.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.6 volts

DET1

Generated: 09/30/2002 10:34:46.

Model 2350 Serial #95358



H100\$E
Set High Voltage: 100



T250\$W
Set Threshold: 250



W1000\$WOFFSP
Set Window: 1000,OFF



O400\$OOFFSC
Set Overload: 400,OFF



F12\$E
Set Scaler Count Time: 12



SU4\$F
Set Readout Units = R



SB2\$.
Set Readout Time Base = hr



SM0\$3
Set Readout Range Multiplier = auto



SL2.603729E-05\$.
Set Dead Time: 2.603729E-05



SC8.643039E+10\$X
Set Calibration Constant: 8.643039E+10



M44-10\$K
Set Detector Model: 44-10



N185844\$6
Set Detector Serial #: 185844



J1.000000E+09\$V
Set Ratemeter Alarm: 1.000000E+09



K1000000\$H
Set Scaler Alarm: 1000000



P1.000000E+09\$.
Set Dose Alarm: 1.000000E+09



SP1\$7
SAVE PARAMETERS AS D1



CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: GTS Duratek - Instrument Services Facility		Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 126172
Contact Name: Thomas Scott		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2002-00561	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	Caled in accordance with RP-INS-I-245.
400K	400,000	406,526	406,526	Pulser: 101500 Cal Due: 08/23/02
40K	40,000	40,327	40,327	ESV: N/A Cal Due: N/A
4K	4,000	4,034	4,034	D-814: 2551 Cal Due: 09/12/02
400	400	403	403	Psychron: 5546 Cal Due: 06/12/02
HV Cal Values (M2350-1 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	
600	600	603	603	Temp: 23.8° C
1,200	1,200	1,199	1,199	Pressure: 741mmHg
1,800	1,800	1,793	1,793	Humidity: 55%
Parameter	Tolerance (±10%)	As Found	As Left	
Low End Threshold	4 ± (3.6 to 4.4) mVDC	3.02	4.0	Geotropism: SAT ACK/Scroll: SAT
Midpoint Threshold	20 ± (18 to 22) mVDC	16	19.4	BAT>4.5: SAT Volume: SAT
High End Threshold	40 ± (36 to 44) mVDC	28.7	38.2	Count: SAT Audio Divide: SAT
Window Width	4 ± (3.6 to 4.6) mVDC	3.8	4	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 4 mV			Overload Test: SAT

STATEMENT OF CERTIFICATION	
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).	
Instrument	I certify that the above information is correct:
Calibrated By: Mike Paul	Reviewed By: James G. Deatt Date: 5-10-02
Calibration Date: 05/09/02	Calibration Due: 11/09/02



CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: GTS Duratek - Instrument Services Facility		Manufacturer:	Ludlum
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 126175
Contact Name: Thomas Scott		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2002-00560	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	Calcd in accordance with RP-INS-I-245.
400K	400,000	406,332	406,332	Pulser: 101500 Cal Due: 08/23/02
40K	40,000	40,251	40,251	ESV: N/A Cal Due: N/A
4K	4,000	4,024	4,024	D-814: 2551 Cal Due: 09/12/02
400	400	402	402	Psychron: 5546 Cal Due: 06/12/02
HV Cal Values (M2350-1 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	
600	600	605	605	Temp: 23.8° C
1,200	1,200	1,200	1,200	Pressure: 741mmHg
1,800	1,800	1,792	1,792	Humidity: 55%
Parameter	Tolerance (±10%)	As Found	As Left	
Low End Threshold	4 ± (3.6 to 4.4) mVDC	3.74	4.0	Geotropism: SAT ACK/Scroll: SAT
Midpoint Threshold	20 ± (18 to 22) mVDC	17.8	19.4	BAT>4.5: SAT Volume: SAT
High End Threshold	40 ± (36 to 44) mVDC	35.0	38.4	Count: SAT Audio Divide: SAT
Window Width	4 ± (3.6 to 4.6) mVDC	4	4	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 4 mV			Overload Test: SAT

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument	I certify that the above information is correct:		
Calibrated By: Mike Paul	Reviewed By: [Signature]	Date: 5-10-02	
Calibration Date: 05/09/02		Calibration Due: 11/09/02	



CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: GTS Duratek - Instrument Services Facility		Manufacturer:	Ludlum
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 129423
Contact Name: Thomas Scott		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2002-01147	Calibration Method: Electronic and Source	

INSTRUMENT CALIBRATION INFORMATION

Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	Calibrated in accordance with RP-INS-I-245 Rev 0
400K	400,000	401,230	401,230	Pulser: 120935 Cal Due: 03/18/03
40K	40,000	40,119	40,119	D-814: 2525 Cal Due: 02/18/03
4K	4,000	4,013	4,013	Psychron: 7480 Cal Due: 05/17/03
400	400	401	401	EPPROM Version: 37122N21
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	
600	600	609	609	Temp: 22.4° C
1,200	1,200	1,204	1,204	Pressure: 745mmHg
1,800	1,800	1,796	1,796	Humidity: 56%
Parameter	Tolerance (±10%)	As Found	As Left	
Low End Threshold	4 ± (3.6 to 4.4) mVDC	4.35	4.35	Geotropism: SAT ACK/Scroll: SAT
Midpoint Threshold	20 ± (18 to 22) mVDC	20.0	20.0	BAT>4.5: SAT Volume: SAT
High End Threshold	40 ± (36 to 44) mVDC	39.0	39.0	Count: SAT Audio Divide: SAT
Window Width	4 ± (3.6 to 4.6) mVDC	4.0	4.0	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 4 mV			Startup Test: SAT Overload Test: SAT

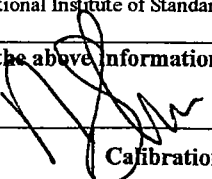
STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument

I certify that the above information is correct:

Calibrated By: 

Reviewed By: 

Date: 10/1/02

Calibration Date: 10/01/02

Calibration Due: 10/01/03

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D2 in the Model 2350.

Today's date is 11/15/2002.

The current time of day is: 15:01:17.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE: *JA*

Comments:

Model 2350 Serial # =	129423.
User I.D. =	129423.
High Voltage =	1100 volts.
Threshold =	250.
Window =	100, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	counts.
Readout Time Base =	sec.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.592389E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	44-10CPS.
Detector Serial # =	192593.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	6.1 volts.

DET2

Generated: 11/15/2002 15:03:21.

Model 2350 Serial #129423



H1100\$F
Set High Voltage: 1100



W100\$W\$OFF\$P
Set Window: 100,OFF



F12\$E
Set Scaler Count Time: 12



SB0\$Z
Set Readout Time Base = sec



SL2.592389E-05\$3
Set Dead Time: 2.592389E-05



SC1.000000E+00\$0
Set Calibration Constant: 1.000000E+00



M44-10CPS\$%
Set Detector Model: 44-10CPS



N192593\$5
Set Detector Serial #: 192593



J1.000000E+09\$V
Set Ratemeter Alarm: 1.000000E+09



K1000000\$H
Set Scaler Alarm: 1000000



P1.000000E+09\$.
Set Dose Alarm: 1.000000E+09



SP2\$8
SAVE PARAMETERS AS D2



T250\$W
Set Threshold: 250



O400\$O\$OFF\$C
Set Overload: 400,OFF



SU7\$I
Set Readout Units = counts



SM0\$3
Set Readout Range Multiplier = auto

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D1 in the Model 2350.

Today's date is 11/15/2002.

The current time of day is: 15:00:55.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE:



Comments:

Model 2350 Serial # =	129423.
User I.D. =	129423.
High Voltage =	1100 volts.
Threshold =	250.
Window =	100, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.592388E-05.
Detector Calibration Constant =	8.807867E+10.
Detector Model =	44-10DOSE.
Detector Serial # =	192593.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	6.1 volts.

DET1

Generated: 11/15/2002 15:02:34.

Model 2350 Serial #129423



H1100\$F
Set High Voltage: 1100



T250\$W
Set Threshold: 250



W100\$WOFF\$P
Set Window: 100,OFF



O400\$OOFF\$C
Set Overload: 400,OFF



F12\$E
Set Scaler Count Time: 12



SU4\$F
Set Readout Units = R



SB2\$.
Set Readout Time Base = hr



SM0\$3
Set Readout Range Multiplier = auto



SL2.592388E-05\$2
Set Dead Time: 2.592388E-05



SC8.807867E+10\$1
Set Calibration Constant: 8.807867E+10



M44-10DOSE\$D
Set Detector Model: 44-10DOSE



N192593\$5
Set Detector Serial #: 192593



J1.000000E+09\$V
Set Ratemeter Alarm: 1.000000E+09



K1000000\$H
Set Scaler Alarm: 1000000



P1.000000E+09\$.
Set Dose Alarm: 1.000000E+09



SP1\$7
SAVE PARAMETERS AS D1



CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

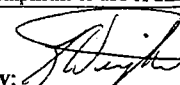
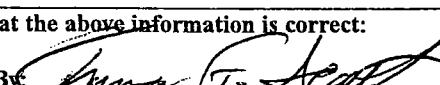
CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: GTS Duratek - Instrument Services Facility		Manufacturer:	Ludlum
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 129440
Contact Name: Thomas Scott		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2002-01147	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION

Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	
400K	400,000	404,234	404,234	Calibrated in accordance with RP-0INS-I-245, Rev. 0
40K	40,000	40,382	40,382	Pulser: 112860 Cal Due: 12/05/02
4K	4,000	4,039	4,039	ESV: ES-17442 Cal Due: 08/13/03
400	400	404	404	D-814: 2525 Cal Due: 02/18/03
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	Psychron: 7480 Cal Due: 05/17/03
600	600	600	650	EPROM Version: 37122N21
1,200	1,200	1,100	1,200	Temp: 22.0°C
1,800	1,800	1,750	1,750	Pressure: 745mmHg
Parameter	Tolerance ($\pm 10\%$)	As Found	As Left	Humidity: 50%
Low End Threshold	4 $\pm$ (3.6 to 4.4) mVDC	4.0	4.0	Geotropism: SAT ACK/Scroll: SAT
Midpoint Threshold	20 $\pm$ (18 to 22) mVDC	20	20	BAT>4.5: SAT Volume: SAT
High End Threshold	40 $\pm$ (36 to 44) mVDC	38	38	Count: SAT Audio Divide: SAT
Window Width	4 $\pm$ (3.6 to 4.6) mVDC	4	4	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 4 mV			Overload Test: SAT Start-up Test: SAT

STATEMENT OF CERTIFICATION

We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).

Instrument	I certify that the above information is correct:		
Calibrated By: 	Reviewed By: 	Date: 10-2-02	
Calibration Date: 09/30/02	Calibration Due: 09/30/03		

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D1 in the Model 2350.

Today's date is 11/15/2002.

The current time of day is: 14:54:58.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE: *M*

Comments:

Model 2350 Serial # =	129440.
User I.D. =	129440.
High Voltage =	1250 volts.
Threshold =	250.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	3.006760E-05.
Detector Calibration Constant =	-9.041190E+10.
Detector Model =	44-10DOSE.
Detector Serial # =	074140.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.4 volts.

DET1

Generated: 11/15/2002 14:59:01.

Model 2350 Serial #129440



H1250\$L
Set High Voltage: 1250



T250\$W
Set Threshold: 250



W1000\$WOFF\$P
Set Window: 1000,OFF



O400\$OOFF\$C
Set Overload: 400,OFF



F12\$E
Set Scaler Count Time: 12



SU4\$F
Set Readout Units = R



SB2\$.
Set Readout Time Base = hr



SM0\$3
Set Readout Range Multiplier = auto



SL3.006760E-05\$U
Set Dead Time: 3.006760E-05



SC9.041190E+10\$O
Set Calibration Constant: 9.041190E+10



M44-10DOSE\$D
Set Detector Model: 44-10DOSE



N074140\$Z
Set Detector Serial #: 074140



J1.000000E+09\$V
Set Ratemeter Alarm: 1.000000E+09



K1000000\$H
Set Scaler Alarm: 1000000



P1.000000E+09\$.
Set Dose Alarm: 1.000000E+09



SP1\$7
SAVE PARAMETERS AS D1

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D2 in the Model 2350.

Today's date is 11/15/2002.

The current time of day is: 14:55:21.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE: TR

Comments:

Model 2350 Serial # =	129440.
User I.D. =	129440.
High Voltage =	1250 volts.
Threshold =	250.
Window =	400, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	counts.
Readout Time Base =	sec.
Readout Range Multiplier =	auto.
Detector Dead Time =	3.006760E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	44-10CPS.
Detector Serial # =	074140.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.4 vol

DET2

Generated: 11/15/2002 14:59:36.

Model 2350 Serial #129440



H1250\$L
Set High Voltage: 1250



W400\$WOFF\$S
Set Window: 400,OFF



F12\$E
Set Scaler Count Time: 12



SB0\$Z
Set Readout Time Base = sec



SL3.006760E-05\$U
Set Dead Time: 3.006760E-05



SC1.000000E+00\$0
Set Calibration Constant: 1.000000E+00



M44-10CPS\$%
Set Detector Model: 44-10CPS



N074140\$Z
Set Detector Serial #: 074140



J1.000000E+09\$V
Set Ratemeter Alarm: 1.000000E+09



K1000000\$H
Set Scaler Alarm: 1000000



P1.000000E+09\$.
Set Dose Alarm: 1.000000E+09



SP2\$8
SAVE PARAMETERS AS D2



T250\$W
Set Threshold: 250



O400\$OOFF\$C
Set Overload: 400,OFF



SU7\$I
Set Readout Units = counts



SM0\$3
Set Readout Range Multiplier = auto



Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

CALIBRATION CERTIFICATE

This Certificate will be accompanied by Calibration Charts or Readings where applicable

Customer Information			Instrument Information		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763			Model: 2929	Serial Number: 142645	
Contact Name: Thomas F. Scott			Probe: 43-10-1	Serial Number: 144756	
Customer Purchase Order Number: N/A		Work Order Number: 2002-00510	Calibration Method: Electronic And Source		
Instrument Calibration Information					
M&TE	ID Number	Calibration Due Date	Environmental Conditions		
Thermometer	2551	09/12/02	Temperature (°C)	21.6	
Barometer	2551	09/12/02	Pressure (mmHg)	742	
Hygrometer	5546	06/12/02	Humidity (%)	54%	
Pulse Generator	101500	08/23/02	Calibrated in accordance with RP-INS-I-241.		
Isotope	Source ID Number	Original Activity (dpm)	Source Cert. Date	Decayed Activity (dpm)	
Th ²³⁰	119706	21,240	10/14/97	21,240	
Tc ⁹⁹	119719	23,100	10/14/97	23,100	
Pu ²³⁹	019442	13,613	06/01/92	13,613	
Frequency Calibration					
Desired (cpm)	Tolerances (cpm)	Alpha As Found (cpm)	Alpha As Left (cpm)	Beta As Found (cpm)	Beta As Left (cpm)
40	40	40	40	40	40
400	(392-408)	403	403	402	402
4,000	(3,920-4,080)	4,033	4,033	4,028	4,028
40,000	(39.2K-40.8K)	40,340	40,340	40,272	40,272
400,000	(392K-408K)	403,325	403,325	402,777	402,777
Background Determination		Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Counts, C _b		6	6	1,356	1,356
Time, T _b (min)		20	20	20	20
Rate, R _b (cpm)		0.3	0.3	67.8	67.8
Statement of Certification					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument		I certify that the above information is correct:			
Calibrated By: Mike Pauli		Reviewed By: James J. West		Date: 5-2-02	
Calibration Date: 04/30/02			Calibration Due: 04/30/03		

EFFICIENCY & CROSS TALK SHEET

 Initials/Date: **MP 4/30/02**

 Instrument ID: **142645**

As Found Alpha Threshold (mv)		As Left Alpha Threshold (mv)	
175mV		175mV	
Alpha Source: Efficiency & Cross Talk - Performed using Pu ²³⁹ 019442			
Paramter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found
Source Count, C _s	24,839	24,839	1,273
Time, T _s (min)	5	5	5
Rate, R _s (cpm)	R _{a[q]} = 4,967.8	R _{a[q]} = 4,967.8	R _{a[q]} = 254.6
EFF (% c/d) (>25%)	36.5%	36.5%	N/A
%Crosstalk [α to β] (< 10%)	$\frac{R_{a[q]} - R_{b[q]}}{R_{a[q]} - R_{b[q]}} = \frac{254.6 - 67.8}{4,967.8 - 0.3} = 3.8\%$		
As Found Beta Low Threshold	As Left Beta Low Threshold	As Found Beta High Threshold	As Left Beta High Threshold
4 mv	4 mv	50 mv	50 mv
Beta Source: Efficiency & Cross Talk-Performed using Tc ⁹⁹ 119719			
Paramter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found
Source Count, C _s	0	0	31,439
Time, T _s (min)	5	5	5
Rate, R _s (cpm)	R _{a[q]} = 0	R _{a[q]} = 0	R _{a[q]} = 6,287.8
EFF (% c/d) (>10%)	N/A	N/A	26.9%
%Crosstalk [β to α] (< 1%)	$\frac{R_{a[q]} - R_{b[q]}}{R_{a[q]} - R_{b[q]}} = \frac{0 - 0.3}{6,287.8 - 67.8} = -0.005\%$		
High Voltage Power			
Desired Voltage	Tolerance	Pulser HV As Found	Pulser HV As Left
600	540 - 660	605	605
800	720 - 880	800	800
1,000	900 - 1,100	994	994
1,200	1,080 - 1,320	1,187	1,187
1,300	1,170 - 1,430	1,288	1,288
High Voltage	As Found	Vern Dial Reading	As Left
	765V	3.04	765V
Statement of Certification			
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).			
Instrument		I certify that the above information is correct:	
Calibrated By: Mike Pauli		Reviewed By: James G. Aut Date: 5-2-02	
Calibration Date: 04/30/02		Calibration Due: 04/30/03	

EFFICIENCY SHEET

Initials/Date: MP 4/30/02

Instrument ID: 142645

As Found Alpha Threshold (mv)		As Left Alpha Threshold (mv)		
175mV		170mV		
Alpha Source: Efficiency determined using Th ²³⁰ 119706				
Paramter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Source Count, C _s	32,841	32,841	5,528	5,528
Time, T _s (min)	5	5	5	5
Rate, R _s (cpm)	R _{a[q]} = 6,568.2	R _{a[q]} = 6,568.2	R _{a[β]} = 1,105.6	R _{a[β]} = 1,105.6
EFF (% c/d) (>25%)	30.9%	30.9%	N/A	N/A
%Crosstalk [α to β] (< 10%)	$\frac{R_{a[\beta]} - R_{b[\beta]}}{R_{a[q]} - R_{b[q]}} = \frac{N/A}{N/A} = N/A$			
As Found Beta Low Threshold	As Left Beta Low Threshold	As Found Beta High Threshold	As Left Beta High Threshold	
4mv	4mv	50mv	50mv	
Beta Source: Efficiency determined using Th ²³⁰				
Paramter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Source Count, C _s	N/A	N/A	N/A	N/A
Time, T _s (min)	5	5	5	5
Rate, R _s (cpm)	R _{a[q]} = N/A	R _{a[q]} = N/A	R _{a[β]} = N/A	R _{a[β]} = N/A
EFF (% c/d) (>25%)	N/A	N/A	N/A	N/A
%Crosstalk [β to α] (< 1%)	$\frac{R_{a[q]} - R_{b[q]}}{R_{a[\beta]} - R_{b[\beta]}} = \frac{N/A}{N/A} = N/A$			
Statement of Certification				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument		I certify that the above information is correct:		
Calibrated By: Mike Pauli		Reviewed By: <i>[Signature]</i>		Date: 5-2-02
Calibration Date: 04/30/02		Calibration Due: 04/30/03		

Chi-Square Test

GTS Duratek

MODEL 2929 Serial #142645

Th-230 - Source # 119706 - 21,240dpm

Background Counts = 0.3 CPM

<u>Count Number (N)</u>	<u>Source Count (x)</u>	<u>x-Mean</u>	<u>(x-Mean)²</u>
1	6593	15.85	251.22
2	6603	25.85	668.22
3	6608	30.85	951.72
4	6682	104.85	10993.52
5	6353	-224.15	50243.22
6	6530	-47.15	2223.12
7	6585	7.85	61.62
8	6545	-32.15	1033.62
9	6622	44.85	2011.52
10	6711	133.85	17915.82
11	6539	-38.15	1455.42
12	6545	-32.15	1033.62
13	6619	41.85	1751.42
14	6693	115.85	13421.22
15	6512	-65.15	4244.52
16	6562	-15.15	229.52
17	6532	-45.15	2038.52
18	6596	18.85	355.32
19	6565	-12.15	147.62
20	6548	-29.15	849.72

$\Sigma =$ 131543

$(x-Mean)^2 =$ 111880.55

Mean = 6577.15

Chi² = 17.01

$\sigma =$ 76.74

2 $\sigma =$ 153.4725

Reduce Chi Square= 0.895289

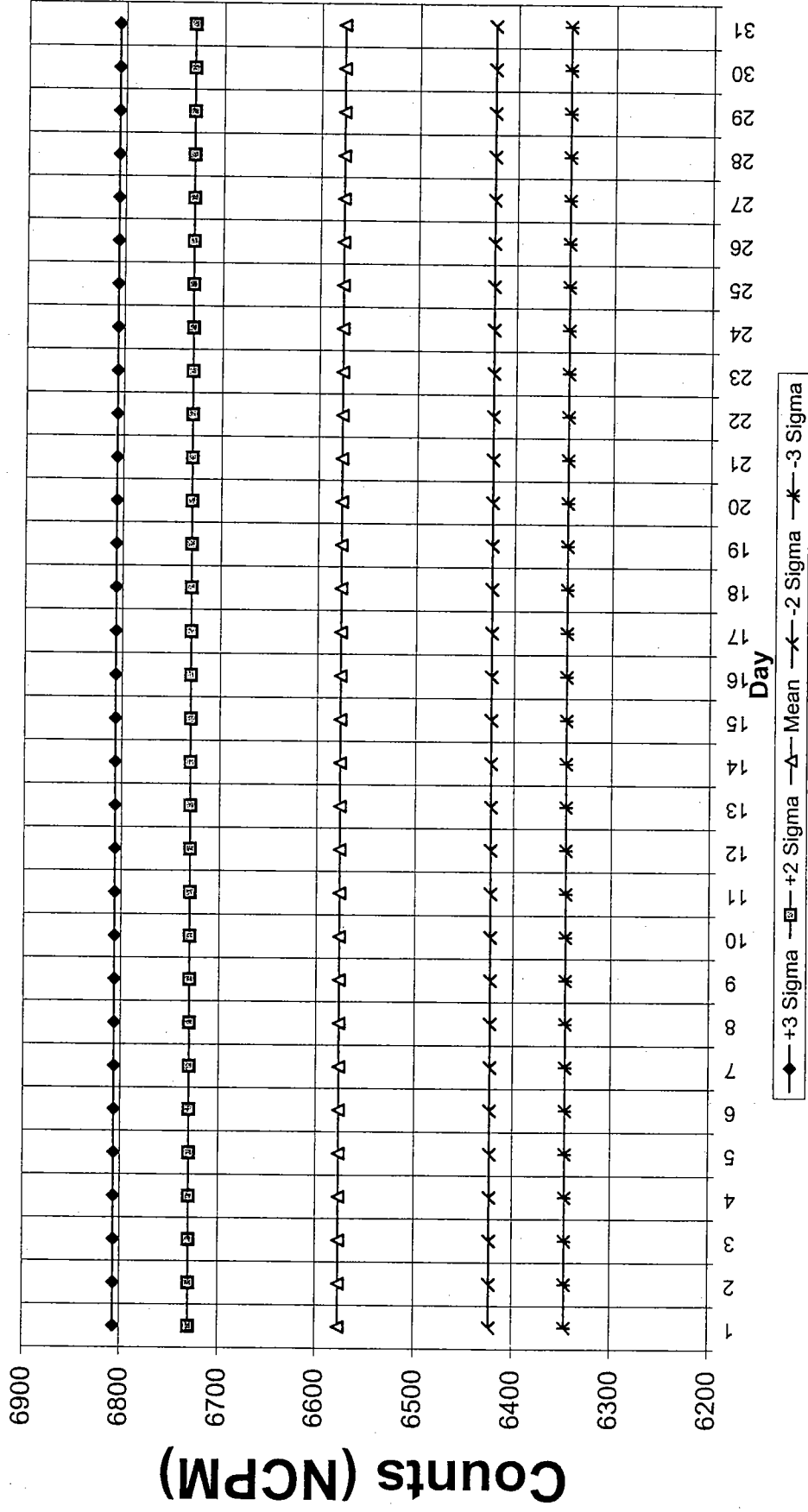
3 $\sigma =$ 230.21

Reduced Chi Pass/Fail= PASS

Performed By/Date Mike Paul / 4-30-02

Reviewed By/Date Thomas F. Paul / 5-2-02

Control Chart Month Of 20 _____
Instrument _____, Source# _____, Isotope _____



Reviewed By _____ Date _____

Chi-Square Test

GTS Duratek

MODEL 2929 Serial #142645 Tc-99 Source # 119719 23,100dpm

Background Counts = 67.8 CPM

<u>Count Number (N)</u>	<u>Source Count (x)</u>	<u>x-Mean</u>	<u>(x-Mean)²</u>
1	6405	113.6	12904.96
2	6329	37.6	1413.76
3	6273	-18.4	338.56
4	6332	40.6	1648.36
5	6189	-102.4	10485.76
6	6363	71.6	5126.56
7	6259	-32.4	1049.76
8	6388	96.6	9331.56
9	6238	-53.4	2851.56
10	6316	24.6	605.16
11	6141	-150.4	22620.16
12	6396	104.6	10941.16
13	6200	-91.4	8353.96
14	6308	16.6	275.56
15	6344	52.6	2766.76
16	6258	-33.4	1115.56
17	6289	-2.4	5.76
18	6344	52.6	2766.76
19	6308	16.6	275.56
20	<u>6148</u>	<u>-143.4</u>	<u>20563.56</u>
Σ =	125828	(x-Mean) ² =	115440.80

Mean = 6291.40

Chi² = 18.35

σ = 77.95

2 σ = 155.8952

Reduce Chi Square= 0.965736

3 σ = 233.84

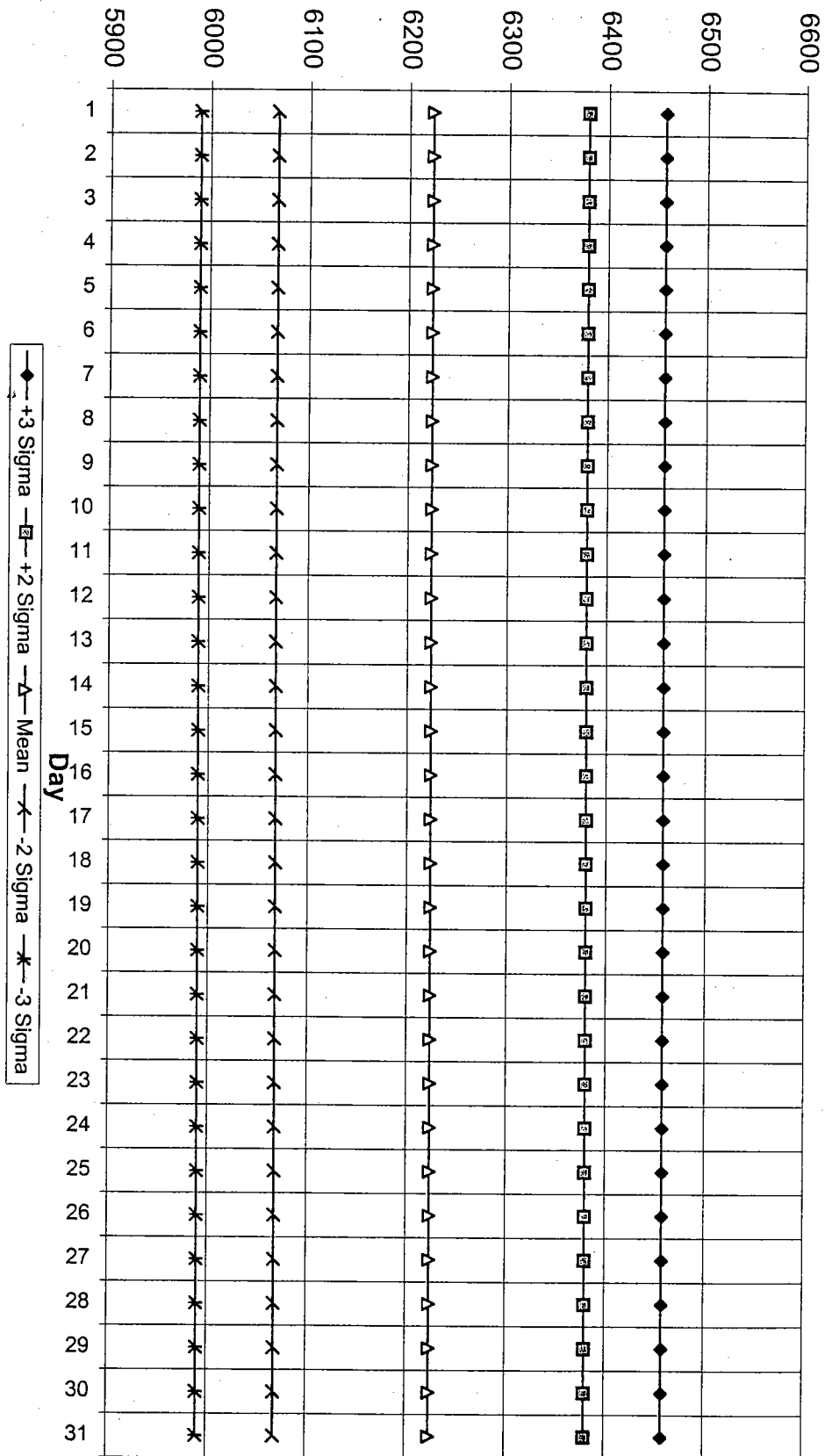
Reduced Chi Pass/Fail= PASS

Performed By/Date Nike Pauli / 4-30-02

Reviewed By/Date James J. Pauli / 5-2-02

Counts (NCPM)

Control Chart Month Of _____ 20____
 Instrument _____, Source# _____, Isotope _____



Reviewed By _____ Date _____

Initials/Date: MP 4/30/02

Instrument ID: 142645

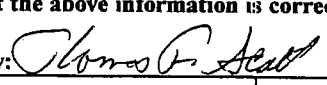
Source and Background Plateau Worksheet								
High Voltage	Background		Alpha Source		Beta Source		Cross Talk	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	α to β	β to α
600								
650								
700								
750								
800	Not	Required:	As	Founds	Within	Tolerance		
850								
900		HV	Left	As	Found			
950								
1000								
1050								
1100								
1150								
1200								
1250								
1300								
Statement of Certification								
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).								
Instrument			I certify that the above information is correct:					
Calibrated By: M. Paul			Reviewed By:			Date:		
Calibration Date: 04/30/02					Calibration Due: 04/30/03			

