

APPENDIX L
PORTABLE INSTRUMENTATION DOCUMENTATION



Designer and Manufacturer
of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER MACTEC CONSTRUCTORS INC ORDER NO. 223782/285468

Mfg. Ludlum Measurements, Inc. Model 2350-1 Serial No. 175852

Cal. Date 7-Oct-04 Cal Due Date 7-Oct-05 Cal. Interval 1 Year Meterface n/a

Check mark applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 55 % Alt 700.8 mm Hg

New Instrument Instrument Received Within Toler. +10% 10-20% Out of Tol. Requiring Repair Other-See comments

Mechanical check Input Sens. Linearity

F/S Resp. check Reset check Window Operation

Audio check Alarm Setting check Battery check (Min. Volt) 4.4 VDC

Ratemeter Linearity check Integrated Dose check Recycle Mode check

Data Log check Overload check Scaler Readout check Threshold Dial Ratio 100 = 10 mV

Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

HV Readout (2 points) Ref./Inst. 500 / 499 V Ref./Inst. 2000 / 1997 V

COMMENTS: Firmware: 37122N2B

I/O FIRMWARE#37123N05
CALIBRATED USING 39" CABLE.
RESOLUTION FOR Cs-137 IS 10%.
NO "AS FOUNDS" DUE TO MALFUNCTIONING OF INSTRUMENT.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

Detector #	Probe Model	Serial #	High Voltage	Threshold	Units/ Time Base	Dead Time Correction Factor	Calibration Constant	Linearity ±10%*
Detector # 1	LMI44-10	RN015203	1000	100	4 / 2	9.173194E-08	5.123821E+10	<input checked="" type="checkbox"/>
Detector # 2	LMI44-10	RN015203	1000	100	7 / 1	9.173194E-06	1.000000E+00	
Detector # 3	PK/CS-137	RN015203	711	642	7 / 1	0.000000E+00	1.000000E+00	
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								

Units: 0 - rad, 1 - Gray, 2 - rem, 3 - Sv, 4 - R, 5 - C/Kg, 6 - Disintegrations, 7 - Counts, 8 - Ci/cm sq., 9 - Bq/cm sq.

Time Base: 0 - Seconds, 1 - Minutes, 2 - Hours

* See attached detector documentation, if applicable.

Digital Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	400 K cpm		40008 (0)	400 cpm		40 (0)
	40 K cpm	N/A	3994 (0)	40 cpm	N/A	4 (0)
	4 K cpm		400 (0)			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCCL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 Gamma S/N

1162 G112 M565 S105 T1008 T879 E552 E551 720 734 1616 Neutron Am-241 Be S/N T-304

Alpha S/N Beta S/N Other Am-241/20.77uCi

m 500 S/N 189509 Multimeter S/N 80820360

Calibrated By: Mason Camp Date 7-Oct-04

Reviewed By: W. J. Blair Date 7 Oct 04

DETECTOR SETUP BAR CODES

Generated: 10/07/2004 08:31:43.

Model 2350 Serial #175852



H711\$M
Set High Voltage: 711



T642\$.
Set Threshold: 642



W40\$WON\$L
Set Window: 40,ON



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



F6\$H
Set Scaler Count Time: 6



SU7\$I
Set Readout Units = counts



SB1\$-
Set Readout Time Base = min



SM0\$3
Set Readout Range Multiplier = auto



SLO.000000E+00\$8
Set Dead Time: 0.000000E+00



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



MPK/CS-137\$1
Set Detector Model: PK/CS-137



NRN015203\$.
Set Detector Serial #: RN015203



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



SP3\$9
SAVE PARAMETERS AS D3

DETECTOR SETUP BAR CODES

Generated: 10/07/2004 08:31:18.

Model 2350 Serial #175852



H1000\$E
Set High Voltage: 1000



T100\$Q
Set Threshold: 100



W1000\$W OFF SP
Set Window: 1000, OFF



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



F12\$E
Set Scaler Count Time: 12



SU7\$I
Set Readout Units = counts



SE1\$-
Set Readout Time Base = min



SM0\$3
Set Readout Range Multiplier = auto



SL9.173194E-06\$0
Set Dead Time: 9.173194E-06



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



*MLMI44-10\$ *
Set Detector Model: LMI44-10



NRN015203\$.
Set Detector Serial #: RN015203



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



K1000000SH
Set Scaler Alarm: 1000000



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



SP2\$8
SAVE PARAMETERS AS D2

DETECTOR SETUP BAR CODES

Generated: 10/07/2004 08:30:49.

Model 2350 Serial #175852



H1000SE

Set High Voltage: 1000



T100SQ

Set Threshold: 100



W1000\$WOF\$P

Set Window: 1000,OFF



O400\$OOF\$C

Set Overload: 400,OFF



F12SE

Set Scaler Count Time: 12



SU4\$F

Set Readout Units = R



SB2\$.

Set Readout Time Base = hr



SM0\$3

Set Readout Range Multiplier = auto



SL9.173194E-06\$0

Set Dead Time: 9.173194E-06



SC5.123821E+10\$M

Set Calibration Constant: 5.123821E+10



MLMI44-10\$

Set Detector Model: LMI44-10



NRN015203\$.

Set Detector Serial #: RN015203



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 D3 in the Model 2350.
Today's date is 10/07/2004.
The current time of day is: 08:30:18.

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

Comments:

Model 2350 Serial # =	175852.
User I.D. =	
High Voltage =	711 volts.
Threshold =	642.
Window =	40, On.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	6 seconds.
Readout Units =	counts.
Readout Time Base =	min.
<hr/>	
Readout Range Multiplier =	auto.
Detector Dead Time =	0.000000E+00.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	PK/CS-137.
Detector Serial # =	RN015203.
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 =	6.5 volts.

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D2 in the Model 2350.
Today's date is 10/07/2004.
The current time of day is: 08:29:59.

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

Comments:

Model 2350 Serial # =	175852.
User I.D. =	
High Voltage =	1000 volts.
Threshold =	100.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	9.173194E-06.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	LMI44-10.
Detector Serial # =	RN015203.
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 =	6.5 volts.

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D1 in the Model 2350.
Today's date is 10/07/2004.
The current time of day is: 08:29:37.

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

Comments:

Model 2350 Serial # =	175852.
User I.D. =	
High Voltage =	1000 volts.
Threshold =	100.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
<hr/>	
Readout Range Multiplier =	auto.
Detector Dead Time =	9.173194E-06.
Detector Calibration Constant =	5.123821E+10.
Detector Model =	LMI44-10.
Detector Serial # =	RN015203.
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 =	6.5 volts.



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SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector 44-10 Serial No. RN015203

Customer MACTEC CONSTRUCTORS INC

Order # 223782/285468

Counter 2350-1 Serial No. 175852

Counter Input Sensitivity 10.00 mV

Count Time 60 sec Background / 6 second Source Count

Distance Source to Detector Surface

Other Cal Constant = 1.000000E+00 Dead Time = 9.173194E-06

High Voltage	Background	Isotope <u>Am-241</u> Size <u>~0.77 μCi</u>	Isotope _____ Size _____	Isotope _____ Size _____	Isotope _____ Size _____
800	6720	10715			
850	6776	12701			
900	6933	12754			
950	7071	12888			
1000	7086	12991			
1050	7330	13149			
1100	8409	13343			
1150	8589	13417			
1200	9729	13576			
1250	10968	13591			

Signature Moses Camp

Date 7-Oct-04



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501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Model 2350 Bench Test Data

Customer MACTEC CONSTRUCTORS INC Date 7-Oct-04 Order #. 223782/285468

Model 2350-1 Serial No. 175852 Detector 44-10 Serial No. RN015203

Source Cs-137 1.9 mCi

High Voltage 1000 V As Found N/A V. Input 10.00 mV As Found / mV.

Cal. Constant 5.123821E+10 as found /

Dead Time 9.173194E-06 as found /

Alarm Setting: Ratemeter 1000000000.000000 as found N/A

Scaler 1000000.000000 as found /

Integrated dose 1000000000.0000 as found /

Overload On Off as found On Off N/A Window 1000 ^{off} as found /

Detector Received: Within Toler. +-10% 10-20% Out of Tol. Requiring Repair Other-See comments

Reference Point	"As Found" Readings: Meter Reading	After Adjustment Readings: Meter Reading
<u>2000 μR/hr</u>	<u>N/A</u>	<u>1.90 mR/hr</u>
<u>1000</u>		<u>1.04 mR/hr</u>
<u>500</u>		<u>543 μR/hr</u>
<u>200</u>		<u>208 μR/hr</u>
<u>100 μR/hr</u>		<u>105 μR/hr</u>

Other 'NOT ABLE TO RECALL DETECTOR SETTINGS'

Signature Mason Camp Date 7-Oct-04



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SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER MACTEC CONSTRUCTORS INC ORDER NO. 226689/286947

Mfg. Ludlum Measurements, Inc. Model 2350-1 Serial No. 186175

Cal. Date 26-Nov-04 Cal Due Date 26-Nov-05 Cal. Interval 1 Year Meterface n/a

check mark applies to applicable instr. and/or detector IAW mfg. spec. T. 73 °F RH 33 % Alt 692.8 mm Hg

New Instrument Instrument Received Within Toler. +10% 10-20% Out of Tol. Requiring Repair Other-See comments

Mechanical check Input Sens. Linearity

F/S Resp. check Reset check Window Operation

Audio check Alarm Setting check Battery check (Min. Volt) 4.4 VDC

Ratemeter Linearity check Integrated Dose check Recycle Mode check

Data Log check Overload check Scaler Readout check Threshold Dial Ratio 100 = 10 mV

Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

HV Readout (2 points) Ref./Inst. 500 / 499 V Ref./Inst. 2000 / 1998 V

COMMENTS: Firmware: 37122N28

10 FIRMWARE# 37123N05
RESOLUTION FOR Cs-137 IS 8.9%.

10 "AS FOUNDS" DUE TO UNACCESSIBLE MEMORY.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

Detector #	Probe Model	Serial #	High Voltage	Threshold	Units/ Time Base	Dead Time Correction Factor	Calibration Constant	Linearity ±10%*
Detector # 1	LMI44-10	PR189144	950	100	4 / 2	1.123691E-05	5.078137E+10	/
Detector # 2	LMI44-10	PR189144	950	100	7 / 1	1.123691E-05	1.000000E+00	/
Detector # 3	PK/CS-137	682KEV	710	642	7 / 1	0.000000E+00	1.000000E+00	/
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								
Detector #								

Units: 0 - rad, 1 - Gray, 2 - rem, 3 - Sv, 4 - R, 5 - C/Kg, 6 - Disintegrations, 7 - Counts, 8 - Ci/cm sq., 9 - Bq/cm sq.
Time Base: 0 - Seconds, 1 - Minutes, 2 - Hours * See attached detector documentation, if applicable.

Digital Readout	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
	400 K cpm		39971 (0)	400 cpm	N/A	40 (0)
	40 K cpm	N/A	3993 (0)	40 cpm	N/A	4 (0)
	4 K cpm		399 (0)			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. A calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources: Cs-137 Gamma S/N
 1162 G112 M565 5105 T1008 T879 E552 E551 720 734 1616 Neutron Am-241 Be S/N T-304
 Alpha S/N Beta S/N Other Am-241/Be 0.75µCi

189509
[Signature] Multimeter S/N 80820360
 Date 26-Nov-04
 Date 30-Nov-04



Designer and Manufacturer
of
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Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Model 2350 Bench Test Data

Customer MACTEC CONSTRUCTORS INC Date 26-Nov-04 Order #. 226689/286947

Model 2350-1 Serial No. 186175 Detector 44-10 Serial No. PR199144

Source 1.9 mCi - Cs-137

High Voltage 950 V As Found N/A V. Input 10.00 mV As Found N/A mV.

Cal. Constant 5.078137E+10 as found _____

Dead Time 1.123691E-05 as found _____

Alarm Setting: Ratemeter 1000000000.000000 as found N/A

Scaler 1000000.000000 as found _____

Integrated dose 1000000000.0000 as found _____

Overload On Off as found On Off Window 1000 ^{off} as found _____

Detector Received: Within Toler. +10% 10-20% Out of Tol. Requiring Repair Other-See comments

Reference Point	"As Found" Readings: Meter Reading	After Adjustment Readings: Meter Reading
<u>2000 µR/hr</u>	<u>N/A</u>	<u>1.90 mR/hr</u>
<u>1000</u>		<u>1.02 mR/hr</u>
<u>500</u>		<u>524 µR/hr</u>
<u>200</u>		<u>202 µR/hr</u>
<u>100 µR/hr</u>		<u>98.3 µR/hr</u>

Other "No Detector Setup"

Signature M. Camp Date 26-Nov-04



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POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector 44-10 Serial No. PR199144
 Customer MACTEC CONSTRUCTORS INC Order #. 226689/286947
 Counter 2350-1 Serial No. 186175 Counter Input Sensitivity 10.00 mV
 Count Time 1 minute Background / 6 seconds Source Count. Distance Source to Detector Surface
 Other Cal Constant = 1.000000E+00 Dead Time = 1.123691E-05

High Voltage Background Isotope Au-241 Isotope Isotope Isotope
 Size 0.25µg Size Size Size

High Voltage	Background	Isotope <u>Au-241</u> Size <u>0.25µg</u>	Isotope <u> </u> Size <u> </u>	Isotope <u> </u> Size <u> </u>	Isotope <u> </u> Size <u> </u>
800	5715	9005			
850	5857	9644			
900	5861	10686			
950	5934	10759			
1000	5965	10813			
1050	5974	10997			
1100	6057	11038			
1150	6120	11100			
1200	6200	11110			

Signature *Mose Comp* Date 26 Nov 04

FORM C4A 04/09/2003

DETECTOR SETUP CHECK LIST REPORT

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

Today's date is 11/26/2004.

The current time of day is: 10:50:39.

I have verified the list below

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

Comments:

Model 2350 Serial # =	186175.
User I.D. =	
High Voltage =	950 volts.
Threshold =	100.
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 =	1.123691E-05.
Detector Calibration Constant =	5.078137E+10.
Detector Model =	LMI44-10.
Detector Serial # =	PR199144.
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 =	6.5 volts.

DETECTOR SETUP CHECK LIST REPORT

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

Today's date is 11/26/2004.

The current time of day is: 10:51:01.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE: Mc.

Comments:

Model 2350 Serial # =	186175.
User I.D. =	
High Voltage =	950 volts.
Threshold =	100.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.123691E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	LMI44-10.
Detector Serial # =	PR199144.
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 =	6.5 volts.

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D3 in the Model 2350.
Today's date is 11/26/2004.

The current time of day is: 10:51:19.

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

Comments:

Model 2350 Serial # =	186175.
User I.D. =	
High Voltage =	710 volts.
Threshold =	642.
Window =	40, On.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	6 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	0.000000E+00.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	PK/CS-137.
Detector Serial # =	662KEV.
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 =	6.5 volts.



