

Duratek



Bristol-Myers Squibb
Former Radiopharmaceutical
Production Facility
Final Status Survey Report
Instrument Calibration and
Source Check Data



APPENDIX B
BOOK 3 of 4
September 2003

BOOK 2 of 4

APPENDIX B
BRISTOL-MYERS SQUIBB
FORMER RADIOPHARMACEUTICAL PRODUCTION FACILITY
FINAL STATUS SURVEY
Instrument Calibration and Source Check Data

for the

Bristol-Myers Squibb
Former Radiopharmaceutical Production Facility
Characterization Report

REVISION 0
SEPTEMBER 2003

Prepared By:
Duratek, Inc.
Commercial Services
1009 Commerce Park Drive
Oak Ridge, TN 37830

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CALIBRATION CERTIFICATE

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


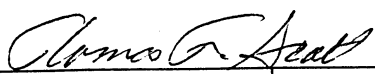
This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			INSTRUMENT INFORMATION	
Customer Name: GTS Duratek - Instrument Services Facility			Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763			Model: 2350-1	Serial Number: 120633
Contact Name: Thomas Scott			Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434	Calibration Method: Electronic and Source	
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	
400K	400,000	400,374	400,374	Pulser: 120935 Cal Due: 03/18/03
40K	40,000	40,055	40,055	D-814: 2525 Cal Due: 02/18/03
4K	4,000	4,004	4,004	Psychron: 7480 Cal Due: 05/17/03
400	400	400	400	EPPROM Version: 37122N28
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	
600	600	603	603	Temp: 22.8°C
1,200	1,200	1,196	1,196	Pressure: 749 mmHg
1,800	1,800	1,786	1,786	Humidity: 29 %
Parameter	Tolerance (±10%)	As Found	As Left	
Low End Threshold	4 ± (3.6 to 4.4) mVDC	4.28	4.28	Geotropism: SAT ACK/Scroll: SAT
Midpoint Threshold	20 ± (18 to 22) mVDC	19.9	19.9	BAT>4.5: SAT Volume: SAT
High End Threshold	40 ± (36 to 44) mVDC	39	39	Count: SAT Audio Divide: SAT
Window Width	4 ± (3.6 to 4.6) mVDC	4	4	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 4 mV			Overload Test: SAT
STATEMENT OF CERTIFICATION				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument				
Calibrated By:		Reviewed By:		Date: 12-31-02
Calibration Date: 12/27/02			Calibration Due: 06/27/03	

**DETECTOR
CERTIFICATE**

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

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

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68B			
Contact Name: Thomas Scott				Serial Number: 092522			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: C ¹⁴		Serial Number: 019708		Activity (dpm) : 26,640		Certification Date: 11/20/96	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)		
Count 1	N/A	4,250	Count 1(Heel)		4,178		
Count 2	N/A	4,104	Count 2(Center)		4,144		
Count 3	N/A	4,038	Count 3(Toe)		3,842		
Average	N/A	4,130.7	Average		4,054.7		
Background (cpm)	N/A	262.3	Pass/Fail		PASS		
Net Counts	N/A	3,868.4			Tolerance $\pm 10\%$		
Efficiency	N/A	14.5%			Min: 3,649.2	Max: 4,460.1	
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.1E ⁻⁶		Calibration Constant (CC): 1.0	
SCALER INFORMATION				DETECTOR INFORMATION			
Model	Serial Number		Due Date	Background (cpm)	Operating Voltage	Threshold	
2350-1	120633		06/27/03	262.3	1850	4 mV	
Detector Setup Report YES <input checked="" type="checkbox"/> NO			Barcode Report YES <input checked="" type="checkbox"/> NO		Voltage Plateau YES <input checked="" type="checkbox"/> NO		
COMMENTS							
No As Finds Taken due to broken anode wire **Calibrated with 25Ft. Cable**				Detector has one layer mylar at .4mg/cm ² Caled in accordance with RP-INS-I-245.			
10 minute background performed Efficiency determined w/43-68 source jig Dead Time set to manufacturer's suggested setting							
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: 		Date: 12-31-02			
Certification Date: 12/27/02				Certification Due: 06/27/03			

BACKGROUND PLATEAU 43-68 #092522 25FT CABLE 12/27/02

900	0
950	0
1000	0
1050	0
1100	0
1150	1
1200	0
1250	0
1300	1
1350	0
1400	2
1450	5
1500	5
1550	2
1600	14
1650	27
1700	55
1750	106
1800	183
1850	291
1900	384
1950	469

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	0
1100	0
1150	67
1200	1307
1250	2803
1300	3657
1350	3908
1400	4297
1450	4352
1500	4194

BETA PLATEAU C14 #019708 26,640DPM

1400	1
1450	1
1500	3
1550	8
1600	245
1650	1040
1700	2046
1750	3070
1800	3813
1850	4113
1900	4444
1950	5118

*Thomas G. Scott**12-31-02*

DETECTOR SETUP CHECK LIST REPORT

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

Today's date is 12/31/2002.