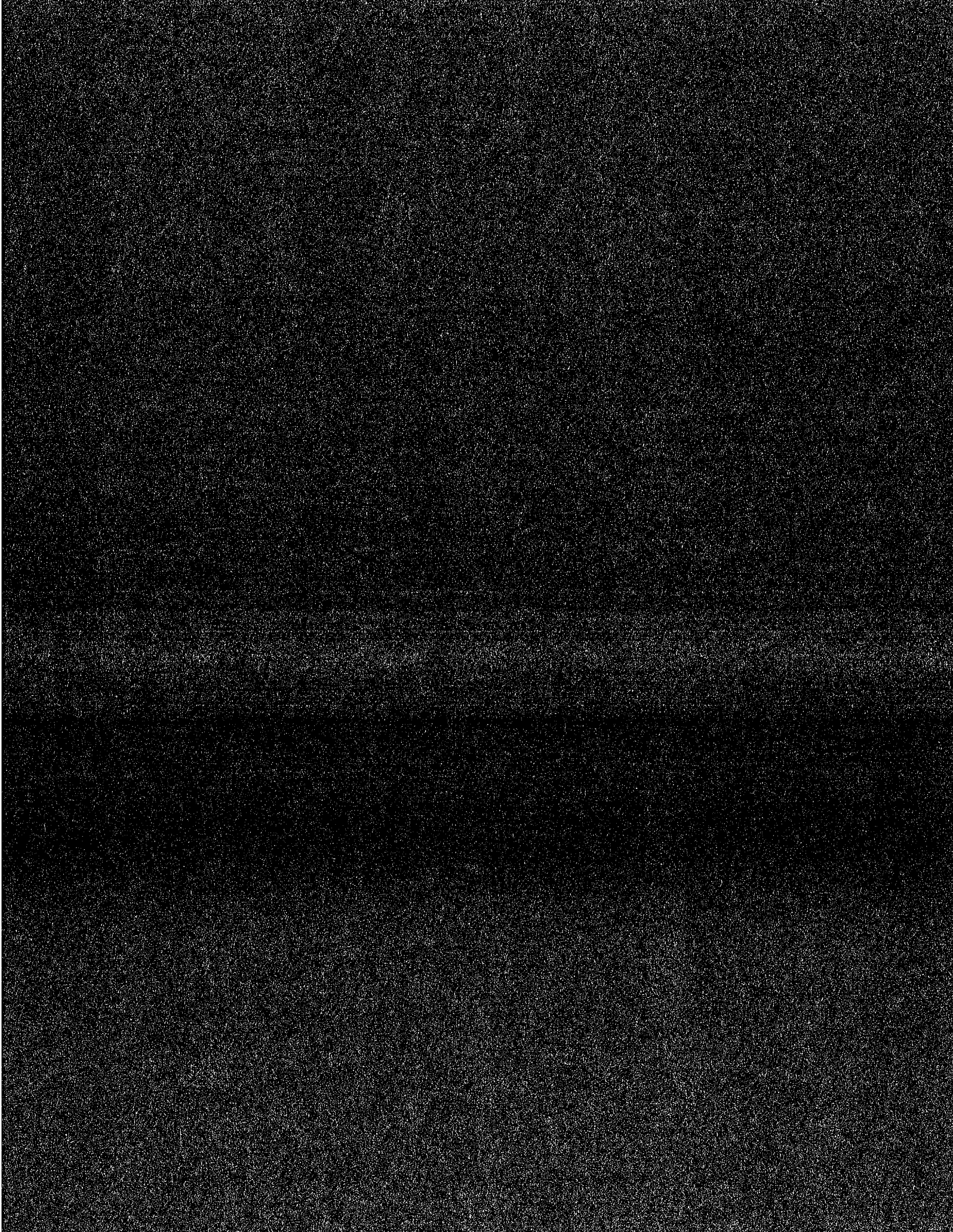


CALIBRATION CERTIFICATE

Duratek Instrument Services
628 Gallaher Road
Kingston, TN 37763
Phone: (865) 376-8337
Fax: (865) 376-8331

This Certificate will be accompanied by Calibration Charts or Readings where applicable

Customer Information				Instrument Information			
Customer Name: Duratek, Inc.				Manufacturer: Victoreen			
Address: 628 Gallaher Road Kingston, TN. 37748				Model: 450P		Serial Number: 1757	
Contact Name: Tom Scott				Probe: N/A		Serial Number: N/A	
P.O. Number: N/A		Work Order Number: 2002-00554		Calibration Method: Electronic and Source			
Instrument Calibration Information							
Instrument Range	Calibration Value	Tolerance ($\pm 10\%$)	Instrument Response		Comments		
			Before Calibration	After Calibration			
µR/hr					DVM: 6565015 Cal Due: 09/25/02		
AutoRanging	500	(450-550)	600	510	D-814: 2551 Cal Due: 09/12/02		
mR/hr					Timer: 2222601 Cal Due: 02/26/02		
AutoRanging	5	(4.5-5.5)	4.2	50	Psychron: 5546 Cal Due: 06/12/02		
AutoRanging	50	(45-55)	42	53			
AutoRanging	500	(450-550)	400	491	Geotropism: SAT Zero: SAT		
R/hr					Batteries: SAT Precision Test: SAT		
AutoRanging	5	(4.5-5.5)	4.3	5.06	Overrange: SAT		
Integrate	1.33mR/hr	1.197-1.463 mR/hr	1.18mR/hr	1.33mR/hr	Temp: 22.8°C Pressure: 743mmHg		
			Exposed to 80mr/hr field for 1 minute		Humidity: 55%		
CALIBRATION FACTORS							
Factor #		Value	As Found	As Left	Cs137 #019701/#019702 Cert Date: 07/12/01		
1		500uR/hr	90	104	Cs137 #049711 Cert Date: 03/27/02		
2		5mR/hr	90	106			
3		50mR/hr	88	110			
4		500mR/hr	92	118	Calibrated in accordance with original equipment technical manual.		
5		5R/hr	94	111			
6		Integrated Dose	100/109	100/95			
Blink Alarm			4.5R/hr	4.5R/hr			
Statement of Certification							
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).							
Instrument		I certify that the above information is correct:					
Calibrated By: 		Reviewed By: 		Date: 5-10-02			
Calibration Date: 05/08/02				Calibration Due: 05/08/03			



INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: MICRO R METER SOURCE ISOTOPE: Cs-137 S/N: 4952 ACTIVITY: 1 μ Ci (10/01/95)

MFG: Ludlum MODEL: 19 S/N: 142645 CAL DATE: 4/30/02 CAL DUE: 4/10/03

DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	SCALE	BKG RATE μ R/hr	SOURCE RATE μ R/hr
11/11/02	Dwm	Yes	Good	0	Yes	Yes	500	17	290
11/12/02	Jack Todaro	Yes	Good	0	OK	OK	500 25	16	290
11/13/02	Dwm	Yes	Good	0	Yes	OK	500	16	290
11/14/02	Jack Todaro	Y	OK	0	OK	OK	500	17	270
11/15/02	Dwm	Y	Y	0	Yes	Yes	500	17	280
<u>11/16/02</u>		POWER	BATTERY	RESIST	LIGHT	AUDIO	SCALE	BKG RATE μ R/hr	SOURCE RATE μ R/hr
DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	SCALE	BKG RATE μ R/hr	SOURCE RATE μ R/hr

COMMENTS:

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: MICRO R METER SOURCE ISOTOPE: Cs-137 S/N: 4952 ACTIVITY: 1 μ Ci (10/01/95)

MFG: Ludlum MODEL: 19 S/N: 142645 CAL DATE: 4/30/02 CAL DUE: 4-10-03

DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	SCALE	BKG RATE μ R/hr	SOURCE RATE μ R/hr
11-18-2002	Jack Todaro	OK	OK	0	OK	OK	500	17	270
11-19-2002	DWM	OK	good	0	OK	OK	500	17	2280
11-20-2002	Jack Todaro	OK	OK	0	OK	0	500	17	270
11-21-2002	Jack Todaro	OK	OK	0	0	OK	500	17	280
DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	SCALE	BKG RATE μ R/hr	SOURCE RATE μ R/hr
DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	SCALE	BKG RATE μ R/hr	SOURCE RATE μ R/hr
DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	SCALE	BKG RATE μ R/hr	SOURCE RATE μ R/hr

COMMENTS:

11-21 B. Harris replaced
#905

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: MICRO R METER SOURCE ISOTOPE: Cs-137 S/N: 4952 ACTIVITY: 1 μ Ci (10/01/95)

MFG: Ludlum MODEL: 19 S/N: CAL DATE: 8-4-03 CAL DUE: 8-4-03

DATE 2-26-03	NAME Jack Todaro	POWER OK	BATTERY OK	RESIST OK	LIGHT OK	AUDIO OK	BKG RATE μ R/hr 22	SCALE 25	SOURCE RATE μ R/hr 160
DATE 2-27-03	NAME Jack Todaro	POWER OK	BATTERY OK	RESIST OK	LIGHT OK	AUDIO OK	BKG RATE μ R/hr 22	SCALE 50	SOURCE RATE μ R/hr 150
DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	BKG RATE μ R/hr	SCALE	SOURCE RATE μ R/hr
DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	BKG RATE μ R/hr	SCALE	SOURCE RATE μ R/hr
DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	BKG RATE μ R/hr	SCALE	SOURCE RATE μ R/hr
DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	BKG RATE μ R/hr	SCALE	SOURCE RATE μ R/hr
DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	BKG RATE μ R/hr	SCALE	SOURCE RATE μ R/hr
DATE	NAME	POWER	BATTERY	RESIST	LIGHT	AUDIO	BKG RATE μ R/hr	SCALE	SOURCE RATE μ R/hr

COMMENTS:

955400

0070-1-10308

E: Cs-137 S/N: 4952 ACTIVITY: 1 μ Ci (10/01/95)

#: 129423 CAL DATE: 10/01/2002 CAL DUE: 10/02/2003

#: 185844 CAL DATE: 09/29/2002 CAL DUE: 3/27/2003

[illegible]

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: CHIEF SOURCE ISOTOPE: Cs-137 S/N: 4952 ACTIVITY: 1 μ Ci (10/01/95)

MFG: Ludlum MODEL: 2350 SCALER INSTR#: 129440 CAL DATE: 9/30/2002 CAL DUE: 9/30/2003

MFG: Ludlum MODEL: 44-10 SCALER INSTR#: 074140 CAL DATE: 11/15/2002 CAL DUE: 9/30/2003

958 $\pm$ 80

DATE	NAME	BATTERY	HV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT	SOURCE COUNT
12-2-2002	Todaro	5.8	1250	10	971	10	44385	
12-3-02 12-2-	Mercer	5.8	1250		975		47888	
DATE	NAME	BATTERY	HV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT	SOURCE COUNT
12-4-02	Mercer	5.5	1250		1023		45283	
				10		10		
DATE	NAME	BATTERY	HV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT	SOURCE COUNT
12-5-02	Todaro	5.8	1250	10	1000	10	50712	
DATE	NAME	BATTERY	HV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT	SOURCE COUNT
12-6	Mercer	5.5	1250		950		43524	
		Changed battery		10		10		

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: CHIEF SOURCE ISOTOPE: Cs-137 S/N: 4952 ACTIVITY: 1 μ Ci (10/01/95)

MFG: Ludlum MODEL: 2350 SCALER INSTR#: 129440 CAL DATE: 9/30/2002 CAL DUE: 9/30/2003

MFG: Ludlum MODEL: 44-10 SCALER INSTR#: 074140 CAL DATE: 11/15/2002 CAL DUE: 9/30/2003

DATE	NAME	BATTERY	HV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT
12-10	Todaro	6.0	1250	10	949	10	48304
12-16	Todaro	5.7	1250	10	1020	10	49262
12-17	Mercer	5.8	1250	10	NA	10 12	55013
12-18	Mercer	5.7	1250	10	983	10	46358
12-19	Mercer	6.0	1250	10	1016	10	47391

12-20 Todaro 5.1 1250 10 990 10 50313

12-21 Todaro 5.7 1250 10 47493

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112
 INSTRUMENT ID: CHIEF SOURCE ISOTOPE: Cs-137 S/N: 4952 ACTIVITY: 1 μ Ci (10/01/95)
 MFG: Ludlum MODEL: 2350 SCALER INSTR#: 129440 CAL DATE: 9/30/2002 CAL DUE: 9/30/2003
 MFG: Ludlum MODEL: 44-10 SCALER INSTR#: 074140 CAL DATE: 11/15/2002 CAL DUE: 9/30/2003

DATE	NAME	BATTERY	HV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT
1/3/03	Mercer	5.6	1250			407 10	40773
1/3/03	Jack Todaro	5.5	1750	10	13,200	10	47780
1/3/03	Jack Todaro	5.5	1300	10	967	10	42779
1/6/03	Mercer	5.9	1300	10	979	10	42112
1/7/03	Mercer	5.7	1300	10	999	10	43522

3-03 Comments 1-3-02 - New 20 foot cable installed - boosted HV to

3-03 1750 V.
 - Voltage adjusted to 1300 because 1750 too high

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: CHIEF SOURCE ISOTOPE: Cs-137 S/N: 4952 ACTIVITY: 1 μ Ci (10/01/95)

MFG: Ludlum MODEL: 2350 SCALER INSTR#: 129440 CAL DATE: 9/30/2002 CAL DUE: 9/30/2003

DATE	NAME	BATTERY	-IV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT
1/8/03	Mercer	6.2	1300	10	975	10	41804
DATE	NAME	BATTERY	-IV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT
1/9/03	Mercer	5.9	1300	10	911	10	44993
DATE	NAME	BATTERY	-IV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT
1/10/03	Mercer	5.9	1300	10	3630	10	52666
DATE	NAME	BATTERY	-IV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT
1/10/03	Todaro	5.9	1300	10		10	40247
DATE	NAME	BATTERY	-IV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT

MFG: Ludlum MODEL: 44-10 SCALER INSTR#: 074140 CAL DATE: 11/15/2002 CAL DUE: 9/30/2003

* took off collimator

① New Cable

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: CHIEF SOURCE ISOTOPE: Cs-137 S/N: 4952 ACTIVITY: 1 μ Ci (10/01/95)

MFG: Ludlum MODEL: 2350 SCALER INSTR#: 129440 CAL DATE: 9/30/2002 CAL DUE: 9/30/2003

MFG: Ludlum MODEL: 44-10 SCALER INSTR#: 074140 CAL DATE: 11/15/2002 CAL DUE: 9/30/2003

DATE	NAME	BATTERY	HV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT
1-13-03	Mercer	6.0	1300	10	1005	10	42531
1-23-03	Mercer	5.7	1300	10	1010	10	38798
1-27-03	Mercer	6.2	1300	10	1206	10	47825
1-28-03	Mercer	5.8	1300	10	2775	10	48506
1-29-03	Jack Todaro	6.2	1300	10	2840	10	49384

*different
cond-
no
collimator

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: CHIEF SOURCE ISOTOPE: Cs-137 S/N: 4952 ACTIVITY: 1 μ Ci (10/01/95)

MFG: Ludlum MODEL: 2350 SCALER INSTR#: 129440 CAL DATE: 9/30/2002 CAL DUE: 9/30/2003

MFG: Ludlum MODEL: 44-10 SCALER INSTR#: 074140 CAL DATE: 11/15/2002 CAL DUE: 9/30/2003

DATE 1-30-03	NAME Jack Todaro	BATTERY 5.8	HV 1300	BKG COUNT TIME (SEC) 10	BKG COUNT 3279	SOURCE COUNT TIME (SEC) 10 55120g	SOURCE COUNT 55,180
DATE 1-31-03	NAME Jack Todaro	BATTERY 5.9	HV 1300	BKG COUNT TIME (SEC) 10	BKG COUNT 3461	SOURCE COUNT TIME (SEC) 10	SOURCE COUNT 52,838
DATE 2/1/03	NAME Mercer	BATTERY 5.9	HV 1300	BKG COUNT TIME (SEC) 10	BKG COUNT 3400	SOURCE COUNT TIME (SEC) 10	SOURCE COUNT 47520
DATE	NAME	BATTERY	HV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT
DATE	NAME	BATTERY	HV	BKG COUNT TIME (SEC)	BKG COUNT	SOURCE COUNT TIME (SEC)	SOURCE COUNT

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: PROBE 1 SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2221 S/N: 86330 CAL DATE: 5/14/02 CAL DUE: 5-14-03

PROBE: Ludlum MODEL: 43-5 S/N: 172236 CAL DATE: 5/14/02 CAL DUE: 4-23-03

BKG cpm 4.2 Bkg Range 2.9-5.5 cpm Eff. 0.134 Eff Range 0.129-0.139 Limit cpm 335
~~1-13-2002~~ 4.2 ~~2.99-5.61~~ 12.6% ~~12.2~~ 13.0%

DATE	BKG COUNT	NAME	COUNT TIME (min)	POWER	BATTERY	HV	SOURCE COUNT	THRESHOLD	COUNT TIME (min)	WINDOW	LIGHT	COMMENTS
11-11-2002	51	Jack Todaro	10	OK	6.0	605	2306	101	1	3960	OK	2306/7,100
				BKG CPM	BKG OK?					COUNT CPM	EFFICIENCY	EFF. OK?
				5.1	Yes					2306	0.135	Yes
11/12/2002	48	Jack Todaro	10	OK	6	606		101		3959	OK	COMMENTS
				BKG CPM	BKG OK?					COUNT CPM	EFFICIENCY	EFF. OK?
				4.3	YES					2315	13.5%	YES
11-13-2002	34	Jack Todaro	10	OK	5.9	605		101		3960	OK	COMMENTS
				BKG CPM	BKG OK?					COUNT CPM	EFFICIENCY	EFF. OK?
				3.4	Yes					2130		Failed Due to new Mylar
11-14-2002	36	Jack Todaro	10	OK	5.8	605		101		3961	OK	COMMENTS
				BKG CPM	BKG OK?					COUNT CPM	EFFICIENCY	EFF. OK?
				3.6	Yes					2122	12.4%	OK
11/15/02	45	DM	10 min	Yes	5.8	606		102		3963	Yes	COMMENTS
				BKG CPM	BKG OK?					COUNT CPM	EFFICIENCY	EFF. OK?
				4.5	Yes					2165	12.6%	OK
				POWER	BATTERY	HV				WINDOW	LIGHT	COMMENTS
										COUNT CPM	EFFICIENCY	EFF. OK?
				BKG CPM	BKG OK?					COUNT CPM	EFFICIENCY	EFF. OK?
										WINDOW	LIGHT	COMMENTS
										COUNT CPM	EFFICIENCY	EFF. OK?
				POWER	BATTERY	HV				WINDOW	LIGHT	COMMENTS
										COUNT CPM	EFFICIENCY	EFF. OK?
				BKG CPM	BKG OK?					COUNT CPM	EFFICIENCY	EFF. OK?
										WINDOW	LIGHT	COMMENTS
										COUNT CPM	EFFICIENCY	EFF. OK?

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: PROBE 2 SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2221 S/N: 97830 CAL DATE: 10/29/02 CAL DUE: 4-29-03

PROBE: Ludlum MODEL: 43-5 S/N: 117588 CAL DATE: 10/29/02 CAL DUE: 4-29-03

BKG cpm 4.4 Bkg Range 3.1-5.7 Eff. 13.4% Eff Range 12.9% - 13.9% Limit cpm 335

DATE 11-11-2002 BKG COUNT 54	NAME Jack Todorov COUNT TIME (min) 1	POWER OK BKG CPM 5.4	BATTERY 5.6 BKG OK? Y	HV 660 SOURCE COUNT 2239	THRESHOLD 10.5 COUNT TIME (min) 1	WINDOW 4063 COUNT CPM 2239	LIGHT OK EFFICIENCY 13.1%	COMMENTS EFF. OK? Y
DATE 11-12-2002 BKG COUNT 31	NAME Jack Todorov COUNT TIME (min) 10	POWER OK BKG CPM 3.1	BATTERY 6 BKG OK? YES	HV 655 SOURCE COUNT 2311	THRESHOLD 100 COUNT TIME (min) 1	WINDOW 4067 COUNT CPM 2311	LIGHT OK EFFICIENCY 13.5%	COMMENTS EFF. OK? YES
DATE 11-13-2002 BKG COUNT 43	NAME Jack Todorov COUNT TIME (min) 8-40-31	POWER OK BKG CPM 4.3	BATTERY 5.8 BKG OK? YES	HV 656 SOURCE COUNT 2296	THRESHOLD 101 COUNT TIME (min) 1	WINDOW 4068 COUNT CPM 2296	LIGHT YES EFFICIENCY 13.4	COMMENTS EFF. OK? ✓
DATE 11-14-2002 BKG COUNT 52	NAME Jack Todorov COUNT TIME (min) 10	POWER OK BKG CPM 5.2	BATTERY OK BKG OK? OK	HV 655 SOURCE COUNT 2238	THRESHOLD 100 COUNT TIME (min) 1	WINDOW 4066 COUNT CPM 2238	LIGHT OK EFFICIENCY 13.1%	COMMENTS EFF. OK? YES
DATE 11/15/02 BKG COUNT 47	NAME RWM COUNT TIME (min) 10	POWER 4.7 YES BKG CPM 4.7	BATTERY 5.6 BKG OK? OK	HV 656 SOURCE COUNT 2261	THRESHOLD 100 COUNT TIME (min) 1	WINDOW 4068 COUNT CPM 2261	LIGHT YES EFFICIENCY 13.2	COMMENTS EFF. OK? YES
DATE BKG COUNT	NAME COUNT TIME (min)	POWER BKG CPM	BATTERY BKG OK?	HV SOURCE COUNT	THRESHOLD COUNT TIME (min)	WINDOW COUNT CPM	LIGHT EFFICIENCY	COMMENTS EFF. OK?
DATE BKG COUNT	NAME COUNT TIME (min)	POWER BKG CPM	BATTERY BKG OK?	HV SOURCE COUNT	THRESHOLD COUNT TIME (min)	WINDOW COUNT CPM	LIGHT EFFICIENCY	COMMENTS EFF. OK?

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: PROBE 2 SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2221 S/N: 97830 CAL DATE: 10/29/02 CAL DUE: 4-29-03

PROBE: Ludlum MODEL: 43-5 S/N: 117588 CAL DATE: 10/29/02 CAL DUE: 4-29-03

BKG cpm 4.65 Bkg Range 3.69-5.61 Eff. 13.2% Eff Range 12.6-13.8% Limit cpm 330

DATE 11-20	NAME Jack Todor	POWER OK	BATTERY 6.1	HV 654	THRESHOLD 100	WINDOW 4067	LIGHT OK	COMMENTS 2303/17100
BKG COUNT 32-11	COUNT TIME (min) 2	BKG CPM 5.5	BKG OK? YES	SOURCE COUNT 2303	COUNT TIME (min) 1	COUNT CPM 2303	EFFICIENCY 13.5%	EFF. OK? OK
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112 *FOR WEDC ENDING 1-4-03*
 INSTRUMENT ID: PROBE 2 SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm
 SCALER: Ludlum MODEL: 2221 S/N: 97830 CAL DATE: 10/29/02 CAL DUE: 4-29-03
 PROBE: Ludlum MODEL: 43-5 S/N: 117588 CAL DATE: 10/29/02 CAL DUE: 4-29-03
 BKG cpm 5 Bkg Range 3.6-6.4 Eff. 13.3% Eff Range 12.8-13.8 Limit cpm 333

DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: PROBE 2 SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2221 S/N: 97830 CAL DATE: 10/29/02 CAL DUE: 4-29-03

PROBE: Ludlum MODEL: 43-5 S/N: 117588 CAL DATE: 10/29/02 CAL DUE: 4-29-03

BKG cpm 403 cpm Bkg Range 3-5.6 cpm Eff. 13.3% Eff Range 12.9-13.7 % Limit cpm 333 cpm

DATE 1-8-03 BKG COUNT 5	NAME T. Odaro COUNT TIME (min) 1	POWER OK BKG CPM 5	BATTERY 6.2 BKG OK? Yes	HV 662 SOURCE COUNT 2226	THRESHOLD 103 COUNT TIME (min) 1	WINDOW 4093 COUNT CPM 2226	LIGHT OK EFFICIENCY 13.0%	COMMENTS 2226/17100 EFF. OK? Yes
DATE 1-9-03 BKG COUNT 4	NAME J. T. Odaro COUNT TIME (min) 1	POWER OK BKG CPM 4	BATTERY 6.1 BKG OK? OK	HV 670 SOURCE COUNT 2322	THRESHOLD 108 COUNT TIME (min) 1	WINDOW 4092 COUNT CPM 2322	LIGHT OK EFFICIENCY 13.6%	COMMENTS EFF. OK? OK
DATE 1-10-03 BKG COUNT 5	NAME J. T. Odaro COUNT TIME (min) 1	POWER OK BKG CPM 5	BATTERY 6.1 BKG OK? Yes	HV 663 SOURCE COUNT 2287	THRESHOLD 102 COUNT TIME (min) 1	WINDOW 4099 COUNT CPM 2287	LIGHT OK EFFICIENCY 13.4%	COMMENTS EFF. OK? Yes
DATE BKG COUNT	NAME COUNT TIME (min)	POWER BKG CPM	BATTERY BKG OK?	HV SOURCE COUNT	THRESHOLD COUNT TIME (min)	WINDOW COUNT CPM	LIGHT EFFICIENCY	COMMENTS EFF. OK?
DATE BKG COUNT	NAME COUNT TIME (min)	POWER BKG CPM	BATTERY BKG OK?	HV SOURCE COUNT	THRESHOLD COUNT TIME (min)	WINDOW COUNT CPM	LIGHT EFFICIENCY	COMMENTS EFF. OK?
DATE BKG COUNT	NAME COUNT TIME (min)	POWER BKG CPM	BATTERY BKG OK?	HV SOURCE COUNT	THRESHOLD COUNT TIME (min)	WINDOW COUNT CPM	LIGHT EFFICIENCY	COMMENTS EFF. OK?
DATE BKG COUNT	NAME COUNT TIME (min)	POWER BKG CPM	BATTERY BKG OK?	HV SOURCE COUNT	THRESHOLD COUNT TIME (min)	WINDOW COUNT CPM	LIGHT EFFICIENCY	COMMENTS EFF. OK?

INSTRUMENT PERFORMANCE LOG

Valid for use: 1-20-03 to 1-26-03

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: **PROBE 2** SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2221 S/N: 97830 CAL DATE: 10/29/02 CAL DUE: 4-29-03

PROBE: Ludlum MODEL: 43-5 S/N: 117588 CAL DATE: 10/29/02 CAL DUE: 4-29-03

BKG cpm 6 Bkg Range 3.0-8.2 ^{cpm} Eff. 13.5% Eff Range 13.2-13.8% Limit cpm 330 / 67

DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
1-21-03	Jack Todaro	OK	6.0	664	103	4096	OK	
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
33	5	6.6	OK	2313	1	2313	13.6	yes
1-23-03	Jack Todaro	OK	6.0	665	105	4095	OK	
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
15-14	2	7	yes	2255	1	2255	13.2%	yes
1-24-03	Jack Todaro	OK	5.9	664	104	4097	OK	
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
12	2	6	OK	2293	1	2293	13.4%	yes
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?

INSTRUMENT PERFORMANCE LOG

Valid for use: 1-24-03 to 1-31-03

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: **PROBE 2** SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2221 S/N: 97830 CAL DATE: 10/29/02 CAL DUE: 4-29-03

PROBE: Ludlum MODEL: 43-5 S/N: 117588 CAL DATE: 10/29/02 CAL DUE: 4-29-03

BKG cpm 5.9 Bkg Range 4.4-7.4 Eff. 13.2% Eff Range 12.07-13.7% Limit cpm 330/66

DATE 1-27-03 BKG COUNT 14	NAME Jack Tabor COUNT TIME (min) 2	POWER 0.2 BKG CPM 7	BATTERY 5.9 BKG OK? yes	HV 663 SOURCE COUNT 2232	THRESHOLD 103 COUNT TIME (min) 1	WINDOW 41099 COUNT CPM 2232	LIGHT OK EFFICIENCY 13.3%	COMMENTS EFF. OK? yes
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?

INSTRUMENT PERFORMANCE LOG

Valid for use: 1-27-03 to 2-2-03

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: **PROBE 2** SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2221 S/N: 97830 CAL DATE: 10/29/02 CAL DUE: 4-29-03

PROBE: Ludlum MODEL: 43-5 S/N: 117588 CAL DATE: 10/29/02 CAL DUE: 4-29-03

BKG cpm 2.1 Bkg Range 1.2-3.0 Eff. 11.4% Eff Range 10.9%-11.9% Limit cpm 285 / 57

DATE 1-23-03 BKG COUNT 2	NAME Jack Tabor COUNT TIME (min) 1	POWER OK BKG CPM 2	BATTERY 6.1 BKG OK? OK	HV 666 SOURCE COUNT 2012	THRESHOLD 104 COUNT TIME (min) 1	WINDOW 4104 COUNT CPM 2012	LIGHT OK EFFICIENCY 11.8%	COMMENTS EFF. OK? YES
DATE 1-24-03 BKG COUNT 3	NAME Jack Tabor COUNT TIME (min) 1	POWER OK BKG CPM 3	BATTERY 6.3 BKG OK? OK	HV 665 SOURCE COUNT 2023	THRESHOLD 102 COUNT TIME (min) 1	WINDOW 4112 COUNT CPM 2023	LIGHT OK EFFICIENCY 11.8%	COMMENTS EFF. OK? YES
DATE 1-30-03 BKG COUNT 5	NAME Jack Tabor COUNT TIME (min) 2	POWER OK BKG CPM 2.5	BATTERY 5.9 BKG OK? YES	HV 666 SOURCE COUNT 1951	THRESHOLD 103 COUNT TIME (min) 1	WINDOW 4108 COUNT CPM 1951	LIGHT OK EFFICIENCY 11.4%	COMMENTS EFF. OK? YES
DATE 1-31-03 BKG COUNT 5	NAME Jack Tabor COUNT TIME (min) 2	POWER OK BKG CPM 2.5	BATTERY 5.8 BKG OK? OK	HV 664 SOURCE COUNT 1947	THRESHOLD 100 COUNT TIME (min) 1	WINDOW 4110 COUNT CPM 1947	LIGHT OK EFFICIENCY 11.3%	COMMENTS EFF. OK? OK
DATE 2-11-03 BKG COUNT 6	NAME Merar COUNT TIME (min) 2	POWER OK BKG CPM 3.0	BATTERY 5.7 BKG OK? OK	HV 662 SOURCE COUNT 1958	THRESHOLD 101 COUNT TIME (min) 1	WINDOW 4106 COUNT CPM 1958	LIGHT YES EFFICIENCY 11.4	COMMENTS EFF. OK? OK
DATE BKG COUNT	NAME COUNT TIME (min)	POWER BKG CPM	BATTERY BKG OK?	HV SOURCE COUNT	THRESHOLD COUNT TIME (min)	WINDOW COUNT CPM	LIGHT EFFICIENCY	COMMENTS EFF. OK?
DATE BKG COUNT	NAME COUNT TIME (min)	POWER BKG CPM	BATTERY BKG OK?	HV SOURCE COUNT	THRESHOLD COUNT TIME (min)	WINDOW COUNT CPM	LIGHT EFFICIENCY	COMMENTS EFF. OK?