**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: 97833
Contact Name: Tom Scott		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2004-02280	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION

Instrument Range	Calibration Standard Value CPM	Ratemeter Response		Calibration Standard Value CPM	Time Base (min)	Tolerances (cpm) ± 10%	Scaler Response	
		As Found	As Left				As Found	As Left
X 1	100	100	100	1,000 CPM	.1	90 - 110	99	99
X 1	250	250	250	1,000 CPM	.2	180 - 220	197	197
X 1	400	400	400	1,000 CPM	.5	450 - 550	494	494
X 10	1,000	1,000	1,000	1,000 CPM	1	900 - 1,100	989	989
X 10	2,500	2,500	2,500	1,000 CPM	2	1.8K-2.2K	1989	1989
X 10	4,000	4,000	4,000	1,000 CPM	5	4.5K-5.5K	4943	4943
X 100	10,000	10,000	10,000					
X 100	25,000	25,000	25,000					
X 100	40,000	40,000	40,000					
X 1000	100,000	100,000	100,000					
X 1000	250,000	250,000	250,000					
X 1000	400,000	400,000	400,000					

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>[Signature]</i>	Reviewed By: <i>[Signature]</i>	Date: 11-9-04	
Calibration Date: 11/9/2004	Calibration Due: 11/9/2005		

Model: 2221Serial Number: 97833

M&TE					Environmental Conditions				
Volt Meter	Due Date:	10/19/05	ID	6565015	D-812	Due Date:	04/15/05	ID:	2816
Pulser	Due Date:	04/13/05	ID	120935	Psychron	Due Date:	02/11/05	ID:	7480
Timer	Due Date:	03/04/05	ID	02010806	Temp: 19.1 °C	Pressure: 751 mmHg	Humidity: 34%		
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									
Voltage	Tolerance ± 2%			As Found			As Left		
400	392-408			405			405		
1,000	980-1,020			1,016			1,016		
1,500	1,470-1,530			1,520			1,520		
1,900	1,862-1,932			1,922			1,922		
Threshold/Gain Calibration (Desired Ratio <u>10</u> mV/100)									
<u>Input</u>	<u>As Found Value</u>		<u>As Found Ratio (mV/100)</u>		<u>As Left Value</u>		<u>As Left Ratio (mV/100)</u>		
10	92		10.9		92		10.9		
20	188		10.6		188		10.6		
30	290		10.3		290		10.3		
40	390		10.3		390		10.3		
Logmeter Scale Linearity Check									
<u>Input</u>	<u>±20% Tolerance</u>		<u>As Found</u>		<u>As Left</u>				
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									
Calibrated in accordance with the OEM Technical Manual									
Instrument									
Calibrated By: <i>And Lopez</i>					Reviewed By: <i>Thomas F. Seal</i>			Date: <i>11-9-04</i>	
Calibration Date: 11/9/2004					Calibration Due: 11/9/2005				



**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: 0534	
Customer Purchase Order Number: N/A		Work Order Number: 2004-01610		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
1) Source Nuclide: Cs ¹³⁷	Serial Number: 019454		Activity: 50Ci		Certification Date: N/A (Used for Plateau Only)
2) Source Nuclide: Cs ¹³⁷	Serial Number: 049711		Activity: Variable		Certification Date: 04/09/04
Desired Exposure (μR/hr)	Detector Response (cpm)	Background (cpm)	(cpm/μR/hr)	Precision Test @250μR/hr	cpm (Source #2)
200	212,955	7,447	1,028	Count 1	256,949
250	259,949	7,447	1,010	Count 2	257,321
400	373,891	7,447	916	Count 3	257,709
Average cpm/μR/hr	985		Average		257,326
				Tolerance \pm10%	All counts within \pm10% of Average
				Pass/Fail	PASS
SCALER INFORMATION			DETECTOR INFORMATION		
<u>Model</u>	<u>Serial Number</u>	<u>Due Date</u>	<u>Background (cpm)</u>	<u>Operating Voltage</u>	<u>Threshold</u>
2221	97833	11/9/2005	7,447	1,100	100 = 10mV
Voltage Plateau: YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>					
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		Reviewed By: <i>Thomas F. Scott</i>		Date: 11-9-04	
Certified By:			Certification Date: 11/9/2004		
			Certification Due: 11/9/2005		

BACKGROUND PLATEAU 44-10#0534 11/09/04

00	77
750	111
800	235
850	336
900	504
950	578
1000	683
1050	707
→ 1100	692
1150	704
1200	712
1250	731
1300	782
1350	730

SOURCE PLATEAU Cs137 #019454 5uCi BUTTON

700	1061
750	1598
800	2153
850	2633
900	3011
950	3218
1000	3430
1050	3511
→ 1100	3633
1150	3525
1200	3704
1250	3647
1300	3674
1350	3650

7

Thomas F. Deeth 11-9-04



**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: 0534		
Customer Purchase Order Number: N/A		Work Order Number: 2004-01610		Evaluation Method: Source		
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION						
1) Source Nuclide: Cs ¹³⁷	Serial Number: 019454			Activity: 50Ci	Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷	Serial Number: 049711			Activity: Variable	Certification Date: 04/09/04	
Desired Exposure (uR/hr)	Detector Response (cpm)	Background (cpm)	(cpm/uR/hr)	Precision Test @250uR/hr	cpm (Source #2)	
200	212,955	7,447	1,028	Count 1	256,949	
250	259,949	7,447	1,010	Count 2	257,321	
400	373,891	7,447	916	Count 3	257,709	
Average cpm/uR/hr	985			Average	257,326	
				Tolerance ±10%	All counts within ±10% of Average	
				Pass/Fail	PASS	
SCALER INFORMATION			DETECTOR INFORMATION			
<u>Model</u>	<u>Serial Number</u>	<u>Due Date</u>	<u>Background (cpm)</u>	<u>Operating Voltage</u>	<u>Threshold</u>	
2221	97833	11/9/2005	7,447	1,100	100 = 10mV	
Voltage Plateau: YES ✓ NO						
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						
Certified By:		Reviewed By: <i>Thomas F. Scott</i>		Date: 11-9-04		
Certification Date: 11/9/2004			Certification Due: 11/9/2005			

BACKGROUND PLATEAU 44-10#0534 11/09/04

00	77
750	111
800	235
850	336
900	504
950	578
1000	683
1050	707
→ 1100	692
1150	704
1200	712
1250	731
1300	782
1350	730

SOURCE PLATEAU Cs137 #019454 SuCi BUTTON

700	1061
750	1598
800	2153
850	2633
900	3011
950	3218
1000	3430
1050	3511
→ 1100	3633
1150	3525
1200	3704
1250	3647
1300	3674
1350	3650

→
Thomas F. Heath 11-9-04



**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: 117651
Contact Name: Tom Scott		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2004-01309	Calibration Method: Electronic	

INSTRUMENT CALIBRATION INFORMATION								
Instrument Range	Calibration Standard Value CPM	Ratemeter Response		Calibration Standard Value CPM	Time Base (min)	Tolerances (cpm) ± 10%	Scaler Response	
		As Found	As Left				As Found	As Left
X 1	100	100	100	1,000 CPM	.1	90 - 110	100	100
X 1	200	200	200	1,000 CPM	.2	180 - 220	200	200
X 1	400	400	400	1,000 CPM	.5	450 - 550	500	500
X 10	1,000	1,000	1,000	1,000 CPM	1	900 - 1,100	1,000	1,000
X 10	2,000	2,000	2,000	1,000 CPM	2	1.8K-2.2K	1,999	1,999
X 10	4,000	4,000	4,000	1,000 CPM	5	4.5K-5.5K	4,998	4,998
X 100	10,000	10,000	10,000					
X 100	20,000	20,000	20,000					
X 100	40,000	40,000	40,000					
X 1000	100,000	100,000	100,000					
X 1000	200,000	200,000	200,000					
X 1000	400,000	400,000	400,000					

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		Reviewed By: <i>Tom Scott</i>	Date: 1-19-04
Calibrated By: <i>[Signature]</i>		Calibration Date: 01/19/04	Calibration Due: 01/19/05

Model: 2221Serial Number: 117651

M&TE				Environmental Conditions					
Volt Meter	Due Date:	02/12/04	ID	TW12662	Barometer	Due Date:	10/22/04	ID:	2525
Pulser	Due Date:	04/02/04	ID	762	Thermometer	Due Date:	10/22/04	ID:	2525
Timer	Due Date:	02/11/04	ID	02010806	Temp: 24.3 °C	Pressure: 740mmHg	Humidity: 31%		
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 ± 10%	As Found	As Left	Time (sec.)	Tolerance	As Found	As Left		
400	392-408	398	398	300	290-310	300	300		
1,000	980-1,020	995	995						
1,500	1,470-1,530	1,503	1,503						
1,900	1,862-1,932	1,895	1,895						
Threshold/Gain Calibration (Desired Ratio <u>10</u> mV/100)									
<u>Input</u>	<u>As Found Value</u>	<u>As Found Ratio (mV/100)</u>	<u>As Left Value</u>	<u>As Left Ratio (mV/100)</u>					
10	78	7.8	90	9					
20	186	9.3	200	10					
30	304	10	316	10.5					
40	402	10	440	11					
Logmeter Scale Linearity Check									
<u>Input</u>	<u>±20% Tolerance</u>	<u>As Found</u>	<u>As Left</u>						
LOG	400	320-480	400	400					
LOG	4,000	3,200-4,800	4,000	4,000					
LOG	40,000	32,000-48,000	40,000	40,000					
LOG	400,000	320,000-480,000	400,000	400,000					
COMMENTS									
Calibrated in accordance with OEM manual.									
Instrument				Reviewed By: <i>Thomas F. Acut</i> Date: 1-19-04					
Calibrated By: <i>[Signature]</i>				Calibration Due: 01/19/05					
Calibration Date: 01/19/04									



**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: 192589	
Customer Purchase Order Number: N/A		Work Order Number: 2004-01367		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
1) Source Nuclide: Cs ¹³⁷	Serial Number: 1296115		Activity: 5μCi		Certification Date: N/A (Used for Plateau Only)
2) Source Nuclide: Cs ¹³⁷	Serial Number: 049711		Activity: Variable		Certification Date: 04/09/03
Desired Exposure (μR/hr)	Detector Response (cpm)	Background (cpm)	(cpm/μR/hr)	Precision Test @250μR/hr	cpm (Source #2)
200	201,848	4,913	984.7	Count 1	246,403
250	246,567	4,913	966.6	Count 2	246,112
400	386,059	4,913	952.9	Count 3	246,220
Average cpm/μR/hr	968.1		Average		246,912
				Tolerance ±10%	All counts within ±10% of Average
				Pass/Fail	PASS
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold
2221	117651	01/19/05	4,913	1100V	100 = 10mV
Voltage Plateau: YES / NO					
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		Certified By: <i>Mike Paul</i>		Reviewed By: <i>James F. Dyer</i> Date: 2-10-04	
Certification Date: 02/10/04			Certification Due: 02/10/05		

BACKGROUND PLATEAU 44-10#192589 5FT CABLE 2/09/2004

700	148
750	241
800	418
850	555
900	707
950	805
1000	804
1050	783
1100	790
1150	822
1200	785
1250	803
1300	784
1350	879

SOURCE PLATEAU CS-137#1296115

700	3111
750	4401
800	5391
850	6299
900	6527
950	6822
1000	6970
1050	7002
1100	7151
1150	7109
1200	7039
1250	7207
1300	7047
1350	7370

James G. Hunt

2-10-04



and Manufacturer
of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER MACTEC CONSTRUCTORS INC ORDER NO. 219124

Mfg. Ludlum Measurements, Inc. Model 2224 Serial No. 190224

Mfg. Ludlum Measurements, Inc. Model 43-93 Serial No. PR215615

Cal. Date 4-Aug-04 Cal Due Date 4-Aug-05 Cal. Interval 1 Year Meterface 202-783

Check mark applies to applicable instr. and/or detector IAW mfg. spec. T. 72 °F RH 47 % Alt 701.8 mm Hg

New Instrument Instrument Received Within Toler. +10% 10-20% Out of Tol. Requiring Repair Other-See comments

Mechanical ck. Meter Zeroed Background Subtract Input Sens. Linearity

F/S Resp. ck Reset ck. Window Operation Geotropism

Audio ck. Alarm Setting ck. Batt. ck. (Min. Volt) 2.2 VDC

Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 650 V Input Sens. Comment mV Det. Oper. 650 V at Comment mV Threshold Dial Ratio = mV

HV Readout (2 points) Ref./Inst. 500 / 489 V Ref./Inst. 1500 / 1500 V

COMMENTS:

Alpha Sensitivity: 120 mv
Beta Sensitivity: 3.5 mv
Beta Window: 30 mv

Overload set simulating light leak.
High Voltage set with detector connected.
Firmware#: 390063

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
<u>x1000</u>	<u>400kcpm</u>	<u> </u>	<u>400</u>
<u>x1000</u>	<u>100kcpm</u>	<u> </u>	<u>100</u>
<u>x100</u>	<u>40kcpm</u>	<u> </u>	<u>400</u>
<u>x100</u>	<u>10kcpm</u>	<u> </u>	<u>100</u>
<u>x10</u>	<u>4kcpm</u>	<u> </u>	<u>400</u>
<u>x10</u>	<u>1kcpm</u>	<u> </u>	<u>100</u>
<u>x1</u>	<u>400cpm</u>	<u> </u>	<u>400</u>
<u>x1</u>	<u>100cpm</u>	<u> </u>	<u>100</u>

*Uncertainty within ± 10% C.F. within ± 20%

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital Readout	<u>400kcpm</u>	<u>39963 (0)</u>	Log Scale	<u> </u>	<u> </u>
	<u>40kcpm</u>	<u>3996 (0)</u>		<u> </u>	<u> </u>
	<u>4kcpm</u>	<u>399 (0)</u>		<u> </u>	<u> </u>
	<u>400cpm</u>	<u>40 (0)</u>		<u> </u>	<u> </u>
	<u>40cpm</u>	<u>4 (0)</u>		<u> </u>	<u> </u>

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LC-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N T162 G112 M655 5105 T1008 T879 E552 E551 720 734 1616 Neutron Am-241 Be S/N T-304

Alpha S/N Pu239 #4337 Beta S/N Tc99 #635/83, Sr90y90 #918 Other

m 500 S/N 38120 Oscilloscope S/N Multimeter S/N 78401030

Calibrated By: Leopoldo Lopez Date 4-Aug-04

Reviewed By: Elis Chaney Date 05 Aug 04

This certificate shall not be reproduced except in full, without the written approval of Ludlum Measurements, Inc.

AC Inst. Passed Dielectric (Hi-Pot) and Continuity Test



Designer and Manufacturer
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Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector 43-93 Serial No. PR 215615 Order # 219124
 Customer MACTEC CONSTRUCTORS INC Alpha Input Sensitivity 120 mV
 Counter 2224 Serial No. 190224 Beta Input Sensitivity 3.5 mV
 Count Time 1 Minute Beta Window 30 mV
 Other _____ Distance Source to Detector Surface

High Voltage	Background		Isotope <u>Pu 239</u> Size <u>30900 dpm</u>		Isotope <u>Tc 99</u> Size <u>22900 dpm</u>		Isotope <u>Sr 90 y 90</u> Size <u>11050 x dpm</u>	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
<u>600</u>	<u>2</u>	<u>42</u>	<u>5560</u>	<u>360</u>	<u>4</u>	<u>1045</u>	<u>1</u>	<u>13548</u>
<u>625</u>	<u>0</u>	<u>71</u>	<u>6235</u>	<u>330</u>	<u>5</u>	<u>2213</u>	<u>0</u>	<u>21842</u>
<u>✓ 650</u>	<u>0</u>	<u>108</u>	<u>6820</u>	<u>352</u>	<u>6</u>	<u>3502</u>	<u>0</u>	<u>27919</u>
<u>675</u>	<u>0</u>	<u>180</u>	<u>6637</u>	<u>373</u>	<u>3</u>	<u>4667</u>	<u>1</u>	<u>32850</u>
<u>700</u>	<u>1</u>	<u>229</u>	<u>6823</u>	<u>481</u>	<u>9</u>	<u>5422</u>	<u>6</u>	<u>35908</u>

- Gas Proportional detector count rate decreased \leq 10% after 15 hour static test using 39" cable.
- Gas proportional detector count rate decreased \leq 10% after 5 hour static test using 39" cable and alpha/beta counter.