INSTRUMENT PERFORMANCE LOG

PROBE 2

PROJECT NAME: CSMRI PROJECT ID: 2112

SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2221 S/N: CAL DATE: 4-29-03

PROBE: Ludlum MODEL: 43-5 S/N: CAL DATE: 4-29-03

BKG cpm 5.1 Bkg Range 3.7-6.5 Eff 13.5% Eff Range 12.9-14.1% Limit cpm 338

DATE 2-27-03	NAME Todor	POWER OK	BATTERY 6.2	HV 664	THRESHOLD 100	WINDOW 4115	LIGHT OK	COMMENTS EFF. OK?
BKG COUNT 5	COUNT TIME (min) 1	BKG CPM 5	BKG OK? YES	SOURCE COUNT 2311	COUNT TIME (min) 1	COUNT CPM 2311	EFFICIENCY 0.135	EFF. OK? YES
DATE 3-3-03	NAME Todor	POWER OK	BATTERY 6.2	HV 663	THRESHOLD 100	WINDOW 4115	LIGHT OK	COMMENTS
BKG COUNT 5	COUNT TIME (min) 1	BKG CPM 5	BKG OK? OK	SOURCE COUNT 2364	COUNT TIME (min) 1	COUNT CPM 2364	EFFICIENCY 13.3%	EFF. OK? YES
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	NAME	POWER	BATTERY	HV	THRESHOLD	WINDOW	LIGHT	COMMENTS
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: SWIPE COUNTER SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2929 SN: 142645 CAL DATE: 4/30/02 CAL DUE: 4-30-03

PROBE: Ludlum MODEL: 43-10-1 S/N: 144756 CAL DATE: 4/30/02 CAL DUE: 4-30-03

BKG cpm	0	Bkg Range	0 - 1 cpm	Eff. 0.326	Eff Range 0.317 - 0.335	Limit cpm	326 cpm
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DATE		COUNT TIME (min)		NAME		POWER		HV		COUNT CPM		COMMENTS	
BKG COUNT	0	11-11-2002	10	BKG CPM	0	BKG OK?	Yes	SOURCE COUNT	5466	COUNT TIME (min)	750	EFFICIENCY	5466/17,100
												0.320 EFF. OK? Yes	
DATE		COUNT TIME (min)		NAME		POWER		HV		COUNT CPM		COMMENTS	
BKG COUNT	0	11-12-2002	10	BKG CPM	0	BKG OK?	OK	SOURCE COUNT	5481	COUNT TIME (min)	750	EFFICIENCY	5481/17,100
												BKG CPM - 5481/17,100 = 32.1% EFF. OK? Yes	
DATE		COUNT TIME (min)		NAME		POWER		HV		COUNT CPM		COMMENTS	
BKG COUNT	0	11-13-2002	1	BKG CPM	0	BKG OK?	Yes	SOURCE COUNT	5646	COUNT TIME (min)	750	EFFICIENCY	5646/17,100 = 32.9% EFF. OK? Yes
												BKG CPM - 5646/17,100 = 32.9% EFF. OK? Yes	
DATE		COUNT TIME (min)		NAME		POWER		HV		COUNT CPM		COMMENTS	
BKG COUNT	0	11-14-2002	10	BKG CPM	0	BKG OK?	Yes	SOURCE COUNT	5527	COUNT TIME (min)	750	EFFICIENCY	5527/17,100 = 32.3% EFF. OK? Yes
												BKG CPM - 5527/17,100 = 32.3% EFF. OK? Yes	
DATE		COUNT TIME (min)		NAME		POWER		HV		COUNT CPM		COMMENTS	
BKG COUNT	1	11/15/02	10	BKG CPM	1	BKG OK?	Yes	SOURCE COUNT	5466	COUNT TIME (min)	750	EFFICIENCY	5466/17,100 = 32.0% EFF. OK? Yes
												BKG CPM - 5466/17,100 = 32.0% EFF. OK? Yes	
DATE		COUNT TIME (min)		NAME		POWER		HV		COUNT CPM		COMMENTS	
BKG COUNT	0	11-15-2002	10	BKG CPM	0	BKG OK?	OK	SOURCE COUNT	5481	COUNT TIME (min)	750	EFFICIENCY	5481/17,100 = 32.1% EFF. OK? Yes
												BKG CPM - 5481/17,100 = 32.1% EFF. OK? Yes	
DATE		COUNT TIME (min)		NAME		POWER		HV		COUNT CPM		COMMENTS	
BKG COUNT	0	11-16-2002	10	BKG CPM	0	BKG OK?	OK	SOURCE COUNT	5481	COUNT TIME (min)	750	EFFICIENCY	5481/17,100 = 32.1% EFF. OK? Yes
												BKG CPM - 5481/17,100 = 32.1% EFF. OK? Yes	
DATE		COUNT TIME (min)		NAME		POWER		HV		COUNT CPM		COMMENTS	
BKG COUNT	0	11-17-2002	10	BKG CPM	0	BKG OK?	OK	SOURCE COUNT	5481	COUNT TIME (min)	750	EFFICIENCY	5481/17,100 = 32.1% EFF. OK? Yes
												BKG CPM - 5481/17,100 = 32.1% EFF. OK? Yes	
DATE		COUNT TIME (min)		NAME		POWER		HV		COUNT CPM		COMMENTS	
BKG COUNT	0	11-18-2002	10	BKG CPM	0	BKG OK?	OK	SOURCE COUNT	5481	COUNT TIME (min)	750	EFFICIENCY	5481/17,100 = 32.1% EFF. OK? Yes
												BKG CPM - 5481/17,100 = 32.1% EFF. OK? Yes	

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: SWIPE COUNTER SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2929 S/N: 142645 CAL DATE: 4/30/02 CAL DUE: 4-30-02

PROBE: Ludlum MODEL: 43-10-1 S/N: 144756 CAL DATE: 4/30/02 CAL DUE: 4-30-02

BKG cpm 0.4 Bkg Range Max 1 cpm Eff. 32.6% Eff Range 31.5 - 33.7% Limit cpm 326

DATE 11-19-2002	NAME Jack Todaro	POWER OK	HV 750	COMMENTS 5411/17100 =
BKG COUNT 4	BKG CPM 0.4	SOURCE COUNT 5411	COUNT TIME (min) 1	EFFICIENCY 31.6% EFF. OK? YES
DATE 11-20-2002	NAME Jack Todaro	POWER OK	HV 750	COMMENTS 5423/17100
BKG COUNT 3	BKG CPM 0.3	SOURCE COUNT 5423	COUNT TIME (min) 1	EFFICIENCY 31.7% EFF. OK? OK
DATE	NAME	POWER	HV	COMMENTS
BKG COUNT	BKG CPM	SOURCE COUNT	COUNT TIME (min)	EFFICIENCY EFF. OK?
DATE	NAME	POWER	HV	COMMENTS
BKG COUNT	BKG CPM	SOURCE COUNT	COUNT TIME (min)	EFFICIENCY EFF. OK?
DATE	NAME	POWER	HV	COMMENTS
BKG COUNT	BKG CPM	SOURCE COUNT	COUNT TIME (min)	EFFICIENCY EFF. OK?
DATE	NAME	POWER	HV	COMMENTS
BKG COUNT	BKG CPM	SOURCE COUNT	COUNT TIME (min)	EFFICIENCY EFF. OK?
DATE	NAME	POWER	HV	COMMENTS
BKG COUNT	BKG CPM	SOURCE COUNT	COUNT TIME (min)	EFFICIENCY EFF. OK?

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: SWIPE COUNTER **SOURCE ISOTOPE: TH-230** **S/N: 99TH470** **ACTIVITY: 17,100 dpm**

SCALER: Ludlum MODEL: 2929 S/N: 142645 CAL DATE: 4/30/02 CAL DUE: 4-30-03

PROBE: Ludlum MODEL: 43-10-1 S/N: 144756 CAL DATE: 4/30/02 CAL DUE: 4-30-03

BKG cpm	Bkg Range	0-10 cpm	Eff. Range	31.7%	Limit cpm	10/10 kW = 1 cpm
0.69	0-10 cpm	0-10 cpm	32.4%	33.1%		
0.4	0-1 cpm	0-1 cpm				

DATE		COUNT TIME (min)		NAME		POWER		HV		COUNT CPM		EFFICIENCY		COMMENTS	
BKG COUNT	12-9-2002	6	10	BKG CPM	0.6	BKG OK?	Yes	SOURCE COUNT	5551	COUNT TIME (min)	750	COUNT CPM	5551	EFF. OK?	Yes
BKG COUNT	12-11-2002	3	10	BKG CPM	0.3	BKG OK?	Yes	SOURCE COUNT	5586	COUNT TIME (min)	750	COUNT CPM	5586	EFF. OK?	Yes
BKG COUNT	12-13-2002	2	10	BKG CPM	0.2	BKG OK?	Yes	SOURCE COUNT	5563	COUNT TIME (min)	750	COUNT CPM	5563	EFF. OK?	Yes
BKG COUNT				BKG CPM		BKG OK?		SOURCE COUNT		COUNT TIME (min)		COUNT CPM		EFF. OK?	
BKG COUNT				BKG CPM		BKG OK?		SOURCE COUNT		COUNT TIME (min)		COUNT CPM		EFF. OK?	
BKG COUNT				BKG CPM		BKG OK?		SOURCE COUNT		COUNT TIME (min)		COUNT CPM		EFF. OK?	
BKG COUNT				BKG CPM		BKG OK?		SOURCE COUNT		COUNT TIME (min)		COUNT CPM		EFF. OK?	
BKG COUNT				BKG CPM		BKG OK?		SOURCE COUNT		COUNT TIME (min)		COUNT CPM		EFF. OK?	

INSTRUMENT PERFORMANCE LOG

PROJECT NAME: CSMRI PROJECT ID: 2112 *For week ending -1-4-03*
 INSTRUMENT ID: SWIPE COUNTER SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm
 SCALER: Ludlum MODEL: 2929 S/N: 142645 CAL DATE: 4/30/02 CAL DUE: 4-30-03
 PROBE: Ludlum MODEL: 43-10-1 S/N: 144756 CAL DATE: 4/30/02 CAL DUE: 4-30-03 *Bkg*
 BKG cpm 003 Bkg Range 0-1 Eff. 32.3% Eff Range 31.3-33.3% Limit cpm 323

BKG COUNT	COUNT TIME (min)	NAME		POWER	H.V.	COMMENTS		
		BKG CPM	BKG OK?			SOURCE COUNT	COUNT CPM	EFF. OK?
DATE		NAME		POWER	H.V.	COMMENTS		
		BKG CPM	BKG OK?			SOURCE COUNT	COUNT CPM	EFF. OK?
DATE		NAME		POWER	H.V.	COMMENTS		
		BKG CPM	BKG OK?			SOURCE COUNT	COUNT CPM	EFF. OK?
DATE		NAME		POWER	H.V.	COMMENTS		
		BKG CPM	BKG OK?			SOURCE COUNT	COUNT CPM	EFF. OK?
DATE		NAME		POWER	H.V.	COMMENTS		
		BKG CPM	BKG OK?			SOURCE COUNT	COUNT CPM	EFF. OK?
DATE		NAME		POWER	H.V.	COMMENTS		
		BKG CPM	BKG OK?			SOURCE COUNT	COUNT CPM	EFF. OK?
DATE		NAME		POWER	H.V.	COMMENTS		
		BKG CPM	BKG OK?			SOURCE COUNT	COUNT CPM	EFF. OK?

PROJECTNAME: CSMRI PROJECT ID: 2112

PROJECTNAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: SWIPE COUNTER SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2929 S/N: 142645 CAL DATE: 4/30/02 CAL DUE: 4-30-03

PROBE: Ludlum MODEL: 43-10-1 S/N: 144756 CAL DATE: 4/30/02 CAL DUE: 4-30-03

BKG cpm	Bkg Range	Eff.	Eff Range	Limit cpm
0.37	0-1 cpm	32.5%	3/6-33.4%	325

DATE		COUNT TIME (min)		NAME		POWER		HV		COMMENTS	
BKG COUNT	COUNT TIME (min)	BKG CPV	BKG CK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFF. OK?	COUNT CPM	EFF. OK?	EFFICIENCY	EFF. OK?
1-8-03	2	10	0.2	Yes	OK	5593	Yes	5593	Yes	32.7%	Yes
COMMENTS											
DATE		COUNT TIME (min)		NAME		POWER		HV		COMMENTS	
BKG COUNT	COUNT TIME (min)	BKG CPV	BKG CK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFF. OK?	COUNT CPM	EFF. OK?	EFFICIENCY	EFF. OK?
1-9-03	1		J. Todor	OK	750	5657	Yes	5657	Yes	33.1	Yes
COMMENTS											
DATE		COUNT TIME (min)		NAME		POWER		HV		COMMENTS	
BKG COUNT	COUNT TIME (min)	BKG CPV	BKG CK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFF. OK?	COUNT CPM	EFF. OK?	EFFICIENCY	EFF. OK?
1-10-03	2	1	J. Todor	Yes	OK	5522	Yes	5522	Yes	32.2%	Yes
COMMENTS											
DATE		COUNT TIME (min)		NAME		POWER		HV		COMMENTS	
BKG COUNT	COUNT TIME (min)	BKG CPV	BKG CK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFF. OK?	COUNT CPM	EFF. OK?	EFFICIENCY	EFF. OK?
DATE		COUNT TIME (min)		NAME		POWER		HV		COMMENTS	
BKG COUNT	COUNT TIME (min)	BKG CPV	BKG CK?	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFF. OK?	COUNT CPM	EFF. OK?	EFFICIENCY	EFF. OK?

INSTRUMENT PERFORMANCE LOG

Valid for use: 1-13-03 to 1-19-03

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: SWIPE COUNTER SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2929 S/N: 142645 CAL DATE: 4/30/02 CAL DUE: 4-30-03

PROBE: Ludlum MODEL: 43-10-1 S/N: 144756 CAL DATE: 4/30/02 CAL DUE: 4-30-03

BKG cpm 0.4 Bkg Range 0-1086 Eff. 33.2 Eff Range 32.3-34.1% Limit cpm 332

0-1 cpm

DATE 1-17-03		NAME Jack Todaro		POWER OK		HV 750		COMMENTS 5600/17100 = 0.327	
BKG COUNT 2	COUNT TIME (min) 10	BKG CPM 0.2	BKG OK? Yes	SOURCE COUNT 5600		COUNT CPM 5600	COUNT TIME (min) 1	EFFICIENCY 32.7%	EFF. OK? Yes
DATE 1-24-03		NAME Jack Todaro		POWER OK		HV 821		COMMENTS	
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT		COUNT CPM	COUNT TIME (min)	EFFICIENCY	EFF. OK?
DATE		NAME		POWER		HV		COMMENTS	
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT		COUNT CPM	COUNT TIME (min)	EFFICIENCY	EFF. OK?
DATE		NAME		POWER		HV		COMMENTS	
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT		COUNT CPM	COUNT TIME (min)	EFFICIENCY	EFF. OK?
DATE		NAME		POWER		HV		COMMENTS	
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT		COUNT CPM	COUNT TIME (min)	EFFICIENCY	EFF. OK?
DATE		NAME		POWER		HV		COMMENTS	
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	SOURCE COUNT		COUNT CPM	COUNT TIME (min)	EFFICIENCY	EFF. OK?

INSTRUMENT PERFORMANCE LOG

Valid for use: 1-20-03 to 1-26-03

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: SWIPE COUNTER SOURCE ISOTOPE: TH-230 S/N: 99TH470 ACTIVITY: 17,100 dpm

SCALER: Ludlum MODEL: 2929 S/N: 142645 CAL DATE: 4/30/02 CAL DUE: 4-30-03

PROBE: Ludlum MODEL: 43-10-1 S/N: 144756 CAL DATE: 4/30/02 CAL DUE: 4-30-03

BKG cpm 0.23 Bkg Range 0-1 cpm Eff. 32.8% Eff Range 31.9% - 33.8% Limit cpm 320

DATE 1-21-03	BKG COUNT 6	COUNT TIME (min) 10	NAME Jack Todaro	BKG CPM 0.6	BKG OK? Yes	POWER OK	SOURCE COUNT 5649	HV 750	COUNT CPM 5649	EFFICIENCY 33.0%	EFF. OK? Yes
DATE 1-23-03	BKG COUNT 4	COUNT TIME (min) 10	NAME Jack Todaro	BKG CPM 0.4	BKG OK? Yes	POWER OK	SOURCE COUNT 5504	HV 750	COUNT CPM 5504	EFFICIENCY 32.2	EFF. OK? Yes
DATE 1-24-03	BKG COUNT 2	COUNT TIME (min) 10	NAME Jack Todaro	BKG CPM 0.2	BKG OK? Yes	POWER OK	SOURCE COUNT 5562	HV 750	COUNT CPM 5562	EFFICIENCY 32.5%	EFF. OK? Yes
DATE	BKG COUNT	COUNT TIME (min)	NAME	BKG CPM	BKG OK?	POWER	SOURCE COUNT	HV	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	BKG COUNT	COUNT TIME (min)	NAME	BKG CPM	BKG OK?	POWER	SOURCE COUNT	HV	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	BKG COUNT	COUNT TIME (min)	NAME	BKG CPM	BKG OK?	POWER	SOURCE COUNT	HV	COUNT CPM	EFFICIENCY	EFF. OK?
DATE	BKG COUNT	COUNT TIME (min)	NAME	BKG CPM	BKG OK?	POWER	SOURCE COUNT	HV	COUNT CPM	EFFICIENCY	EFF. OK?

Valid for use: 1-24-03 to 1-31-03

PROJECT NAME: CSMRI PROJECT ID: 2112

INSTRUMENT ID: SWIPE COUNTER **SOURCE ISOTOPE: TH-230** **S/N: 99TH470** **ACTIVITY: 17,100 dpm**

SCALER: Ludlum MODEL: 2929 S/N: 142645 CAL DATE: 4/30/02 CAL DUE: 4-30-03

PROBE: Ludlum MODEL: 43-10-1 SN: 144756 CAL DATE: 4/30/02 CAL DUE: 4-30-03

BKG cpm	Bkg Range	Eff.	Eff Range	Limit cpm
0.22	0-10	32.5%	31.4-33.6%	325

DATE		COUNT TIME (min)		NAME		POWER	HV	COUNT CPM	EFFICIENCY	EFF. OK?
1-27-03	3	10		Jack Todaro	BKG OK?	OK	750	5484	32.1	yes
COMMENTS										
1-28-03	0	10		Jack Todaro	BKG OK?	OK	750	5647	0.330	yes
COMMENTS										
1-29-03	1	5		Jack Todaro	BKG OK?	OK	750	5489	32.1	yes
COMMENTS										
1-30-03	5	10		Jack Todaro	BKG OK?	OK	750	5529	32.3	yes
COMMENTS										
1-31-03	2	10		Jack Todaro	BKG OK?	OK	750	5330	31.5%	yes
COMMENTS										
BKG COUNT	COUNT TIME (min)	BKG CPM	BKG OK?	POWER	SOURCE COUNT	COUNT TIME (min)	COUNT CPM	EFFICIENCY	EFF. OK?	

1-31-03 to 2-7-03

1-515 to 2-1-00

PROJECT NAME: CSMRI PROJECT ID: 2112

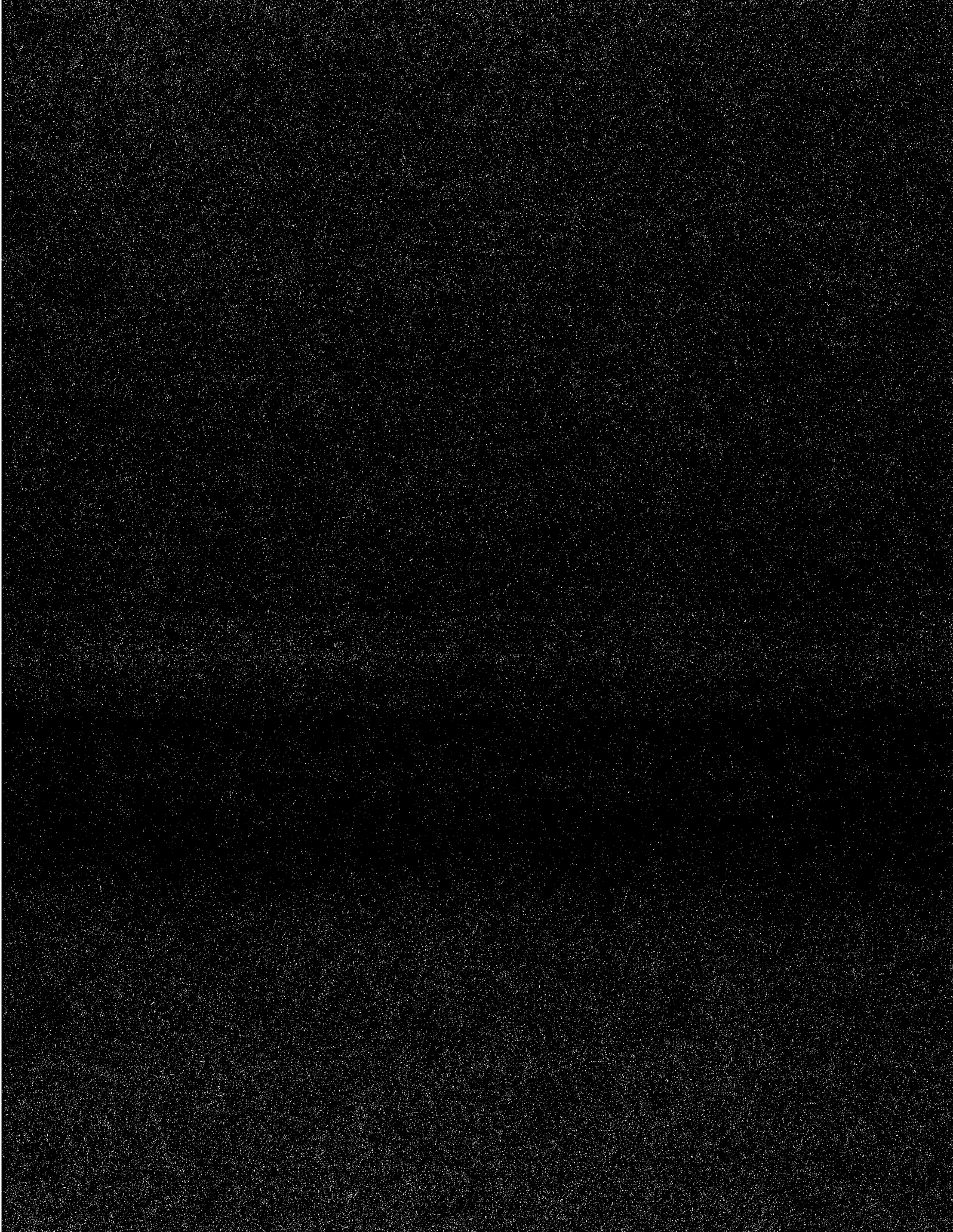
INSTRUMENT ID: SWIPE COUNTER **SOURCE ISOTOPE: TH-230** **S/N: 99TH470** **ACTIVITY: 17,100 dpm**

SCALER: Ludlum MODEL: 2929 S/N: 142645 CAL DATE: 4/30/02 CAL DUE: 4-30-03

PROBE: Ludlum MODEL: 43-10-1 S/N: 144756 CAL DATE: 4/30/02 CAL DUE: 4-30-03

BKG cpm	Bkg Range	Eff.	Eff Range	Limit cpm
0.23	0 - 1 cpm	32.3%	31.5 - 33.1%	323

[illegible]



LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 11-3-2002PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 2SCALER MFG Ludlum MODEL 2221 S/N 97830 CAL DATE 10/29/02 CAL DUE 4/29/03PROBE MFG Ludlum MODEL 43-5 S/N 117588 CAL DATE 10/29/02 CAL DUE 4/29/03

OPERATIONS & SETTINGS

POWER OK BATTERY 5.3 HV 657 THRESHOLD 102 WINDOW 4060 LIGHT OK WIN YES
OUT

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (MIN) COUNT 45 3.16 5.84
LONG COUNT RATE 4.5 CPM LONG COUNT 2 SD RANGE 3rd TO 6th CPMSHORT COUNT TIME 1 (MIN)
COUNTS 5 4 5 6 3 3 2 6 4 3
X SHORT COUNT RATE 4.1 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? Yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470CAL EFFICIENCY 0.124 LOW (-15%) 0.105 HIGH (+15%) 0.143COUNT TIME 1 (min)COUNTS 2354 2420 2306 2301 2378 2389 2329 2356 2381 2353X COUNT RATE $\pm$ SD 2362 X EFFICIENCY $\pm$ 2SD 66X EFFICIENCY RANGE: LOW 0.130 HIGH 0.146EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? No (if not then, redo efficiency check) If not
use cal. efficiency boundary as limits

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 4.5 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 3.2 TO 5.8 CPMWEEKLY EFFICIENCY TO BE USED: 0.138ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 0.130 HIGH 0.143NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-3-2002COMMENTS: Used calibration efficiency + 15% as upper acceptable daily check range to stay within cal. efficiency.

CALCULATIONS

LONG BKG COUNT RATE = 45 COUNTS $\div$ 10 COUNT TIME = 4.5 CPMLONG BKG COUNT RATE SD = $\sqrt{45}$ LONG COUNT $\div$ 10 COUNT TIME = 0.67 CPM $\times 2 = 1.34$ cpm = 2SDEFFICIENCY = 2362 X CPM = 0.138
17,100 DPM $\div$ 0.5EFFICIENCY SD = 66 SD CPM
17,100 DPM $\div$ 0.52 SD Range 2362 + 66 = 0.142 2362 - 66 = 0.134 = 0.130Max CPM For Limit =
Limit (CPM) * eff * area correction
 $5000 \times 0.138 \times 0.5 = 345$ CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 11-3-2002PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 1SCALER MFG Ludlum MODEL 2221 S/N 86330 CAL DATE 5/14/02 CAL DUE 5/14/03PROBE MFG Ludlum MODEL 43-5 S/N 172236 CAL DATE 10/23/02 CAL DUE 4/23/03

OPERATIONS & SETTINGS

POWER OK BATTERY 6.1 HV 602 THRESHOLD 100 WINDOW 3948 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (MIN) COUNT 37LONG COUNT RATE 3.7 CPM LONG COUNT 2 SD RANGE 2.48 TO 4.92 CPMSHORT COUNT TIME 1 (MIN)COUNTS 1 7 3 5 4 3 4 3 4 6 $\bar{x}$ SHORT COUNT RATE 4 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? YES

EFFICIENCY DETERMINATION

SOURCE ISOTOPE TH-230 SOURCE ACTIVITY 17,100 dpm SERIAL # 99TH470CAL EFFICIENCY ^{90%} 0.129 LOW (-15%) 0.110 HIGH (+15%) 0.148COUNT TIME 1 (MIN)COUNTS 2361 2299 2447 2354 2292 2447 2375 2443 2405 2379 $\bar{x}$ COUNT RATE $\pm$ SD 2380 $\pm$ 56.71 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.139 $\pm$ 0.00663 $\bar{x}$ EFFICIENCY RANGE: LOW 0.136 ^{0.133} HIGH 0.146EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? YES (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 3.7 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 2.48 TO 4.92 CPMWEEKLY EFFICIENCY TO BE USED: 0.139ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 0.133 HIGH 0.146MAX CPM FOR LIMIT= 348NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-3-2002

COMMENTS: _____

CALCULATIONS

LONG BKG COUNT RATE = 37 COUNTS $\div$ 10 COUNT TIME = 3.7 CPMLONG BKG COUNT RATE SD = $\sqrt{37}$ LONG COUNT $\div$ 10 COUNT TIME = 0.61 CPM $\times 2 = 1.22 = 2SD$ EFFICIENCY = $\frac{2380}{17,100} \times \frac{\text{CPM}}{\text{DPM}} = 0.139$ MAX CPM = LIMIT (dpm) $\times$ EFFICIENCY $\times$ PROBE AREA CORRECTION
= $\frac{5000}{5000} \times 0.139 \times 0.5 = 348$ CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 11-9-2002PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 2SCALER MFG Ludlum MODEL 2221 S/N 97830 CAL DATE 10/29/02 CAL DUE 4/29/03PROBE MFG Ludlum MODEL 43-5 S/N 117588 CAL DATE 10-29-02 CAL DUE 4/29/03

OPERATIONS & SETTINGS

POWER OK BATTERY 5.7 HV 656 THRESHOLD 101 WINDOW 4065 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (min) COUNT 44LONG COUNT RATE 4.4 CPM LONG COUNT 2 SD RANGE 3.1 TO 5.7 CPMSHORT COUNT TIME 2 (min)COUNTS 11 6 7 14 7 11 14 8 8 8 $\bar{x}$ SHORT COUNT RATE 4.7 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? Yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470LICENSED CAL EFFICIENCY 0.124 LOW (-15%) 0.105 HIGH (+15%) 0.143COUNT TIME 1 (min)COUNTS 2285 2311 2323 2341 2202 2282 2250 2344 2273 2306 $\bar{x}$ COUNT RATE $\pm$ SD 2292 $\pm$ 43 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.134 $\pm$ 0.00503 $\bar{x}$ EFFICIENCY RANGE: LOW 0.129 HIGH 0.139EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? YES (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 4.4 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 3.1 TO 5.7 CPMWEEKLY EFFICIENCY TO BE USED: 0.134ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 0.129 HIGH 0.139MAX CPM FOR LIMIT = 335NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-9-2002

COMMENTS: _____

CALCULATIONS

LONG BKG COUNT RATE = 44 COUNTS $\div$ 10 COUNT TIME = 4.4 CPMLONG BKG COUNT RATE SD = $\sqrt{44}$ LONG COUNT $\div$ 10 COUNT TIME = 0.663 CPMEFFICIENCY = $\frac{2292}{17,100} \times \frac{\text{CPM}}{\text{DPM}}$ = 0.134 MAX CPM = LIMIT (dpm) $\times$ EFFICIENCY $\times$ PROBE AREA CORRECTION
= $5000 \times 0.134 \times 0.5$ = 335 CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 11-9-2002PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 1SCALER MFG Ludlum MODEL 2221 S/N 86330 CAL DATE 5-14-02 CAL DUE 5-14-03PROBE MFG Ludlum MODEL 43-5 S/N 172236 CAL DATE 10-23-02 CAL DUE 4-23-03

OPERATIONS & SETTINGS

POWER OK BATTERY 6.2 HV 604 THRESHOLD 100 WINDOW 3959 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (min) COUNT 42LONG COUNT RATE 4.2 CPM LONG COUNT 2 SD RANGE 2.9 TO 5.5 CPMSHORT COUNT TIME 2 (min)COUNTS 10 8 8 11 7 7 10 8 10 8 $\bar{x}$ SHORT COUNT RATE 4.4 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? Yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470CAL EFFICIENCY 0.129 LOW (-15%) 0.110 HIGH (+15%) 0.148COUNT TIME 1 (min)COUNTS 2299 2313 2259 2295 2384 2383 2322 2292 2375 2269 $\bar{x}$ COUNT RATE $\pm$ SD 2299 $\pm$ 85 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.134 $\pm$ 0.00497 $\bar{x}$ EFFICIENCY RANGE: LOW 0.129 HIGH 0.139EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? YES (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 4.2 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 2.9 TO 5.5 CPMWEEKLY EFFICIENCY TO BE USED: 0.134ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 0.129 HIGH 0.139MAX CPM FOR LIMIT = 335NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-9-2002

COMMENTS: _____

CALCULATIONS

LONG BKG COUNT RATE = 42 COUNTS $\div$ 10 COUNT TIME = 4.2 CPMLONG BKG COUNT RATE SD = $\sqrt{42}$ LONG COUNT $\div$ 10 COUNT TIME = 0.648 CPMEFFICIENCY = $\frac{2299}{17,100} \times \frac{\text{CPM}}{\text{DPM}} = 0.134$ MAX CPM = LIMIT (dpm) $\cdot$ EFFICIENCY $\cdot$ PROBE AREA CORRECTION
= $\frac{5000}{5000} \cdot 0.134 \cdot 0.5 = 335$ CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 11-13-2002PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 1SCALER MFG Ludlum MODEL 2221 S/N 86330 CAL DATE 5-14-02 CAL DUE 5/14/03PROBE MFG Ludlum MODEL 43-5 S/N 172236 CAL DATE 10-23-02 CAL DUE 4/23/03

OPERATIONS & SETTINGS

POWER OK BATTERY 5.9 HV 606 THRESHOLD 102 WINDOW 3960 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (min) COUNT 43LONG COUNT RATE 4.3 CPM LONG COUNT 2 SD RANGE 2.99 TO 5.61 CPMSHORT COUNT TIME 1 (min)COUNTS 2 4 7 1 3 1 2 4 3 1 $\bar{x}$ SHORT COUNT RATE 2.8 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? 3.75

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470LICENSED CAL EFFICIENCY 0.129 LOW (-15%) 0.110 HIGH (+15%) 0.148COUNT TIME 1 (min)COUNTS 2177 2173 2090 2127 2203 2177 2132 2181 2209 2133 $\bar{x}$ COUNT RATE $\pm$ SD 2160 ± 37.9 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.126 ± 0.00443 $\bar{x}$ EFFICIENCY RANGE: LOW 0.122 HIGH 0.130EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 4.3 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 2.99 TO 5.61 CPMWEEKLY EFFICIENCY TO BE USED: 12.6%ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 12.2% HIGH 13.0%MAX CPM FOR LIMIT= 315NAME Jack Todor SIGNATURE Jack Todor DATE 0639COMMENTS: New efficiency due to new mylar

CALCULATIONS

LONG BKG COUNT RATE = 43 COUNTS $\div$ 10 COUNT TIME = 4.3 CPMLONG BKG COUNT RATE SD = $\sqrt{43}$ LONG COUNT $\div$ 10 COUNT TIME = 0.656 CPMEFFICIENCY = $\frac{2160}{17,100}$ $\times$ CPM $\div$ DPM = 0.126 MAX CPM = LIMIT (dpm) $\times$ EFFICIENCY $\times$ PROBE AREA CORRECTION
= 5000 $\times$ 0.126 $\times$ 0.5 = 315 CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 11-18-2002PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 2SCALER MFG Ludlum MODEL 2221 S/N 97830 CAL DATE 10/29/02 CAL DUE 4-29-03
PROBE MFG Ludlum MODEL 43-5 S/N 117588 CAL DATE 10-29-02 CAL DUE 4-29-03

OPERATIONS & SETTINGS

POWER OK BATTERY 6.2 HV 655 THRESHOLD 100 WINDOW 4070 LIGHT 0

BACKGROUND DETERMINATION

LONG COUNT TIME 20 (min) COUNT 93LONG COUNT RATE 4.65 CPM LONG COUNT 2 SD RANGE 3.69 TO 5.61 CPMSHORT COUNT TIME 1 (min)COUNTS 2 4 3 3 7 2 3 5 6 3 $\bar{x}$ SHORT COUNT RATE 3.8 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? Yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470LICENSED CAL EFFICIENCY 0.124 LOW (-15%) 0.105 HIGH (+15%) 0.143COUNT TIME 1 (min)COUNTS 2258 2321 2295 2288 2182 2245 2205 2294 2244 2177 $\bar{x}$ COUNT RATE $\pm$ SD 2250 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.132 $\pm$ 0.00586 $\bar{x}$ EFFICIENCY RANGE: LOW 0.126 HIGH 0.138EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 4.65 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 3.69 TO 5.61 CPMWEEKLY EFFICIENCY TO BE USED: 13.2%ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 12.6% HIGH 13.8%MAX CPM FOR LIMIT= 330NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-18-2002

COMMENTS: _____

CALCULATIONS

LONG BKG COUNT RATE = 93 COUNTS $\div$ 20 COUNT TIME = 4.65 CPMLONG BKG COUNT RATE SD = $\sqrt{93}$ LONG COUNT $\div$ 20 COUNT TIME = 0.48 CPMEFFICIENCY = $\frac{2251}{17,100} \times \frac{\text{CPM}}{\text{DPM}}$ = 0.132MAX CPM = LIMIT (dpm) * EFFICIENCY * PROBE AREA CORRECTION
= $5000 \times 0.132 \times 0.5$ = 330 CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-2-03PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 2SCALER MFG Ludlum MODEL 2221 S/N 97830 CAL DATE 10/29/02 CAL DUE 4-29-03PROBE MFG Ludlum MODEL 43-5 S/N 117588 CAL DATE 10-29-02 CAL DUE 4-29-03

OPERATIONS & SETTINGS

POWER OK BATTERY 6.0 HV 660 THRESHOLD 101 WINDOW 4087 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (min) COUNT 50LONG COUNT RATE 5 CPM LONG COUNT 2 SD RANGE 3.6 TO 6.4 CPMSHORT COUNT TIME 1 (min)COUNTS 5 4 6 7 6 2 5 5 6 4 $\bar{x}$ SHORT COUNT RATE 5.2 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? YES

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470LICENSED CAL EFFICIENCY 0.124 LOW (-15%) 0.105 HIGH (+15%) 0.143COUNT TIME 1 (min)COUNTS 2242 2301 2240 2241 2259 2310 2333 2289 2328 2226 $\bar{x}$ COUNT RATE $\pm$ SD 2277 $\pm$ 39.9 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.133 $\pm$ 0.0047 $\bar{x}$ EFFICIENCY RANGE: LOW 0.128 HIGH 0.138EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? YES (if not then calibration efficiency boundary as limit)Cal. eff. $\rightarrow$ 12.4% 10.5 - 14.2%

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 5 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 3.6 TO 6.4 CPMWEEKLY EFFICIENCY TO BE USED: 13.3%ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 12.8% HIGH 13.8%MAX CPM FOR LIMIT= 333NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-2-03

COMMENTS: _____

CALCULATIONS

LONG BKG COUNT RATE = 50 COUNTS $\div$ 10 COUNT TIME = 5 CPMLONG BKG COUNT RATE SD = $\sqrt{50}$ LONG COUNT $\div$ 10 COUNT TIME = 0.71 CPMEFFICIENCY = $\frac{2277}{17,100} \times \frac{\text{CPM}}{\text{DPM}}$ = 0.133MAX CPM = LIMIT (dpm) * EFFICIENCY * PROBE AREA CORRECTION
= $5000 \cdot 0.133 \cdot 0.5$ = 333 CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-7-2003PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2221 S/N 97830 CAL. DATE 4-29-03 CAL. DUE. 4-29-03
 PROBE MFG. Ludlum MODEL 43-5 S/N 117583 CAL. DATE 4-29-03 CAL. DUE. 4-29-03
 OPERATIONS & SETTINGS
 POWER OK BATTERY 6.2 HV 665 THRESHOLD 105 WINDOW 4090 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (MIN) COUNT 43 LONG COUNT RATE = COUNT ÷ COUNT TIME = 4.3 CPM
 LONG COUNT RATE SD = $\sqrt{\text{LONG COUNT} \div \text{COUNT TIME}}$ = 0.656 CPM 2 SD RANGE 3.0 TO 5.6 CPM
 SHORT COUNT TIME 1 (MIN)
 COUNTS 6 4 2 3 9 2 5 3 6 8
 $\bar{x}$ SHORT COUNT RATE 4.8 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? Yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th 230 SOURCE ACTIVITY 17,100 DPM SERIAL # 99TH4702118
 CAL EFFICIENCY 12.4 % LOW (-15%) 10.54 HIGH (+15%) 14.26 %
 COUNT TIME 1 min
 COUNTS 2282 2307 2245 2211 2302 2313 2274 2314 2286 2266
 $\bar{x}$ COUNT RATE $\pm$ SD 2281 $\pm$ 33.4 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.133 $\pm$ 0.0039
 $\bar{x}$ EFFICIENCY RANGE: LOW 0.129 HIGH 0.137
 EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then, redo efficiency check)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 4.3 CPM
 ACCEPTABLE RANGE FOR DAILY BACKGROUND: 3 TO 5.6 CPM
 WEEKLY EFFICIENCY TO BE USED: 13.3%
 ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 12.9% HIGH 13.7%

NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-7-03
 COMMENTS: _____

CALCULATIONS

$$\text{COUNTER EFFICIENCY} = \frac{2281}{17,100} \frac{\bar{x} \text{ CPM}}{\text{DPM} \times 0.5} = 0.133$$

$$\text{Max cpm} = 5000 \times 0.133 \times 0.5$$

$$\text{COUNTER EFFICIENCY SD} = \frac{33.4}{17,100} \frac{\text{SD CPM}}{\text{DPM} \times 0.5} = 0.002$$

333

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-13-03PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 2SCALER MFG Ludlum MODEL 2221 S/N 97830 CAL DATE 10/29/02 CAL DUE 4-29-03PROBE MFG Ludlum MODEL 43-5 S/N 117588 CAL DATE 10-29-02 CAL DUE 4-29-03

OPERATIONS & SETTINGS

POWER OK BATTERY 6 HV 664 THRESHOLD 103 WINDOW 4095 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (min) COUNT 51LONG COUNT RATE 5.1 CPM LONG COUNT 2 SD RANGE 3.7 TO 6.5 CPMSHORT COUNT TIME 1 (min)COUNTS 13 4 3 2 5 2 4 5 4 9 $\bar{x}$ SHORT COUNT RATE 5.1 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? Yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470LICENSED CAL EFFICIENCY 0.124 LOW (-15%) 0.105 HIGH (+15%) 0.143COUNT TIME 1 (min)COUNTS 2319 2341 2234 2239 2332 2280 2314 2248 2253 2383 $\bar{x}$ COUNT RATE $\pm$ SD 2294 $\pm$ 50.8 $\bar{x}$ EFFICIENCY $\pm$ 2SD 13.4 $\pm$ 0.006% OK $\bar{x}$ EFFICIENCY RANGE: LOW 12.8% HIGH 14.0% 0.6%EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 5.1 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 3.7 TO 6.5 CPMWEEKLY EFFICIENCY TO BE USED: 13.4%ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 12.8% HIGH 14.0%MAX CPM FOR LIMIT = 335 / 67 SWIPENAME Jack Todaro DIRECTOR SIGNATURE Paul C. Todaro DATE 1-13-03COMMENTS: 67 BPM $\rightarrow$ Level to Swipe

CALCULATIONS

LONG BKG COUNT RATE = 51 der 10 COUNTS $\div$ 10 COUNT TIME = 5.1 CPMLONG BKG COUNT RATE SD = $\sqrt{51}$ LONG COUNT $\div$ 10 COUNT TIME = CPMEFFICIENCY = $\frac{2294}{17100} \times \frac{100}{\text{DPM}} = 13.4\%$ MAX CPM = LIMIT (dpm) $\times$ EFFICIENCY $\times$ PROBE AREA CORRECTION
= $\frac{335}{5000} \times 13.4\% \times 0.5 = 335$ CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-20-03PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 2SCALER MFG Ludlum MODEL 2221 S/N 97830 CAL DATE 10/29/02 CAL DUE 4-29-03PROBE MFG Ludlum MODEL 43-5 S/N 117588 CAL DATE 10-29-02 CAL DUE 4-29-03

OPERATIONS & SETTINGS

POWER OK BATTERY 5.8 HV 664 THRESHOLD 104 WINDOW 4093 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 5 (min) COUNT 30LONG COUNT RATE 6 CPM LONG COUNT 2 SD RANGE 3.8 TO 8.2 CPMSHORT COUNT TIME 1 (min)COUNTS 3 4 6 6 5 5 2 2 5 4 $\bar{x}$ SHORT COUNT RATE 4.2 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? Yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470LICENSED CAL EFFICIENCY 0.124 LOW (-15%) 0.105 HIGH (+15%) 0.143COUNT TIME 1 (min)COUNTS 2322 2337 2267 2293 2333 2289 2337 2264 2314 2327 $\bar{x}$ COUNT RATE $\pm$ SD 2305 $\pm$ 26.7 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.135 $\pm$ 0.0031 $\bar{x}$ EFFICIENCY RANGE: LOW 13.2% HIGH 13.8%EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 6 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 3.8 TO 8.2 CPMWEEKLY EFFICIENCY TO BE USED: 13.5%ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 13.2% HIGH 13.8%MAX CPM FOR LIMIT = 338 / 67NAME Jack A. Todaro SIGNATURE Jack A. Todaro DATE 1-20-03COMMENTS: 338 cpm = 5000 direct 67 cpm = level to performSwipe survey

CALCULATIONS

LONG BKG COUNT RATE = 30 COUNTS $\div$ 5 COUNT TIME = 6 CPMLONG BKG COUNT RATE SD = $\sqrt{30}$ LONG COUNT $\div$ 5 COUNT TIME = 1.1 CPMEFFICIENCY = $\frac{2305}{17,100} \times \frac{\text{CPM}}{\text{DPM}} = 13.5\%$ MAX CPM = LIMIT (dpm) $\times$ EFFICIENCY $\times$ PROBE AREA CORRECTION
= $\frac{5000}{5000} \times 0.135 \times 0.5 = 338$ CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-24-03PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 2SCALER MFG Ludlum MODEL 2221 S/N 97830 CAL DATE 10/29/02 CAL DUE 4-29-03
PROBE MFG Ludlum MODEL 43-5 S/N 117588 CAL DATE 10-29-02 CAL DUE 4-29-03

OPERATIONS & SETTINGS

POWER OK BATTERY 5.8 HV 627 THRESHOLD 103 WINDOW 4065 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (min) COUNT 59LONG COUNT RATE 5.9 CPM LONG COUNT 2 SD RANGE 4.36 TO 7.4 CPMSHORT COUNT TIME 1 (min)COUNTS 8 3 5 6 3 6 7 8 4 5 $\bar{x}$ SHORT COUNT RATE 5.5 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470LICENSED CAL EFFICIENCY 0.124 LOW (-15%) 0.105 HIGH (+15%) 0.143COUNT TIME 1 (min)COUNTS 2239 2296 2310 2240 2309 2229 2184 2314 2253 2227 $\bar{x}$ COUNT RATE $\pm$ SD 2260 $\pm$ 45 $\bar{x}$ EFFICIENCY $\pm$ 2SD 13.2% $\pm$ 0.521% $\bar{x}$ EFFICIENCY RANGE: LOW 12.7% HIGH 13.7%EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? _____ (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 5.9 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 4.4 TO 7.4 CPMWEEKLY EFFICIENCY TO BE USED: 13.2%ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 12.7% HIGH 13.7%MAX CPM FOR LIMIT = 330 / 66NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-24-03

COMMENTS: _____

CALCULATIONS

LONG BKG COUNT RATE = 59 COUNTS $\div$ 10 COUNT TIME = 5.9 CPMLONG BKG COUNT RATE SD = $\sqrt{59}$ LONG COUNT $\div$ 10 COUNT TIME = 0.78 CPMEFFICIENCY = $\frac{2260}{17,100}$ $\times$ CPM / DPM = 13.2% MAX CPM = LIMIT (dpm) $\times$ EFFICIENCY $\times$ PROBE AREA CORRECTION
= $5000 \times 0.132 \times 0.5$ = 330 CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-27-03PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 2SCALER MFG Ludlum MODEL 2221 S/N 97830 CAL DATE 10/29/02 CAL DUE 4-29-03PROBE MFG Ludlum MODEL 43-5 S/N 117588 CAL DATE 10-29-02 CAL DUE 4-29-03

OPERATIONS & SETTINGS

POWER OK BATTERY 6.2 HV 665 THRESHOLD 104 WINDOW 4100 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 210 (min) COUNT 21LONG COUNT RATE 2.1 CPM LONG COUNT 2 SD RANGE 1.2 TO 3.0 CPMSHORT COUNT TIME 1 (min)COUNTS 2 2 0 2 1 3 0 1 2 4 $\bar{x}$ SHORT COUNT RATE 1.6 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? Yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470LICENSED CAL EFFICIENCY 0.124 LOW (-15%) 0.105 HIGH (+15%) 0.143COUNT TIME 1 (min)COUNTS 1956 1975 1936 1936 1997 1928 1938 1850 1923 2009 $\bar{x}$ COUNT RATE $\pm$ SD 1949 $\pm$ 46.1 $\bar{x}$ EFFICIENCY $\pm$ 2SD 11.4 $\pm$ 0.0054 $\bar{x}$ EFFICIENCY RANGE: LOW 10.9% HIGH 11.9% 0.114EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 2.1 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 1.2 TO 3.0 CPMWEEKLY EFFICIENCY TO BE USED: 11.4%ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 10.9% HIGH 11.9%MAX CPM FOR LIMIT= 285 / 57NAME Jack A. Todaro SIGNATURE Jack A. Todaro DATE 1-27-03COMMENTS: New mylar on Probe

CALCULATIONS

LONG BKG COUNT RATE = 21 COUNTS $\div$ 10 COUNT TIME = 2.1 CPMLONG BKG COUNT RATE SD = $\sqrt{21}$ LONG COUNT $\div$ 10 COUNT TIME = 0.46 CPMEFFICIENCY = $\frac{1949}{17,100}$ $\times$ CPM / DPM =MAX CPM = LIMIT (dpm) $\times$ EFFICIENCY $\times$ PROBE AREA CORRECTION
= $\frac{5000}{11.4\%} \times 0.5 = 285$ CPM

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 2-13-03PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

INSTRUMENT ID 2SCALER MFG Ludlum MODEL 2221 S/N 97830 CAL DATE 10/29/02 CAL DUE 4-29-03PROBE MFG Ludlum MODEL 43-5 S/N 117588 CAL DATE 10-29-02 CAL DUE 4-29-03

OPERATIONS & SETTINGS

POWER OK BATTERY 6.2 HV 663 THRESHOLD 100 WINDOW 4111 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 5 (min) COUNT 20LONG COUNT RATE 4 CPM LONG COUNT 2 SD RANGE 2.2 TO 5.8 CPMSHORT COUNT TIME 1 (min)
COUNTS 2 5 4 3 5 2 1 1 3 2 $\bar{x}$ SHORT COUNT RATE 2.8 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? Yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 SERIAL # 99TH470LICENSED CAL EFFICIENCY 0.124 LOW (-15%) 0.105 HIGH (+15%) 0.143COUNT TIME 0.5 (min)COUNTS 2 1098 5 1111 1241 1138 1186 1144 1112 1152 1179 $\bar{x}$ COUNT RATE $\pm$ SD 2305 $\pm$ 85 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.135 $\pm$ 0.00497 $\bar{x}$ EFFICIENCY RANGE: LOW 0.130 HIGH 0.140EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 4 CPMACCEPTABLE RANGE FOR DAILY BACKGROUND: 2.2 TO 5.8 CPMWEEKLY EFFICIENCY TO BE USED: 0.135ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 0.130 HIGH 0.140

MAX CPM FOR LIMIT=

NAME Jack Todaro SIGNATURE Jack Todaro DATE 2-13-03

COMMENTS:

CALCULATIONS

LONG BKG COUNT RATE = 20 COUNTS $\div$ 5 COUNT TIME = 4 CPMLONG BKG COUNT RATE SD = $\sqrt{20}$ LONG COUNT $\div$ 5 COUNT TIME = 0.094 CPMEFFICIENCY = 2305 $\bar{x}$ CPM $\div$ 17,100 DPM = 0.135 MAX CPM = LIMIT (dpm) * EFFICIENCY * PROBE AREA CORRECTION
= 5000 * 0.5 = CPM1152.3
17,100

LUDLUM 2221

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 2-26-03PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

SCALER MFG Ludlum MODEL 2221 S/N 117588 CAL DATE 10-29-02 CAL DUE 4-29-03
 PROBE MFG Ludlum MODEL 43-5 S/N 97830 CAL DATE 10-29-02 CAL DUE 4-29-03
 OPERATIONS & SETTINGS
 POWER ON BATTERY 6.3 HV 668 THRESHOLD 101 WINDOW 4131 LIGHT OK

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (min) COUNT 51
 LONG COUNT RATE 5.1 CPM LONG COUNT 2 SD RANGE 3.68 TO 6.5 CPM
 SHORT COUNT TIME 1 (min)
 COUNTS 6 7 2 4 5 2 3 2 2 1
 $\bar{x}$ SHORT COUNT RATE 4 CPM WITHIN LONG COUNT RATE $\pm$ 2SD? Yes

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17.100 SERIAL # 99TH470
 LICENSED CAL EFFICIENCY 12.4 LOW (-15%) 10.54 HIGH (+15%) 14.26
 COUNT TIME 1 (min)
 COUNTS 2369 2287 2329 2369 2321 2260 2240 2245 2363 2283
 $\bar{x}$ COUNT RATE $\pm$ SD 2307 $\pm$ 50.6 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.135 $\pm$ 0.00592
 $\bar{x}$ EFFICIENCY RANGE: LOW 12.9% HIGH 14.1%
 EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then calibration efficiency boundary as limit)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED (Long Count Rate): 5.1 CPM
 ACCEPTABLE RANGE FOR DAILY BACKGROUND: 3.7 TO 6.5 CPM
 WEEKLY EFFICIENCY TO BE USED: 13.5%
 ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 12.9% HIGH 14.1%
 MAX CPM FOR LIMIT= 333
 NAME Jack Toledano SIGNATURE Jack Toledano DATE 2-26-03
 COMMENTS: 68 dpm for removable

CALCULATIONS

LONG BKG COUNT RATE = 51 COUNTS $\div$ 10 COUNT TIME = 5.1 CPMLONG BKG COUNT RATE SD = $\sqrt{51}$ LONG COUNT $\div$ 10 COUNT TIME = CPM

EFFICIENCY = $\frac{2307}{17,100} \times \frac{\bar{x} \text{ CPM}}{\text{DPM}} = 0.135$ MAX CPM = LIMIT (dpm) * EFFICIENCY * PROBE AREA CORRECTION
 $= 5000 * 0.135 * 0.5 = 338$ CPM

WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 11-2-2002

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2929 S/N 142645 CAL. DATE 4-30-02 CAL. DUE 4-30-03

PROBE MFG. Ludlum MODEL 43-10-1 S/N PR 144756 CAL. DATE 4-30-02 CAL. DUE 4-30-03

OPERATIONS & SETTINGS

POWER OK BATTERY N/A HV 765 LIGHT N/A

BACKGROUND DETERMINATION

LONG COUNT TIME 500 (MIN) COUNT 0 LONG COUNT RATE = COUNT ÷ COUNT TIME = 0 CPM

Notes: 1) The long count time should be at least 60 minutes. 2) The background count rate should be less than 1 cpm. For a 10 minute daily check, the maximum acceptable background check is 1 count.

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 dpm Serial # 99TH4702118

CAL EFFICIENCY ± 15% 0.309 ± 0.0464 Low: 0.263 High 0.355

COUNT TIME 1 min

COUNTS 5503 5449 5516 5571 5636 5544 5432 5588 5712 5500

$\bar{x}$ COUNT RATE ± SD 5545 ± 85 $\bar{x}$ EFFICIENCY ± 2SD 0.324 ± 0.00994

$\bar{x}$ EFFICIENCY RANGE: LOW 0.314 HIGH 0.334

EFFICIENCY RANGE WITHIN ± 15% CAL EFFICIENCY? YES (if not then, redo efficiency check)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED: 0 CPM

MAXIMUM RESULT FOR 10 MINUTE DAILY BACKGROUND: 1 COUNTS

WEEKLY EFFICIENCY TO BE USED: 0.324

ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 0.314 HIGH 0.334

NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-2-2002

COMMENTS: _____

CALCULATIONS

COUNTER EFFICIENCY = $\frac{5545 \bar{x} \text{ CPM}}{17,100 \text{ DPM}} = 0.324$

COUNTER EFFICIENCY SD = $\frac{170 \text{ SD CPM}}{17,100 \text{ DPM}} = 0.00994$

Max CPM Allowable =
Limit 1
Removable (dpm) × EFF. ~~≠~~

$1000 \times 0.324 = 324 \text{ cpm}$

LUDLUM 2929
WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 11-9-2002

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2929 S/N 142645 CAL. DATE 4-30-02 CAL. DUE. 4/30/03
PROBE MFG. Ludlum MODEL 43-10-1 S/N 144756 CAL. DATE 4-30-02 CAL. DUE. 4/30/03
OPERATIONS & SETTINGS
POWER OK HV 760

BACKGROUND DETERMINATION

LONG COUNT TIME 60 (min) COUNT 0 LONG COUNT RATE = COUNT ÷ COUNT TIME = 0 CPM

Notes: 1) The long count time should be at least 60 minutes. 2) The background count rate should be less than 0.1 cpm. For a 10 minute daily check, the maximum acceptable background check is 1 count.

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 dpm SERIAL # 99TH4702118
CAL EFFICIENCY 0.309 LOW (-15%) 0.263 HIGH (+15%) 0.355
COUNT TIME 1 (min)

COUNTS

5596 5598 5419 5489 5555 5689 5557 5667 5611 5524

$\bar{x}$ COUNT RATE $\pm$ SD 5571 $\pm$ 81 $\bar{x}$ EFFICIENCY $\pm$ 2SD 5571 $\pm$ 161

$\bar{x}$ EFFICIENCY RANGE: LOW 0.317 HIGH 0.335

EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then, redo efficiency check)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED: 0 CPM

MAXIMUM RESULT FOR 10 MINUTE DAILY BACKGROUND: 1 COUNTS

WEEKLY EFFICIENCY TO BE USED: 0.326

ACCEPTABLE DAILY EFFICIENCY RANGE: LOW 0.317 HIGH 0.335

NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-9-2002
COMMENTS: _____

CALCULATIONS

$$\text{COUNTER EFFICIENCY} = \frac{5571}{17,100} \times \frac{\text{CPM}}{\text{DPM}} = 0.326$$

$$\text{COUNTER EFFICIENCY SD} = \frac{161}{17,100} \times \frac{\text{SD CPM}}{\text{DPM}} = 0.00942$$

$$\begin{aligned} \text{MAX CPM Allowable} &= \\ \text{Limit (DPM)} \times \text{Eff} &= \\ 1000 \text{ dpm} \times 0.326 &= 326 \text{ cpm} \end{aligned}$$

LUDLUM 2929
WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 11-18-2002

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2929 S/N 142645 CAL. DATE 4-30-02 CAL. DUE. _____

PROBE MFG. Ludlum MODEL 43-10-1 S/N 144756 CAL. DATE 4-30-02 CAL. DUE. _____

OPERATIONS & SETTINGS

POWER OK HV 750

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (min) COUNT 4 LONG COUNT RATE = COUNT ÷ COUNT TIME = 0.4 CPM

Notes: 1) The long count time should be at least 60 minutes.

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 dpm SERIAL # 99TH4702118

LICENSED CAL EFFICIENCY 0.309 LOW (-15%) 0.263 HIGH (+15%) 0.355

COUNT TIME 1 (min)

COUNTS

5585 5488 5655 5538 5658 5602 5718 5641 5398 5533

$\bar{x}$ COUNT RATE $\pm$ SD 5582 ± 94.59 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.326 ± 0.00553 ^{rev}

$\bar{x}$ EFFICIENCY RANGE: LOW 0.315 HIGH 0.337 0.01106

EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then, redo efficiency check)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED: 0.4 cpm

MAXIMUM RESULT FOR 10 MINUTE DAILY BACKGROUND: 10 counts

WEEKLY EFFICIENCY TO BE USED: 32.6 %

ACCEPTABLE DAILY EFFICIENCY RANGE: Low 31.5 % High 33.7 %

MAX ALLOWABLE CPM FOR REMOVABLE LIMIT = _____ cpm

NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-18-2002

COMMENTS: _____

CALCULATIONS

COUNTER EFFICIENCY = $\frac{5582}{17,100} \bar{x}$ CPM $\div$ DPM = 0.326 Max CPM for allowable = Limit (DPM) * Efficiency
 $\frac{1000 \text{ dpm}}{1000 \text{ dpm}} * 0.326 = 326 \text{ cpm}$

COUNTER EFFICIENCY SD = $\frac{94.59}{17,100}$ SD CPM $\div$ DPM = 0.00553

LUDLUM 2929
WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 12-9-2002

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2929 S/N 142645 CAL. DATE 4-30-02 CAL. DUE. 4-30-03

PROBE MFG. Ludlum MODEL 43-10-1 S/N 144756 CAL. DATE 4-30-02 CAL. DUE. 4-30-03

OPERATIONS & SETTINGS

POWER OK HV 750

BACKGROUND DETERMINATION

LONG COUNT TIME 10 (min) COUNT 4 LONG COUNT RATE = COUNT ÷ COUNT TIME = 0.4 CPM

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 dpm SERIAL # 99TH4702118

LICENSED CAL EFFICIENCY 0.309 LOW (-15%) 0.263 HIGH (+15%) 0.355

COUNT TIME 1 (min)

COUNTS

5474 5441 5601 5502 5530 5513 5595 5489 5595 5594

$\bar{x}$ COUNT RATE $\pm$ SD 5533 ± 58.9 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.324 ± 0.00688

$\bar{x}$ EFFICIENCY RANGE: LOW 0.317 HIGH 0.331

EFFICIENCY RANGE WITHIN $\pm 15\%$ CAL EFFICIENCY? Yes (if not then, redo efficiency check)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED: 0.4 cpm

MAXIMUM RESULT FOR 10 MINUTE DAILY BACKGROUND: 10 counts

WEEKLY EFFICIENCY TO BE USED: 0.324

ACCEPTABLE DAILY EFFICIENCY RANGE: Low 31.7% High 33.1%

MAX ALLOWABLE CPM FOR REMOVABLE LIMIT = 324 cpm

NAME Jack A. Todaro SIGNATURE Jack A. Todaro DATE 12-9-2002

COMMENTS: _____

CALCULATIONS

COUNTER EFFICIENCY = $\frac{5533}{17,100} \times \frac{\text{CPM}}{\text{DPM}} = 0.324$ Max CPM for allowable = Limit (DPM) * Efficiency
 $1000 \text{ dpm} * 0.324 = 324 \text{ cpm}$

COUNTER EFFICIENCY SD = $\frac{58.9}{\text{DPM}} = 0.00344$

LUDLUM 2929
WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-2-03

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2929 S/N 142645 CAL. DATE 4-30-02 CAL DUE 4-30-03
PROBE MFG. Ludlum MODEL 43-10-1 S/N 144756 CAL. DATE 4-30-02 CAL DUE 4-30-03

OPERATIONS & SETTINGS

POWER OK HV 750

BACKGROUND DETERMINATION

LONG COUNT TIME 30 (min) COUNT 9 LONG COUNT RATE = COUNT ÷ COUNT TIME = 0.30 CPM

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 dpm SERIAL # 99TH4702118

LICENSED CAL EFFICIENCY 0.309 LOW (-15%) 0.263 HIGH (+15%) 0.355

COUNT TIME 1 (min)

COUNTS

5506 5465 5589 5547 5499 5608 5317 5518 5604 5561

$\bar{x}$ COUNT RATE $\pm$ SD 5521 ± 86 $\bar{x}$ EFFICIENCY $\pm$ 2SD $5521 \pm 0.323 \pm 0.01$

$\bar{x}$ EFFICIENCY RANGE: LOW 0.313 HIGH 0.333

EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then, redo efficiency check)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED: 0.3 cpm

MAXIMUM RESULT FOR 10 MINUTE DAILY BACKGROUND: 10 counts

WEEKLY EFFICIENCY TO BE USED: 32.3%

ACCEPTABLE DAILY EFFICIENCY RANGE: Low 31.3% High 33.3%

MAX ALLOWABLE CPM FOR REMOVABLE LIMIT = 323 cpm

NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-2-03
COMMENTS: _____

CALCULATIONS

COUNTER EFFICIENCY = $\frac{5506}{17,100} \times \frac{\text{CPM}}{\text{DPM}}$ = 0.323

Max CPM for allowable = Limit (DPM) * Efficiency
 $1000 \text{ dpm} * 0.323 = 323 \text{ cpm}$

COUNTER EFFICIENCY SD = $\frac{86}{17,100} \times \frac{\text{SD CPM}}{\text{DPM}}$ = 0.005

LUDLUM 2929
WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-7-2003

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2929 S/N 142645 CAL. DATE 4-30-02 CAL. DUE 4-30-03
PROBE MFG. Ludlum MODEL 43-10-1 S/N 144756 CAL. DATE 4-30-02 CAL. DUE 4-30-03
OPERATIONS & SETTINGS
POWER OK HV 750

BACKGROUND DETERMINATION

LONG COUNT TIME 100 (min) COUNT 37 LONG COUNT RATE = COUNT ÷ COUNT TIME = 0.37 CPM

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 dpm SERIAL # 99TH4702118

LICENSED CAL EFFICIENCY 0.309 LOW (-15%) 0.263 HIGH (+15%) 0.355

COUNT TIME 1 (min)

COUNTS

5414 5491 5504 5654 5604 5604 5551 5656 5537 5605

$\bar{x}$ COUNT RATE $\pm$ SD 5562 ± 77 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.325 ± 0.0090

$\bar{x}$ EFFICIENCY RANGE: LOW 31.6% HIGH 33.4%

EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then, redo efficiency check)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED: 0.37 cpm

MAXIMUM RESULT FOR 10 MINUTE DAILY BACKGROUND: 10 counts

WEEKLY EFFICIENCY TO BE USED: 0.325 or 32.5%

ACCEPTABLE DAILY EFFICIENCY RANGE: Low 31.6% High 33.4%

MAX ALLOWABLE CPM FOR REMOVABLE LIMIT = 325 cpm

NAME Jack Todaro SIGNATURE Jack C. Todaro DATE 1-7-03

COMMENTS: _____

CALCULATIONS

COUNTER EFFICIENCY = $\frac{5562}{17,100} \times \frac{\text{CPM}}{\text{DPM}}$ = 0.325 Max CPM for allowable = Limit (DPM) * Efficiency
 $\frac{1000 \text{ dpm}}{1000 \text{ dpm}} * 0.325 = 325 \text{ cpm}$

COUNTER EFFICIENCY SD = $\frac{77}{17,100} \times \frac{\text{SD CPM}}{\text{DPM}}$ = 0.0045

LUDLUM 2929
WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-13-03

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2929 S/N 142645 CAL. DATE 4-30-02 CAL. DUE 4-30-03

PROBE MFG. Ludlum MODEL 43-10-1 S/N 144756 CAL. DATE 4-30-02 CAL. DUE 4-30-03

OPERATIONS & SETTINGS

POWER OK HV 750

BACKGROUND DETERMINATION

LONG COUNT TIME 20 (min) COUNT 8 LONG COUNT RATE = COUNT ÷ COUNT TIME = 0.4 CPM

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 dpm SERIAL # 99TH4702118

LICENSED CAL EFFICIENCY 0.309 LOW (-15%) 0.263 HIGH (+15%) 0.355

COUNT TIME 1 (min)

COUNTS

5620 5833 5719 5570 5718 5565 5672 5687 5662 5671

$\bar{x}$ COUNT RATE $\pm$ SD 5672 ± 78 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.332 ± 0.0092

$\bar{x}$ EFFICIENCY RANGE: LOW 32.3% HIGH 34.1%

EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then, redo efficiency check)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED: 0.4 cpm