Signature *Lena Ortega* Date 4-Aug-04



Designer and Manufacturer
of
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Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER MACTEC CONSTRUCTORS INC ORDER NO. 206408/276907

Mfg. Ludlum Measurements, Inc. Model 2224 Serial No. 183077

Mfg. Ludlum Measurements, Inc. Model 43-89 Serial No. PR 191002

Cal. Date 1-Dec-03 Cal Due Date 1-Dec-04 Cal. Interval 1 Year Meterface 202-783

Check mark applies to applicable instr. and/or detector IAW mfg. spec. T. 69 °F RH 20 % Alt 712.8 mm Hg

New Instrument Instrument Received Within Toler. $\pm 10\%$ 10-20% Out of Tol. Requiring Repair Other-See comments

Mechanical ck. Meter Zeroed Background Subtract Input Sens. Linearity

F/S Resp. ck. Reset ck. Window Operation Geotropism

Audio ck. Alarm Setting ck. Batt. ck. (Min. Volt) 2.2 VDC

Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 750 V Input Sens. Comment mV Det. Oper. 750 V at Comment mV Threshold mV
Dial Ratio =

HV Readout (2 points) Ref./Inst. 500 / 494 V Ref./Inst. 1500 / 1494 V

COMMENTS:

AT: 120mV
BT: 3.5mV
BW: 30mV
O.L. SET TO SIMULATE LIGHT LEAK.
FIRMWARE # 390063.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-B in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X1000	400 K cpm	400	400
X1000	100 K cpm	100	100
X100	40 K cpm	400	400
X100	10 K cpm	100	100
X10	4 K cpm	400	400
X10	1 K cpm	100	100
X1	400cpm	400	400
X1	100cpm	100	100

*Uncertainty within $\pm 10\%$ C.F. within $\pm 20\%$

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400 K cpm	398021	398599			
40 K cpm	39772	39871			
4 K cpm	3980	3980			
400 cpm	398	398			
40 cpm	39	40			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N 1162 G112 M565 5105 T1008 T879 E552 E551 720 734 1616 Neutron Am-241 Be S/N T-304
 Alpha S/N Pu-239 / 2928 Beta S/N Tc-99 / NI-EV Other Sr-90 / 4016
 m 500 S/N 189509 Oscilloscope S/N Multimeter S/N 80820360

Calibrated By: Moss Cange Date 1-Dec-03
 Reviewed By: WJ Robin Date 9 Dec 03



Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector 43-89 Serial No. PR 191002 Order # 206408/276907
 Customer MACTEC CONSTRUCTORS INC Alpha Input Sensitivity 120 mV
 Counter 2224 Serial No. 183097 Beta Input Sensitivity 3.5 mV
 Count Time 1 Minute Beta Window 30 mV
 Other _____ Distance Source to Detector Surface

High Voltage	Background		Isotope <u>Po-210</u> Size <u>12,600 cpm</u>		Isotope <u>Tl-209</u> Size <u>14,100 cpm</u>		Isotope <u>Sr-90</u> Size <u>44022 cpm</u>	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
725	1	160	4484	364	1	2576	3	12929
→ 750	1	211	4723	555	3	3448	3	15988
775 <u>800</u>	2	268	4848	1134	3	4269	2	17968
800	1	352	5148	2133	2	5098	8	19062

- Gas Proportional detector count rate decreased \leq 10% after 15 hour static test using 39" cable.
- Gas proportional detector count rate decreased \leq 10% after 5 hour static test using 39" cable and alpha/beta counter.

Signature Mads C... Date 1-Dec-03



Designer and Manufacturer
of
Scientific and Industrial
Instruments

Work Order: 206408

LUDLUM MEASUREMENTS, INC
POST OFFICE BOX 810 PH: 915-235-5494
501 OAK STREET FAX: 915-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

TAG #: 276907

Date Received: 11/11/2003

Received Via: FEDEX SAVER

Condition Received: WORN

SHIP TO:
MACTEC CONSTRUCTORS INC
ATTN: BOB CLARK
2000 DAY HILL ROAD
WINDSOR CT 06095

BILL TO:
MACTEC CONSTRUCTORS INC
ATTN: A/P, CE WINDSOR
2000 DAY HILL ROAD
WINDSOR CT 06095

CUSTOMER #: 16943

Reason for Return: Repair/Calibration

Cal Interval \ Special Instructions: 1 / YR

Comments:

*Replaced Window in Detector.
Cal'd. Instrument.*

1-PC message 1-PC

ITEM QTY	PART #	DESCRIPTION	PRICE	COST	ITEM QTY	PART #	DESCRIPTION	PRICE	COST
01*	1.00 EA 2224	M 2224 FOR REPAIR/CAL *183077			2	1	4393-019 Window	15.99	
02*	1.00 EA 43-89	M 43-89 FOR REPAIR/CAL *PR191002			1	2	219312 Batteries		
03*	1.00 EA C	C CABLE							

Instrument Calibrated: _____ at _____

Total Parts Cost: 18.00

Total Calibration, Parts, and Labor: 112.50

Secondary Detectors: _____ at _____

Total Calibration Charge: 70.00

Shipping Charges: _____

Extended Calibration: 1 at 70

Total Labor: 27.50

Total Charges: _____

Labor: 1/2 hour(s) at \$ 55 per hour

Signed: Mary Campa

Date: 1 Dec 03

QC Released: L.A. Kline

9 Dec 03

**DO NOT PAY!
INVOICE TO FOLLOW**

Date: 4- Dec -03

Contacted: BOB CLARK

ACU

By: _____

Return Ship: MS

Phone: 860-285-2544

PO Number: M02212-0189



of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER MACTEC CONSTRUCTORS INC ORDER NO. 239803 / 293866

Mfg. Ludlum Measurements, Inc. Model 2224 Serial No. 183077

Mfg. Ludlum Measurements, Inc. Model 43-93 Serial No. PR212501

Cal. Date 11-Aug-05 Cal Due Date 11-Aug-06 Cal. Interval 1 Year Meterface 202-783

Check mark applies to applicable instr. and/or detector IAW mfg. spec. T. 71 °F RH 45 % Alt 760.0 mm Hg

New Instrument Instrument Received Within Toler. +/-10% 10-20% Out of Tol. Requiring Repair Other-See comments

Mechanical ck. Meter Zeroed Background Subtract Input Sens. Linearity

F/S Resp. ck. Reset ck. Window Operation Geotropism

Audio ck. Alarm Setting ck. Batt. ck. (Min. Volt) 2.2 VDC

Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 725 V Input Sens. Comment mV Det. Oper. 725 V at Comment mV Threshold = mV

HV Readout (2 points) Ref./Inst. 500 / 475 V Ref./Inst. 1500 / 1760 V

COMMENTS:

Input Sensitivity is set as follows:

Alpha Threshold: 120 mV

Beta Threshold: 3.5 mV

Beta Window: 30 mV

High Voltage set with detector connected.

No "AS FOUNDS" due to replacement on noisy C-cable. Overload checked but not set.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*
X1000	400 K cpm	400	400
X1000	100 K cpm	100	100
X100	40 K cpm	400	400
X100	10 K cpm	100	100
X10	4 K cpm	400	400
X10	1 K cpm	100	100
X1	400cpm	400	400
X1	100cpm	100	100

*Uncertainty within ± 10% C.F. within ± 20%

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
400 K cpm	39770 (e)	39770 (e)			
40 K cpm	3976	3976			
4 K cpm	398	398			
400 cpm	40	40			
40 cpm	4	4			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other International Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. Calibration system conforms to the requirements of ANSI/NCSL Z540-1-1994 and ANSI N323-1978. State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

137 Gamma S/N 1162 G112 M565 5105 T1008 T879 E552 E551 720 734 1616 Neutron Am-241 Be S/N T-304

Alpha S/N Pu-239 12,600 cpm Beta S/N Sr-90 83363 cpm; Tc-99 14,100 cpm Other

m 500 S/N 134709 Oscilloscope S/N Multimeter S/N 86250390

Calibrated By: Jeremy Maxwell Date 11 Aug 05

Reviewed By: USAR Date 11 Aug 05



Designer and Manufacturer
of
Scientific and Industrial
Instruments

POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector 43-93 Serial No. PR212501 Order #. 239803 / 293866
 Customer MACTEC CONSTRUCTORS INC Alpha Input Sensitivity 120 mV
 Counter 2224 Serial No. 183077 Beta Input Sensitivity 3.5 mV
 Count Time 1 Minute Beta Window 30 mV
 Other _____ Distance Source to Detector Surface

High Voltage	Background		Isotope <u>Sr-90</u> Size <u>83363cpm</u>		Isotope <u>Tc-99</u> Size <u>14,100cpm</u>		Isotope <u>Pu-239</u> Size <u>12,600cpm</u>	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
<u>700</u>	<u>0</u>	<u>144</u>	<u>2</u>	<u>33635</u>	<u>1</u>	<u>3194</u>	<u>5201</u>	<u>353</u>
<u>-725</u>	<u>3</u>	<u>190</u>	<u>0</u>	<u>39776</u>	<u>2</u>	<u>4340</u>	<u>5355</u>	<u>475</u>
<u>750</u>	<u>2</u>	<u>298</u>	<u>4</u>	<u>42619</u>	<u>3</u>	<u>5679</u>	<u>5351</u>	<u>811</u>

- Gas Proportional detector count rate decreased \leq 10% after 15 hour static test using 39" cable.
- Gas proportional detector count rate decreased \leq 10% after 5 hour static test using 39" cable and alpha/beta counter.

Signature Jerry Mayer Date 11 Aug 05



Designer and Manufacturer
of
Scientific and Industrial
Instruments

CERTIFICATE OF CALIBRATION

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

CUSTOMER MACTEC CONSTRUCTORS INC ORDER NO. 223782/285468

Mfg. Ludlum Measurements, Inc. Model 2224 Serial No. 183074

Mfg. Ludlum Measurements, Inc. Model 43-89 Serial No. PK 193028

Cal. Date 6-Oct-04 Cal Due Date 6-Oct-05 Cal. Interval 1 Year Meterface 202-783

Check mark applies to applicable instr. and/or detector IAW mfg. spec. T. 75 °F RH 56 % Alt 701.8 mm Hg

New Instrument Instrument Received Within Toler. +10% 10-20% Out of Tol. Requiring Repair Other-See comments

Mechanical ck. Meter Zeroed Background Subtract Input Sens. Linearity

F/S Resp. ck. Reset ck. Window Operation Geotropism

Audio ck. Alarm Setting ck. Batt. ck. (Min. Volt) 2.2 VDC

Calibrated in accordance with LMI SOP 14.8 rev 12/05/89. Calibrated in accordance with LMI SOP 14.9 rev 02/07/97.

Instrument Volt Set 275 V Input Sens. Comment mV Det. Oper. 275 V at Comment mV Threshold Dial Ratio = mV

HV Readout (2 points) Ref./Inst. 500 / 494 V Ref./Inst. 1500 / 1490 V

COMMENTS:

AT: 120mV
BT: 3.5mV
BW: 3.5mV
OVERLOAD SET TO SIMULATED LIGHT LEAK.
H.V. SET WITH DETECTOR CONNECTED.
FIRMWARE#390063
No "AS" founds" Due To Noisy Cable.

Gamma Calibration: GM detectors positioned perpendicular to source except for M 44-9 in which the front of probe faces source.

RANGE/MULTIPLIER	REFERENCE CAL. POINT	INSTRUMENT REC'D "AS FOUND READING"	INSTRUMENT METER READING*	
X1000	400 K cpm	N/A	400	
X1000	100 K cpm		100	
X100	40 K cpm		400	
X100	10 K cpm		100	
X10	4 K cpm		400	
X10	1 K cpm		100	
X1	400cpm		400	
X1	100cpm		100	

*Uncertainty within ± 10% C.F. within ± 20%

ALL Range(s) Calibrated Electronically

REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*	REFERENCE CAL. POINT	INSTRUMENT RECEIVED	INSTRUMENT METER READING*
Digital readout 400 K cpm	N/A	399828	Log Scale		
40 K cpm		39924			
4 K cpm		3992			
400 cpm		399			
40 cpm		40			

Ludlum Measurements, Inc. certifies that the above instrument has been calibrated by standards traceable to the National Institute of Standards and Technology, or to the calibration facilities of other international Standards Organization members, or have been derived from accepted values of natural physical constants or have been derived by the ratio type of calibration techniques. The calibration system conforms to the requirements of ANSI/NCCL Z540-1-1994 and ANSI N323-1978 State of Texas Calibration License No. LO-1963

Reference Instruments and/or Sources:

Cs-137 Gamma S/N 1162 G112 M565 5105 T1008 T879 E552 E551 720 734 1616 Neutron Am-241 Be S/N T-304

Alpha S/N Pu-239/2928-01 Beta S/N Tc-99, Ni-EV/Sr90Y90.4016 Other

m 500 S/N 189509 Oscilloscope S/N Multimeter S/N 80820360

Calibrated By: Mason Camp Date 6-Oct-04

Reviewed By: W. J. Blinn Date 7 Oct 04

AC Inst. Passed Dielectric (Hi-Pot) and Continuity Test
Only Failed:



Designer and Manufacturer
of
Scientific and Industrial
Instruments

LUDLUM MEASUREMENTS, INC.
POST OFFICE BOX 810 PH. 325-235-5494
501 OAK STREET FAX NO. 325-235-4672
SWEETWATER, TEXAS 79556, U.S.A.

Bench Test Data For Detector

Detector 43-89 Serial No. PR 193028 Order # 223782/285468
 Customer MACTEC CONSTRUCTORS INC Alpha Input Sensitivity 120 mV
 Counter 2224 Serial No. 183074 Beta Input Sensitivity 35 mV
 Count Time 1Minute Beta Window 30 mV
 Other _____ Distance Source to Detector Surface

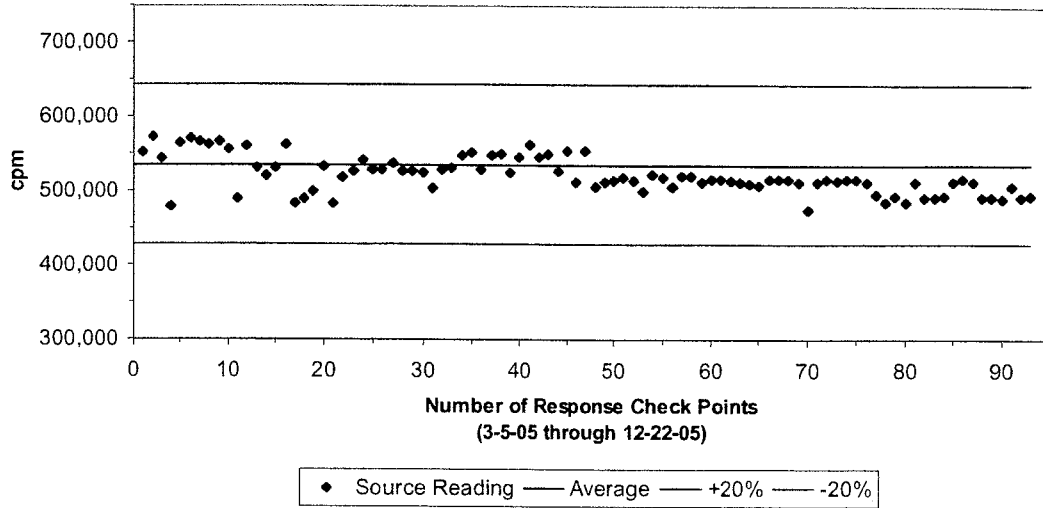
High Voltage	Background		Isotope <u>Pu-239</u> Size <u>12,600cpm</u>		Isotope <u>Tc-99</u> Size <u>14,100cpm</u>		Isotope <u>Sr-90Y90</u> Size <u>4324cpm</u>	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	Alpha	Beta
<u>750</u>	<u>1</u>	<u>172</u>	<u>4728</u>	<u>467</u>	<u>3</u>	<u>2327</u>	<u>0</u>	<u>10443</u>
<u>775</u>	<u>3</u>	<u>287</u>	<u>4687</u>	<u>702</u>	<u>2</u>	<u>3250</u>	<u>6</u>	<u>13030</u>
<u>800</u>	<u>1</u>	<u>308</u>	<u>4736</u>	<u>1207</u>	<u>3</u>	<u>4198</u>	<u>2</u>	<u>14827</u>

- Gas Proportional detector count rate decreased \leq 10% after 15 hour static test using 39" cable.
- Gas proportional detector count rate decreased \leq 10% after 5 hour static test using 39" cable and alpha/beta counter.