MAXIMUM RESULT FOR 10 MINUTE DAILY BACKGROUND: 10 counts

WEEKLY EFFICIENCY TO BE USED: 33.2%

ACCEPTABLE DAILY EFFICIENCY RANGE: Low 32.3% High 34.1%

MAX ALLOWABLE CPM FOR REMOVABLE LIMIT = 332 cpm

NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-13-03

COMMENTS: _____

CALCULATIONS

COUNTER EFFICIENCY = $\frac{5672}{17,100} \times \frac{\text{CPM}}{\text{DPM}} = 0.332$ Max CPM for allowable = Limit (DPM) * Efficiency
 $1000 \text{ dpm} * 0.332 = 332 \text{ cpm}$

COUNTER EFFICIENCY SD = $\frac{78.3}{17,100} \times \frac{\text{SD CPM}}{\text{DPM}} = 0.0031$

LUDLUM 2929
WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-20-03

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2929 S/N 142645 CAL. DATE 4-30-02 CAL DUE 4-30-03
PROBE MFG. Ludlum MODEL 43-10-1 S/N 144756 CAL. DATE 4-30-02 CAL DUE 4-30-03
OPERATIONS & SETTINGS
POWER 01K HV 750

BACKGROUND DETERMINATION

LONG COUNT TIME 30 (min) COUNT 7 LONG COUNT RATE = COUNT ÷ COUNT TIME = 0.233 CPM

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 dpm SERIAL # 99TH4702118
LICENSED CAL EFFICIENCY 0.309 LOW (-15%) 0.263 HIGH (+15%) 0.355
COUNT TIME 1 (min)

COUNTS

5619 5549 5644 5580 5630 5591 5657 5438 5707 5714
 $\bar{x}$ COUNT RATE $\pm$ SD 5613 ± 81 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.328 ± 0.0095
 $\bar{x}$ EFFICIENCY RANGE: LOW 31.9% HIGH 33.8%

EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then, redo efficiency check)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED: 0.23 cpm
MAXIMUM RESULT FOR 10 MINUTE DAILY BACKGROUND: 10 counts
WEEKLY EFFICIENCY TO BE USED: 32.8%
ACCEPTABLE DAILY EFFICIENCY RANGE: Low 31.9% High 33.8%
MAX ALLOWABLE CPM FOR REMOVABLE LIMIT = 328 cpm

NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-20-03
COMMENTS: _____

CALCULATIONS

COUNTER EFFICIENCY = $\frac{5613}{17,100} \times \frac{\text{CPM}}{\text{DPM}}$ = 0.328 Max CPM for allowable = Limit (DPM) * Efficiency
 $\frac{1000 \text{ dpm}}{1000 \text{ dpm}} * 0.328 = 328 \text{ cpm}$
COUNTER EFFICIENCY SD = $\frac{81}{17,100} \times \frac{\text{CPM}}{\text{DPM}}$ = 0.0095 for 0.0047

LUDLUM 2929
WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-24-03

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2929 S/N 142645 CAL. DATE 4-30-02 CAL. DUE. 4-30-03
PROBE MFG. Ludlum MODEL 43-10-1 S/N 144756 CAL. DATE 4-30-02 CAL. DUE. 4-30-03
OPERATIONS & SETTINGS
POWER OK HV 750

BACKGROUND DETERMINATION

LONG COUNT TIME 60 (min) COUNT 13 LONG COUNT RATE = COUNT ÷ COUNT TIME = 0.217 CPM

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 dpm SERIAL # 99TH4702118
LICENSED CAL EFFICIENCY 0.309 LOW (-15%) 0.263 HIGH (+15%) 0.355
COUNT TIME 1 (min)

COUNTS

5510 5680 5497 5572 5486 5575 5634 5371 5640 5655

$\bar{x}$ COUNT RATE $\pm$ SD 5562 ± 96 $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.325 ± 0.011

$\bar{x}$ EFFICIENCY RANGE: LOW 31.4% HIGH 33.6%

EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then, redo efficiency check)

SUMMARY

WEEKLY BACKGROUND RATE TO BE USED: 0.22 cpm
MAXIMUM RESULT FOR 10 MINUTE DAILY BACKGROUND: 10 counts
WEEKLY EFFICIENCY TO BE USED: 32.5%
ACCEPTABLE DAILY EFFICIENCY RANGE: Low 31.4% High 33.6%
MAX ALLOWABLE CPM FOR REMOVABLE LIMIT = 325 cpm

NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-24-03
COMMENTS: _____

CALCULATIONS

COUNTER EFFICIENCY = $\frac{5562}{17,100} \times \frac{\text{CPM}}{\text{DPM}}$ = 0.325 Max CPM for allowable = Limit (DPM) * Efficiency
 $\frac{17,100}{1000 \text{ dpm}} \times 0.325 = 325 \text{ cpm}$
COUNTER EFFICIENCY SD = $\frac{96}{17,100} \times \frac{\text{SD CPM}}{\text{DPM}}$ = 0.0056

LUDLUM 2929
WEEKLY BACKGROUND & EFFICIENCY DETERMINATION

DATE 1-31-03

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. Ludlum MODEL 2929 S/N 142645 CAL. DATE 4-30-02 CAL. DUE 4-30-03
PROBE MFG. Ludlum MODEL 43-10-1 S/N 144756 CAL. DATE 4-30-02 CAL. DUE 4-30-03
OPERATIONS & SETTINGS
POWER OK HV 750

BACKGROUND DETERMINATION

LONG COUNT TIME 100 (min) COUNT 28 LONG COUNT RATE = COUNT ÷ COUNT TIME = 0.28 CPM

EFFICIENCY DETERMINATION

SOURCE ISOTOPE Th-230 SOURCE ACTIVITY 17,100 dpm SERIAL # 99TH4702118
LICENSED CAL EFFICIENCY 0.309 LOW (-15%) 0.263 HIGH (+15%) 0.355
COUNT TIME 1 (min)

COUNTS

5602 5517 5492 5510 5421 5477 5474 5609 5481 5623
 $\bar{x}$ COUNT RATE $\pm$ SD $5,521 \pm 68$ $\bar{x}$ EFFICIENCY $\pm$ 2SD 0.323 ± 0.00398 for 0.00795
 $\bar{x}$ EFFICIENCY RANGE: LOW 31.5% HIGH 33.1%
EFFICIENCY RANGE WITHIN $\pm$ 15% CAL EFFICIENCY? Yes (if not then, redo efficiency check)

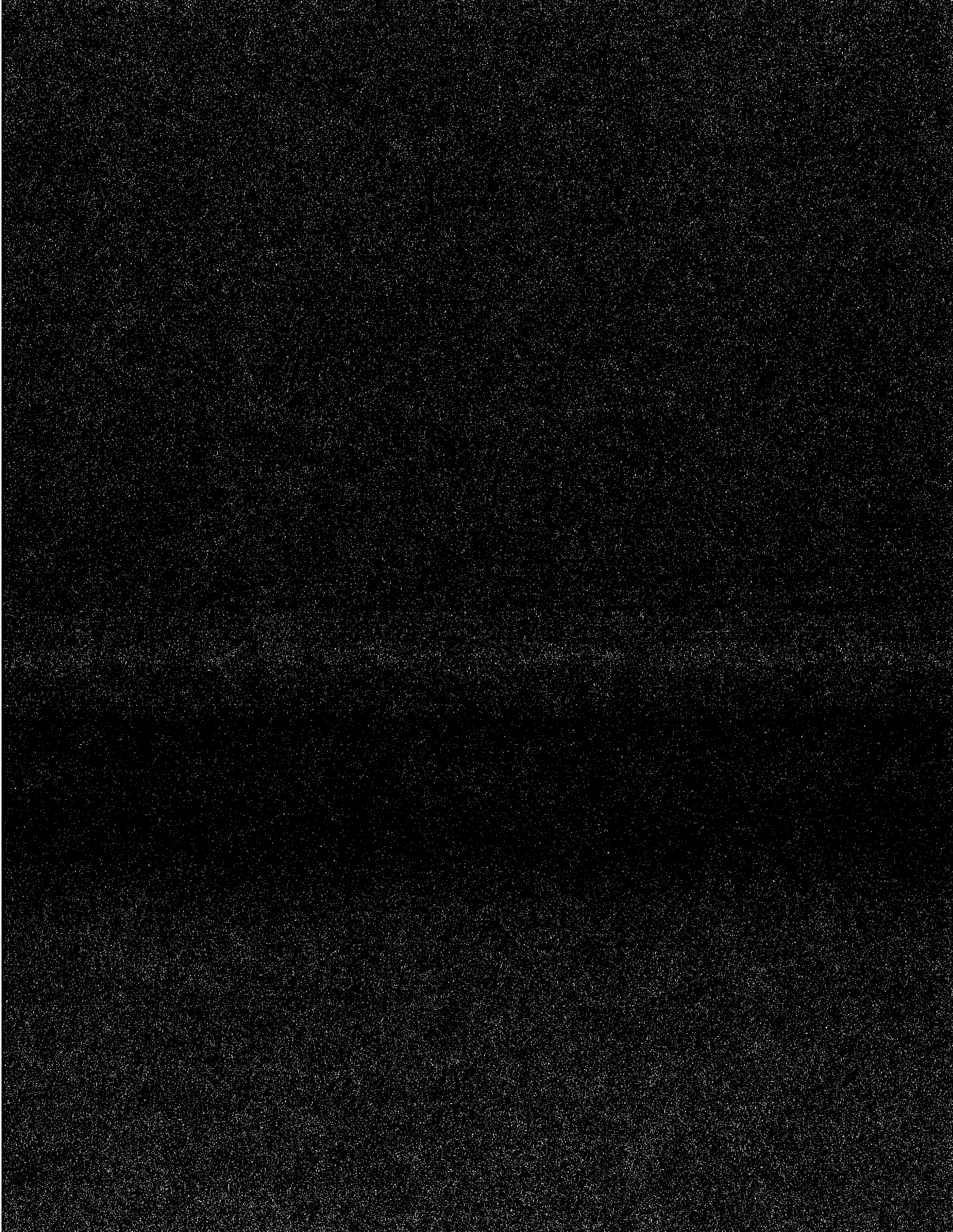
SUMMARY

WEEKLY BACKGROUND RATE TO BE USED: 0.28 cpm
MAXIMUM RESULT FOR 10 MINUTE DAILY BACKGROUND: 10 counts
WEEKLY EFFICIENCY TO BE USED: 32.3%
ACCEPTABLE DAILY EFFICIENCY RANGE: Low 31.5% High 33.1%
MAX ALLOWABLE CPM FOR REMOVABLE LIMIT = _____ cpm

NAME Jack Todaro SIGNATURE [Signature] DATE 1-31-03
COMMENTS: _____

CALCULATIONS

COUNTER EFFICIENCY = $\frac{5521}{17,100} \times 100$ CPM = 32.3% Max CPM for allowable = Limit (DPM) * Efficiency
 $\frac{1000 \text{ dpm}}{1000 \text{ dpm}} * 0.323 = 323$ cpm
COUNTER EFFICIENCY SD = $\frac{68}{17,100}$ CPM = 0.00398



INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Cal. Date: <u>11-4-2002</u>
Counter Mfg. <u>Ludlum</u>	Model: <u>19</u>	S/N: <u>95469</u>
Probe Mfg.	Model:	S/N:

OPERATIONS AND SETTINGS		
Power: <u>OK</u>	Battery: <u>OK</u>	H.V. <u> </u>
THR. <u> </u>	Window: <u> </u>	Light: <u>OK</u>

EFFICIENCY CHECK		
<u>ES-137</u>		
Source: <u>TH-230 Is</u>	Activity: <u>4952 uCi</u>	Cert.: <u> </u>
Mfg. <u> </u>	S/N: <u> </u>	<u> </u>

Background: <u>17 uR/hr</u>	cpm	Count Time: <u> </u>	mins.
Rate: ☐	Scaler: ☐	Location: <u>Trailer</u>	
Source Count: <u>290 uR/hr</u>		Count Time: <u> </u>	
Efficiency: (<u>1</u>) (100) = <u> </u>			

COMMENTS:

Name: <u>Jack Todaro</u>	Weather Conditions: <u>Cloudy/Cold</u>
Date: <u>11-4-2002</u>	Time of Day: <u>07:51 AM</u>
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By: <u>Sam E. [Signature]</u>	Date: <u>11-4-2002</u>

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION 19 Gammn		Cal. Date: 10/10/02
Counter Mfg. Ludlum	Model: Model 19	S/N: 95469
Probe Mfg.	Model:	S/N:

OPERATIONS AND SETTINGS		
Power: Yes	Battery: good	H.V.: Res - 5 0
THR.	Window: X	Ligt: Yes

EFFICIENCY CHECK		
Source: 137Cs 137Cs	Activity:	Cert.: 12/95
Mfg. The Source	S/N: 4952	

Background: 18 <i>cpm</i>	Count Time: N/A <i>mins.</i>
Rate: ☒ Scaler: ☐	Location: Trailer
Source Count: 2290 2343 → 290 uR	Count Time:
Efficiency: $(2343 / 17,100) (100) =$	

COMMENTS:

Name: DUM	Weather Conditions: dark
Date: 11/5/02	Time of Day: 5:50
Project Name: CSMRI	Project No. 2112
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Gamma Ray	Cal. Date: 10/10/2002
Counter Mfg. Ludlum	Model: 19	S/N: 95469	
OPERATIONS AND SETTINGS			
Power: ✓	Battery: good	Res.: 0	
		Light: yes	
EFFICIENCY CHECK			
Source: CS 137	Activity:	Cert.: 12/95	
Mfg. The Source	S/N: 4952		
Background: 18		<i>cpm</i>	
		Location: Trailer	
Source Count: 290			
COMMENTS:			
Name: DWM		Weather Conditions: dark	
Date: 11/6/02		Time of Day: 5:40	
Project Name: <u>CSMRI</u>		Project No. <u>2112</u>	
Reviewed By:		Date	

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Gamma Ray	Cal. Date: 10/10/2002								
Counter Mfg. Ludlum	Model: 19	S/N: 95469									
OPERATIONS AND SETTINGS											
Power: ☒	Battery: good	Res.: 0									
		Light: yes									
EFFICIENCY CHECK											
Source: CS 137	Activity:	Cert.: 12/95									
Mfg. The Source	S/N: 4952										
Background: 17		<i>cpm</i>									
		Location: Trailer									
Source Count:											
COMMENTS:											
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; padding: 5px;">Name: David Mercer</td> <td style="width: 50%; padding: 5px;">Weather Conditions: dark, clear</td> </tr> <tr> <td style="padding: 5px;">Date: 11/7/02</td> <td style="padding: 5px;">Time of Day: 5:30 AM</td> </tr> <tr> <td style="padding: 5px;">Project Name: CSMRI</td> <td style="padding: 5px;">Project No. 2112</td> </tr> <tr> <td style="padding: 5px;">Reviewed By:</td> <td style="padding: 5px;">Date</td> </tr> </table>				Name: David Mercer	Weather Conditions: dark, clear	Date: 11/7/02	Time of Day: 5:30 AM	Project Name: CSMRI	Project No. 2112	Reviewed By:	Date
Name: David Mercer	Weather Conditions: dark, clear										
Date: 11/7/02	Time of Day: 5:30 AM										
Project Name: CSMRI	Project No. 2112										
Reviewed By:	Date										

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Gamma Ray	Cal. Date: 10/10/2002
Counter Mfg. Ludlum	Model: 19	S/N: 95469	
OPERATIONS AND SETTINGS			
Power: ☒	Battery: <i>good</i>	Res.: <i>0</i>	
		Light: ☒	
EFFICIENCY CHECK			
Source: CS 137	Activity:	Cert.: 12/95	
Mfg. The Source	S/N: 4952		
Background: <i>17</i> <i>cpm</i>			
		Location: Trailer	
Source Count: <i>290</i>			
COMMENTS:			
Name: <i>DWM</i>		Weather Conditions: <i>clear, dark</i>	
Date: <i>11/8/02</i>		Time of Day: <i>5:35</i>	
Project Name: <u>CSMRI</u>		Project No. <u>2112</u>	
Reviewed By:		Date	

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Gamma Ray	Cal. Date: 10/10/2002
Counter Mfg. Ludlum	Model: 19	S/N: 95469	
OPERATIONS AND SETTINGS			
Power: OK	Battery: OK	Res.: OK	
		Light: OK	
EFFICIENCY CHECK			
Source: CS 137	Activity: 4925 μCi	Cert.: 12/95	
Mfg. The Source	S/N: 4952		
Background: 15 μR/hr		<i>cpm</i>	
		Location: Trailer	
Source Count:			
290 μR/hr on contact			
COMMENTS:			
Name: Jack Todaro		Weather Conditions: Partly Cloudy	
Date: 1-21-03		Time of Day: 9:00	
Project Name: CSMRI		Project No. 2112	
Reviewed By:		Date	

Survey 102402-01

INSTRUMENT OPERATIONS AND EFFICIENCY
DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Cal. Date: 5/9/02
Counter Mfg. Ludlum	Model: 19	S/N: 95516
Probe Mfg.	Model:	S/N:
OPERATIONS AND SETTINGS		
Power: OK	Battery: OK	H.V.
THR.	Window:	Light:
EFFICIENCY CHECK		
Source: Cs137	Activity: 4925 μ Ci	Cert.:
Mfg.	S/N:	
Background: 17 μ R/hr	cpm	Count Time: mins.
Rate: ☐	Scaler: ☐	Location:
Source Count: 290 μ R/hr		Count Time:
Efficiency: (1) (100) =		
COMMENTS: Source ¹³⁷ Cs 4952 μ Ci 12-95		
Name: Jack Todaro		Weather Conditions: cloudy
Date: 10/24/2002		Time of Day: 1300
Project Name: CSMRI		Project No. 2112
Reviewed By: Joe Todaro		Date: 10-24-2002

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Survey # 102502-01

INSTRUMENT OPERATIONS AND EFFICIENCY
DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Cal. Date:
Counter Mfg. <i>Ludlum</i>	Model: <i>19</i>	S/N: <i>95516</i>
Probe Mfg.	Model:	S/N:
OPERATIONS AND SETTINGS		
Power: <i>OK</i>	Battery: <i>OK</i>	H.V.
THR.	Window:	Light:
EFFICIENCY CHECK		
Source: <i>Cs-137</i>	Activity: <i>4925uCi</i>	Cert.:
Mfg.	S/N:	
Background: <i>19 uR/hr</i>	<i>cpm</i>	Count Time: <i>mins.</i>
Rate: ☐	Scaler: ☐	Location:
Source Count:		Count Time:
Efficiency: (<i>1</i>) (100) =		
COMMENTS: <i>250 uR hour w/ source underneath instrument</i>		
Name: <i>Jack Todaro</i>		Weather Conditions: <i>Partly Cloudy</i>
Date: <i>10/25/2002</i>		Time of Day:
Project Name: <i>CSMRI</i>		Project No. <i>2112</i>
Reviewed By: <i>Jack Todaro</i>		Date: <i>10/25/2002</i>

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Cal. Date: 5/9/02
Counter Mfg. <u>Ludlum</u>	Model: <u>19</u>	S/N: <u>95516</u>
Probe Mfg.	Model:	S/N:

OPERATIONS AND SETTINGS		
Power: ☒	Battery: ☒	H.V.
THR.	Window:	Light:

EFFICIENCY CHECK		
Source: <u>Cs-137</u>	Activity: <u>4925 mCi</u>	Cert.:
Mfg.	S/N:	

Background: <u>17</u> <u>8r + 5 mR/hr</u> cpm	Count Time: mins.
Rate: <u>300 R/hr</u> ☒ Scaler: ☐	Location:
Source Count: <u>300 mR/hr</u>	Count Time:
Efficiency: (<u>1</u>) (100) =	

COMMENTS: Dose rate at contact

Name: <u>Jack Todaro</u>	Weather Conditions: <u>cloudy</u>
Date: <u>10/28/2002</u>	Time of Day: <u>02:39 PM</u>
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By: <u>James C. Wodars</u>	Date:

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Cal. Date: 5/19/02
Counter Mfg. Ludlum	Model: 19	S/N: 95516
Probe Mfg. Ludlum	Model: 19	S/N: 95516

OPERATIONS AND SETTINGS		
Power: OK	Battery: OK	H.V. OK
THR. —	Window: —	Lignt: OK

EFFICIENCY CHECK		
Source: CS-137	Activity: 4952 uCi	Cert.: —
Mfg. —	S/N: —	—

Background: 16 14.3 u R/hr	cpm	Count Time: — mins.
Rate: ☒ Scaler: ☐	Location: —	
Source Count: 220 u R/hr 250	Count Time: —	
Efficiency: (1) (100) =		

COMMENTS:

Name: Jack Todaro	Weather Conditions: Snowy
Date: 10/30/2002	Time of Day: 0939
Project Name: CSMRI	Project No. 2112
Reviewed By: Jack Todaro	Date: 10/30/2002

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #1	Cal. Date: 5/14/02, 10/23/02
Counter Mfg. Ludlum	Model: 2221	S/N: 86330	
Probe Mfg. Ludlum	Model: 43-5	S/N: 172236	

OPERATIONS AND SETTINGS

Power: <i>yes</i>	Battery: <i>6.2</i>	H.V. <i>603</i>
THR. <i>101</i>	Window: <i>3950</i>	Light: <i>Yes</i>

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 2118	

Background: <i>7</i>	<i>cpm</i>	Count Time: <i>1</i>	<i>mins.</i>
Rate: ☐	Scaler: ☒	Location: <i>Trailer</i>	
Source Count: <i>2184</i>		Count Time:	
Efficiency: $(2184 / 17,100) (100) = 12.8\%$		320 field count	

COMMENTS:

Name: <i>DWM</i>	Weather Conditions: <i>Snowy</i>
Date: <i>10/30/02</i>	Time of Day: <i>10:10</i>
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By: <i>Jan C. [Signature]</i>	Date: <i>10/30/02</i>

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

#1

INSTRUMENT IDENTIFICATION		Cal. Date: 5/14/02/10/23/02
Counter Mfg. <i>Ludlum</i>	Model: 2221	S/N: 86330
Probe Mfg. <i>Ludlum</i>	Model: 43-5	S/N: 172236

OPERATIONS AND SETTINGS		
Power: ☒	Battery: 6.0	H.V. 604
THR. 101	Window: 3955	Light: Yes

EFFICIENCY CHECK		
Source: <i>Th 230</i>	Activity: 17,100	Cert.: Yes
Mfg. <i>The Source</i>	S/N: 2118	

Background: 7 / (315) cpm	Count Time: 2 minutes mins.
Rate: ☐ Scaler: ☒	Location: Trailer
Source Count: 2254 2254 / 17100 #2	Count Time: 1 minute
Efficiency: (17,100) (100) = 13.2 / .134	

COMMENTS: 2nd try successful

Name: <i>DWM</i>	Weather Conditions: Partly
Date: 11/4/02	Time of Day: 7:00
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date: 11/4/02

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #1	Cal. Date: 5/14/02, 10/23/02
Counter Mfg. Ludlum	Model: 2221	S/N: 86330	
Probe Mfg. Ludlum	Model: 43-5	S/N: 172236	

OPERATIONS AND SETTINGS

Power: OK	Battery: OK	H.V. 605
THR. 101	Window: 3958	Light: OK

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 2118 ^{Dr} 99TH4702118	

Background: 24/5 = 4.8 cpm	Count Time: 5 mins.
Rate: ☐ Scaler: ☒	Location: Trailer
Source Count: 54 2298	Count Time: 1 min
Efficiency: $(2298 / 17,100) (100) = 0.134$	

COMMENTS:

Name: Jack Todaro	Weather Conditions: Dark
Date: 11-5-2002	Time of Day: 0607
Project Name: CSMRI	Project No. 2112
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #1	Cal. Date: Probe 10/23/02 Counter 5/14/02
Counter Mfg. Ludlum	Model: 43-5 2221	S/N: 86330 86330	
Probe Mfg. Ludlum	Model: 43-5	S/N: 172236 172236	

OPERATIONS AND SETTINGS		
Power: yes	Battery: 5.5	H.V. 605
THR. 101	Window: 3960	Light: Yes

EFFICIENCY CHECK		
Source: Th-230	Activity: 17,100	Cert.: Yes
Mfg. The Source	S/N: 2118	

Background: 4 cpm	Count Time: 1 mins.
Rate: ☐ Scaler: ☒	Location: Trailer
Source Count: 2305 2305	Count Time: 1 minute
Efficiency: $(2305 / 17100) (100) = 13.5\% \approx 0.135$	

COMMENTS: $\frac{x}{.135(.5)} = 5000 = 337.5$ magic number for too hot of a truck reading

338 cpm

Name: Dwm	Weather Conditions: Snowy
Date: 10/29/02	Time of Day: 6:45
Project Name: CSMRI	Project No. 2112
Reviewed By: <i>Joel G. Toder</i>	Date: 10/29/02

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #1	Cal. Date: 5/14/02, 10/23/02
Counter Mfg. Ludlum	Model: 2221	S/N: 86330	
Probe Mfg. Ludlum	Model: 43-5	S/N: 172236	

OPERATIONS AND SETTINGS

Power: ☒	Battery: 6.0	H.V. 605
THR. 101	Window: 3960	Light: ☒

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: 4	cpm	Count Time: 1	mins.
Rate: ☐	Scaler: ☒	Location: trailer	
Source Count: 2297 2297		Count Time: 1 minute	
Efficiency: $(\frac{2297}{17,100}) (100) = 0.134$			

COMMENTS:

Name: DWM	Weather Conditions: dark
Date: 11/6/02	Time of Day: 5:55
Project Name: CSMRI	Project No. 2112
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #1	Cal. Date: 5/14/02, 10/23/02
Counter Mfg. Ludlum	Model: 2221	S/N: 86330	
Probe Mfg. Ludlum	Model: 43-5	S/N: 172236	

OPERATIONS AND SETTINGS

Power: ☒	Battery: 5.9	H.V. 607
THR. 101	Window: 3970	Light: Yes

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: 4	cpm	Count Time: 1m	mins.
Rate: ☐	Scaler: ☒	Location: trailer	
Source Count: 2327		Count Time: 1	
Efficiency: $(2327 / 17,100)(100) = 0.136$			

COMMENTS:

Name: DWM	Weather Conditions: clear, dark
Date: 11/7/02	Time of Day: 5:39 AM
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #1	Cal. Date: 5/14/02, 10/23/02
Counter Mfg. Ludlum	Model: 2221	S/N: 86330	
Probe Mfg. Ludlum	Model: 43-5	S/N: 172236	

OPERATIONS AND SETTINGS

Power: ☒	Battery: 5.8	H.V. 605
THR. 100	Window: 3957	Light: Yes

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: 5	cpm	Count Time: 1 / 5 mins.
Rate: ☐	Scaler: ☒	Location: trailer
Source Count: 2398		Count Time:
Efficiency: $(2398 / 17,100) (100) = 0.140$		

COMMENTS:

Name: David Mercer	Weather Conditions: clear
Date: 11/8/02	Time of Day: 5:45
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Cal. Date: 10/18/02
Counter Mfg. Ludlum	Model: 222	S/N: 168558
Probe Mfg. Ludlum	Model: 43-S	S/N: 082640

OPERATIONS AND SETTINGS		
Power: ☒	Battery: ☒	H.V. ☒
THR. ☒	Window: open	Light: ☒

EFFICIENCY CHECK		
Source: TH-230	Activity: 17,100 dpm	Cert.: Y
Mfg. The Source	S/N: 2118	

Background: 0.5 cpm	Count Time: 10 mins.
Rate: ☒ Scaler: ☐	Location: Office
Source Count: 2019	Count Time: 1 min
Efficiency: $(2019 / 17100) (100) = 11.8\%$	

COMMENTS: 2.5000 dpm = 590 cpm

Name: R. Krumbecker	Weather Conditions: 70°F Sun
Date: 10/18/02	Time of Day: 1454
Project Name: CSMRI	Project No. 2112
Reviewed By: Kelly M. Coffin	Date: 10/18/02

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Cal. Date: <u>10/21/02</u>
Counter Mfg. <u>Lucium</u>	Model: <u>2221</u>	S/N: <u>168558</u>
Probe Mfg. <u>Lucium</u>	Model: <u>43-5</u>	S/N: <u>082642</u>

OPERATIONS AND SETTINGS		
Power: ☒	Battery: ☒	H.V. ☒
THR. ☒	Window: ☒	Light: ☒

EFFICIENCY CHECK		
Source: <u>Th-230</u>	Activity: <u>17,100 dpm</u>	Cert.: <u>Y</u>
Mfg. <u>The Source</u>	S/N: <u>2118</u>	

Background: <u>0.2</u> cpm	Count Time: <u>10</u> mins.
Rate: ☒ Scaler: ☐	Location: <u>Office</u>
Source Count: <u>1978</u>	Count Time:
Efficiency: $(1978 / 17100) (100) = 11.5\%$ ZTC	$4\pi = 6\pi$

COMMENTS: $B = 2 \sqrt{B} = 1.41$ $A = 50 \text{ cm}^2$

$3 + 4.65 \cdot 1.41 / 0.5 = 13 \text{ counts}$

1978

Name: <u>Robert K. [Signature]</u>	Weather Conditions: <u>40°F</u>
Date: <u>10/21/02</u>	Time of Day:
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

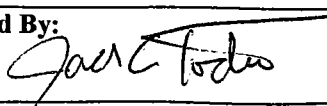
INSTRUMENT IDENTIFICATION		Probe #2	Cal. Date: 5/09/02, 5/09/02
Counter Mfg. Ludlum	Model: 2221	S/N: 168558	
Probe Mfg. Ludlum	Model: 43-5	S/N: 082642	

OPERATIONS AND SETTINGS		
Power: Yes	Battery: 6.3	H.V. 704
THR. 252	Window: 3830	Light: Yes

EFFICIENCY CHECK		
Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 2118	

Background: 2	cpm	Count Time: 1	mins.
Rate: ☐	Scaler: ☒	Location: Trailer	
Source Count: 2071		Count Time: 1	
Efficiency: $(2071 / 17,100) (100) = 12.1\% = 0.121$			

COMMENTS:	$\frac{x}{0.121 (1.5)} = 5000$ $x = 302.5 \text{ cpm}$

Name: DWM	Weather Conditions: Snowy
Date: 10/29/02	Time of Day: 10:30
Project Name: CSMRI	Project No. 2112
Reviewed By: 	Date: 10/29/02

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #2	Cal. Date: 5/09/02, 5/09/02
Counter Mfg. Ludlum	Model: 2221	S/N: 168558	
Probe Mfg. Ludlum	Model: 43-5	S/N: 082642	

OPERATIONS AND SETTINGS

Power: <i>Yes</i>	Battery: <i>6.3</i>	H.V. <i>705</i>
THR. <i>253</i>	Window: <i>3830</i>	Light: <i>Yes</i>

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 2118	

Background: <i>1</i> cpm	Count Time: <i>1</i> mins.
Rate: ☐ Scaler: ☒	Location: <i>Trailer 1</i>
Source Count: <i>2047</i>	Count Time:
Efficiency: $(2047 / 17,100) (100) = 11.9\% .119$	<i>298</i>

COMMENTS:

Name: <i>DWM</i>	Weather Conditions: <i>Snowy</i>
Date: <i>10/30/02</i>	Time of Day: <i>9:50</i>
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By: <i>Joel C. Todd</i>	Date: <i>10/30/02</i>

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

2

INSTRUMENT IDENTIFICATION		Cal. Date: 10/29/02
Counter Mfg. <u>Ludlum</u>	Model: <u>2221</u>	S/N: <u>97830</u>
Probe Mfg. <u>Ludlum</u>	Model: <u>43-5</u>	S/N: <u>117588</u>
OPERATIONS AND SETTINGS		
Power: ☒	Battery: <u>5.4</u>	H.V. <u>659</u>
THR. <u>102</u>	Window: <u>4064</u>	Light: <u>Yes</u>
EFFICIENCY CHECK		
Source: <u>Th 230</u>	Activity: <u>17,100</u>	Cert.: <u>Yes</u>
Mfg. <u>The Source</u>	S/N: <u>2118</u>	
Background: <u>5.5</u> (11) cpm		Count Time: <u>2</u> mins.
Rate: ☐	Scaler: ☒	Location: <u>Trailer</u>
Source Count: <u>17,100</u>		Count Time: <u>1 minute</u>
Efficiency: $(2177 / 17,100) (100) = 12.7\%$		
COMMENTS: <u>falls within weekly parameters</u> 		
Name: <u>DWM</u>		Weather Conditions: <u>Partly cloudy</u>
Date: <u>11/4/02</u>		Time of Day: <u>6:50</u>
Project Name: <u>CSMRI</u>		Project No. <u>2112</u>
Reviewed By:		Date: <u>11/4/02</u>

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #2	Cal. Date: 10/29/02
Counter Mfg. Ludlum	Model: 2221	S/N: 97830	
Probe Mfg. Ludlum	Model: 43-5	S/N: 117588	

OPERATIONS AND SETTINGS

Power: <u>OK</u>	Battery: <u>5.5</u>	H.V. <u>654</u>
THR. <u>100</u>	Window: <u>4068</u>	Ligt: <u>OK</u>

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: <u>22/5 = 4.4 cpm</u>	Count Time: <u>5 m. hours</u>
Rate: ☐ Scaler: ☒	Location: <u>trailer</u>
Source Count: <u>2343</u>	Count Time:
Efficiency: $(2343 / 17,100) (100) = 0.137$ <u>13.7%</u>	

COMMENTS: ✓ OK

Name: <u>Dwm</u>	Weather Conditions: <u>dark</u>
Date: <u>11/5/02</u>	Time of Day: <u>6:05</u>
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #2	Cal. Date: 10/29/02
Counter Mfg. Ludlum	Model: 2221	S/N: 97830	
Probe Mfg. Ludlum	Model: 43-5	S/N: 117588	

OPERATIONS AND SETTINGS		
Power: ☒	Battery: 5.5	H.V. 657
THR. 100	Window: 4069	Light: ☒

EFFICIENCY CHECK		
Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: 4 4	cpm	Count Time: 1	mins.
Rate: ☒	Scaler: ☐	Location: Trailer	
Source Count: 2044 2244		Count Time:	
Efficiency: $(2244 / 17,100) (100) = 0.131$			

COMMENTS:

Name: DWM	Weather Conditions: dark
Date: 11/6/02	Time of Day: 6:00
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #2	Cal. Date: 10/29/02
Counter Mfg. Ludlum	Model: 2221	S/N: 97830	
Probe Mfg. Ludlum	Model: 43-5	S/N: 117588	

OPERATIONS AND SETTINGS		
Power: ☒	Battery: 5.9	H.V. 657
THR. 102	Window: 20	Light: yes

EFFICIENCY CHECK		
Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: 3.5	cpm	Count Time: 1	mins.
Rate: ☐	Scaler: ☒	Location: Trailer	
Source Count:		Count Time: 1	
Efficiency: $(2339 / 17100) (100) = 0.137$			

COMMENTS:

Name: DWM	Weather Conditions: clear, dark
Date: 11/7/02	Time of Day: 5:45
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Probe #2	Cal. Date: 10/29/02
Counter Mfg. Ludlum	Model: 2221	S/N: 97830	
Probe Mfg. Ludlum	Model: 43-5	S/N: 117588	

OPERATIONS AND SETTINGS

Power:	Battery:	H.V.
THR.	Window:	Light:

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: <u>5</u> $22/5 = 4.4 \text{ cpm}$	Count Time: <u>5</u> mins.
Rate: ☐ Scaler: ☒	Location: <u>Trailer</u>
Source Count: <u>2297</u>	Count Time: <u>1</u>
Efficiency: $(2297 / 17,100)(100) = 0.134$	

COMMENTS:

Name: <u>Jack Todaro</u>	Weather Conditions: <u>clear</u>
Date: <u>11-8-2002</u>	Time of Day: <u>0700</u>
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION Dual Scaler		Cal. Date: 4/30/02
Counter Mfg. Ludlum	Model: 2929	S/N: 142645
Probe Mfg. Ludlum	Model: 43-10-1	S/N: PR 144756

OPERATIONS AND SETTINGS		
Power: Yes	Battery: N/A	H.V. 3.04
THR. N/A	Window: N/A	Light: N/A

EFFICIENCY CHECK		
Source: Th 230	Activity: 17,100	Cert.: Yes
Mfg. The Source	S/N: 2118	

Background: 2 cpm	Count Time: 10 mins.
Rate: ☐ Scaler: ☒ 3	Location: trailer
Source Count: 5546 5546 counts	Count Time: 100 1 min
Efficiency: $(5546 / 17,100) (100) = 32.4\% = 0.324$	

COMMENTS: 324 cpm = Removette Limit Value

Name: DWM	Weather Conditions: Snowy
Date: 10/29/02	Time of Day: 10:45
Project Name: CSMRI	Project No. 2112
Reviewed By: <i>Gal C. [Signature]</i>	Date: 10/29/02

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Cal. Date: 4/30/02 <i>[Signature]</i>
Counter Mfg. <i>Ludlum</i>	Model: 2929	S/N: 142645
Probe Mfg. <i>Ludlum</i>	Model: 43-10-1	S/N: 144756

OPERATIONS AND SETTINGS		
Power: <i>Yes</i>	Battery:	H.V.
THR.	Window:	Light:

EFFICIENCY CHECK		
Source: <i>Th 230</i>	Activity: <i>17,100</i>	Cert.: <i>Yes</i>
Mfg. <i>The Source Inc</i>	S/N: <i>2118</i>	

Background: <i>4 counts</i> cpm	Count Time: <i>10</i> mins.
Rate: ☐ Scaler: ☒	Location: <i>Trailer</i>
Source Count: <i>5597</i>	Count Time: <i>1</i>
Efficiency: $(5597 / 17,100) (100) = 32.7$ <i>327</i>	<i>327</i>

COMMENTS: *[Signature]* *5000* *24h*

? cpm = $1000 \text{ dpm} / 100 \text{ cm}^2 (0.327)$

Name: <i>DWM</i>	Weather Conditions: <i>Snowy</i>
Date: <i>10/30/02</i>	Time of Day: <i>9:45</i>
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date: <i>10/30/02</i>

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

Cal Due: 4-30-03

INSTRUMENT IDENTIFICATION

Cal. Date: 4-30-02

Counter Mfg. <i>Ludlum</i> Probe <i>43-10-1</i>	Model: <i>43-10-1</i>	S/N: <i>PR 144756</i>
Probe Mfg. <i>Ludlum</i> COUNTER	Model: <i>2929</i>	S/N:

OPERATIONS AND SETTINGS

Power: <i>✓</i>	Battery: <i>N/A</i>	H.V. <i>3.4</i>
THR. <i>—</i>	Window: <i>3.4 jrk</i>	Ligt: <i>—</i>

EFFICIENCY CHECK

Source: <i>Th-230</i>	Activity: <i>17,100</i>	Cert.:
Mfg.	S/N: <i>99TH4702118</i>	

Background: <i>0</i> cpm	Count Time: <i>10</i> mins.
Rate: ☐ Scaler: ☒	Location: <i>Trailer</i>
Source Count: <i>5556</i>	Count Time: <i>1342 ± min</i>
Efficiency: $(5556 / 17,100) (100) = 32.4$ <i>94%</i>	

COMMENTS: *324 cpm = 1000 dpm*
Efficiency within ± 15% of manufacturers calibration

Name: <i>Jack Todaro</i>	Weather Conditions:
Date: <i>10/31/2002</i>	Time of Day: <i>1342</i>
Project Name: <i>CSMRI</i>	Project No. <i>2112</i>
Reviewed By: <i>Jack C. Todaro</i>	Date: <i>10-31-2002</i>

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Cal. Date: 4/30/02								
Counter Mfg. Ludlum	Model: 2929	S/N: 142645								
Probe Mfg. Ludlum	Model: 43-10-1	S/N: 144756								
OPERATIONS AND SETTINGS										
Power: OK	Battery: N/A	H.V. 765V								
THR. N/A	Window: N/A	Light: _____								
EFFICIENCY CHECK										
Source: TH-230	Activity: 17,100 dpm	Cert.:								
Mfg.	S/N: 99TH470									
Background: 0 cpm		Count Time: 10 mins.								
Rate: ☐	Scaler: ☒	Location: Trailer								
Source Count: 5503		Count Time: 1 min								
Efficiency: $(5503/17,100)(100) = 0.322$										
COMMENTS:										
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 5px;">Name: Jack Todaro</td> <td style="padding: 5px;">Weather Conditions: cloudy / cool</td> </tr> <tr> <td style="padding: 5px;">Date: 11-4-2002</td> <td style="padding: 5px;">Time of Day: 0700</td> </tr> <tr> <td style="padding: 5px;">Project Name: CSMRI</td> <td style="padding: 5px;">Project No. 2112</td> </tr> <tr> <td style="padding: 5px;">Reviewed By: <i>Jim C. [Signature]</i></td> <td style="padding: 5px;">Date: 11-4-2002</td> </tr> </table>			Name: Jack Todaro	Weather Conditions: cloudy / cool	Date: 11-4-2002	Time of Day: 0700	Project Name: CSMRI	Project No. 2112	Reviewed By: <i>Jim C. [Signature]</i>	Date: 11-4-2002
Name: Jack Todaro	Weather Conditions: cloudy / cool									
Date: 11-4-2002	Time of Day: 0700									
Project Name: CSMRI	Project No. 2112									
Reviewed By: <i>Jim C. [Signature]</i>	Date: 11-4-2002									

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Swipe Counter	Cal. Date: 4/30/02
Counter Mfg. Ludlum	Model: 2929	S/N: 142645	
Probe Mfg. Ludlum	Model: 43-10-1	S/N: 144756	

OPERATIONS AND SETTINGS

Power: OK	Volts: OK	

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: 0	cpm	Count Time: 10 mins.
		Location: Trailer
Source Count: 5468		Count Time: 1 min
Efficiency: $(5468 / 17,100) (100) = 0.320$		

COMMENTS:

Name: Jack Todaro	Weather Conditions: Dark
Date: 11-5-2002	Time of Day:
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Swipe Counter	Cal. Date: 4/30/02
Counter Mfg. Ludlum	Model: 2929	S/N: 142645	
Probe Mfg. Ludlum	Model: 43-10-1	S/N: 144756	

OPERATIONS AND SETTINGS

Power: <u>OK</u>	Volts: <u>750</u>	

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: <u>0</u> cpm	Count Time: <u>10</u> mins.
	Location: Trailer
Source Count: <u>5419</u>	Count Time: <u>1 min</u>
Efficiency: $(5419 / 17100) (100) = 0.317$	

COMMENTS:

Name: <u>Jack Todaro</u>	Weather Conditions: <u>Dark</u>
Date: <u>11-6-2002</u>	Time of Day: <u>0542</u>
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Swipe Counter	Cal. Date: 4/30/02
Counter Mfg. Ludlum	Model: 2929	S/N: 142645	
Probe Mfg. Ludlum	Model: 43-10-1	S/N: 144756	

OPERATIONS AND SETTINGS

Power: <i>OK</i>	Volts: <i>750</i>	

EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: <i>0</i>	<i>cpm</i>	Count Time: <i>1</i>	<i>mins.</i>
		Location: Trailer	
Source Count: <i>5534</i>			Count Time: <i>1</i>
Efficiency: $(5534 / 17,100) (100) = 0.324$			

COMMENTS:

Name: <i>Jack Todaro</i>	Weather Conditions: <i>Dark/clear</i>
Date: <i>11-7-2002</i>	Time of Day: <i>0552</i>
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date

INSTRUMENT OPERATIONS AND EFFICIENCY DAILY TEST RECORD

INSTRUMENT IDENTIFICATION		Swipe Counter	Cal. Date: 4/30/02
Counter Mfg. Ludlum	Model: 2929	S/N: 142645	
Probe Mfg. Ludlum	Model: 43-10-1	S/N: 144756	

OPERATIONS AND SETTINGS

Power: <i>OK</i>	Volts: <i>760</i>	

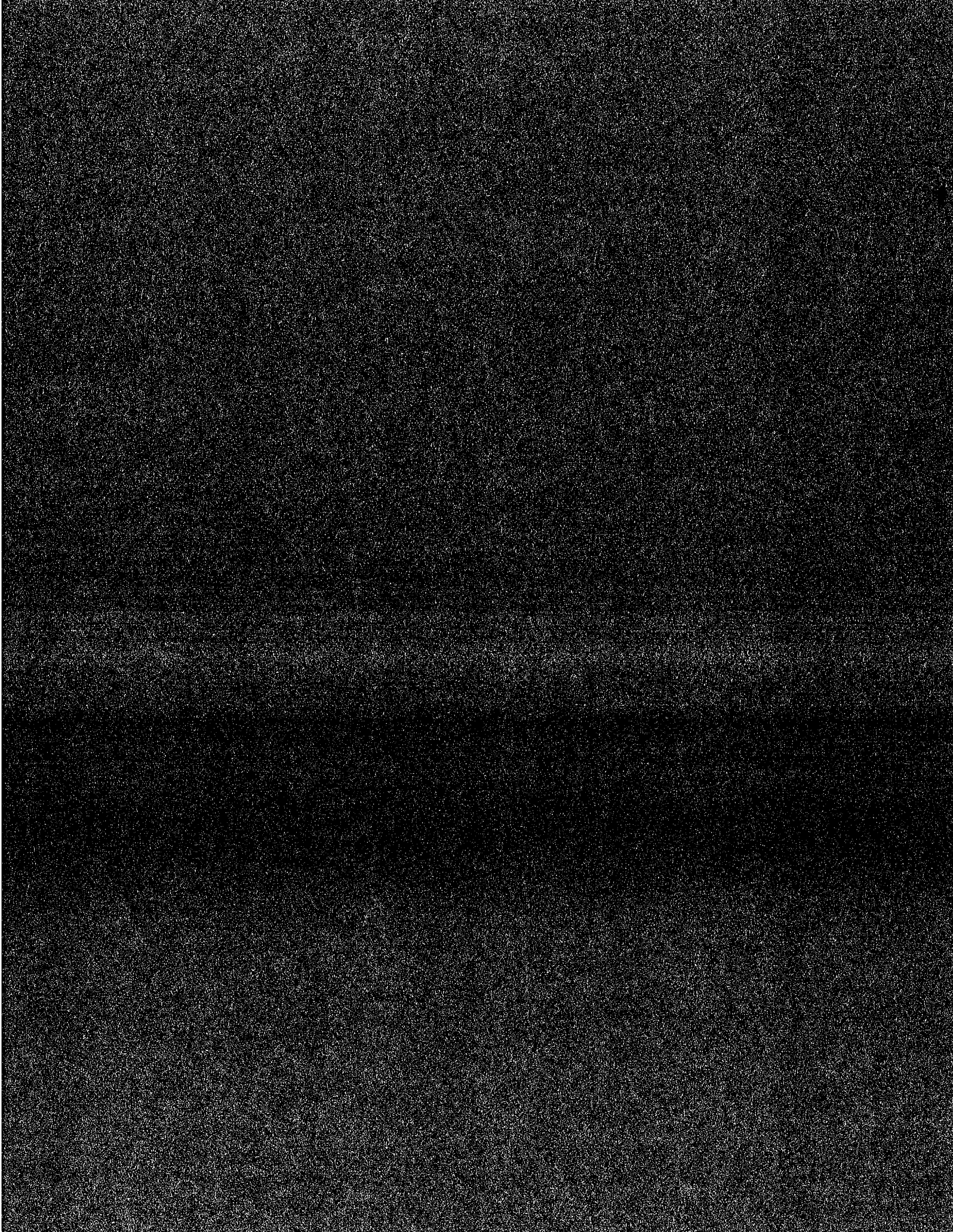
EFFICIENCY CHECK

Source: Th 230	Activity: 17,100	Cert.: yes
Mfg. The Source	S/N: 99TH4702118	

Background: <i>0</i>	<i>cpm</i>	Count Time: <i>10</i> mins.
		Location: Trailer
Source Count: <i>5463</i>	Count Time: <i>1 min</i>	
Efficiency: $(5463 / 17,100) (100) = 0.319$		

COMMENTS:

Name: <i>Jack Todaro</i>	Weather Conditions: <i>clear</i>
Date: <i>11-8-2002</i>	Time of Day: <i>06:55 AM</i>
Project Name: <u>CSMRI</u>	Project No. <u>2112</u>
Reviewed By:	Date



LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 10240201 DATE OF SAMPLE 10-24-02

FILTER TYPE _____

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Re count of sample

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Giliberator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE _____ SSN _____

FLOW RATE

INITIAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

FINAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-02 TIME 1130 AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (cpm) = 3 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 cpm

SAMPLE ACTIVITY (μCi) = 0 cpm * 4.505E-7 = 0 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 298 SAMPLE VOL (L) * 1000 = 2.98E5 ml

ACTIVITY CONCENTRATION (μCi/ml) = 0 μCi ÷ 2.98E5 SAMPLE VOL (ml) = 0 (μCi/ml)

DAC CALCULATION

MPC FOR Th-230 = 3E-12 μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 0 / 3E-12 = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-12-02

NEW HORIZONS ENVIRONMENTAL CONSULTANTS, INC.

6585 S. WRIGHT STREET · LITTLETON, CO 80127-4806
TELEPHONE: (303) 932-2220 FAX: (303) 932-2221

1 minute count

AIR MONITORING DATA SHEET

PROJECT CSMRI				PROJECT # 2112			
SAMPLER DWM				SAMPLE DATE 10/24/02			
SAMPLE NUMBER 10/24/02-01				TYPE OF SAMPLE Area			
EMPLOYEE N/A				SSN N/A			
PUMP MODEL Gil A. 5				PUMP S/N 11108			
CALIBRATOR MODEL Gilibrator 2				CALIBRATOR S/N 910316-S			
CALIBRATION DATE / TIME (INITIAL) 12:45 10/24/02				AM ☒ PM			
INITIAL FLOW RATE	1.612	1.605	1.605	1.602	1.605		
1.604 avg 1/m	1.605	1.604	1.604	1.602	1.600		
1.695	1.710	1.707	1.706	1.713	1.702		
FINAL FLOW RATE	1.710	1.707	1.706	1.713	1.702		
1.703 avg 1/m	1.699	1.701	1.702	1.702	1.697		
CALIBRATION DATE / TIME (FINAL) 3:50				AM ☐ PM ☒			
START TIME 12:45 AM ☒ PM		STOP TIME 3:45 AM ☒ PM		180		MIN	
START TIME AM PM		STOP TIME AM PM				MIN	
START TIME AM PM		STOP TIME AM PM				MIN	
START TIME AM PM		STOP TIME AM PM				MIN	
TOTAL VOLUME 297.6 1			MEDIA TYPE MCE				
NOTES Sample taken during excavation of concrete removal around 10307, 10308, 10309, 10310, 10311, 10312, 10313, 10314, 10315, 10316, 10317, 10318, 10319, 10320, 10321, 10322, 10323, 10324, 10325, 10326, 10327, 10328, 10329, 10330, 10331, 10332, 10333, 10334, 10335, 10336, 10337, 10338, 10339, 10340, 10341, 10342, 10343, 10344, 10345, 10346, 10347, 10348, 10349, 10350, 10351, 10352, 10353, 10354, 10355, 10356, 10357, 10358, 10359, 10360, 10361, 10362, 10363, 10364, 10365, 10366, 10367, 10368, 10369, 10370, 10371, 10372, 10373, 10374, 10375, 10376, 10377, 10378, 10379, 10380, 10381, 10382, 10383, 10384, 10385, 10386, 10387, 10388, 10389, 10390, 10391, 10392, 10393, 10394, 10395, 10396, 10397, 10398, 10399, 10400, 10401, 10402, 10403, 10404, 10405, 10406, 10407, 10408, 10409, 10410, 10411, 10412, 10413, 10414, 10415, 10416, 10417, 10418, 10419, 10420, 10421, 10422, 10423, 10424, 10425, 10426, 10427, 10428, 10429, 10430, 10431, 10432, 10433, 10434, 10435, 10436, 10437, 10438, 10439, 10440, 10441, 10442, 10443, 10444, 10445, 10446, 10447, 10448, 10449, 10450, 10451, 10452, 10453, 10454, 10455, 10456, 10457, 10458, 10459, 10460, 10461, 10462, 10463, 10464, 10465, 10466, 10467, 10468, 10469, 10470, 10471, 10472, 10473, 10474, 10475, 10476, 10477, 10478, 10479, 10480, 10481, 10482, 10483, 10484, 10485, 10486, 10487, 10488, 10489, 10490, 10491, 10492, 10493, 10494, 10495, 10496, 10497, 10498, 10499, 10500, 10501, 10502, 10503, 10504, 10505, 10506, 10507, 10508, 10509, 10510, 10511, 10512, 10513, 10514, 10515, 10516, 10517, 10518, 10519, 10520, 10521, 10522, 10523, 10524, 10525, 10526, 10527, 10528, 10529, 10530, 10531, 10532, 10533, 10534, 10535, 10536, 10537, 10538, 10539, 10540, 10541, 10542, 10543, 10544, 10545, 10546, 10547, 10548, 10549, 10550, 10551, 10552, 10553, 10554, 10555, 10556, 10557, 10558, 10559, 10560, 10561, 10562, 10563, 10564, 10565, 10566, 10567, 10568, 10569, 10570, 10571, 10572, 10573, 10574, 10575, 10576, 10577, 10578, 10579, 10580, 10581, 10582, 10583, 10584, 10585, 10586, 10587, 10588, 10589, 10590, 10591, 10592, 10593, 10594, 10595, 10596, 10597, 10598, 10599, 10600, 10601, 10602, 10603, 10604, 10605, 10606, 10607, 10608, 10609, 10610, 10611, 10612, 10613, 10614, 10615, 10616, 10617, 10618, 10619, 10620, 10621, 10622, 10623, 10624, 10625, 10626, 10627, 10628, 10629, 10630, 10631, 10632, 10633, 10634, 10635, 10636, 10637, 10638, 10639, 10640, 10641, 10642, 10643, 10644, 10645, 10646, 10647, 10648, 10649, 10650, 10651, 10652, 10653, 10654, 10655, 10656, 10657, 10658, 10659, 10660, 10661, 10662, 10663, 10664, 10665, 10666, 10667, 10668, 10669, 10670, 10671, 10672, 10673, 10674, 10675, 10676, 10677, 10678, 10679, 10680, 10681, 10682, 10683, 10684, 10685, 10686, 10687, 10688, 10689, 10690, 10691, 10692, 10693, 10694, 10695, 10696, 10697, 10698, 10699, 10700, 10701, 10702, 10703, 10704, 10705, 10706, 10707, 10708, 10709, 10710, 10711, 10712, 10713, 10714, 10715, 10716, 10717, 10718, 10719, 10720, 10721, 10722, 10723, 10724, 10725, 10726, 10727, 10728, 10729, 10730, 10731, 10732, 10733, 10734, 10735, 10736, 10737, 10738, 10739, 10740, 10741, 1							

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 1025 2002 AM DATE OF SAMPLE 10-25-02

FILTER TYPE _____

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES RECOUNT OF SAMPLE

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTUER Gilan PUMP MODEL GiAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Giliberator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE _____ SSN _____

FLOW RATE

INITIAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

FINAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-02 TIME 01:00 AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK YES (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 2 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = 0 dpm * 4.505E-7 = 0 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 192 SAMPLE VOL (L) * 1000 = 1.92E5 ml

ACTIVITY CONCENTRATION (μCi/ml) = 0 μCi ÷ 1.92E5 SAMPLE VOL (ml) = 0 (μCi/ml)

DAC CALCULATION

MPC FOR Th-230 = 3E-12 μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 0 , 3E-12 = 0 DAC

NAME Jack Todaro SIGNATURE Jack C. Todaro DATE 12-12-2002



NEW HORIZONS ENVIRONMENTAL CONSULTANTS, INC.

6585 S. WRIGHT STREET LITTLETON, CO 80127-4806
TELEPHONE: (303) 932-2220 FAX: (303) 932-2221

AIR MONITORING DATA SHEET

east side
101c

PROJECT CSMRI				PROJECT # 2112	
SAMPLER DWM			SAMPLE DATE 10/25/02		
SAMPLE NUMBER 102502-AM			TYPE OF SAMPLE Area		
EMPLOYEE N/A			SSN N/A		
PUMP MODEL Gilair-5/8			PUMP S/N 11108		
CALIBRATOR MODEL Gilibrator 2			CALIBRATOR S/N 910316-5		
CALIBRATION DATE / TIME (INITIAL) 10/25/02 7:45 AM PM					
INITIAL FLOW RATE	1.612	1.611	1.596	1.588	1.612
1.606 1/m	1.612	1.612	1.611	1.597	1.612
FINAL FLOW RATE	1.606	1.605	1.601	1.600	1.600
1.597 x 1/m	1.599	1.598	1.576	1.590	1.596
CALIBRATION DATE / TIME (FINAL) AM PM					
START TIME 9:45 AM PM	STOP TIME 11:45 AM PM		120 MIN		
START TIME 11:45 AM PM	STOP TIME		AM PM MIN		
START TIME	STOP TIME		AM PM MIN		
START TIME	STOP TIME		AM PM MIN		
TOTAL VOLUME 1060 1921			MEDIA TYPE MCE		
NOTES Sample taken during excavation of 101C. Sampler placed east of work.					
SIGNATURE <i>Garrett</i>					

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 102502PM DATE OF SAMPLE 10-25-02

FILTER TYPE _____

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Recount of Sample

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE _____ SSN _____

FLOW RATE

INITIAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

FINAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-02 TIME 12:30 AM ☒ PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 1 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = 0 dpm * $4.505\text{E-}7$ = 0 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 169 SAMPLE VOL (L) * 1000 = 1.69E5 ml

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = 0 μCi ÷ 1.69E5 SAMPLE VOL (ml) = 0 ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR Th-230 = $3\text{E-}12$ $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) ÷ MPC ($\mu\text{Ci/ml}$) = 0 / $3\text{E-}12$ = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-02



NEW HORIZONS ENVIRONMENTAL CONSULTANTS, INC.

6585 S. WRIGHT STREET LITTLETON, CO 80127-4806
TELEPHONE: (303) 932-2220 FAX: (303) 932-2221

AIR MONITORING DATA SHEET

PROJECT CSMRI				PROJECT # 2112	
SAMPLER DWM/JT			SAMPLE DATE 10/25/02		
SAMPLE NUMBER 102502-PM			TYPE OF SAMPLE Area		
EMPLOYEE _____			SSN _____		
PUMP MODEL GilAir-5/8			PUMP S/N 11108		
CALIBRATOR MODEL Gilibrator 2			CALIBRATOR S/N 910316-S		
CALIBRATION DATE / TIME (INITIAL) 7:00 10/25/02 AM ☒ PM					
INITIAL FLOW RATE	1.625	1.637	1.603	1.644	1.619
1.622 l/m	1.618	1.621	1.617	1.628	1.612
FINAL FLOW RATE	1.626	1.630	1.639	1.642	1.635
1.627 l/m	1.614	1.623	1.617	1.624	1.625
CALIBRATION DATE / TIME (FINAL) 10/25/02 3:30 AM ☒ PM					
START TIME 105	AM ☒ PM	STOP TIME 2:45	AM ☒ PM	104	MIN
START TIME	AM PM	STOP TIME	AM PM		MIN
START TIME	AM PM	STOP TIME	AM PM		MIN
START TIME	AM PM	STOP TIME	AM PM		MIN
TOTAL VOLUME 169		MEDIA TYPE MCE			
NOTES sample take during excavation of 101C. Sampler placed east of work and 101N					
SIGNATURE Gael A. Wicks					

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 1028 02 AM DATE OF SAMPLE 10-28-02 12-02-00 JMS

FILTER TYPE _____

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES RECOUNT OF SAMPLE

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-02

COUNTER MFG. LU DLUM MODEL 2929 S/N 142645

PROBE MFG. LU DLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK YES (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 3 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = 0 dpm * 4.505E-7 = 0 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 218 SAMPLE VOL (L) * 1000 = 2.18E5 ml

ACTIVITY CONCENTRATION (μCi/ml) = 0 μCi ÷ 2.18E5 SAMPLE VOL (ml) = 0 (μCi/ml)

DAC CALCULATION

MPC FOR Th-230 = 3E-12 μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 0 / 3E-12 = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-02

NOTES / CALCULATIONS

RECOUNT OF SAMPLE



NEW HORIZONS ENVIRONMENTAL CONSULTANTS, INC.