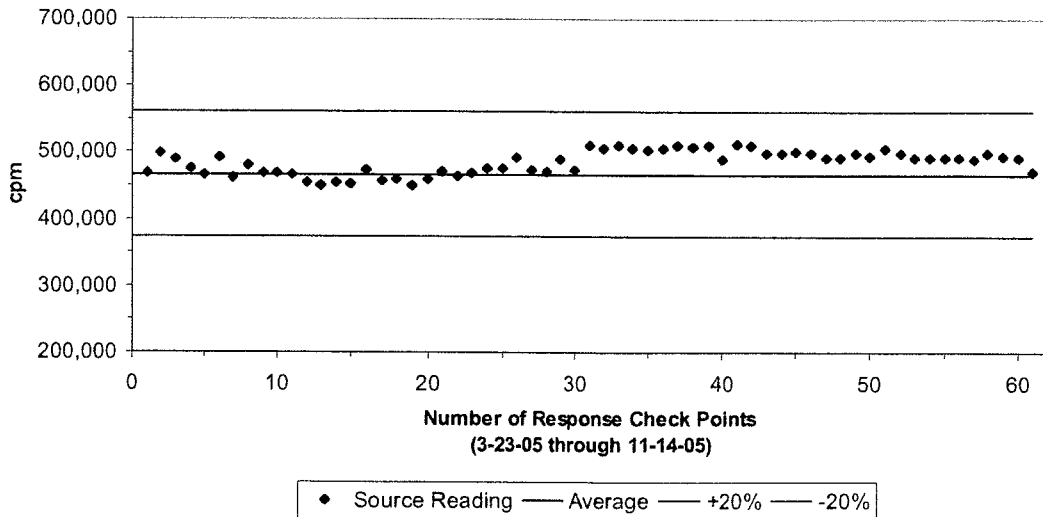
Signature Moss Camp Date 6-Oct-01

Portable Instrument Control Charts

Instrument Source Response Control Chart
Ludlum 2350-1 # 175852 with 44-10 Probe

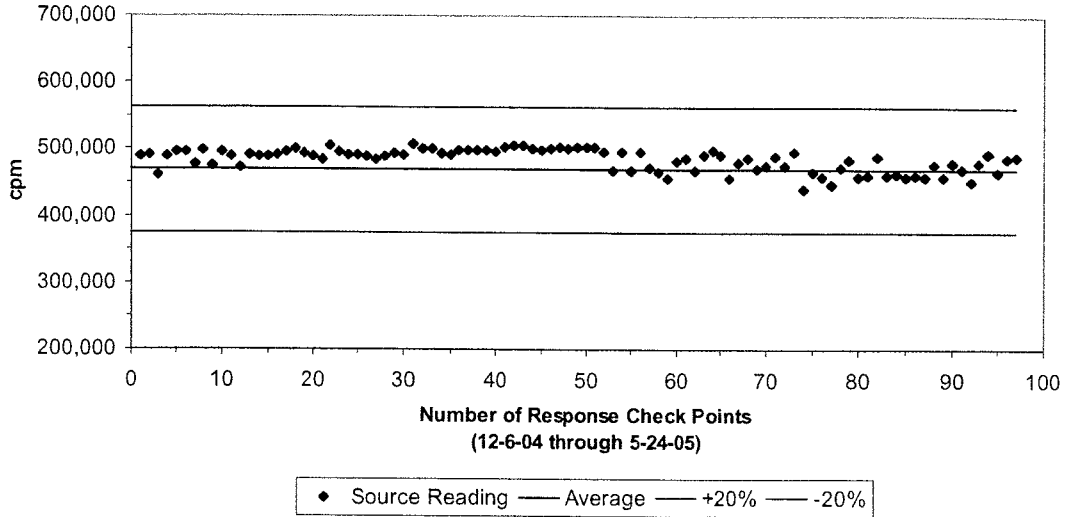


Instrument Source Response Control Chart
Ludlum 2350-1 #186175 with 44-10 Probe

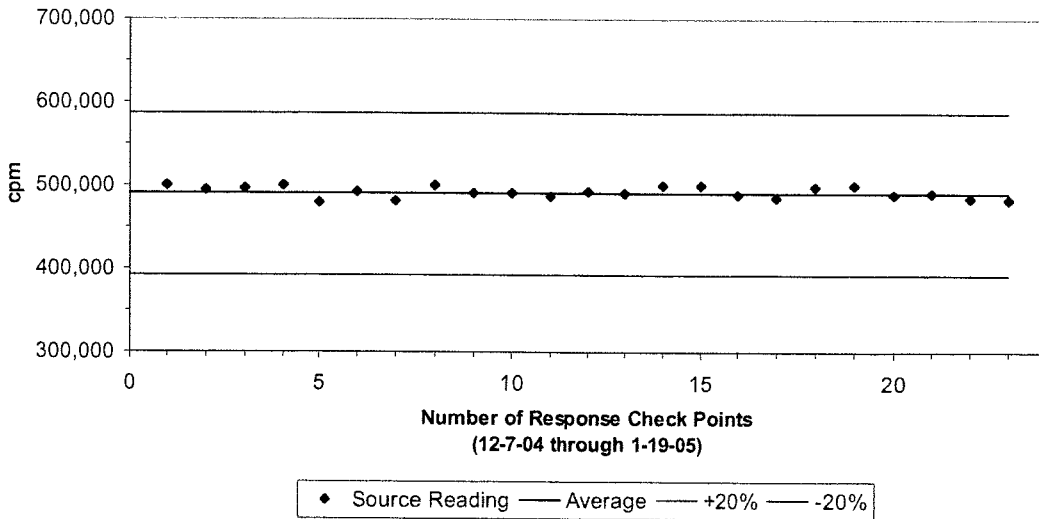


Portable Instrument Control Charts

Instrument Source Response Control Chart
Ludlum 2221 #97833 with 44-10 Probe

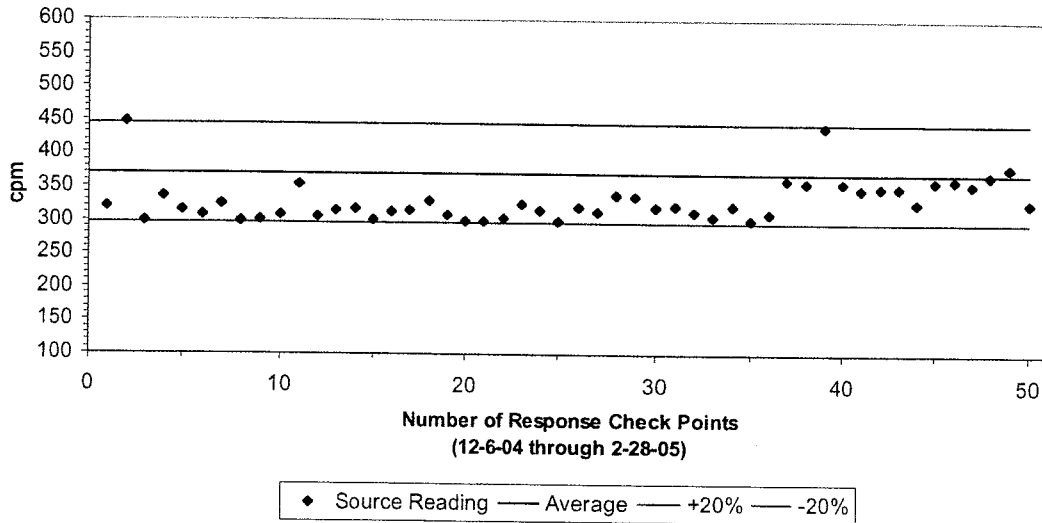


Instrument Source Response Control Chart
Ludlum 2221 #117651 with 44-10 Probe

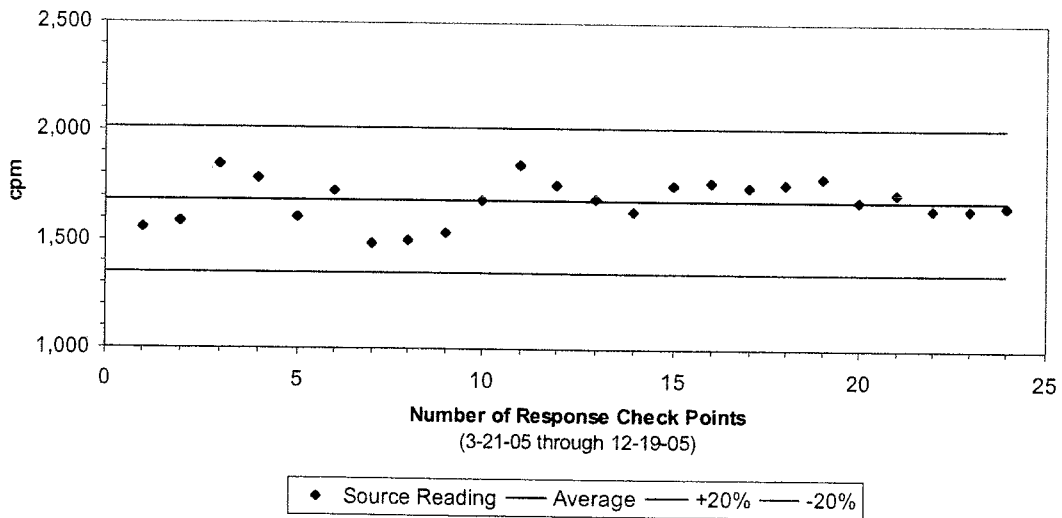


Portable Instrument Control Charts

Instrument Source Response Control Chart
Ludlum 2224 #190224 with 43-93 Probe



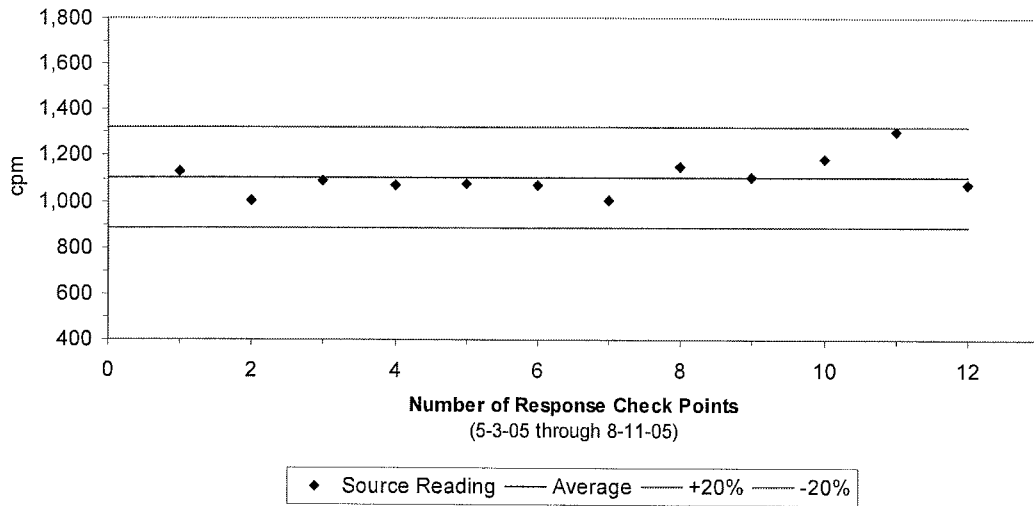
Instrument Source Response Control Chart
Ludlum 2224 #183077 with 43-93 Probe



Portable Instrument Control Charts

Instrument Source Response Control Chart

Ludlum 2224 #183074 with 43-89 Probe



Portable Instrument Response Check Sheet

Instrument: Ludon 2350 Serial No: 175852 Probe: 44-10 Serial No: RND15203

Cal. Performed Date: 10/7/04 Cal. Due Date: 10/7/05

Response Check Location: Healthwark HP

Source ID: SRS-020 Source Jig ID: NAT-2

Source Reference Reading (α): _____ +20% _____ -20% _____

Source Reference Reading (β): 565629 +20% 678755 -20% 452504

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
11/16/04 1430	N/A	-	N/A	560665	SAT	AK
11/17/04 0630				564640	SAT	MS
11/18/04 0622		4157		560208	SAT	MS
11/22/04 0608		4634		575495	SAT	MS
11/23/04 0622		4269		574511	SAT	MS
11/24/04 0625		4383		568612	SAT	MS
11/28/04 0620		4345		567271	SAT	MS
11/30/04 0629		4180		561785	SAT	MS
12-1-04 0805		4863		583513	SAT	LP
12-2-04 0620		4974		568459	SAT	MS
12-6-04 0620		4618		572999	SAT	MS
12-9-04 1015		1825		594508	SAT	RC
12-13-04 0625		1685		586227	SAT	MS
12-14-04 0622		1595		563574	SAT	MS
12-15-04 0618		1656		587524	SAT	MS
12-16-04 0622		1708		560283	SAT	MS
12-20-04 0805		1559		584627	SAT	LP
12-21-04 0630		1523		577170	SAT	MS
12-22-04 0618		2236		566288	SAT	MS
12-27-04 0715		1856		578796	SAT	MS
12-28-04 0622		1773		576290	SAT	MS

Comments: _____
 RSO Review: [Signature] Date: 1/1/05

Portable Instrument Response Check Sheet

Instrument: Led 2350 Serial No: 178852 Probe: 44-10 Serial No: RN015208

Cal. Performed Date: 10-7-04 Cal. Due Date: 10-7-05

Response Check Location: MacTec HP

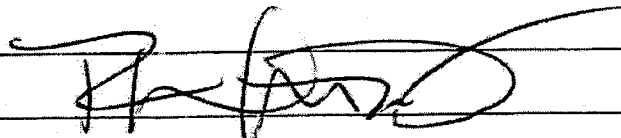
Source ID: SAS-020 Source Jig ID: NAI - 2

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (βγ): 565629 +20% 678255 -20% 452509

Date/Time	α Bkg.	βγ Bkg.	α Reading	βγ Reading	Remarks	Initials
12-29-04 0630	NA	1784	NA	573913	SQT	MS
12-30-04 0625		1686		567002	SQT	MS
1-4-05 0627		1915		554972	SQT	MS
1-5-05 0622		1874		591258	SQT	MS
1-10-05 0647		1569		577015	SQT	MS
1-11-05 0619		1665		597916	SQT	MS
1-12-05 0612		1778		597008	SQT	MS
1-13-05 0604		1628		578773	SQT	MS
1-17-05 0625		1673		579114	SQT	MS
1-18-05 0610		1618		578840	SQT	MS
1-19-05 0600		1674		573212	SQT	MS
1-20-05 0605		1812		575088	SQT	MS
1-21-05 @ 0935		1708		574995	SQT	MS
1-24-05 0627		1648		581767	SQT	MS
1-25-05 0602		1764		544265	SQT	MS
1-26-05 0620		1634		584819	SQT	MS
1-27-05 0610		1806		593530	SQT	MS
1-24-05 0610		1658		591490	SQT	MS
2-1-05 0600	✓	1674	✓	586596	SQT	MS

Comments:

RSO Review:  Date: 7/7/05

Portable Instrument Response Check Sheet

Instrument: Lod 2356 Serial No: 178852 Probe: 44-10 Serial No: AN 01520

Cal. Performed Date: 10-7-05 Cal. Due Date: 10-7-05

Response Check Location: Master IP Area

Source ID: SRS-020 Source Jig ID: N4E-2

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (β): 565629 +20% 678755 -20% 452509

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
2-2-05 0615	NA	1656	NA	581128	SAT	MS
2-3-05 0612	NA	1574	NA	592434	SAT	MS
2-7-05 0620		1776		592274	SAT	MS
2-8-05 0605		1622		587597	SAT	MS
2-9-05 0630		1719		585195	SAT	MS
2-10-05 0630		2033		583781	SAT	MS
2-15-05 0705		1660		598146	SAT	MS
2-16-05 0645		1745		596641	SAT	MS
2-17-05 0645		1695		594640	SAT	MS
2-21-05 0650		1735		589209	SAT	MS
2-22-05 0645		1605		589189	SAT	MS
2-23-05 0625		1776		590042	SAT	MS
2-24-05 0630		1778		589177	SAT	MS
2-28-05 0650		2098		573640	SAT	MS
3-1-05 0710		1895		589187	SAT	MS
3-2-05 0630		2019		587152	SAT	MS
3/2/05 1130		2428	1679	553061	SAT	MS
3/14/05 1700		2068		572410	SAT	MS
3/15/05 1700	✓	2141	✓	543933	SAT	MS

Comments:

RSO Review: [Signature] Date: 7/7/05

PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: 2350-1 Serial No: 175852 Probe: 44-16 Serial No: 1107520

Cal. Performed Date: 10-7-04 Cal. Due Date: 10-7-05

Response Check Location: HP Area

Source ID: SRS-020 Source Jig ID: NAJ-2

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (β): 565629 +20% 678755 -20% 452504

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
3/16/05 0600	NA	2045	NA	478765	SAT	✓
3/17/05		1854				
3/17/05		2056		564100	SAT	✓
3/18/05		1742		570279	SAT	✓
3/21/05 0630		2158		491172		
3/21/05 0430		2154		566921	SAT	✓
3/22/05 1430		2030		562917	SAT	✓
3/23/05 0900		2144		567060	SAT	✓
14 Mar 2005		2242		555392	SAT	✓
3/28/05 0600		2136		488836	SAT	✓
3/29/05 0615		2155		560328	SAT	✓
3/30/05 0600		2135		530420	SAT	✓
3/31/05 0630		2165		520381	SAT	✓
4/1/05 0400		2214		530261	SAT	✓
4/4/05 0400		2035		562074	SAT	✓
4/5/05 0600		1892		482539	SAT	✓
6 Apr 05		2086		488648	SAT	✓
7 Apr 05		2018		499932	SAT	✓
4/11/05 0945		2045		533541	SAT	✓
13 Apr 05		2174		483198	SAT	✓
14 Apr 05	✓	1667		518242	SAT	✓
4/18/05		1660		526813	SAT	✓
4/19/05		1789		54263	SAT	✓

RSO Review: [Signature] Date: 7/7/05

PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: 2350-A Serial No: 175852 Probe: 44-10 Serial No: 15203

Cal. Performed Date: 7 Oct 2004 Cal. Due Date: 7 Oct 2005

Response Check Location: MACTEC HP AREA

Source ID: SRC-020 Source Jig ID: NAI

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (β): 565629 +20% 678755 -20% 452504

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
20 APR 05	NA	1813	NA	528241	SAT	[Signature]
21 APR 05	NA	1724	NA	528171	SAT	[Signature]
22 APR 05	N/A	2152	N/A	538418	SAT	CM
4/25/05		1901		526419	SAT	[Signature]
26 APR 05		1774		4743 527696	SAT	[Signature]
27 APR 05		1796		525189	SAT	[Signature]
28 APR 05		1722		504675	SAT	[Signature]
29 APR 05		1713		529255	SAT	[Signature]
2 MAY 05		1864		631618	SAT	[Signature]
3 MAY 2005		1721		547835	SAT	[Signature]
5-4-05		1760		552167	SAT	JT
5/9/05		1773		528497	SAT	[Signature]
5/10/05		1696		547897	SAT	[Signature]
5/11/05		1781		550198	SAT	[Signature]
12 MAY 05		1646		524006	SAT	[Signature]
5/13/05				52		
5/16/05		3196		545347	SAT	[Signature]
5/17/05		2736		562294	SAT	[Signature]
5/18/05		1662		546225	SAT	JT
5/19/05		1752		549241	SAT	
5/20/05		1803		577852	SAT	[Signature]
5/23/05		1793		554671	SAT	[Signature]

Comments:

RSO Review: [Signature] Date: 7/7/05

PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: 2350 Serial No: 175852 Probe: 44-10 Serial No: 15203

Cal. Performed Date: OCT-7-04 Cal. Due Date: OCT-7-05

Response Check Location: Mactec HP Area

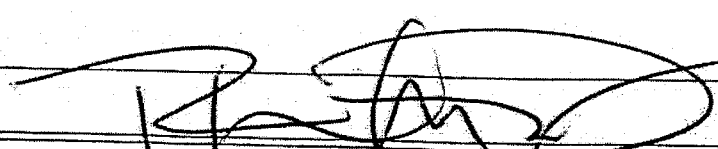
Source ID: SRS-020 Source Jig ID: NAT

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (β): 565679 +20% 678755 -20% 452509

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
6/28/05 1315	NA	1640		513404	SAT	MS
8/10/05 0620		1873		554208	SAT	R
8/11/05		1786		506255	SAT	R
8/15/05 1000		2280		512994	SAT	R
8/16/05 0645		2412		514454	SAT	R
8/17/05 0415		2280		518429	SAT	R
8/18/05 0015		2490		514193	SAT	R
8/24/05 1500		2441		499031	SAT	R
8/29/05 1130		1887		521895	SAT	R
8/30/05 0700		2105		517793	SAT	R
9/13/05 0645		2389		505381	SAT	R
9/14/05 0700		2286		520740	SAT	R
9/14/05 1100		2197		519833	SAT	R
10/3/05 0700		1991		511535	SAT	R
10/3/05 1620		1750		515907	SAT	MS
10/4/05 0730		1561		515643	SAT	R
10/4/05 1620		1655		514837	SAT	MS
10/5/05 0630		1460		513247	SAT	MS
10/5/05 1630		1441		511138	SAT	MS
10/6/05 0600		1489		508733	SAT	MS
10/10/05 0600	✓	1599	✓	517604	SAT	MS

Comments:

RSO Review: 

Date: 7/9/05 1/10/22

PROCEDURE NO: RPP-12	REVISION NO: 0	ATTACHMENT 1 PAGE NO: 1 OF 1
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Portable Instrument Response Check Sheet

Instrument: 2350-1 Serial No: 175852 Probe: 44-10 Serial No: 15203

Cal. Performed Date: 10/25/05 Cal. Due Date: 10/25/06

Response Check Location: MACTEC HP

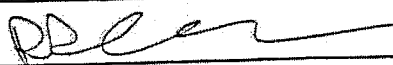
Source ID: 205-020 Source Jig ID: MACTEC WAS

Source Reference Reading (α): +20% -20%

Source Reference Reading (β): 510524 +20% 612629 -20% 408419

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
10/31/05 1430	NA	1169	NA	516253	SAT	MS
10/31/05 1645		1800		515740	SAT	MS
11/1/05 0640		1456		512421	SAT	MS
11/2/05 1615		1316		474471	SAT	MS
11/2/05 0650		1386		513540	SAT	MS
11/3/05 0645		1342		515720	SAT	MS
11/7/05 0930		1585		513576	SAT	MS
11/9/05 0645		1305		517297	SAT	MS
11/9/05 0640		1405		517703	SAT	MS
11/10/05 0715		1489		513502	SAT	MS
11/15/05 0820		1568		495001	SAT	CP
11/15/05 1630		1532		485174	SAT	CP
11/16/05 0726		1635		493557	SAT	CP
11/16/05 1700		1473		485586	SAT	MS
11/21/05 1330		1487		511955	SAT	MS
11/22/05 0735		1394		492616	SAT	CP
11/29/05 1058		1516		491181	SAT	CP
11/30/05 0730		2607		492974	SAT	CA
12/1/05 0710	✓	1312	✓	512731	SAT	MS

Comments:

RSO Review:  Date: 3/1/06

Portable Instrument Response Check Sheet

Instrument: L 2350-1 Serial No: 17585-2 Probe: 44-10 Serial No: 15203

Cal. Performed Date: 10/25/05 Cal. Due Date: 10/25/06

Response Check Location: mactec HP

Source ID: SRS-020 Source Jig ID: NAT

Source Reference Reading (α): — +20% — -20% —

Source Reference Reading (β): 510529 +20% 612629 -20% 408419

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
12/15/05 0730	NA	1533	NA	517048	SAT	MS
12/16/05 0735		1255		513360	SAT	MS
12/17/05 0740		1316		491908	SAT	CA
12/18/05 0715		1229		492072	SAT	CA
12/14/05 1050		1331		489378	SAT	CA
12/18/05 0745		1779		506896	SAT	CA
12/19/05 1015		1411		491445	SAT	CA
12/22/05 0735		1330		493380	SAT	CA

Comments:

RSO Review: [Signature] Date: 3/1/06

Portable Instrument Response Check Sheet

Instrument: 2350-1 Serial No: 186175 Probe: 44-10 Serial No: 199144

Cal. Performed Date: 11-26-04 Cal. Due Date: 11-26-05

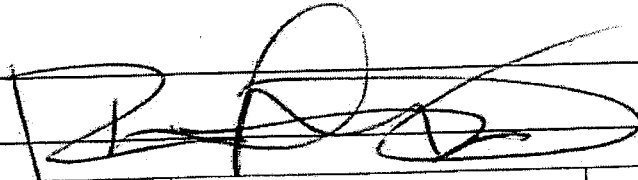
Response Check Location: MDXTEC HP Office

Source ID: SRS-020 Source Jig ID: NaI-2

Source Reference Reading (α): _____ +20% _____ -20% _____
 Source Reference Reading (β): 545454 +20% 654545 -20% 452504

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
12-20-04 0807	N A	3900	N A	554222	SAT	LD
12-21-04 0630		3611		545060	SAT	MS
12-22-04 0620		5194		532663	SAT	MS
12-27-04 0710		4486		546637	SAT	MS
12-28-04 0618		4312		544690	SAT	MS
12-29-04 0620		4316		545246	SAT	MS
12-30-04 0620		3898		547367	SAT	MS
1-4-05 0635		4774		549886	SAT	MS
1-5-05 0620		4991		559378	SAT	MS
1-10-05 0650		3783		541713	SAT	MS
1-11-05 0625		3720		569663	SAT	MS
1-12-05 0615		4096		577272	SAT	MS
1-13-05 0608		3968		551604	SAT	MS
1-17-05 0625		3578		553550	SAT	MS
1-18-05 0559		3483		552285	SAT	MS
1-19-05 0612		3612		545911	SAT	MS
1-20-05 0615		3991		555121	SAT	MS
1-24-05 0605		3682		562319	SAT	MS
1-25-05 0610	↓	3695	↓	566285	SAT	MS

Comments:

RSO Review:  Date: _____

Portable Instrument Response Check Sheet

Instrument: 2350-1 Serial No: 186175 Probe: 44-10 Serial No: 199144

Cal. Performed Date: 11-26-04 Cal. Due Date: 11-26-05

Response Check Location: Mactec HP office

Source ID: SR5-020 Source Jig ID: _____

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (β): 545454 +20% 654545 -20% 452504

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
1-26-05 0625	NA	3858	NA	565242	SAT	MS
1-27-05 0612		3688		55848	SAT	MS
1-31-05 0622		3742		566740	SAT	MS
2-1-05 0850		3707		563490	SAT	MS
2-2-05 0605		4000		554885	SAT	MS
2-3-05 0615		4683		563418	SAT	MS
2-7-05 0612		4934		562816	SAT	MS
2-8-05 0610		3636		561471	SAT	MS
2-9-05 0635		4509		552821	SAT	MS
2-10-05 0640		4187		552182	SAT	MS
2-15-05 0705		3973		570545	SAT	MS
2-16-05 0650		4939		526192	SAT	MS
2-17-05 0655		5034		537921	SAT	MS
2-21-05 0650		4905		551092	SAT	MS
2-22-05 0645		4777		555211	SAT	MS
2-23-05 0630		4690		557951	SAT	MS
2-24-05 0630		4816		534878	SAT	MS
3-23-05 1200		1439*		467999*	SAT	MS
24 Mar 05 0620	↓	1406	↓	499606	SAT	MS

Comments:

* QC with Probe shield installed

RSO Review: [Signature] Date: _____

PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: 2350-1 Serial No: 186175 Probe: 44-10 Serial No: 19914

Cal. Performed Date: 11/26/04 Cal. Due Date: 11/26/05

Response Check Location: McTech HP

Source ID: SRS-020 Source Jig ID: _____

Source Reference Reading (α): N/A +20% N/A -20% N/A

Source Reference Reading (β): 545454 +20% 654545 -20% 452524

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
3/30/05 0900	N/A	1635	N/A	469638	SAT	NO
3/31/05 0630		1403		474778	SAT	NO
4/1/05 0730		1526		465720	SAT	NO
4/4/05		1382		492361	SAT	NO
4/5/05		1312		472297	SAT	NO
6 Apr 05		1.29K		480900	SAT	
7 APR 05		1480		467846	SAT	NO
4/11/05 0700		1323		468226	SAT	NO
4/12/05 0600		1469		46752	SAT	NO
13 APR 05		1488		455819	SAT	
14 APR 05		1378		449694	SAT	
4/15/05		1560		455376	SAT	NO
4/18/05		1362		452614	SAT	NO
4/19/05		1404		472165	SAT	NO
20 APR 05		1516		457776	SAT	
21 APR 05		1404		458706	SAT	
22 APR 05		1565		450506	SAT	NO
4/25/05		1336		458562	SAT	NO
26 APR 2005		1441		471785	SAT	
27 APR 05		1492		464934	SAT	
28 APR 05		1551		469599	SAT	
29 APR 05		1414		474338	SAT	

Comments:

RSO Review: 

Date: _____

PROCEDURE NO: RPP-12	REVISION NO: 0	ATTACHMENT 1
		PAGE NO: 1 OF 1

PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: 2350-A Serial No: 186175 Probe: 44-10 Serial No: 1992114

Cal. Performed Date: 26 Nov 05 Cal. Due Date: 26 Nov 05

Response Check Location: MACTECH HP

Source ID: SRS -020 Source Jig ID:

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (βγ): 545454 +20% 654545 -20% 452500

Date/Time	α Bkg.	βγ Bkg.	α Reading	βγ Reading	Remarks	Initials
2 May 2005	NA	1454	NA	471597	SAT	<i>[Signature]</i>
3 MAY 2005	NA	1398	NA	490632	SAT	<i>[Signature]</i>
5/4/05	NA	1546	NA	473741	SAT	<i>[Signature]</i>
8/4/05	NA	1342		470397	SAT	<i>[Signature]</i>
5/11/05		1451		489670	SAT	<i>[Signature]</i>
10/11/05		1696/1426		473487	SAT	<i>[Signature]</i>
8/29/05 0900		1765		510399	SAT	R
9/13/05 0645		2441		504697	SAT	R
9/14/05 0700		2066		510040	SAT	R
9/14/05 1100		1997		605267	SAT	R
9/20/05 1600		2124		503125	SAT	R
9/21/05 0845		1976		506430	SAT	R
9/22/05 10:30		2295		510471	SAT	R
9/22/05 1515		2121		508388	SAT	R
9/23/05 0900		1962		509430	SAT	R
9/26/05 10:00		1834		489540	SAT	R
9/28/05 0930		2209		512606	SAT	R
9/28/05 1630		2191		509772	SAT	R
9/29/05 0900		2170		498379	SAT	R
10/3/05		1821		497887	SAT	R
10/17/05		2424		501545	SAT	R

Comments:

RSO Review: *[Signature]* Date:

Portable Instrument Response Check Sheet

Instrument: 2350 Serial No: 186175 Probe: 44-10 Serial No: 199144

Cal. Performed Date: 11-26-04 Cal. Due Date: 11-26-05

Response Check Location: MACTEC - HP

Source ID: SRS-020 Source Jig ID: MACTEC 2x2 NaI

Source Reference Reading (α): — +20% — -20% —

Source Reference Reading (βγ): 545454 +20% 654545 -20% 452504

Date/Time	α Bkg.	βγ Bkg.	α Reading	βγ Reading	Remarks	Initials
10/18/05 0650	NA	1517	NA	499586	SAT	MS
10/19/05 0645		1432		490860	SAT	MS
10/20/05 0635		1436		492036	SAT	MS
10/27/05 0945		1702		499165	SAT	R
10/28/05 0715		1330		494883	SAT	MS
10/31/05 0640		1439		505803	SAT	MS
10/31/05 1640		1387		497470	SAT	MS
11/1/05 0645		1264		491182	SAT	MS
11/1/05 1620		1194		491161	SAT	MS
11/2/05 0645		1277		491782	SAT	MS
11/2/05 0640		1298		492631	SAT	MS
4/7/05 10:00		1251		490163	SAT	R
11/8/05 0640		1274		499126	SAT	MS
11/9/05 0645		1238		494772	SAT	MS
11/10/05 0730		1357		491633	SAT	MS
11/14/05 0730		1283		471930	SAT	CA
11/18/05 0818		1748		475250	SAT	CP
11/15/05 1715		1572		467252	SAT	CP
11/16/05 0735	↓	1528	↓	461724	SAT	CP
11/16/05 1705		1276		457705	SAT	MS

Comments:

RSO Review:  Date: 3/1/06

Portable Instrument Response Check Sheet

Instrument: 2350 Serial No: 186175 Probe: 44-10 Serial No: 199144

Cal. Performed Date: 11-26-04 Cal. Due Date: 11-26-05

Response Check Location: mactec-HP

Source ID: SRS-020 Source Jig ID: mactec 2x2 NAJ

Source Reference Reading (α): +20% -20%

Source Reference Reading (β): 545454 +20% 654545 -20% 452504

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
11/21/05 1120	NA	1326	NA	482767	SAT	MS
11/22/05 0730		1196		462246	SAT	CA
Remained in same part calibration						

Comments:

RSO Review: *[Signature]* Date: 3/1/06

Portable Instrument Response Check Sheet

Instrument: L-2350 Serial No: 186175 Probe: 44-10 Serial No: PA144

Cal. Performed Date: 11/30/05 Cal. Due Date: 11/30/06

Response Check Location: HP Trailer

Source ID: SES-020 Source Jig ID: MACTEC 01

Source Reference Reading (α): — +20% — -20% —

Source Reference Reading (β): 496529 +20% 595835 -20% 397223

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
12/8/05 0725	N/A	2745	N/A	483909	SAT	CP
12/14/05 1045		1320		478691	SAT	CP
12/15/05 0740		3719		491035	SAT	CP
12/22/05 0740		186175		481020	SAT	CP
12/22/05 0740		1048		—	—	CP
1/10/06 1400		1827		499113	SAT	R
1/10/06 1620		2056		479451	SAT	R
1/16/06 1350		1850		519013	SAT	R
1/16/06 1420		2041		485511	SAT	R

Comments:

RSO Review: [Signature] Date: 3/1/06

Portable Instrument Response Check Sheet

Instrument: Ludlum 2221 Serial No: 97833 Probe: 44-10 Serial No: 0534

Cal. Performed Date: 11-9-04 Cal. Due Date: 11-9-05

Response Check Location: MacTex HP Area

Source ID: SRS-20 Source Jig ID: NAI-2

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (β): 501385 +20% 601662 -20% 401108

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
11/23 11/23/04 1100	NA	1682	NA	504394	SAT	MS
11/30/04 0628		1726		489525	SAT	MS
12-1-04 0802		1842		491295	SAT	LP
12-2-04 0628		1982		492300	SAT	MS
12-6-04 0618		1891		490017	SAT	MS
12-7-04 0628		1747		492758	SAT	MS
12-8-04 0622		1617		489675	SAT	MS
12-7-04 081200		1927		462364	SAT	MS
12-9-04 0615		1870		495462	SAT	MS
12-13-04 0610		1395		497090	SAT	MS
12-14-04 0620		1701		478544	SAT	MS
12-15-04 0625		1885		498688	SAT	MS
				492774 ^{MS}		MS
12-16-04 0612		1530		474403	SAT	MS
12-20-04 0725		¹⁵¹⁰ LP 1425		494683	SAT	LP
12-21-04 0621		1554		489959	SAT	MS
12-22-04 0628		1770		473059	SAT	MS
12-27-04 0705		1770		491507	SAT	MS
12-28-04 0615	✓	1450	✓	489534	SAT	MS

Comments:

RSO Review: 

Date: 7/7/05

Portable Instrument Response Check Sheet

Instrument: Luc/um 2221 Serial No: 97833 Probe: 44-10 Serial No: 0534

Cal. Performed Date: 11-9-04 Cal. Due Date: 11-9-05

Response Check Location: MACTec HP Area

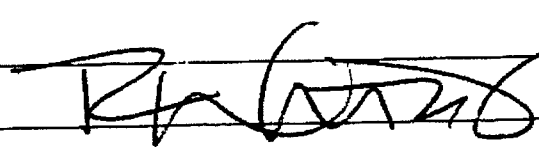
Source ID: SRS-20 Source Jig ID: NAI-2

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (β): 501385 +20% 601662 -20% 401108

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
12-29-04 0630	NA	1512	NA	489590	SAT	MS
12-30-04 0622		1569		491108	SAT	MS
1-4-05 0620		1925		496887	SAT	MS
1-5-05 0627		1774		500664	SAT	MS
1-6-05 0712		1564		493060	SAT	MS
1-7-05 0820		1453		489715	SAT	MS
1-10-05 0640		1457		483871	SAT	MS
1-11-05 0630		1795		505017	SAT	MS
1-12-05 0605		1493		496999	SAT	MS
1-13-05 0600		1489		490945	SAT	MS
1-17-05 0615		1488		492396	SAT	MS
1-18-05 0550		1543		490368	SAT	MS
1-19-05 0608		1477		485076	SAT	MS
1-20-05 0610		1460		490461	SAT	MS
1-24-05 0615		1324		493260	SAT	MS
1-25-05 0605		1425		491678	SAT	MS
1-26-05 0650		1958		507140	SAT	MS
1-27-05 0620		1817		501379	SAT	MS
1-31-05 0618	↓	1479	↓	500714	SAT	MS
2-1-05 0605		1713		494847	SAT	MS

Comments:

RSO Review:  Date: 1/7/05

Portable Instrument Response Check Sheet

Instrument: Lod 2221 Serial No: 97833 Probe: 44-10 Serial No: 0534

Cal. Performed Date: 11-9-04 Cal. Due Date: 11-9-05

Response Check Location: Mactec HP Area

Source ID: SRS-020 Source Jig ID: N/A-2

Source Reference Reading (α): N/A +20% N/A -20% N/A

Source Reference Reading (β): 501385 +20% 601662 -20% 401108

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
2-2-05 0610	NA	1478	NA	498368	SAT	MS
2-3-05 0602		1462		498862	SAT	MS
2-7-05 0605		1563		499056	SAT	MS
2-8-05 0600		1384		497731	SAT	MS
2-9-05 0630		1477		497581	SAT	MS
2-10-05 0620		1425		496272	SAT	MS
2-15-05 0705		1377		503382	SAT	MS
2-16-05 0645		1474		504486	SAT	MS
2-17-05 0645		1448		505972	SAT	MS
2-18-05 0705		1468		500807	SAT	MS
2-21-05 0647		1538		499343	SAT	MS
2-22-05 0645		1526		501417	SAT	MS
2-23-05 0625		1511		503049	SAT	MS
2-24-05 0630		1533		499901	SAT	MS
2-28-05 0645		1341		503740	SAT	MS
3-1-05 0700		1541		504195	SAT	MS
3-2-05 0635		1417		502178	SAT	MS
3-3-05 0620		1396		496553	SAT	MS
3-4-05 0730	Y	1519	Y	469504	SAT	MS

Comments:

RSO Review: [Signature] Date: 7/7/05

PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: Lud 2221 Serial No: 97833 Probe: 44-10 Serial No: 0534

Cal. Performed Date: 11-9-04 Cal. Due Date: 11-9-05

Response Check Location: MACTEC HP Acca

Source ID: SRS-020 Source Jig ID: NaI-2

Source Reference Reading (α): Na +20% Na -20% N/A

Source Reference Reading (β): 501385 +20% 601662 -20% 401108

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
3/7/05 1300	N/A	1518	N/A	496342	SAT	JT
9/11/05 0650		1540		469166	SAT	
10/11/05 0700		1620		496225	SAT	
3/11/05 1015		1476		472111	SAT	RP
3/14/05 0715		1544		467299	SAT	MP
3/15/05		1531		456437	SAT	MP
3/16/05		1720		401785	SAT	MP
3/17/05 dew		1554		487798	SAT	WD
3/18/05 0715		1531		469252	SAT	MP
3/21/05		1529		491772	SAT	NO
3/22/05		1483		498108	SAT	MP
3/23/05		1505		492204	SAT	MP
24 Mar 05 1625		1404		457479	SAT	
3/28/05 0600		1602		429387	SAT	MP
3/29/05 0415		1611		487824	SAT	MP
3/30/05 0600		1482		470393	SAT	MP
3/31/05 0600		1547		476341	SAT	MP
4/1/05		1492		489444	SAT	MP
4/4/05 dew		1554		476217	SAT	MP
4/5/05		1644		495525	SAT	MP
12 Apr 05		1624		441806	SAT	
13 Apr 05		1588		466433	SAT	

Comments:

RSO Review: 

Date: 7/7/05

PROCEDURE NO: RPP-12	REVISION NO: 0	ATTACHMENT 1 PAGE NO: 1 OF 1
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PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: L2221 Serial No: 97833 Probe: 44-10 Serial No: 0534

Cal. Performed Date: 11-9-04 Cal. Due Date: 11-9-05

Response Check Location: MACTEC HP AREA

Source ID: SRS 20 Source Jig ID: NA-I

Source Reference Reading (α): N/A +20% NA -20% NA

Source Reference Reading (β): 501385 +20% 601662 -20% 401108

Date/Time	α Bkg.	βy Bkg.	α Reading	βy Reading	Remarks	Initials
14 APR 05	NA	1796	NA	479707	SAT	[Signature]
15 APR 05	NA	1804	NA	446805	SAT	[Signature]
4/18/05	N/A	1822	N/A	474157	Sgt	TC
4/19/05	N/A	1496	N/A	483567	Sgt	[Signature]
20 APR 05	NA	1880	NA	459453	SAT	[Signature]
21 APR 05	NA	1898	NA	462472	SAT	[Signature]
4/25/05		1857		480293	SAT	[Signature]
26 APR 05		1864		460505	SAT	[Signature]
27 APR 05		1917		463599	SAT	[Signature]
28 APR 05		1832		458483	SAT	[Signature]
29 APR 05		1766		462730	SAT	[Signature]
2 MAY 05		1790		458700	SAT	[Signature]
3 MAY 2005		1792		477988	Sgt	[Signature]
4 MAY 05		1851		459792	SAT	[Signature]
5/9/05		1812		480041	SAT	[Signature]
5/10/05		1840		469742	SAT	[Signature]
12 MAY 05		1867		452001	SAT	[Signature]
5/17/05		1865		480518	Sgt	TC
5/19/05 1250		1605		493687	Sgt	TC
5/20/05		1774		466968	SAT	[Signature]
5/23/05		1601		486892	SAT	[Signature]
5/24/05		1836		489111	SAT	[Signature]

Comments:

RSO Review: [Signature]

Date: 7/7/05

PROCEDURE NO: RPP-12	REVISION NO: 0	ATTACHMENT 1 PAGE NO: 1 OF 1
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PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: Ludlum 2221 Serial No: 117651 Probe: 44-10 Serial No: 192589

Cal. Performed Date: 2/10/04 Cal. Due Date: 2/10/05

Response Check Location: Healthworks HP Office

Source ID: SRS-020 C5137 Source Jig ID: NaI-2

Source Reference Reading (α): _____ +20% _____ -20% _____

Source Reference Reading (β): 557366 +20% 668839 -20% 445893

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
8-17-04 0730	N/A	4793	N/A	576389	SAT	RC
8-18-04 0735		4563		562379	SAT	RC
8-31-04 1355		1694*		509397	SAT	RC
9-1-04 0750		1735		487757	SAT	RC
9-7-04 0730		1705		509558	SAT	RC
9-8-04 1635		1622		486406	SAT	RC
9-13-04 0745		1714		486609	SAT	RC
9-20-04 1315		1500		474656	SAT	RC
9-21-04 0650		2630		492659	SAT	MS
9-22-04 0725		1753		496411	SAT	MS
9-29-04 0815		1870		472600	SAT	RC
9-30-04 0647		1698		494300	SAT	MS
10-4-04 0645		1628		499466	SAT	MS
10-5-04 0730		1841		498703	SAT	MS
10/6/04 6725		1792		477810	SAT	MS
10/7/04 0755		1481		503807	SAT	MS
10/11/04 0645		1799		494285	SAT	MS
10/12/04 0647		1476		500112	SAT	MS
10/13/04 0655		1577		497333	SAT	MS
10/14/04 0645		1691		494007	SAT	MS
10/18/04 0615	✓	1778	↓	473139	SAT	MS

* w/shield

Comments:

RSO Review: _____

Date: _____

PROCEDURE NO: RPP-12	REVISION NO: 0	ATTACHMENT 1 PAGE NO: 1 OF 1
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Portable Instrument Response Check Sheet

Instrument: Lod 2221 Serial No: 117651 Probe: 44-10 Serial No: 192589

Cal. Performed Date: 2/10/04 Cal. Due Date: 2/10/05

Response Check Location: MacTec HP

Source ID: SRS-020 Source Jig ID: NaI-2

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (βγ): 557366 +20% 668839 -20% 445893

Date/Time	α Bkg.	βγ Bkg.	α Reading	βγ Reading	Remarks	Initials
10/19/04 0621	NA	1743	NA	498710	SAT	MS
10/20/04 0625		1938		494705	SAT	MS
10/21/04 0621		1974		497192	SAT	MJ
10/25/04 0635		1806		510739	SAT	MS
10/26/04 0620		1784		494898	SAT	MJ
10/27/04 0622		1662		493770	SAT	MS
10/28/04 0623		1777		501137	SAT	MS
11/1/04 0620		2566		504669	SAT	MS
11/2/04 0630		1633		489708	SAT	MJ
11/3/04 0620		1705		501897	SAT	MS
11/4/04 0630		1528		452223	SAT	MS
11/8/04 0628		1506		452163	SAT	MS
11/9/04 0620		1857		489208	SAT	MS
11/10/04 0620		1706		497011	SAT	MS
11/11/04 0615		1431		506316	SAT	LP MS
11/12/04 0750		1278		483724	SAT	RC
11/15/04 0620		1757		507108	SAT	MJ
11/16/04 0620		1872		504545	SAT	MS
11/17/04 0620		1637		501335	SAT	MS
11/18/04 0620		1835		499701	SAT	MS
11/23/04 0678	↓	1669	↓	507369	SAT	MS

Comments:

RSO Review: 

Date:

Portable Instrument Response Check Sheet

Instrument: Lud 2221 Serial No: 117651 Probe: 44-10 Serial No: 192589

Cal. Performed Date: 2-10-04 Cal. Due Date: 2-10-05

Response Check Location: Mactec HP

Source ID: SRS-020 Source Jig ID: NaI-2

Source Reference Reading (α): NIA +20% NIA -20% NIA

Source Reference Reading (β): 557366 +20% 668839 -20% 445893

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
11/24/04 0618	NIA	1660	NA	499198	Sgt	MS
11/29/04 0620		1550		507651	Sgt	MS
11/30/04 0618		1546		498949	Sgt	MS
12-1-04 0800		1628		497945	Sgt	LP
12-2-04 0625		2053		497521	Sgt	MS
12-6-04 0605		1751		500343	Sgt	MS
12-7-04 0625		1706		500197	Sgt	MS
12-8-04 0630		2099		495146	Sgt	MS
12-9-04 0618		1840		496135	Sgt	MS
12-13-04 0615		1668		499688	Sgt	MS
12-14-04 0618		1797		480492	Sgt	MS
12-15-04 0625		1933		492774	Sgt	MS
12-16-04 0622		1744		480881	Sgt	MS
12-20-04 0727		1425		500835	Sgt	LP
12-21-04 0625		1754		491174	Sgt	MS
12-27-04 0626		1747		491041	Sgt	MS
12-28-04 0625		1723		497523	Sgt	MS
12-29-04 0627		1645		492978	Sgt	MS
12-30-04 0616		1526		490648	Sgt	MS