6585 S. WRIGHT STREET LITTLETON, CO 80127-4806
TELEPHONE: (303) 932-2220 FAX: (303) 932-2221

AIR MONITORING DATA SHEET

PROJECT CSMRI				PROJECT # 2112	
SAMPLER DWM			SAMPLE DATE 10/28/02		
SAMPLE NUMBER 102802-AM			TYPE OF SAMPLE Area		
EMPLOYEE N/A			SSN N/A		
PUMP MODEL Gil Air 5			PUMP S/N 11108		
CALIBRATOR MODEL Gilibrator 2			CALIBRATOR S/N 910316-S		
CALIBRATION DATE / TIME (INITIAL) 8:15 AM PM					
INITIAL FLOW RATE	1.613	1.612	1.612	1.612	1.612
1.612 $\bar{x}$ 1/m	1.612	1.612	1.611	1.612	1.612
FINAL FLOW RATE	1.693	1.686	1.681	1.678	1.677
1.678 $\bar{x}$ 1/m	1.675	1.675	1.673	1.671	1.669
CALIBRATION DATE / TIME (FINAL) AM PM					
START TIME 8:45 AM PM	STOP TIME 1055 AM PM		130 MIN		
START TIME AM PM	STOP TIME AM PM		MIN		
START TIME AM PM	STOP TIME AM PM		MIN		
START TIME AM PM	STOP TIME AM PM		MIN		
TOTAL VOLUME $1.678 \bar{x} / 130 \text{ min} = 1$ 218			MEDIA TYPE MCE		
NOTES Sample taken east of 101C during concrete removal.					
SIGNATURE Jan Chodas					

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 10292002 1 DATE OF SAMPLE 10-29-2002

FILTER TYPE _____

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES RECOUNT OF SAMPLE

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTUER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Giliberator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE _____ SSN _____

FLOW RATE

INITIAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

FINAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-02 TIME 1:20 AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 3 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = 0 dpm * 4.505E-7 = 0 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 695 SAMPLE VOL (L) * 1000 = 6.95E5 ml

ACTIVITY CONCENTRATION (μCi/ml) = 0 μCi ÷ 6.95E5 SAMPLE VOL (ml) = 0 (μCi/ml)

DAC CALCULATION

MPC FOR Th-230 = 3E-12 μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 0 / 3E-12 = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-02

AIR SAMPLE DAC DETERMINATION

DATE 11-5-2002 SAMPLE NUMBER 102920021

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

BACKGROUND (cpm) 0 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 0 COUNTS ÷ 10 COUNT TIME (min) - 0 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = 0 dpm * $4.505\text{E-}7$ = 0 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 0 SAMPLE VOL (L) * 1000 = 0 ml

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = 0 μCi ÷ 0 SAMPLE VOL (ml) = 0 ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR TH-230 = $3\text{E-}12$ $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) ÷ MPC ($\mu\text{Ci/ml}$) = 0 / $3\text{E-}12$ = 0 DAC

NAME Jack A. Todaro SIGNATURE Jack A. Todaro DATE 11-5-2002

NOTES DAC Level 0 since 0 counts were measured,



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6585 S. WRIGHT STREET LITTLETON, CO 80127-4806
TELEPHONE: (303) 932-2220 FAX: (303) 932-2221

AIR MONITORING DATA SHEET

PROJECT CSMRT		PROJECT# 2112			
SAMPLER Gilian		SAMPLE DATE 10/29/2002			
SAMPLE NUMBER 10292002-1		TYPE OF SAMPLE Personal			
EMPLOYEE Ivan Gutierrez		SSN 634 12 1222			
PUMP MODEL Gil Air 5		PUMP S/N 11108			
CALIBRATOR MODEL Gilibrator 2		CALIBRATOR S/N 91C316-5			
CALIBRATION DATE / TIME (INITIAL) 0757 1.633 1.635 1.638 AM PM					
INITIAL FLOW RATE	1.647	1.645	1.643	1.641	1.642
1.634 l/m	1.642	1.643	1.640	1.635	1.631
FINAL FLOW RATE	1.643	1.642	1.640	1.636	1.638
1.638 l/m	1.639	1.634	1.633	1.634	1.636
CALIBRATION DATE / TIME (FINAL)				AM PM	
START TIME 0820 AM PM	STOP TIME 1525 AM PM		425 MIN		
START TIME AM PM	STOP TIME AM PM		MIN		
START TIME AM PM	STOP TIME AM PM		MIN		
START TIME AM PM	STOP TIME AM PM		MIN		
TOTAL VOLUME 695 l		MEDIA TYPE MCE			
NOTES Excavator operator. $1.634 + 1.638 \div 2 = 1.636$ l/m				$1.636 \times 425 \text{ min} = 695 \text{ l}$	
SIGNATURE Ivan Gutierrez					

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 103020021 DATE OF SAMPLE 10-30-2002

FILTER TYPE _____

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Recount of Sample

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE _____ SSN _____

FLOW RATE

INITIAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

FINAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-02 TIME 11:45 AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 4 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = 0 dpm * 4.505E-7 = 0 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 3721 SAMPLE VOL (L) * 1000 = 3.72E6 ml

ACTIVITY CONCENTRATION (μCi/ml) = 0 μCi ÷ 3.72E6 SAMPLE VOL (ml) = 0 (μCi/ml)

DAC CALCULATION

MPC FOR TH-230 = 3E-12 μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 0 / 3E-12 = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-2002

AIR SAMPLE DAC DETERMINATION

DATE 11-5-2002 SAMPLE NUMBER 103020021

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

BACKGROUND (cpm) 0 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 5 COUNTS ÷ 10 COUNT TIME (min) - 0 BKG (cpm) ÷ 0.324 EFFICIENCY = 1.54 dpm

SAMPLE ACTIVITY (μCi) = 1.54 dpm * $4.505\text{E-}7$ = $6.95\text{E-}7$ μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 3721 SAMPLE VOL (L) * 1000 = $3.72\text{E}6$ ml

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = $6.95\text{E-}7$ μCi ÷ $3.72\text{E}6$ SAMPLE VOL (ml) = $1.87\text{E-}13$ ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR Th-230 = $3\text{E-}12$ $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) ÷ MPC ($\mu\text{Ci/ml}$) = $1.87\text{E-}13 / 3\text{E-}12$ = 0.062 DAC

NAME Jack Todaro SIGNATURE Jack C. Todaro DATE 11-5-2002

NOTES Assumes all activity Th-230



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6585 S. WRIGHT STREET LITTLETON, CO 80127-4806
TELEPHONE: (303) 932-2220 FAX: (303) 932-2221

AIR MONITORING DATA SHEET

PROJECT ZTTZ CSMRI		PROJECT # 2112	
SAMPLER MED. VOL.		SAMPLE DATE 10/30/2002	
SAMPLE NUMBER 10302002-1		TYPE OF SAMPLE Area	
EMPLOYEE _____		SSN _____	
PUMP MODEL		PUMP S/N	
CALIBRATOR MODEL		CALIBRATOR S/N	
CALIBRATION DATE / TIME (INITIAL) _____ AM PM			
INITIAL FLOW RATE	19.9		
19.9 l/m			
FINAL FLOW RATE			
19.9 l/m			
CALIBRATION DATE / TIME (FINAL) _____ AM PM			
START TIME 1255 AM (PM)	STOP TIME 1602 AM (PM)	187	MIN
START TIME _____ AM PM	STOP TIME _____ AM PM		MIN
START TIME _____ AM PM	STOP TIME _____ AM PM		MIN
START TIME _____ AM PM	STOP TIME _____ AM PM		MIN
TOTAL VOLUME 3,721		MEDIA TYPE MCE	
NOTES SE of 101 C during break up of large chunks and removal of wall. 187 min x 19.9 l/m =			
SIGNATURE [Signature]			

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 103120021 DATE OF SAMPLE 10-31-02

FILTER TYPE _____

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Recount of sample

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE _____ SSN _____

FLOW RATE

INITIAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

FINAL (L/min) 1) _____ 2) _____ 3) _____ 4) _____ 5) _____ 6) _____ 7) _____ 8) _____

9) _____ 10) _____ AVG. _____ CALIBRATION TIME _____ AM PM

SAMPLE VOLUME

VOLUME SAMPLED = 738 ⁹⁰⁶ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-2002 TIME 0200 AM PM

COUNTER MFG. LU DLUM MODEL 2929 S/N 142645

PROBE MFG. LU DLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 5 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0.309 dpm

SAMPLE ACTIVITY (μCi) = 0.309 dpm * $4.505\text{E-}7$ = $1.39\text{E-}7$ μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 738 SAMPLE VOL (L) * 1000 = $7.38\text{E}5$ ml

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = $1.39\text{E-}7$ μCi ÷ $7.38\text{E}5$ SAMPLE VOL (ml) = $1.88\text{E-}13$ ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR Tk-230 = $3\text{E-}12$ $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) ÷ MPC ($\mu\text{Ci/ml}$) = $1.88\text{E-}13$ $3\text{E-}12$ = 0.063 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-2002

AIR SAMPLE DAC DETERMINATION

DATE 11-5-2002 SAMPLE NUMBER 103120021

PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

BACKGROUND (cpm) 0 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 3 COUNTS $\div$ 10 COUNT TIME (min) - 0 BKG (cpm) $\div$ 0.324 EFFICIENCY = 0.926 dpm

SAMPLE ACTIVITY (μCi) = 0.926 dpm $\times 4.505\text{E-}7$ = 4.17E-7 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 738 SAMPLE VOL (L) $\times 1000$ = 7.38E5 ml

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = 4.17E-7 μCi $\div$ 7.38E5 SAMPLE VOL (ml) = 5.65E-13 ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR TH-230 = 3E-12 $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) $\div$ MPC ($\mu\text{Ci/ml}$) = 5.65E-13 $\div$ 3E-12 = 0.19 DAC

NAME Jack Todaro SIGNATURE Jack C. Todaro DATE 11-5-2002

NOTES



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TELEPHONE: (303) 932-2220 FAX: (303) 932-2221

AIR MONITORING DATA SHEET

PROJECT CSMRI				PROJECT # 2112	
SAMPLER Gil AR5			SAMPLE DATE 10-31-2002		
SAMPLE NUMBER 10312002-1			TYPE OF SAMPLE Lapel		
EMPLOYEE Ivan Gutierrez			SSN 634-12-1222		
PUMP MODEL Gil AR5			PUMP S/N 11108		
CALIBRATOR MODEL Gilibrator 2			CALIBRATOR S/N 910316-5		
CALIBRATION DATE / TIME (INITIAL) 0805 (AM) PM					
INITIAL FLOW RATE	1.640	1.634	1.632	1.632	1.630
1.631 l/m	1.632	1.628	1.626	1.630	1.626
FINAL FLOW RATE	1.609	1.617	1.601	1.600	1.600
1.604 l/m	1.598	1.598	1.599	1.615	1.600
CALIBRATION DATE / TIME (FINAL) AM PM					
START TIME 0824 (AM) PM	STOP TIME 0400 AM (PM)		456 MIN		
START TIME AM PM	STOP TIME AM PM		MIN		
START TIME AM PM	STOP TIME AM PM		MIN		
START TIME AM PM	STOP TIME AM PM		MIN		
TOTAL VOLUME 738 l			MEDIA TYPE MCE		
NOTES Lapel Sampler while doing excavator and breaker work					
SIGNATURE Jan E. Boden					

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 103120022 DATE OF SAMPLE 10-31-2002

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES _____

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-2002 TIME 12:00 AM PM

COUNTER MFG. LU DLUM MODEL 2929 S/N 142645

PROBE MFG. LU DLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK _____ (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 32.4%

ACTIVITY

SAMPLE ACTIVITY (dpm) = 11 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 2.2 dpm

SAMPLE ACTIVITY (μCi) = 2.2 dpm * 4.505E-7 = 9.91E-7 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 8,540 SAMPLE VOL (L) * 1000 = 8.54E6 ml

ACTIVITY CONCENTRATION (μCi/ml) = 9.91E-7 μCi ÷ 8.54E6 SAMPLE VOL (ml) = 1.16E-13 (μCi/ml)

DAC CALCULATION

MPC FOR TH-230 = 3E-12 μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 1.16E-13 / 3E-12 = 0.039 DAC

NAME Jack Todaro SIGNATURE [Signature] DATE 12-14-2002

NOTES / CALCULATIONS

Recant of sample.

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 103120022 DATE OF SAMPLE 10-31-2002

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES East of excavation work
on 101C/101S vicinity

START TIME 0902 FLOW RATE (LPM) 20

STOP TIME 1609 FLOW RATE (LPM) 20

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = 427 SAMPLE TIME(min) X 20 AVG FLOW RATE (LPM) = 8,540 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 11-5-2002

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 6 COUNTS ÷ 10 COUNT TIME (min) - 0 BKG (cpm) ÷ 0.324 EFFICIENCY = 1.85 dpm

SAMPLE ACTIVITY (μ Ci) = 1.85 dpm * $4.505E-7$ = ~~8.33E-7~~ μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 8,540 SAMPLE VOL (L) * 1000 = 8.54E6 ml 9.75E-14

ACTIVITY CONCENTRATION (μ Ci/ml) = 8.33E-7 μ Ci ÷ 8.54E6 SAMPLE VOL (ml) = ~~1.02E-13~~ (μ Ci/ml)
905

DAC CALCULATION

MPC FOR Th 230 = 3E-12 μ Ci/ml 9.75E-14

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) ÷ MPC (μ Ci/ml) = ~~1.02E-13~~ ÷ 3E-12 = 0.033 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-7-2002

NOTES / CALCULATIONS



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6585 S. WRIGHT STREET LITTLETON, CO 80127-4806
TELEPHONE: (303) 932-2220 FAX: (303) 932-2221

AIR MONITORING DATA SHEET

PROJECT <u>CSMRI</u>		PROJECT # <u>2112</u>	
SAMPLER <u>Med. Volume</u>		SAMPLE DATE <u>10-31-2002</u>	
SAMPLE NUMBER <u>10312002-2</u>		TYPE OF SAMPLE <u>Area</u>	
EMPLOYEE <u> </u>		SSN <u> </u>	
PUMP MODEL <u>Reliance Electric</u>		PUMP S/N <u>00010192</u>	
CALIBRATOR MODEL		CALIBRATOR S/N	
CALIBRATION DATE / TIME (INITIAL) AM PM			
INITIAL FLOW RATE	<u>20</u> <u>l/m</u>	<u>1609</u>	
FINAL FLOW RATE	<u>20</u> <u>l/m</u>		
CALIBRATION DATE / TIME (FINAL) AM PM			
START TIME	<u>0902</u> <u>AM</u> <u>PM</u>	STOP TIME	<u>1609</u> <u>AM</u> <u>PM</u> <u>427</u> MIN
START TIME	AM PM	STOP TIME	AM PM MIN
START TIME	AM PM	STOP TIME	AM PM MIN
START TIME	AM PM	STOP TIME	AM PM MIN
TOTAL VOLUME <u>8,540</u> <u>l</u>		MEDIA TYPE <u>MCE</u>	
NOTES <u>Same East of Excavation work on</u> <u>101 C / 101 S vicinity</u>			
SIGNATURE <u>Janet Widen</u>			

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 110120021 DATE OF SAMPLE 11-1-2002

FILTER TYPE _____

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES RECOUNT OF SAMPLE

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-02

COUNTER MFG. LU DLUM MODEL 2929 S/N 142645

PROBE MFG. LU DLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK _____ (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 2 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = 0 dpm * 4.505E-7 = 0 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 8,680 SAMPLE VOL (L) * 1000 = 8.6856 ml

ACTIVITY CONCENTRATION (μCi/ml) = 0 μCi ÷ 8.6856 SAMPLE VOL (ml) = 0 (μCi/ml)

DAC CALCULATION

MPC FOR TA-230 = 0 μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 0 13E-12 = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-02

NOTES / CALCULATIONS

RECOUNT OF SAMPLE

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 110120021 DATE OF SAMPLE 1101021

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Excavation wall demolition on 101W, 101N, 109, 116, 101N2, 101N3, 117. Sampler set up just east of 101C.

START TIME 0826 AM FLOW RATE (LPM) 20

STOP TIME 0350 PM FLOW RATE (LPM) 20

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME 444-10-4340

VOLUME SAMPLED = 434 SAMPLE TIME(min) X 20 AVG FLOW RATE (LPM) = 8,680 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 11-5-2002

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK YES (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 3 COUNTS ÷ 10 COUNT TIME (min) - 0 BKG (cpm) ÷ 0.3 EFFICIENCY = 0.926 dpm

SAMPLE ACTIVITY (μCi) = 0.926 dpm * $4.505\text{E-}7$ = $4.17\text{E-}7$ μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 8,680 SAMPLE VOL (L) * 1000 = $8.68\text{E}6$ ml

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = $4.17\text{E-}7$ μCi ÷ $8.68\text{E}6$ SAMPLE VOL (ml) = $4.81\text{E-}14$ ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR Th-230 = $3\text{E-}12$ $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) ÷ MPC ($\mu\text{Ci/ml}$) = $4.81\text{E-}14$ / $3\text{E-}12$ = $1.6\text{E-}2$ ^{0.016} DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-7-2002

NOTES / CALCULATIONS

① Sampler shut off for ~10 min during refueling.

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 1102021 DATE OF SAMPLE 11-2-2002

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Excavation & break up of large concrete blocks on west side of site. Sampler set up to the east of 101C.

START TIME 0800 FLOW RATE (LPM) 20

STOP TIME 1211 FLOW RATE (LPM) 18

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = 251 SAMPLE TIME(min) X 19 AVG FLOW RATE (LPM) = 4769 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 11-5-2002 07:00 PM

COUNTER MFG. LU DLUM MODEL 2929 S/N 142645

PROBE MFG. LU DLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 1 COUNTS ÷ 10 COUNT TIME (min) - 0 BKG (cpm) ÷ 0.324 EFFICIENCY = 0.309 dpm
 SAMPLE ACTIVITY (μCi) = 0.309 dpm ÷ 0.309 dpm * 4.505E-7 = 1.39E-7 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 4,769 SAMPLE VOL (L) * 1000 = 4.769E6 ml
 ACTIVITY CONCENTRATION (μCi/ml) = 1.39E-7 μCi ÷ 4.769E6 SAMPLE VOL (ml) = 2.91E-14 (μCi/ml)

DAC CALCULATION

MPC FOR Th-230 = 3E-12 μCi/ml
 DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 2.91E-14 ÷ 3E-12 = 0.0097 DAC

NAME Go Jack Todaro SIGNATURE Jack Todaro DATE 11-7-2002

NOTES / CALCULATIONS

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 1102021 DATE OF SAMPLE 11-2-02

FILTER TYPE _____

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Recount of Sample

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-02

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 1 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μ Ci) = 0 dpm * $4.505E-7$ = 0 μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 4,769 SAMPLE VOL (L) * 1000 = 4.769E6 ml

ACTIVITY CONCENTRATION (μ Ci/ml) = 0 μ Ci ÷ 4.769E6 SAMPLE VOL (ml) = 0 (μ Ci/ml)

DAC CALCULATION

MPC FOR Th-230 = 3E-12 μ Ci/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) ÷ MPC (μ Ci/ml) = 0 / 3E-12 = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-02

NOTES / CALCULATIONS

Recount of Sample

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 110420021 DATE OF SAMPLE 11-4-2002

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES RECOUNT OF SAMPLE

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE _____ TIME _____ AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK YES (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 2 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μ Ci) = 0 dpm * $4.505E-7$ = 0 μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 5.168 SAMPLE VOL (L) * 1000 = 5.168E6 ml

ACTIVITY CONCENTRATION (μ Ci/ml) = 0 μ Ci ÷ 5.168E6 SAMPLE VOL (ml) = 0 (μ Ci/ml)

DAC CALCULATION

MPC FOR Th230 = 3E-12 μ Ci/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) ÷ MPC (μ Ci/ml) = 0 / 3E-12 = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-02

NOTES / CALCULATIONS

RECOUNT OF SAMPLE

AIR SAMPLE DAC DETERMINATION

DATE 11-7-2002 SAMPLE NUMBER 110420021
PROJECT NAME CSMRI PROJECT NUMBER 2112

INSTRUMENTATION

COUNTER MFG. LU DLUM MODEL 2929 S/N 142645
PROBE MFG. LU DLUM MODEL 43-10-1 S/N 144756
PASSED DAILY PERFORMANCE CHECK X (YES/NO)
BACKGROUND (cpm) 0 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 0 COUNTS $\div$ _____ COUNT TIME (min) - _____ BKG (cpm) $\div$ _____ EFFICIENCY = _____ dpm
SAMPLE ACTIVITY (μ Ci) = _____ dpm $\times 4.505E-7$ = _____ μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = _____ SAMPLE VOL (L) $\times 1000$ = _____ ml
ACTIVITY CONCENTRATION (μ Ci/ml) = _____ μ Ci $\div$ _____ SAMPLE VOL (ml) = _____ (μ Ci/ml)

DAC CALCULATION

MPC FOR _____ = _____ μ Ci/ml
DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) $\div$ MPC (μ Ci/ml) = _____ / _____ = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-7-2002

NOTES

0 cpm = 0 DAc



NEW HORIZONS ENVIRONMENTAL CONSULTANTS, INC.

6585 S. WRIGHT STREET LITTLETON, CO 80127-4806
TELEPHONE: (303) 932-2220 FAX: (303) 932-2221

AIR MONITORING DATA SHEET

PROJECT <u>2+ CSM RI</u>		PROJECT # <u>2112</u>	
SAMPLER <u>Jack Todaro</u>		SAMPLE DATE <u>11-04-2002</u>	
SAMPLE NUMBER <u>110420021</u>		TYPE OF SAMPLE <u>AREA</u>	
EMPLOYEE <u> </u>		SSN <u> </u>	
PUMP MODEL <u>Reliance</u>		PUMP S/N <u>00010192</u>	
CALIBRATOR MODEL <u>325-8</u>		CALIBRATOR S/N <u> </u>	
CALIBRATION DATE / TIME (INITIAL) AM PM			
INITIAL FLOW RATE			
<u>l/m</u>	<u>20</u>		
FINAL FLOW RATE			
<u>l/m</u>	<u>18</u>		
CALIBRATION DATE / TIME (FINAL) AM PM			
START TIME <u>11:08</u> <u>AM</u> PM	STOP TIME <u>03:40</u> <u>PM</u> <u>272</u> MIN		
START TIME <u> </u> AM PM	STOP TIME <u> </u> AM PM		MIN
START TIME <u> </u> AM PM	STOP TIME <u> </u> AM PM		MIN
START TIME <u> </u> AM PM	STOP TIME <u> </u> AM PM		MIN
TOTAL VOLUME <u>19 x 272 = 5168</u> <u>lpm</u> <u>min</u>		MEDIA TYPE <u>MCE</u>	
NOTES <u>Sample east of 101 C during loading, moving, breaking.</u>			
SIGNATURE <u>gawc to do</u>			

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 1105200201 DATE OF SAMPLE 11/05/02

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Shipment of BFI material,
Sampler located east of 161C.

START TIME 10:10 AM FLOW RATE (LPM) 20

STOP TIME 03:20 PM FLOW RATE (LPM) 18

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = 310 SAMPLE TIME(min) X $\frac{18+20}{2} = 19$ AVG FLOW RATE (LPM) = 5,890 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 11/13/2002

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.326

ACTIVITY

SAMPLE ACTIVITY (dpm) = $\frac{5 \text{ } \cancel{0} \text{ } \text{dpm}}{\cancel{0} \text{ } \text{dpm}} \times \frac{10 \text{ COUNTS}}{10 \text{ COUNT TIME (min)}} \times \frac{0.4 \text{ BKG (cpm)}}{0.4 \text{ BKG (cpm)}} \div \frac{0.326 \text{ EFFICIENCY}}{0.326 \text{ EFFICIENCY}} = \cancel{0} \text{ } \text{dpm}$

SAMPLE ACTIVITY (μCi) = 0.307 dpm $\times 4.505\text{E-}7 = \underline{1.38\text{E-}7} \mu\text{Ci}$

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 5,890 SAMPLE VOL (L) $\times 1000 = \underline{5.89\text{E+}6} \text{ ml}$

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = $\frac{1.38\text{E-}7 \mu\text{Ci}}{5.89\text{E+}6 \text{ ml}} = \underline{2.35\text{E-}14} \mu\text{Ci/ml}$

DAC CALCULATION

MPC FOR Th230 = $\frac{\cancel{0} \text{ } \text{dpm}}{\cancel{0} \text{ } \text{dpm}} \times \frac{3\text{E-}12 \text{ } \mu\text{Ci/ml}}{3\text{E-}12 \text{ } \mu\text{Ci/ml}} = \underline{0.008} \text{ DAC}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) $\div$ MPC ($\mu\text{Ci/ml}$) = $\frac{2.35\text{E-}14 \text{ } \mu\text{Ci/ml}}{3\text{E-}12 \text{ } \mu\text{Ci/ml}} = \underline{\cancel{0} \text{ } \text{dpm}} \text{ DAC}$

NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-13-2002

NOTES / CALCULATIONS

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 1105200201 DATE OF SAMPLE 11-05-02

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES _____

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-12-02 TIME 1:40 AM ☒ PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 5 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0.1 dpm

SAMPLE ACTIVITY (μCi) = 0.1 dpm * $4.505\text{E-}7$ = $4.505\text{E-}8$ μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 5,890 SAMPLE VOL (L) * 1000 = $5.89\text{E}6$ ml

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = $4.505\text{E-}8$ μCi ÷ $5.89\text{E}6$ SAMPLE VOL (ml) = $7.65\text{E-}15$ ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR Th-230 = $3\text{E-}12$ $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) ÷ MPC ($\mu\text{Ci/ml}$) = $7.65\text{E-}15$ / $3\text{E-}12$ = 0.0026 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-2002

NOTES / CALCULATIONS

Recant

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 110620021 DATE OF SAMPLE 11-6-02

FILTER TYPE millipore

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES North of Loading activities
(southerly winds). Loading BFI Material into trucks for disposal.

START TIME 07:35 AM FLOW RATE (LPM) 20

STOP TIME 12:40 PM FLOW RATE (LPM) 20 per 18

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = 365 SAMPLE TIME(min) X 19 AVG FLOW RATE (LPM) = 6,935 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 11-13-2002

COUNTER MFG. LU DLUM MODEL 2929 S/N 142645

PROBE MFG. LU DLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) _____ EFFICIENCY _____

ACTIVITY

SAMPLE ACTIVITY (dpm) = 0 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.326 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = _____ dpm * 4.505E-7 = _____ μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = _____ SAMPLE VOL (L) * 1000 = _____ ml

ACTIVITY CONCENTRATION (μCi/ml) = _____ μCi ÷ _____ SAMPLE VOL (ml) = _____ (μCi/ml)

DAC CALCULATION

MPC FOR _____ = 0 μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = _____ / _____ = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-13-2002

NOTES / CALCULATIONS

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 110620021 DATE OF SAMPLE 11-6-02

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES _____

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-14-02 TIME 09:30 AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK YES (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 7 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0.926 dpm

SAMPLE ACTIVITY (μ Ci) = 0.926 dpm * $4.505E-7$ = $4.17E-7$ μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 6,935 SAMPLE VOL (L) * 1000 = $6.935E6$ ml

ACTIVITY CONCENTRATION (μ Ci/ml) = $4.17E-7$ μ Ci ÷ $6.935E6$ SAMPLE VOL (ml) = $6.01E-14$ (μ Ci/ml)

DAC CALCULATION

MPC FOR Th-230 = $3E-12$ μ Ci/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) ÷ MPC (μ Ci/ml) = $6.01E-14$ / $3E-12$ = 0.02 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-2002

NOTES / CALCULATIONS

Recount

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 1108020021 DATE OF SAMPLE 11-08-2002

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES RECOUNT OF SAMPLE

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-14-02 TIME 09:45 AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.324

ACTIVITY

SAMPLE ACTIVITY (dpm) = 3 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = 0 dpm * $4.505\text{E-}7$ = 0 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 3,477 SAMPLE VOL (L) * 1000 = 3.48E6 ml

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = 0 μCi ÷ 3.48E6 SAMPLE VOL (ml) = 0 ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR Th 230 = 3E-12 $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) ÷ MPC ($\mu\text{Ci/ml}$) = 0 / 3E-12 = 0 DAC

NAME Jack Toderro SIGNATURE Jack Toderro DATE 12-14-02

NOTES / CALCULATIONS

RECOUNT OF SAMPLE

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 110820021 DATE OF SAMPLE 11-8-2002

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Loading trucks on east side of site,

START TIME 0808 FLOW RATE (LPM) 20

STOP TIME 0111 FLOW RATE (LPM) 18

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = 183 SAMPLE TIME(min) X 19 AVG FLOW RATE (LPM) = 3,477 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 11-19-2002

COUNTER MFG. LU DLUM MODEL 2929 S/N 142645

PROBE MFG. LU DLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.326

ACTIVITY

SAMPLE ACTIVITY (dpm) = 8 COUNTS ÷ 10 COUNT TIME (min) 0.8 BKG (cpm) ÷ 0.326 EFFICIENCY = 1.22 dpm
 SAMPLE ACTIVITY (μCi) = 1.22 dpm * $4.505\text{E-}7$ = $5.496\text{E-}7$ μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 3,477 SAMPLE VOL (L) * 1000 = $3.48\text{E}6$ ml
 ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = $5.50\text{E-}7$ μCi ÷ $3.48\text{E}6$ SAMPLE VOL (ml) = $1.58\text{E-}13$ ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR Th-230 = $3\text{E-}12$ $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) ÷ MPC ($\mu\text{Ci/ml}$) = $1.58\text{E-}13$ / $3\text{E-}12$ = 0.053 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 11-19-2002

NOTES / CALCULATIONS

CSMRI AIR SAMPLE REPORT

12/11/02

(Th-230 = 20%)

SAMPLE#	DATE	TYPE	VOL(l)	Sample uCi/ml	Standard uCi/ml	DESCRIPTION OF CONDITIONS
10240201	10/24/02	A	298	5.60E-13	3.00E-12	EXCAVATION 10307, 103EN, 103E
102502AM	10/25/02	A	192	0.00E+00	3.00E-12	EXCAVATION OF 101C
102502PM	10/25/02	A	169	3.30E-13	3.00E-12	EXCAVATION OF 101C & 101N
102802AM	10/28/02	A	218	3.82E-13	3.00E-12	EXCAVATION 101C
102920021	10/29/02	L	695	0.00E+00	3.00E-12	EXCAVATION 102, SWR
103020021	10/30/02	A	3721	3.74E-14	3.00E-12	BREAKUP OF LARGE CONCRETE & WALL REMOVAL
103120021	10/31/02	L	738	1.13E-13	3.00E-12	EXCAVATER & BREAKUP OF LARGE CONCRETE
103120022	10/31/02	A	8540	1.95E-14	3.00E-12	EXCAVATION OF 101C, 101S
1101021	11/1/02	A	8680	9.62E-15	3.00E-12	EXCAVATION OF MULTIPLE BUILDINGS ON WEST SIDE
1102021	11/2/02	A	4769	5.84E-15	3.00E-12	EXCAVATION & BREAKUP OF CONCRETE ON WEST SIDE
110420021	11/4/02	A	5168	0.00E+00	3.00E-12	LOADING, MOVING, BREAKING BFI MATERIAL ON WEST SIDE
1105200201	11/5/02	A	5890	5.10E-15	3.00E-12	SHIPMENT OF BFI MATERIAL
110620021	11/6/02	A	6935	0.00E+00	3.00E-12	SHIPMENT OF BFI MATERIAL
110720022	11/7/02	A	2508	2.20E-14	3.00E-12	SHIPMENT OF MATERIAL EAST SIDE
110820021	11/8/02	A	3477	3.16E-14	3.00E-12	SHIPMENT OF MATERIAL EAST SIDE

Notes: 1. Calculation for Activity concentration assumes 20% activity Th-230 2. A = Area Sample, L = Lapel Sample

CSMRI AIR SAMPLE REPORT

12/13/02

SAMPLE#	DATE	TYPE	VOL(l)	Sample uCi/ml (Th-230 100%)	Standard uCi/ml	DAC	DESCRIPTION OF CONDITIONS
10240201	10/24/02	A	298	0.00E+00	3.00E-12	0	EXCAVATION 10307, 103EN, 103E
102502AM	10/25/02	A	192	0.00E+00	3.00E-12	0	EXCAVATION OF 101C
102502PM	10/25/02	A	169	0.00E+00	3.00E-12	0	EXCAVATION OF 101C & 101N
102802AM	10/28/02	A	218	0.00E+00	3.00E-12	0	EXCAVATION 101C
102920021	10/29/02	L	695	0.00E+00	3.00E-12	0	EXCAVATION 102, SWR
103020021	10/30/02	A	3721	0.00E+00	3.00E-12	0	BREAKUP OF LARGE CONCRETE & WALL REMOVAL
103120021	10/31/02	L	738	1.88E-13	3.00E-12	0.06	EXCAVATER & BREAKUP OF LARGE CONCRETE
103120022	10/31/02	A	8540	1.16E-13	3.00E-12	0.04	EXCAVATION OF 101C, 101S
1101021	11/1/02	A	8680	0.00E+00	3.00E-12	0	EXCAVATION OF MULTIPLE BUILDINGS ON WEST SIDE
1102021	11/2/02	A	4769	0.00E+00	3.00E-12	0	EXCAVATION & BREAKUP OF CONCRETE ON WEST SIDE
110420021	11/4/02	A	5168	0.00E+00	3.00E-12	0	LOADING, MOVING, BREAKING BFI MATERIAL ON WEST SIDE
1105200201	11/5/02	A	5890	7.65E-15	3.00E-12	0	SHIPMENT OF BFI MATERIAL
110620021	11/6/02	A	6935	6.01E-14	3.00E-12	0.02	SHIPMENT OF BFI MATERIAL
110720022	11/7/02	A	2508	2.76E-13	3.00E-12	0.09	SHIPMENT OF MATERIAL EAST SIDE
110820021	11/8/02	A	3477	0.00E+00	3.00E-12	0	SHIPMENT OF MATERIAL EAST SIDE

Based on recount of air samples

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 010303 DATE OF SAMPLE 1-3-03

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Personal - Dig Trenches, worked in backhoe

START TIME 9:45 FLOW RATE (LPM) 1.942

STOP TIME 4:08 FLOW RATE (LPM) 1.911

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE David Mercer SSN 513-78-7213

INITIAL FLOW RATE (L/min) 1) 1.959 2) 1.951 3) 1.951 4) 1.946 5) 1.944 6) 1.944 7) 1.932 8) 1.934
9) 1.931 10) 1.931 AVG. 1.942 CALIBRATION TIME 08:10 AM PM

FINAL FLOW RATE (L/min) 1) 1.921 2) 1.916 3) 1.915 4) 1.912 5) 1.910 6) 1.908 7) 1.907 8) 1.908
9) 1.905 10) 1.905 AVG. 1.911 CALIBRATION TIME 4:30 AM PM

SAMPLE VOLUME

VOLUME SAMPLED = 383 SAMPLE TIME(min) X 1.927 AVG FLOW RATE (LPM) = 738 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 1-13-03

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 33.2%

ACTIVITY

SAMPLE ACTIVITY (dpm) = 2 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.332 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μ Ci) = 0 dpm * $4.505E-7$ = 0 μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 738 SAMPLE VOL (L) * 1000 = 7380 ml

ACTIVITY CONCENTRATION (μ Ci/ml) = 0 μ Ci ÷ 7380 SAMPLE VOL (ml) = 0 (μ Ci/ml)

DAC CALCULATION

MPC FOR 0 = 0 μ Ci/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) ÷ MPC (μ Ci/ml) = 0 / 0 = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-17-03

Note: Since net activity is zero, calculation not continued.