Comments:

RSO Review: 

Date: _____

Procedure RPP-12	Revision No: 1	Attachment 1 Page 1 of 1
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Portable Instrument Response Check Sheet

Instrument: Lod 2221 Serial No: 117651 Probe: 44-10 Serial No: 192589

Cal. Performed Date: 2-10-09 / 1/9/04 Cal. Due Date: 2-10-05 / 1-19-05

Response Check Location: Mactec HP area

Source ID: SKS-020 Source Jig ID: NGI-2

Source Reference Reading (α): NA +20% NA -20% NA

Source Reference Reading (β): 557366 +20% 668839 -20% 445893

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
1-4-05 0620	NA	2094	NA	499112	SAT	MS
1-5-05 0625		1762		499464	SAT	MS
1-7-05 0825		1511		488182	SAT	MS
1-10-05 0645		1405		485438	SAT	MS
1-11-05 0627		1494		498777	SAT	MS
1-12-05 0620		1884		499523	SAT	MS
1-13-05 0612		1487		489113	SAT	MS
1-17-05 0620		1511		490054	SAT	MS
1-18-05 0605		1542		485584	SAT	MS
1-19-05 0615		1351		482875	SAT	MS

Comments: Rental unit returned to vendor per

RSO Review: [Signature] Date: _____

Portable Instrument Response Check Sheet

Instrument: Ludlum 2224 Serial No: 190224 Probe: 43-93 Serial No: 215615

Cal. Performed Date: 4 aug 04 Cal. Due Date: 4 aug 05

Response Check Location: Mactec HP Area

Source ID: SRS-031 Source Jig ID: NA

Source Reference Reading (α): 2543 +20% 3051 -20% 2034

Source Reference Reading (β): 371 +20% 446 -20% 297

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
8/17/04 0630	1	86	2577	363	Sat	MS
8/18/04 0636	0	106	2706	370	Sat	MS
8/19/04 0650	0	114	2413	330	Sat	MS
8/23/04 0637	0	121	2506	403	Sat	MS
8/24/04 0645	0	101	2461	340	Sat	MS
8/25/04 0635	0	118	2450	398	Sat	MS
8/26/04 0720	2	108	2371	351	Sat	MS
8/30/04 0641	0	103	2373	407	Sat	MS
8/31/04 0637	0	112	2556	377	Sat	MS
9/1/04 0635	1	121	2427	376	Sat	MS
9/7/04 0638	1	107	2364	388	Sat	MS
9/8/04 0635	1	101	2395	377	Sat	MS
9/9/04 0645	2	104	2480	363	Sat	MS
9/13/04 0637	0	114	2264	379	Sat	MS
9/14/04 0640	0	116	2551	376	Sat	MS
9/15/04 0640	0	117	2294	381	Sat	MS
9/16/04 0647	2	101	2430	370	Sat	MS
9/20/04 0652	1	89	2390	368	Sat	MS
9/21/04 0635	2	119	2542	350	Sat	MS
9/22/04 0645	1	111	2471	378	Sat	MS
9/23/04 0640	1	111	2362	361	Sat	MS

Comments:

RSO Review: 

Date: 7/1/05

Portable Instrument Response Check Sheet

Instrument: LUOLUM 2224 Serial No: 190 224 Probe: 43-93 Serial No: 215615

Cal. Performed Date: 4 AUG 04 Cal. Due Date: 4 AUG 05

Response Check Location: MACTEC HP AREA

Source ID: SRS 031 Source Jig ID: N/A

Source Reference Reading (α): 2543 +20% 3051 -20% 2034

Source Reference Reading (β): ~~374~~ 371 +20% 446 -20% 297

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
9-27-04 0720	0	98	2608	350	SAT	RL
9-28-04 0640	0	98	2373	337	SAT	MS
9-29-04 0640	1	117	2357	353	SAT	MS
9-30-04 0643	0	111	2312	367	SAT	MS
10-1-04 0647	2	79	2366	362	SAT	MS
10-5-04 0715	0	98	2175	371	SAT	MS
10/6/04 0642	1	97	2360	386	SAT	MS
10/7/04 0755	1	80	2307	368	SAT	MS
10/11/04 0642	0	107	2443	329	SAT	MS
10/12/04 0650	2	109	2384	322	SAT	MS
10/13/04 0645	1	89	2339	350	SAT	MS
10/14/04 0645	1	115	2300	337	SAT	MS
10/18/04 0608	1	100	2330	315	SAT	MS
10/19/04 0618	0	98	2255	363	SAT	MS
10/20/04 0623	0	110	2351	333	SAT	MS
10/21/04 0620	1	116	2166	313	SAT	MS
10/25/04 0623	1	70	1962	301	SAT	MS
10/26/04 0630	1	125	2219	341	SAT	MS
10/27/04 0620	0	102	2149	327	SAT	MS
10/28/04 0620	1	106	2313	367	SAT	MS
11/1/04 0678	1	104	2138	348	SAT	MS

Comments:

RSO Review: 

Date: 7/7/05

Portable Instrument Response Check Sheet

Instrument: Ludlum 2224 Serial No: 190224 Probe: 43-93 Serial No: 215615

Cal. Performed Date: 4 Aug 04 Cal. Due Date: 4 Aug 05

Response Check Location: Mactec HP Area

Source ID: SRS-031 Source Jig ID: NA

Source Reference Reading (α): 2543 +20% 3051 -20% 2034

Source Reference Reading (β): 371 +20% 446 -20% 297

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
11/2/04 0630	0	107	2155	373	Sgt	MS
11/2/04 0625	3	132	2241	363	Sgt	MS
11/4/04 0628	0	100	2234	365	Sgt	MS
11/8/04 0623	0	112	2072	335	Sgt	MS
11/9/04 0618	0	129	1980	372	fail	MS
11/9/04 0635	0	125	2105	344	Sgt	MS
11/10/04 0618	0	106	2107	315	Sgt	MS
11/11/04 0618	3	108	2559	336	Sgt	MS
11/15/04 0618	1	99	2196	315	Sgt	MS
11/16/04 0617	1	122	2135	351	Sgt	MS
11/17/04 0617	1	97	2313	336	Sgt	MS
11/18/04 0610	5	105	2149	374	Sgt	MS
11/22/04 0620	8	125	2207	318	Sgt	MS
11/23/04 0628	1	110	2228	341	Sgt	MS
11/24/04 0623	1	96	2186	333	Sgt	MS
11/29/04 0623	0	93	2169	344	Sgt	MS
11/30/04 0623	0	95	2104	314	Sgt	MS
12/1/04 0615	1	113	2179	317	Sgt	MS
12-2-04 0623	4	104	2181	324	Sgt	MS
12-6-04 0615	0	86	2202	319	Sgt	MS
12-6-04 1345	3	107	2126	448	Sgt	MS

Comments:

RSO Review: 

Date: 7/7/05

Portable Instrument Response Check Sheet

Instrument: Lod 2224 Serial No: 190224 Probe: 43-93 Serial No: 215615

Cal. Performed Date: 8-4-04 Cal. Due Date: 8-4-05

Response Check Location: Mactec HP Area

Source ID: SRS-031 Source Jig ID: NA

Source Reference Reading (α): 2543 +20% 3051 -20% 2034

Source Reference Reading (β): 371 +20% 446 -20% 297

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
12-7-04 0628	0	97	2074	298	Sat	MS
12-8-04 0620	0	92	2176	315	SAT	MS
12-7-04 0623	2	137	2096	337	SAT	MS
12-9-04 0620	0	96	2167	308	SAT	MS
12-13-04 0618	0	110	2289	324	SAT	MS
12-14-04 0625	1	102	2227	298	SAT	MS
12-15-04 0620	0	78	2074	301	SAT	MS
12-16-04 0620	1	59	2257	309	SAT	MS
12-26-04 0755	1	102	2383	354	Sat	LD
12-21-04 0619	1	95	2152	306	SAT	MS
12-22-04 0615	1	101	2345	315	SAT	MS
12-27-04 0615	0	96	2422	317	SAT	MS
12-28-04 0615	3	113	2585	301	SAT	MS
12-29-04 0625	1	126	2254	314	SAT	MS
12-30-04 0645	2	101	2106	315	SAT	MS
1-4-05 0640	2	72	2153	320	SAT	MS
1-5-05 0629	1	91	2051	309	SAT	MS
1-6-05 0700	2	87	2086	299	SAT	MS
1-7-05 1005	1	74	2051	300	SAT	MS

Comments:

RSO Review: 

Date: 7/7/05

Procedure RPP-12

Revision No: 1

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Portable Instrument Response Check Sheet

Instrument: Lud 2224 Serial No: 190224 Probe: 43-93 Serial No: 215615

Cal. Performed Date: 8-4-04 Cal. Due Date: 8-4-05

Response Check Location: SRS-031^{ms} HP Area

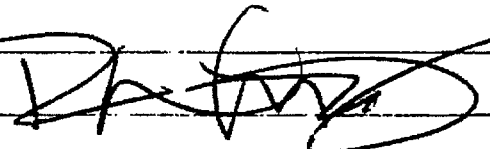
Source ID: SRS-031 Source Jig ID: NA

Source Reference Reading (a): 2543 +20% 3051 -20% 2034

Source Reference Reading (By): 371 +20% 446 -20% 297

Date/Time	a Bkg.	By Bkg.	a Reading	By Reading	Remarks	Initials
1-10-05 0622	2	79	2140	304	SAT	MS
1-11-05 0620	1	77	2131	325	SAT	MS
1-12-05 0625	2	76	2237	315	SAT	MS
1-13-05 0601	2	85	2087	300	SAT	MS
1-17-05 0620	0	78	2081	319	SAT	MS
1-18-05 0608	1	94	2249	314	SAT	MS
1-19-05 0558	0	94	2042	338	SAT	MS
1-20-05 0612	0	86	2141	335	SAT	MS
1-24-05 0610	2	105	2256	321	SAT	MS
1-25-05 0612	2	98	2086	322	SAT	MS
1-26-05 0630	0	87	2047	312	SAT	MS
1-27-05 0620	0	108	2036	306	SAT	MS
1-31-05 0612	2	71	2096	323	SAT	MS
2-1-05 0655	1	114	2057	301	SAT	MS
2-2-05 0610	1	97	2045	311	SAT	MS
2-3-05 0607	1	108	2164	361	SAT	MS
2-8-05 0605	1	109	2106	356	SAT	MS
2-9-05 0615	0	246	2120	440	SAT	MS
2-10-05 0610	1	111	2370	356	SAT	MS

Comments:

RSO Review:  Date: 7/7/05

Portable Instrument Response Check Sheet

Instrument: L-2224 Serial No: 190224 Probe: 43-93 Serial No: 215615

Cal. Performed Date: 8-4-04 Cal. Due Date: 8-4-05

Response Check Location: Health Works

Source ID: SRS-031 Source Jig ID: N/A

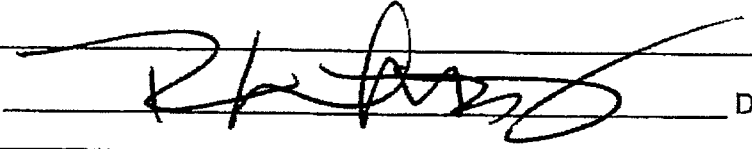
Source Reference Reading (α): 2543 +20% 3051 -20% 2034

Source Reference Reading (βγ): 371 +20% 446 -20% 297

Date/Time	α Bkg.	βγ Bkg.	α Reading	βγ Reading	Remarks	Initials
2-14-05 0645	0	85	2286	348	Sat	JK
2-15-05 0620	3	127	2106	350	Sat	JK
2-16-05 0630	1	111	2244	351	Sat	comp
2-17-05 0630	1	97	2115	326	Sat	comp
2-18-05 0705	1	119	2168	359	Sat	comp
2-21-05 0630	1	104	2168	362	Sat	comp
2-22-05 0635	0	110	2119	355	Sat	comp
2-23-05 0620	2	96	2666	368	Sat	comp
2-24-05 0615	2	97	2241	370	Sat	comp
2-28-05 0625	0	111	2399	326	Sat	comp
3-1-05 0650	1	107	2269	376	Sat	comp
3-2-05 0635	1	108	2251	370	Sat	comp
3/7/05 0700	1	106	1600	308	UNSAT	MP
3/3/05 0830	0	92	2347	301	UN/SAT/Account	MP
3/3/05 1030	2	104	2095 2095	380	SAT	MP
9/1/05 0850	0	133	2054	1391	SAT	MP

Sc# 8132

Comments:

RSO Review:  Date: 7/7/05

PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: Lud 2224 Serial No: 183077 Probe: 43-89 Serial No: 212561

Cal. Performed Date: 6/29/04 Cal. Due Date: 6/29/05

Response Check Location: HP MAC Tech

Source ID: SRS-32/SRS-08 Source Jig ID: NA

Source Reference Reading (α): 2224 +20% 2669 -20% 1780

Source Reference Reading (β): 1642 +20% 1970 -20% 1313

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
3/21/05	3	241	2347	1558	SAT	MD
3/22/05 0600	0	121	2425	1586	SAT	MD
24 Mar 05 0620	0	137	2449	1847	SAT	MD
3/28/05 0600	0	128	2536	1780	SAT	MD
3/29/05 0615	1	93	2391	1607	SAT	MD
3/30/05 0600	1	123	2309	1727	SAT	MD
3/31/05 0600	0	131	2123	1483	SAT	MD
4/1/05 0600	1	110	2048	1498	SAT	MD
4/4/05 0600	0	121	2176	1534	SAT	MD
4/5/05 0600	0	118	1961	1684	SAT	MD
6 APR 05	2	111	1937	1844	SAT	MD
7 APR 05	1	116	2469	1756	SAT	MD
4/12/05 0700	1	153	1938	1548	SAT	MD
13 APR 05	0	107	1907	1666	SAT	MD
14 APR 05	1	121	1809	1824	SAT	MD
15 APR 05	1	112	1855	1483	SAT	MD
16 APR 05	3	121	2550	1620	SAT	MD
4/18/05	0	102	1971	1701	SAT	MD
4/19/05	2	118	2585	1477	SAT	MD
20 APR 05	0	134	2262	1875	SAT	MD
21 APR 05	0	106	2249	1697	SAT	MD

~~22 APR 05~~ 1 5-22-05

Comments:

RSO Review: [Signature] Date: _____

PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: END 2224 Serial No: 183077 Probe: 43-89 Serial No: 212501

Cal. Performed Date: 6/29/09 Cal. Due Date: 6/29/05

Response Check Location: A.P. Mac Tech

Source ID: RS-32/SNS-08 Source Jig ID: NA

Source Reference Reading (α): 2224 +20% 2669 -20% 1780

Source Reference Reading (β): 1642 +20% 1970 -20% 1313

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
4/22/05 0730	1	120	2531 2510	1376	SAT	SUR
4/25/05 0600	1	100	2575	1661	SAT	VP
4/26/05 0700	4	132	2541	1442	SAT	AG
27 APR 05	4	129	2345	1658	SAT	AG
28 APR 05	3	126	2325	1577	SAT	AG
30 APR 05	2	121	2410	1580	SAT	AG
2 MAY 2005	0	118	2224	1781	SAT	AG
3 MAY 2005	3	127	2562	1698	SAT	AG
5/4/05	0	111	2366	1394	SAT	MS
5/5/05	0	121	2350	1498	SAT	MS
5/9/05	1	84	2434	1690	SAT	VP
5/10/05	1	98	2326	1549	SAT	VP
5/17/05	1	75	2182	1433	SAT	MS
5/18/05	2	78	2433	1696	SAT	VP
5/23/05	2	73	2259	1695	SAT	MS
5/24/05	1	87	2274	1549	SAT	MS
5/25/05 0655	1	105	2298	1503	SAT	MS
5/26/05 0645	2	93	2410	1856	SAT	MS
5/31/05 0650	0	78	2295	1759	SAT	MS
6/1/05 0645	2	98	2245	1723	SAT	MS
6/2/05 0650	0	100	2504	1360	SAT	VP

Comments:

RSO Review: [Signature] Date: _____

PROCEDURE NO: RPP-12	JAN 12 2006 REVISION NO: 0	ATTACHMENT 1 PAGE NO: 1 OF 1
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PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: Lud 2224 Serial No: 183077 Probe: 43-89 Serial No: 212501

Cal. Performed Date: 6/24/04 Cal. Due Date: 6/24/05

Response Check Location: Mactec HP Area

Source ID: SRS-008 ~~SRS~~ SRS-032 Source Jig ID: NA

Source Reference Reading (α): 2224 +20% 2669 -20% 1780

Source Reference Reading (β): 1642 +20% 1970 -20% 1313

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
6/6/05 0715	2	128	2511	1356	SAT	MS
6/7/05 0650	2	87	2257	1705	SAT	MS
6/8/05 0615	1	110	2339	1645	SAT	MS
6/9/05 0655	2	108	2305	1479	SAT	MS
6/10/05 0645	2	100	2279	1589	SAT	MS
6/13/05 0705	3	127	2381	1675	SAT	MS
6/14/05 0705	3	95	2509	1599	SAT	MS
6/15/05 0645	0	90	2124	1407	SAT	MS
6/16/05 0650	2	102	2353	1583	SAT	MS
6/20/05 0645	2	108	2051	1474	SAT	MS
6/21/05 0610	2	96	2223	1518	SAT	MS
6/22/05 0810	0	82	2291	1428	SAT	MS
6/27/05 0615	0	98	2204	1644	SAT	MS
6/28/05 1315	0	101	2316	1593	SAT	MS
Pulled for Routine Cal						
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Comments:

RSO Review: [Signature]

Date:

PROCEDURE NO: RPP-12	JAN 12 2006	REVISION NO: 0	ATTACHMENT 1
			PAGE NO: 1 OF 1

PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: L-2224 Serial No: 193077 Probe: 43-93 Serial No: 212501

Cal. Performed Date: 8/22/05 Cal. Due Date: 8/11/06

Response Check Location: HP TRAILER

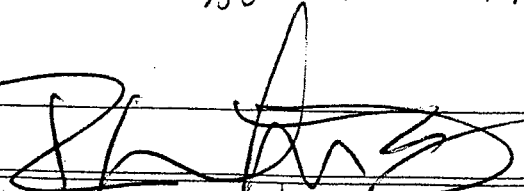
Source ID: B 525032/525008 Source Jig ID: None

Source Reference Reading (α): 2428 +20% 2914 -20% 1943

Source Reference Reading (βγ): 1875 +20% 2250 -20% 1500

Date/Time	α Bkg.	βγ Bkg.	α Reading	βγ Reading	Remarks	Initials
8/23/05 0915	2	173	2546	1696	SAT	R
9/24/05 0920	0	174	2269	1763	SAT	R
9/29/05 0720	1	177 ^R	2204	1843	SAT	R
9/30/05 0920	0	170	2220	1932	SAT	R
10/3/05 0715	2	165	2319	1759	SAT	R
10/3/05 1625	1	145	2233	1638	SAT	MS
10/4/05 0730	2	142	2293	1741	SAT	MS
10/4/05 1625	1	147	2279	1638	SAT	MS
10/5/05 0640	2	147	2309	1691	SAT	MS
10/5/05 1635	2	135	2366	1653	SAT	MS
10/6/05 0610	0	135	2185	1662	SAT	MS
10/6/05 0610	0	160	2025	1737	SAT	MS
10/11/05 0600	0	153	2328	1652	SAT	MS
10/12/05 0620	1	138	2032	1600	SAT	MS
10/12/05 0615	0	152	2043	1547	SAT	MS
10/17/05 0600	4	147	2115	1705	SAT	MS
10/18/05 0625	0	149	2204	1725	SAT	MS
10/19/05 0635	1	136	2234	1630	SAT	MS
10/20/05 0645	0	132	2311	1645	SAT	MS
10/24/05 0630	0	163	2101	1692	SAT	MS
10/24/05 0635	2	117	2084	1683	SAT	MS
11/1/05 0635	0	150	2151	1733	SAT	MS

Comments:

RSO Review: 

Date: 3/7/04

PROCEDURE NO: RPP-12	REVISION NO: 0	ATTACHMENT 1 PAGE NO: 1 OF 1
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Portable Instrument Response Check Sheet

Instrument: L 2224 Serial No: 183077 Probe: 43-93 Serial No: 212501

Cal. Performed Date: 8-22-05 Cal. Due Date: 8-11-06

Response Check Location: HP Trailer

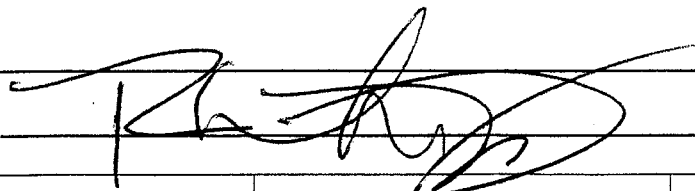
Source ID: SRS 032/SRS 008 Source Jig ID: None

Source Reference Reading (α): 2428 +20% 2914 -20% 1943

Source Reference Reading (β): 1875 +20% 2250 -20% 1500

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
11/2/05 0635	1	141	2258	1687	SAT	MS
11/3/05 0635	2	138	2297	1632	SAT	MS
11/8/05 0635	1	151	2296	1755	SAT	MS
11/9/05 0635	1	144	2079	1770	SAT	MS
11/22/05 0745	1	158	2209	1743	SAT	CP
11/28/05 0730	0	106	2171	1759	SAT	MS
11/29/05 0715	2	128	2269	1790	SAT	MS
11/30/05 0750	0	118	2215	1682	SAT	CP
12/1/05 0705	0	140	2155	1719	SAT	MS
12/5/05 0700	1	151	2200	1649	SAT	MS
12/12/05 0830	0	131	2229	1646	SAT	MS
12/19/05 0720	1	155	2584	1658	SAT	CP
12/20/05 0735	0	130	2281	1751	SAT	MS
12/21/05 0745	0	129	2240	1797	SAT	MS
12/22/05 0740	1	141	2289	1770	SAT	MS
12/30/05 0915	0	134	2359	1710	SAT	R
1/4/06 1330	1	147	2183	1661	SAT	R

Comments:

RSO Review:  Date: 3/7/06

Portable Instrument Response Check Sheet

Instrument: Ludlum 2224 Serial No: 1830741 Probe: 43-89 Serial No: 193028

Cal. Performed Date: 10/6/04 Cal. Due Date: 10/6/05

Response Check Location: MACTEC HP

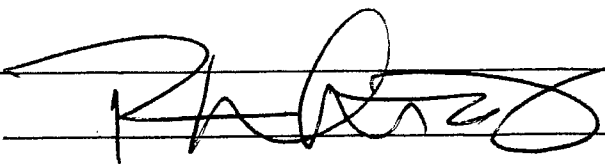
Source ID: SRS 008A, SRS 032 B Source Jig ID: NONE

Source Reference Reading (α): 1805 +20% 2166 -20% 1444

Source Reference Reading (β): 1128 +20% 1354 -20% 902

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
12-15-04 0623	1	115	1904	1127	SAT	MS
12-16-04 0700	1	109	1875	1152	SAT	MS
12-20-04 0736	0	109	1903	1253	SAT	LP
12-21-04 0647	4	123	1930	1200	SAT	MS
12-22-04 0630	5	132	1868	1162	SAT	MS
12-27-04 0755	1	102	1980	1125	SAT	MS
12-28-04 0620	4	137	1898	1325	SAT	MS
12-29-04 0640	2	113	1874	1129	SAT	MS
12-30-04 0629	1	127	1878	1262	SAT	MS
1-4-05 0645	3	102	1780	1118	SAT	MS
1-5-05 0650	0	119	1971	1041	SAT	MS
1-6-05 0740	0	119	1953	1094	SAT	MS
1-10-05 0628	4	114	2068	1067	SAT	MS
1-11-05 1005	0	94	1849	1179	SAT	MS
1-12-05 0627	0	95	2008	1175	SAT	MS
1-13-05 0615	2	115	1969	1174	SAT	MS
1-17-05 0640	1	103	1806	1155	SAT	MS
1-18-05 0610	1	96	1848	1130	SAT	MS
1-20-05 0621	0	91	1994	1139	SAT	MS

Comments:

RSO Review:  Date: 3/7/05

Portable Instrument Response Check Sheet

Instrument: Lud 2224 Serial No: 183074 Probe: 43-89 Serial No: 193028

Cal. Performed Date: 10/6/04 Cal. Due Date: 10/6/05

Response Check Location: HP AREA

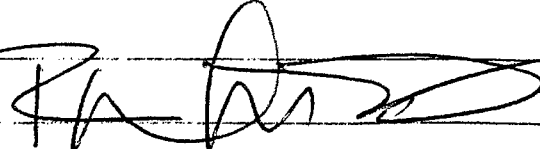
Source ID: SRS-008α/SRS-032D Source Jig ID: None

Source Reference Reading (α): 1805 +20% 2166 -20% 1444

Source Reference Reading (β): 1128 +20% 1354 -20% 902

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
1-24-05 0630	1	117	1688	1080	Sgt	MS
1-25-05 0620	1	104	1949	1318	Sgt	MS
1-26-05 0645	1	104	1872	1080	Sgt	MS
1-27-05 0625	1	91	2074	1167	Sgt	MS
1-31-05 0615	1	108	1870	1145	Sgt	MS
2-1-05 0615	1	181	1913	1263	Sgt	MS
2-2-05 0615	1	176	1806	1161	Sgt	MS
2-3-05 0612	1	124	1974	1101	Sgt	MS
2-7-05 0618	2	79	1791	1199	Sgt	MS
2-8-05 0620	0	102	1662	1037	Sgt	MS
2-9-05 0625	0	120	1701	1172	Sgt	MS
2-14-05 0645	0	108	1713	974	Sgt	MS
2-15-05 0620	0	104	1575	1059	Sgt	MS
2-16-05 0620	0	110	1955	1071	Sgt	MS
2-17-05 0630	1	109	1714	1043	Sgt	MS
2-18-05 0705	0	93	1737	1189	Sgt	MS
2-21-05 0645	1	105	1763	1092	Sgt	MS
2-22-05 0615	0	111	1752	1073	Sgt	MS
2-23-05 0615	0	103	1747	1065	Sgt	MS

Comments:

RSO Review:  Date: 3/7/06

Portable Instrument Response Check Sheet

Instrument: Lud 2224 Serial No: 183074 Probe: 43-89 Serial No: 193028

Cal. Performed Date: 10/6/04 Cal. Due Date: 10/6/05

Response Check Location: HP Area

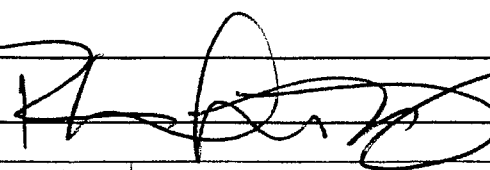
Source ID: SRS-006α/srs-032β Source Jig ID: N/A

Source Reference Reading (α): 1805 +20% 2166 -20% 1444

Source Reference Reading (β): 1128 +20% 1354 -20% 902

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
2.24.05	0	89	1629	1244	SAT	anf
3.2.05 0630	0	87	1675	1308	SAT	anf
3/3/05	1	186	1648	1082	SAT	anf
7 Mar 2005 0700	2	106	1915	1043	SAT	anf
8 Mar 2005 0650	1	96	1836	927	SAT	anf
9 Mar 2005 0700	0	125	1486	961	SAT	anf
3-15-05	2	174	1631	912	SAT	anf
3-15-05 0700	2	122	1432	923	SAT	anf
3/16/05 α α	1	126	1744	988	SAT	anf
3/17/05	0	138	1706	961	SAT	anf
3/22/05 1100			1645	1111	SAT	anf
4/8/05	0	108	1890	1177	SAT	anf
4/11/05 0600	1	103	1878	1073	SAT	anf
4/14/05 α α	1	92	1675	940	SAT	anf
13 Apr 05	1	88	1719	914	SAT	anf
14 Apr 05	0	97	1799	929	SAT	anf
15 Apr 05	0	119	1823	1041	SAT	anf
4/18/05	102	230				anf
26 Apr 05	0	122	1853	1054	SAT	anf
27 Apr 05	0	106	1883	995	SAT	anf

Comments:

RSO Review:  Date: 3/7/06

PORTABLE INSTRUMENT RESPONSE CHECK SHEET

Instrument: L-2224 Serial No: 183074 Probe: 43-89 Serial No: 193028

Cal. Performed Date: 10/6/04 Cal. Due Date: 10/6/05

Response Check Location: MACTEC HP

Source ID: SRS0086/SRS032 B Source Jig ID: N/A

Source Reference Reading (α): 1805 +20% 2166 -20% 1444

Source Reference Reading (β): 1128 +20% 1354 -20% 902

Date/Time	α Bkg.	β Bkg.	α Reading	β Reading	Remarks	Initials
<u>26 APR 05</u>	<u>1X</u>	<u>104</u>	<u>1779</u>	<u>987</u>	<u>SAT</u>	
<u>3 MAY 2005</u>	<u>1</u>	<u>114</u>	<u>1826</u>	<u>1133</u>	<u>SAT</u>	<u>MS</u>
<u>4 MAY 2005</u>	<u>0</u>	<u>92</u>	<u>1878</u>	<u>1004</u>	<u>SAT</u>	<u>MS</u>
<u>5 MAY 2005</u>	<u>0</u>	<u>93</u>	<u>1809</u>	<u>1057</u>	<u>SAT</u>	<u>MS</u>
<u>5/9/05</u>	<u>0</u>	<u>94</u>	<u>1827</u>	<u>1073</u>	<u>SAT</u>	<u>MS</u>
<u>5/10/05</u>	<u>0</u>	<u>119</u>	<u>1792</u>	<u>1075</u>	<u>SAT</u>	<u>MS</u>
<u>12 MAY 05</u>	<u>1</u>	<u>106</u>	<u>1912</u>	<u>1070</u>	<u>SAT</u>	<u>MS</u>
<u>5/17/05 1430</u>	<u>1</u>	<u>109</u>	<u>1849</u>	<u>1004</u>	<u>SAT</u>	<u>MS</u>
<u>5/20/05</u>	<u>1</u>	<u>102</u>	<u>1964</u>	<u>1147</u>	<u>SAT</u>	<u>MS</u>
<u>6/8/05 10:30</u>	<u>1</u>	<u>130</u>	<u>1951</u>	<u>1104</u>	<u>SAT</u>	<u>R</u>
<u>6/9/05 0900</u>	<u>1</u>	<u>131</u>	<u>1994</u>	<u>1184</u>	<u>SAT</u>	<u>R</u>
<u>8/4/05 1400</u>	<u>0</u>	<u>378</u>	<u>1874</u>	<u>1300</u>	<u>SAT</u>	<u>R</u>
<u>8/11/05 0710</u>	<u>0</u>	<u>129</u>	<u>1866</u>	<u>1073</u>	<u>SAT</u>	<u>PC</u>
<u>8/14/05</u>						<u>PC</u>

Comments:

RSO Review: 

Date: 3/7/06

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