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 010603 DATE OF SAMPLE 1-6-03

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Dig Trenches, Measure gamma with Ld. 2350

START TIME 0810 FLOW RATE (LPM) 1.916

STOP TIME 0430 FLOW RATE (LPM) 1.975

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE Jack Todaro SSN 521-04-4639

INITIAL FLOW RATE (L/min) 1) 1.960 2) 1.920 3) 1.914 4) 1.913 5) 1.913 6) 1.915 7) 1.909 8) 1.908

9) 1.907 10) 1.904 AVG. 1.916 CALIBRATION TIME 7.41 AM PM

FINAL FLOW RATE (L/min) 1) 1.969 2) 1.963 3) 1.981 4) 1.974 5) 1.984 6) 1.981 7) 1.980 8) 1.978

9) 1.974 10) 1.971 AVG. 1.967 CALIBRATION TIME 4.37 AM PM

SAMPLE VOLUME

VOLUME SAMPLED = 500 SAMPLE TIME(min) X 1.94 AVG FLOW RATE (LPM) = 970 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 1-13-03

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.332

ACTIVITY

SAMPLE ACTIVITY (cpm) = 0 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.332 EFFICIENCY = 0 cpm

SAMPLE ACTIVITY (μ Ci) = — cpm * $4.505E-7$ = — μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = — SAMPLE VOL (L) * 1000 = — ml

ACTIVITY CONCENTRATION (μ Ci/ml) = — μ Ci ÷ — SAMPLE VOL (ml) = 0 (μ Ci/ml)

DAC CALCULATION

MPC FOR — = — μ Ci/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) ÷ MPC (μ Ci/ml) = — / — = 0 DAC

NAME Jack Todaro SIGNATURE Jack A. Todaro DATE 1-17-03

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 010703 DATE OF SAMPLE 1-7-03

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Trenching, collect soil samples

START TIME 0815 AM FLOW RATE (LPM) 1.876

STOP TIME 0430 PM FLOW RATE (LPM) 1.899

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE Sally Cuffin SSN 164-44-4991

INITIAL FLOW RATE (L/min) 1) 1.886 2) 1.887 3) 1.890 4) 1.885 5) 1.879 6) 1.866 7) 1.895 8) 1.873

9) 1.863 10) 1.832 AVG. 1.876 CALIBRATION TIME 7:10 AM PM

FINAL FLOW RATE (L/min) 1) 1.925 2) 1.904 3) 1.899 4) 1.899 5) 1.898 6) 1.898 7) 1.898 8) 1.884

9) 1.893 10) 1.893 AVG. 1.899 CALIBRATION TIME 7:30 AM PM

SAMPLE VOLUME

VOLUME SAMPLED = 505 SAMPLE TIME(min) X 1.888 AVG FLOW RATE (LPM) = 953 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 1-13-03

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.332

ACTIVITY

SAMPLE ACTIVITY (dpm) = 2 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.332 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = 0 dpm * 4.505E-7 = 0 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 953 SAMPLE VOL (L) * 1000 = 953 ml

ACTIVITY CONCENTRATION (μCi/ml) = 0 μCi ÷ 953 SAMPLE VOL (ml) = 0 (μCi/ml)

DAC CALCULATION

MPC FOR α = 0.001 μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 0 / 0.001 = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-17-03

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 010803 DATE OF SAMPLE 1-8-03

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Dig Trenches with backhoe

START TIME 8:50 AM FLOW RATE (LPM) 1.849

STOP TIME 12:40 PM FLOW RATE (LPM) 1.865

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE David Mercer SSN 513 787213

INITIAL FLOW RATE (L/min) 1) 1.857 2) 1.856 3) 1.852 4) 1.852 5) 1.849 6) 1.848 7) 1.847 8) 1.846

9) 1.843 10) 1.842 AVG. 1.849 CALIBRATION TIME 0840 (AM) PM

FINAL FLOW RATE (L/min) 1) 1.878 2) 1.873 3) 1.867 4) 1.862 5) 1.857 6) 1.855 7) No more battery power 8) →

9) — 10) — AVG. 1.865 CALIBRATION TIME 12:45 AM (PM)

SAMPLE VOLUME

VOLUME SAMPLED = 230 SAMPLE TIME(min) X 1.857 AVG FLOW RATE (LPM) = 427 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 1-13-03

COUNTER MFG. LU DLUM MODEL 2929 S/N 142645

PROBE MFG. LU DLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.332

ACTIVITY

SAMPLE ACTIVITY (dpm) = 1 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.332 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μCi) = — dpm * 4.505E-7 = — μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = — SAMPLE VOL (L) * 1000 = — ml

ACTIVITY CONCENTRATION (μCi/ml) = — μCi ÷ — SAMPLE VOL (ml) = 0 (μCi/ml)

DAC CALCULATION

MPC FOR — = — μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = — / — = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-17-03

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 010903 DATE OF SAMPLE 1-9-03

FILTER TYPE MEF

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Dig Trenches w/ Back hoe

START TIME 908 FLOW RATE (LPM) 1.857

STOP TIME 410 FLOW RATE (LPM) 1.935

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE David W Mercer SSN 513-78-7213

INITIAL FLOW RATE (L/min) 1) 1.705 2) 1.878 3) 1.882 4) 1.877 5) 1.877 6) 1.875 7) 1.872 8) 1.872

9) 1.870 10) 1.864 AVG. 1.857 CALIBRATION TIME 735 AM PM

FINAL FLOW RATE (L/min) 1) 1.997 2) 1.993 3) 1.929 4) 1.931 5) 1.931 6) 1.931 7) 1.928 8) 1.928

9) 1.925 10) 1.928 AVG. 1.935 CALIBRATION TIME 4:40 AM PM

SAMPLE VOLUME

VOLUME SAMPLED = 422 SAMPLE TIME(min) X 1.896 AVG FLOW RATE (LPM) = 800 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 1-13-03

COUNTER MFG. LUDDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.332

ACTIVITY

SAMPLE ACTIVITY (dpm) = 2 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.332 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μ Ci) = 0 dpm * $4.505E-7$ = 0 μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 800 SAMPLE VOL (L) * 1000 = 8E5 ml

ACTIVITY CONCENTRATION (μ Ci/ml) = 0 μ Ci ÷ 8E5 SAMPLE VOL (ml) = 0 (μ Ci/ml)

DAC CALCULATION

MPC FOR = μ Ci/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) ÷ MPC (μ Ci/ml) = / = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-17-03

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 011003 DATE OF SAMPLE 1-10-03

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Lapel, Backhoe Operator, Dig Trenches

START TIME 9:25 FLOW RATE (LPM) 1.872

STOP TIME 3:00 FLOW RATE (LPM) 1.893

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE David Mercer SSN 513-78-7213

FLOW RATE

INITIAL (L/min) 1) 1.873 2) 1.877 3) 1.875 4) 1.876 5) 1.876 6) 1.875 7) 1.872 8) 1.870

9) 1.867 10) 1.865 AVG. 1.872 CALIBRATION TIME 7:20 AM PM

FINAL (L/min) 1) 1.902 2) 1.901 3) 1.896 4) 1.895 5) 1.896 6) 1.891 7) 1.889 8) 1.889

9) 1.887 10) 1.885 AVG. 1.893 CALIBRATION TIME 3:10 AM PM

SAMPLE VOLUME

VOLUME SAMPLED = 335 SAMPLE TIME(min) X 1.893 AVG FLOW RATE (LPM) = 631 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 1-13-03 TIME 4:30 AM PM

COUNTER MFG. LUDELM MODEL 2929 S/N 142645

PROBE MFG. LUDELM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK YES (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 0.332

ACTIVITY

SAMPLE ACTIVITY (dpm) = 5 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.332 EFFICIENCY = 0.301 dpm

SAMPLE ACTIVITY (μCi) = 0.301 dpm * $4.505\text{E-}7$ = $1.357\text{E-}7$ μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 631 SAMPLE VOL (L) * 1000 = 631,000 ml

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = $1.357\text{E-}7$ μCi ÷ 631,000 ml = $2.151\text{E-}13$ ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR 7H-230 = $3\text{E-}12$ $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) ÷ MPC ($\mu\text{Ci/ml}$) = $2.151\text{E-}13$ / $3\text{E-}12$ = 0.072 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 1-17-03

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 011303 DATE OF SAMPLE 1-13-03

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Cab of backhoe

START TIME 0850 FLOW RATE (LPM) 1.866

STOP TIME 325 FLOW RATE (LPM) 1.866

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE David Mercer SSN 513 78 7213

FLOW RATE

INITIAL (L/min) 1) 1.877 2) 1.872 3) 1.870 4) 1.870 5) 1.865 6) 1.865 7) 1.865 8) 1.858

9) 1.859 10) 1.858 AVG. 1.866 CALIBRATION TIME 750 AM PM

FINAL (L/min) 1) 1.879 2) 1.876 3) 1.873 4) 1.870 5) 1.869 6) 1.863 7) 1.863 8) 1.864

9) 1.861 10) 1.857 AVG. 1.855 CALIBRATION TIME 3:30 AM PM

SAMPLE VOLUME AVG. 1.866

VOLUME SAMPLED = 395 SAMPLE TIME(min) X 1.866 AVG FLOW RATE (LPM) = 737 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 11-17-03 TIME 12:00 AM PM

COUNTER MFG. LUPLUM MODEL 2929 S/N 142645

PROBE MFG. LUPLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK YES (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 33.2%

ACTIVITY

SAMPLE ACTIVITY (dpm) = 0 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) + 0.332 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μ Ci) = — dpm * $4.505E-7$ = — μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = — SAMPLE VOL (L) * 1000 = — ml

ACTIVITY CONCENTRATION (μ Ci/ml) = — μ Ci ÷ — SAMPLE VOL (ml) = 0 (μ Ci/ml)

DAC CALCULATION

MPC FOR — = — μ Ci/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) ÷ MPC (μ Ci/ml) = — / — = 0 DAC

NAME Jack A. Todaro SIGNATURE Jack A. Todaro DATE 1-17-03

1/20/2003

CSMRI AIR SAMPLE REPORT

MEAN AIR CONCENTRATION 3.92E-14 (uCi/ml)

Standard=3.00E-12

SAMPLE#	DATE	TYPE	VOL(l)	Sample uCi/ml*	DAC	DESCRIPTION OF CONDITIONS
10240201	10/24/2002	A	298	0.00E+00	0	EXCAVATION 10307, 103EN, 103E
102502AM	10/25/2002	A	192	0.00E+00	0	EXCAVATION OF 101C
102502PM	10/25/2002	A	169	0.00E+00	0	EXCAVATION OF 101C & 101N
102802AM	10/28/2002	A	218	0.00E+00	0	EXCAVATION 101C
102920021	10/29/2002	L	695	0.00E+00	0	EXCAVATION 102, SWR
103020021	10/30/2002	A	3721	0.00E+00	0	BREAKUP OF LARGE CONCRETE & WALL REMOVAL
103120021	10/31/2002	L	738	1.88E-13	0.063	EXCAVATER & BREAKUP OF LARGE CONCRETE
103120022	10/31/2002	A	8540	1.16E-13	0.039	EXCAVATION OF 101C, 101S
1101021	11/1/2002	A	8680	0.00E+00	0	EXCAVATION OF MULTIPLE BUILDINGS ON WEST SIDE
1102021	11/2/2002	A	4769	0.00E+00	0	EXCAVATION & BREAKUP OF CONCRETE ON WEST SIDE
110420021	11/4/2002	A	5168	0.00E+00	0	LOADING, MOVING, BREAKING BFI MATERIAL ON WEST SIDE
1105200201	11/5/2002	A	5890	7.65E-15	0.0026	SHIPMENT OF BFI MATERIAL
110620021	11/6/2002	A	6935	6.01E-14	0.02	SHIPMENT OF BFI MATERIAL
110720022	11/7/2002	A	2508	2.76E-13	0.092	SHIPMENT OF MATERIAL EAST SIDE
110820021	11/8/2002	A	3477	0.00E+00	0	SHIPMENT OF MATERIAL EAST SIDE
010303	1/3/2003	L	738	0.00E+00	0	BACKHOE OPERATION DURING TRENCHING
010603	1/6/2003	L	970	0.00E+00	0	GAMMA SURVEYS, SOIL SAMPLING DURING TRENCHING
010703	1/7/2003	L	953	0.00E+00	0	SOIL SAMPLING DURING TRENCHING
010803	1/8/2003	L	427	0.00E+00	0	BACKHOE OPERATION DURING TRENCHING
010903	1/9/2003	L	800	0.00E+00	0	BACKHOE OPERATION DURING TRENCHING
011003	1/10/2003	L	631	2.15E-13	0.072	BACKHOE OPERATION DURING TRENCHING
011303	1/13/2003	L	737	0.00E+00	0	BACKHOE OPERATION DURING TRENCHING

* Assumes all activity Th-230

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 012703 DATE OF SAMPLE 1-27-2003

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Soil Borings - Driller

START TIME 08:40 FLOW RATE (LPM) 1892

STOP TIME 4:53 FLOW RATE (LPM) 1876

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE DAVID RYAN SSN 523-23-5393

FLOW RATE

INITIAL (L/min) 1) 1898 2) 1895 3) 1892 4) 1893 5) 1892 6) 1893 7) 1892 8) 1892
9) 1889 10) 1887 AVG. 1896 CALIBRATION TIME 5:00 AM PM

FINAL (L/min) 1) 1901 2) 1880 3) 1870 4) 1867 5) 1837 6) 1880 7) 1884 8) 1862
9) 1855 10) 1875 AVG. 1876 CALIBRATION TIME 08:00 AM PM for

SAMPLE VOLUME

VOLUME SAMPLED = 493 SAMPLE TIME(min) X 1.884 AVG FLOW RATE (LPM) = 929 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 2-4-03 TIME 09:00 AM PM

COUNTER MFG. LUPLUM MODEL 2929 S/N 142645

PROBE MFG. LUPLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.28 EFFICIENCY 0.323

ACTIVITY

SAMPLE ACTIVITY (dpm) = 6 COUNTS + 10 COUNT TIME (min) - 0.28 BKG (cpm) + 0.323 EFFICIENCY = 0.991 dpm

SAMPLE ACTIVITY (μCi) = 0.991 dpm * $4.505\text{E-}7$ = $4.46\text{E-}7$ μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 929 SAMPLE VOL (L) * 1000 = $9.29\text{E}5$ ml
ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = $4.46\text{E-}7$ μCi $\div$ $9.29\text{E}5$ SAMPLE VOL (ml) = $4.80\text{E-}13$ ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR Th-230 = $3\text{E-}12$ $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) $\div$ MPC ($\mu\text{Ci/ml}$) = $4.80\text{E-}13$ / $3\text{E-}12$ = 0.16 DAC

NAME Jack Todaro SIGNATURE Jack C. Todaro DATE 2-4-03

LAPEL AIR MONITORING DATA SHEET

012803

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 012803 DATE OF SAMPLE 1-28-03

FILTER TYPE ME5

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Soil Borings - Driller

START TIME 7:30 AM FLOW RATE (LPM) 1.884

STOP TIME 2:40 PM FLOW RATE (LPM) 1.909

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE David Ryan SSN 523-23-5393

FLOW RATE

INITIAL (L/min) 1) 1.882 2) 1.887 3) 1.884 4) 1.878 5) 1.878 6) 1.875 7) 1.885 8) 1.892

9) 1.895 10) 1.880 AVG. 1.884 CALIBRATION TIME 7:15 AM PM

FINAL (L/min) 1) 1.936 2) 1.926 3) 1.897 4) 1.905 5) 1.913 6) 1.914 7) 1.887 8) 1.916

9) 1.912 10) 1.883 AVG. 1.909 CALIBRATION TIME 2:50 AM PM

SAMPLE VOLUME

VOLUME SAMPLED = 430 SAMPLE TIME(min) X 1.897 AVG FLOW RATE (LPM) = 815 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 2-4-03 TIME 9:10 AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.28 EFFICIENCY 0.323

ACTIVITY

SAMPLE ACTIVITY (dpm) = 2 COUNTS + 10 COUNT TIME (min) - 0.28 BKG (cpm) + 0.323 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μ Ci) = 0 dpm * $4.505E-7$ = 0 μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = / SAMPLE VOL (L) * 1000 = / ml

ACTIVITY CONCENTRATION (μ Ci/ml) = / μ Ci $\div$ / SAMPLE VOL (ml) = / (μ Ci/ml)

DAC CALCULATION

MPC FOR Th-230 = $3E-12$ μ Ci/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) $\div$ MPC (μ Ci/ml) = 0 / $3E-12$ = 0 DAC

NAME Jack Todaro SIGNATURE Jack C. Todaro DATE 2-4-03

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 012903 DATE OF SAMPLE 1-29-2003

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES BorMy's of Si/

START TIME 7:30 AM FLOW RATE (LPM) 1.846

STOP TIME 4:00 PM FLOW RATE (LPM) 1.832

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE David Ryan SSN 523-23-5393

FLOW RATE

INITIAL (L/min) 1) 1.854 2) 1.848 3) 1.846 4) 1.847 5) 1.846 6) 1.847 7) 1.843 8) 1.843

9) 1.841 10) 1.841 AVG. 1.846 CALIBRATION TIME 700 AM PM

FINAL (L/min) 1) 1.841 2) 1.830 3) 1.825 4) 1.824 5) 1.825 6) 1.823 7) 1.822 8) 1.843

9) 1.840 10) 1.842 AVG. 1.832 CALIBRATION TIME 4:10 AM PM

SAMPLE VOLUME

VOLUME SAMPLED = 510 SAMPLE TIME(min) X 1.839 AVG FLOW RATE (LPM) = 938 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 2-4-03 TIME 9:30 AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.28 EFFICIENCY 0.323

ACTIVITY

SAMPLE ACTIVITY (dpm) = 4 COUNTS ÷ 10 COUNT TIME (min) - 0.28 BKG (cpm) + 0.323 EFFICIENCY = 0.372 dpm

SAMPLE ACTIVITY (μCi) = 0.372 dpm * 4.505E-7 = 1.68E-7 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 938 SAMPLE VOL (L) * 1000 = 9.38E5 ml

ACTIVITY CONCENTRATION (μCi/ml) = 1.68E-7 μCi ÷ 9.38E5 SAMPLE VOL (ml) = 1.79E-13 (μCi/ml)

DAC CALCULATION

MPC FOR 3E-12 ^{Th-230} = 3E-12 μCi/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 1.79E-13 / 3E-12 = 0.06 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 2-4-03

LAPEL AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 040 013/03 DATE OF SAMPLE 1-31-03

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES Soil Rmngs

START TIME 725 FLOW RATE (LPM) 1.0812

STOP TIME 330 FLOW RATE (LPM) 1.0882

SAMPLER DATA

PUMP MANUFACTURER Gilan PUMP MODEL GilAir-5/8 SERIAL NUMBER 11108

CALIBRATOR MODEL Gilibrator 2 CALIBRATOR S/N 910316-S CALIBRATION DATE 10/05/99

EMPLOYEE David Ryan SSN 523235393

FLOW RATE

INITIAL (L/min) 1) 1.820 2) 1.819 3) 1.817 4) 1.815 5) 1.814 6) 1.809 7) 1.808 8) 1.809

9) 1.807 10) 1.807 AVG. 1.812 CALIBRATION TIME 710 AM PM

FINAL (L/min) 1) 1.891 2) 1.886 3) 1.886 4) 1.883 5) 1.883 6) 1.882 7) 1.877 8) 1.876

9) 1.872 10) 1.885 AVG. 1.882 CALIBRATION TIME 3:40 AM PM

SAMPLE VOLUME

VOLUME SAMPLED = 485 SAMPLE TIME(min) X 1.047 AVG FLOW RATE (LPM) = 896 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 2-4-03 TIME 9:40 AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.28 EFFICIENCY 0.323

ACTIVITY

SAMPLE ACTIVITY (dpm) = 2 COUNTS ÷ 10 COUNT TIME (min) 0.28 BKG (cpm) ÷ 0.323 EFFICIENCY = 0 dpm

SAMPLE ACTIVITY (μ Ci) = 0 dpm * $4.505E-7$ = 0 μ Ci

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 896 SAMPLE VOL (L) * 1000 = 8.96E5 ml

ACTIVITY CONCENTRATION (μ Ci/ml) = 0 μ Ci ÷ 8.96E5 SAMPLE VOL (ml) = 0 (μ Ci/ml)

DAC CALCULATION

MPC FOR Tk-230 = 3E-12 μ Ci/ml

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μ Ci/ml) ÷ MPC (μ Ci/ml) = 0 1.3E-12 = 0 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 2-4-03

2/4/2003

CSMRI AIR SAMPLE REPORT

MEAN AIR CONCENTRATION 5.85E-14 (uCi/ml)

Standard=3.00E-12

SAMPLE#	DATE	TYPE	VOL(l)	Sample uCi/ml*	DAG	DESCRIPTION OF CONDITIONS
10240201	10/24/2002	A	298	0.00E+00	0	EXCAVATION 10307, 103EN, 103E
102502AM	10/25/2002	A	192	0.00E+00	0	EXCAVATION OF 101C
102502PM	10/25/2002	A	169	0.00E+00	0	EXCAVATION OF 101C & 101N
102802AM	10/28/2002	A	218	0.00E+00	0	EXCAVATION 101C
102920021	10/29/2002	L	695	0.00E+00	0	EXCAVATION 102, SWR
103020021	10/30/2002	A	3721	0.00E+00	0	BREAKUP OF LARGE CONCRETE & WALL REMOVAL
103120021	10/31/2002	L	738	1.88E-13	0.063	EXCAVATER & BREAKUP OF LARGE CONCRETE
103120022	10/31/2002	A	8540	1.16E-13	0.039	EXCAVATION OF 101C, 101S
1101021	11/1/2002	A	8680	0.00E+00	0	EXCAVATION OF MULTIPLE BUILDINGS ON WEST SIDE
1102021	11/2/2002	A	4769	0.00E+00	0	EXCAVATION & BREAKUP OF CONCRETE ON WEST SIDE
110420021	11/4/2002	A	5168	0.00E+00	0	LOADING, MOVING, BREAKING BFI MATERIAL ON WEST SIDE
1105200201	11/5/2002	A	5890	7.65E-15	0.0026	SHIPMENT OF BFI MATERIAL
110620021	11/6/2002	A	6935	6.01E-14	0.02	SHIPMENT OF BFI MATERIAL
110720022	11/7/2002	A	2508	2.78E-13	0.092	SHIPMENT OF MATERIAL EAST SIDE
110820021	11/8/2002	A	3477	0.00E+00	0	SHIPMENT OF MATERIAL EAST SIDE
010303	1/3/2003	L	738	0.00E+00	0	BACKHOE OPERATION DURING TRENCHING
010603	1/6/2003	L	970	0.00E+00	0	GAMMA SURVEYS, SOIL SAMPLING DURING TRENCHING
010703	1/7/2003	L	953	0.00E+00	0	SOIL SAMPLING DURING TRENCHING
010803	1/8/2003	L	427	0.00E+00	0	BACKHOE OPERATION DURING TRENCHING
010903	1/9/2003	L	800	0.00E+00	0	BACKHOE OPERATION DURING TRENCHING
011003	1/10/2003	L	631	2.15E-13	0.072	BACKHOE OPERATION DURING TRENCHING
011303	1/13/2003	L	737	0.00E+00	0	BACKHOE OPERATION DURING TRENCHING
012703	1/27/2003	L	929	4.80E-13	0.16	SOIL BORING AND SAMPLING - DRILLER SUPPORT
012803	1/28/2003	L	815	0.00E+00	0	SOIL BORING AND SAMPLING - DRILLER SUPPORT
012903	1/29/2003	L	938	1.79E-13	0.06	SOIL BORING AND SAMPLING - DRILLER SUPPORT
013103	1/31/2003	L	896	0.00E+00	0	SOIL BORING AND SAMPLING - DRILLER SUPPORT

* Assumes all activity Th-230

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 110720022 DATE OF SAMPLE 11-7-2002

FILTER TYPE MCE

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES _____

START TIME _____ FLOW RATE (LPM) _____

STOP TIME _____ FLOW RATE (LPM) _____

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = _____ SAMPLE TIME(min) X _____ AVG FLOW RATE (LPM) = _____ LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 12-14-02 TIME 0915 AM PM

COUNTER MFG. LUDLUM MODEL 2929 S/N 142645

PROBE MFG. LUDLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK Yes (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) 0.4 EFFICIENCY 32.4%

ACTIVITY

SAMPLE ACTIVITY (dpm) = 9 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.324 EFFICIENCY = 1.54 dpm

SAMPLE ACTIVITY (μCi) = 1.54 dpm $\times 4.505\text{E-}7$ = 6.94E-7 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 2,508 SAMPLE VOL (L) $\times 1000$ = 2.51E6 ~~2.76E7~~ 2.51E6 ml

ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) = 6.94E-7 μCi ÷ 2.51E6 SAMPLE VOL (ml) = 2.76E-13 ($\mu\text{Ci/ml}$)

DAC CALCULATION

MPC FOR TR-230 = 3E-12 $\mu\text{Ci/ml}$

DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION ($\mu\text{Ci/ml}$) ÷ MPC ($\mu\text{Ci/ml}$) = 2.76E-13 ÷ 3E-12 = 0.092 DAC

NAME Jack Todaro SIGNATURE Jack Todaro DATE 12-14-2002

NOTES / CALCULATIONS

Recount of sample

AREA AIR MONITORING DATA SHEET

PROJECT CSMRI NUMBER 2112

SAMPLE DATA

SAMPLE NUMBER 110720022 DATE OF SAMPLE 11-7-2002

FILTER TYPE 1

SAMPLER LOCATION / DESCRIPTION OF ACTIVITIES NE of loading area • Loading of trucks on East side. Unloading of trucks on east side.

START TIME 8:50 AM FLOW RATE (LPM) 20

STOP TIME 11:02 AM FLOW RATE (LPM) 18

SAMPLER DATA

PUMP MANUFACTURER RELIANCE ELECTRIC PUMP MODEL 325-8 SERIAL NUMBER RE-SN 00010192

SAMPLE VOLUME

VOLUME SAMPLED = 132 SAMPLE TIME(min) X 19 AVG FLOW RATE (LPM) = 2508 LITERS

COUNTING INSTRUMENTATION

SAMPLE COUNT DATE 11-18-2002

COUNTER MFG. LU DLUM MODEL 2929 S/N 142645

PROBE MFG. LU DLUM MODEL 43-10-1 S/N 144756

PASSED DAILY PERFORMANCE CHECK (YES/NO)

RADIATION TYPE ALPHA BACKGROUND (cpm) EFFICIENCY

ACTIVITY

SAMPLE ACTIVITY (dpm) = 6 COUNTS ÷ 10 COUNT TIME (min) - 0.4 BKG (cpm) ÷ 0.326 EFFICIENCY = 0.613 dpm
 SAMPLE ACTIVITY (μCi) = 0.613 dpm * 4.505E-7 = 2.76E-7 μCi

ACTIVITY CONCENTRATION

SAMPLE VOLUME (ml) = 2,508 SAMPLE VOL (L) * 1000 = 2.51E6 ml
 ACTIVITY CONCENTRATION (μCi/ml) = 2.76E-7 μCi ÷ 2.51E6 SAMPLE VOL (ml) = 1.10E-13 (μCi/ml)

DAC CALCULATION

MPC FOR TH-230 = 3E-12 μCi/ml
 DAC LEVEL = SAMPLE ACTIVITY CONCENTRATION (μCi/ml) ÷ MPC (μCi/ml) = 1.10E-13 / 3E-12 = 0.037 DAC

NAME Jack Todaro SIGNATURE [Signature] DATE 11-19-2002

NOTES / CALCULATIONS

Paragon Analytics, Incorporated

Sample Number(s) Cross-Reference Table

Paragon OrderNum: 0212096

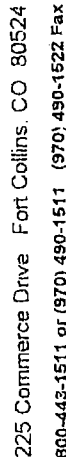
Client Name: New Horizons

Client Project Name: CSMRI

Client Project Number: 2112

Client PO Number:

Client Sample	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
11072002-2	0212096-1		FILTER	11/7/02	
11062002-1	0212096-2		FILTER	11/6/02	
10312002-2	0212096-3		FILTER	10/31/02	



Paragon Analytics, Inc.

Accession /
Chain-of-Custody

Accession Number (LAB ID)

Chain-of-Custody

Date 12/18/02 Page 1 of 1

Page 1 of 1

Project Name / No: CSMPT / 2112 Sampler(s): JAT Turnaround (circle one) Standard or Rush (Due _____) Standard or Return to Client (Due _____) Standard or Return to Client (Due _____) Standard

Report To: Robert Krumberger
Phone: (303) 647-1055 Cell (303) 229-6616
Fax: (303) 647-2301
Company: NHEC
Address:

6585 S. Wright St.
Littleton, CO 80127

circle method or specify under comments

[illegible]

Comments:

Comments: 12/20/02 @ 09:45, Ra-226 is also
low. R. Krumbein PA1 Standard MDC's are acceptable.
requested. PA1 Standard MDC's are acceptable.
pp

Relinquished By:

Signature David W. Mercer
Printed Name David W. Mercer
Date 12/19/02 Time 8:30 AM
Company New Horizons

Relinquished By:

Signature _____
 Printed Name _____
 Date _____ Time _____
 Company _____

Received By: _____

Signature [Signature]
Printed Name Amal Wadh
Date 12/19/02 Time 1330
Company Parsons Industries

Received By: _____ (2)

Signature _____
 Printed Name _____
 Date _____ Time _____
 Company _____

Paragon Analytics, Inc. -- Fort Collins, Colorado

CONDITION OF SAMPLE UPON RECEIPT FORM

CLIENT: New Horizons WORKORDER NO: 0212096

PROJECT MANAGER: Lori Pacheco INITIALS: LP DATE: 12/19/02

1. Does this project require any special handling in addition to standard Paragon procedures?	Yes	<u>No</u>
IS PRE-SCREENING REQUIRED? (radiochemistry, DOE, etc.)	Yes	<u>No</u>
2. Are custody seals on shipping containers intact? How many custody seals are provided? <u>N/A</u>	Yes	No
3. Are the custody seals on sample containers intact? <u>N/A</u>	Yes	No
4. Is there a Chain-of-Custody (COC) or other representative documents, letters, or shipping memos? <u>Yes</u>	Yes	No
5. Is the COC complete? Relinquished: Yes <u>✓</u> No <u> </u> Analyses Requested: Yes <u>✓</u> No <u> </u>	N/A	<u>Yes</u> No
6. Is the COC in agreement with the samples received? No. of Samples: Yes <u>✓</u> No <u> </u> Sample ID's: Yes <u>✓</u> No <u> </u> Matrix: Yes <u>✓</u> No <u> </u> No. of Containers: Yes <u>✓</u> No <u> </u>	N/A	<u>Yes</u> No
7. Were COC (if applicable) and sample labels legible? <u>Yes</u>	Yes	No
8. Were airbills present and/or removable? <u>N/A</u>	<u>Yes</u>	No
9. Are all aqueous samples requiring chemical preservation preserved correctly (excluding volatile organics)? <u>N/A</u>	Yes	No
Are all aqueous non-preserved samples at the correct pH? <u> </u>	Yes	No
10. Is there enough sample for requested analyses? If so, were samples placed in the proper containers? <u>Yes</u>	Yes	No
11. Are all samples within holding times for the requested analyses? <u>Yes</u>	Yes	No
12. Were all sample containers received intact? (not broken or leaking, etc.) <u>Yes</u>	Yes	No
13. Are samples requiring no headspace (volatiles, reactive cyanide/sulfide, radon), headspace free? Size of bubble: <u> </u> < green pea; <u> </u> > green pea (List sample IDs and affected containers on Page 2)	<u>N/A</u>	Yes No
14. Were samples checked for and free from the presence of residual chlorine? <u>N/A</u>	Yes	No
15. Were the sample(s) shipped on ice? <u>N/A</u>	Yes	No
16. Were cooler temperatures measured at 0.1 - 6 °C? IR Gun Used*: 1 2 <u>N/A</u>	Yes	No
17. Were all samples cooled that should have been cooled? <u>N/A</u>	Yes	No

Cooler #'s 1
 Temperature Ambient (Cool Only) °C
 Project Manager Signature / Date: LP 12/20/02

A NO RESPONSE TO ANY QUESTION EXCEPT # 1 REQUIRES THE COMPLETION OF PAGE 2 OF THIS FORM

* IR Gun #1 (original): Raytek, SN SC-PM3/T29403
 IR Gun #2 (newer): Oakton, SN 2SCIR1201

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Febru
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Express

From

Date 2/13/02

303 647-1655
phone

Phylogeny

Sender's Name Kumarabage, C.

Company Waxfloss

Company W.A.A. Address 1585 E. Wright St.

State CO ZIP 80121

little

212

2 Your Internal Billing Reference 4-11-11 460 462-1511

Phone 01708

Recipient's Name _____

1

Company

2000

Address _____
_____ Fax address _____

70-HOLD-45-F

DEPT. / FLOOR / SUITE: FLOOR 11

1
2
3
4
5

Address

1

4809 6084
4829 6284

8353 6284 6084

944

Barbours

Release Significant

COMPLAINTS & CONCURRENCES

...that we use to deliver this shipment without opening

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Questions? Call 800.463.3339

Call 1-800-222-2222

1124 *Journal of Interpersonal Violence* 26(6)

100