The current time of day is: 13:39:57.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE: M

Comments:

Model 2350 Serial # =	120633.
User I.D. =	
High Voltage =	1850 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.210000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68B.
Detector Serial # =	092522.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.0 volts.

DET2

Generated: 12/31/2002 13:58:05.

Model 2350 Serial #120633



H1850\$R
Set High Voltage: 1850



T100\$Q
Set Threshold: 100



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



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



F60\$H
Set Scaler Count Time: 60



SU7\$I
Set Readout Units = counts



SB1\$-
Set Readout Time Base = min



SM0\$3
Set Readout Range Multiplier = auto



SL2.210000E-05\$D
Set Dead Time: 2.210000E-05



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



M43-68B\$0
Set Detector Model: 43-68B



N092522\$\$
Set Detector Serial #: 092522



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



K1000000\$H
Set Scaler Alarm: 1000000



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



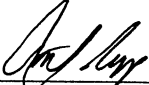

SP2\$8
SAVE PARAMETERS AS D2



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

**DETECTOR
CERTIFICATE**

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

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68A			
Contact Name: Thomas Scott				Serial Number: 092522			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Th ²³⁰		Serial Number: 119738		Activity (dpm) : 18,600		Certification Date: 10/20/97	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)		
Count 1	N/A	4,180	Count 1(Heel)		3,721		
Count 2	N/A	4,127	Count 2(Center)		4,219		
Count 3	N/A	4,300	Count 3(Toe)		3,790		
Average	N/A	4,202.3	Average		3,910		
Background (cpm)	N/A	.40	Pass/Fail		PASS		
Net Counts	N/A	4,201.9			Tolerance ±10%		
Efficiency	N/A	22.6%			Min: 3,519	Max: 4,301	
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 19.4E ⁻⁶		Calibration Constant (CC): 1.0	
SCALER INFORMATION				DETECTOR INFORMATION			
Model	Serial Number		Due Date	Background (cpm)	Operating Voltage	Threshold	
2350-1	120633		06/27/03	.40	1400	4 mV	
Detector Setup Report		YES ✓ NO	Barcode Report		YES ✓ NO	Voltage Plateau YES ✓ NO	
COMMENTS							
No As Finds due to broken anode wire in detector Detector has one layer mylar window							
Calibrated with 25Ft. Cable Calibrated in accordance with RP-INS-I-245.							
10 minute background Efficiency determined w/43-68 source jig Dead Time set to manufacturer's suggested setting							
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: 		Date: 12-31-02			
Certification Date: 12/27/02				Certification Due: 06/27/03			

BACKGROUND PLATEAU 43-68 #092522 25FT CABLE 12/27/02

900	0
950	0
1000	0
1050	0
1100	0
1150	1
1200	0
1250	0
1300	1
1350	0
1400	2
1450	5
1500	5
1550	2
1600	14
1650	27
1700	55
1750	106
1800	183
1850	291
1900	384
1950	469

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	0
1100	0
1150	67
1200	1307
1250	2803
1300	3657
1350	3908
1400	4297
1450	4352
1500	4194

BETA PLATEAU C14 #019708 26,640DPM

1400	1
1450	1
1500	3
1550	8
1600	245
1650	1040
1700	2046
1750	3070
1800	3813
1850	4113
1900	4444
1950	5118



12-31-02

DETECTOR SETUP CHECK LIST REPORT

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

Today's date is 12/31/2002.

The current time of day is: 13:39:38.

I have verified the list below

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

Comments:

Model 2350 Serial # =	120633.
User I.D. =	
High Voltage =	1400 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.940000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68A.
Detector Serial # =	092522.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.0 volts.

Model 2350 Serial #120633



H1400\$I

Set High Voltage: 1400



T100\$Q

Set Threshold: 100



*W1000\$W

Set Window: 1000,OFF



*O400\$O

Set Overload: 400,OFF



F60\$H

Set Scaler Count Time: 60



SU7\$I

Set Readout Units = counts



SB1\$-

Set Readout Time Base = min



SM0\$3

Set Readout Range Multiplier = auto



SL1.940000E-05\$M

Set Dead Time: 1.940000E-05



SC1.000000E+00\$0

Set Calibration Constant: 1.000000E+00



M43-68A\$%

Set Detector Model: 43-68A



N092522\$\$

Set Detector Serial #: 092522



J1.000000E+09\$V

Set Ratemeter Alarm: 1.000000E+09



K1000000\$H

Set Scaler Alarm: 1000000



P1.000000E+09\$.

Set Dose Alarm: 1.000000E+09




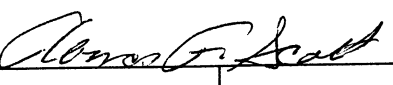
SP1\$7

SAVE PARAMETERS AS D1

**CALIBRATION
CERTIFICATE**

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

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

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 44-2			
Contact Name: Thomas Scott				Serial Number: 121806			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019463		Activity: 5 μ Ci		Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711		Activity: Variable		Certification Date: 03/27/02	
Parameter				Precision Test		mR/Hr (Source #2)	
Count 1		N/A		Count 1		2.01	
Count 2		N/A		Count 2		2.00	
Count 3		N/A		Count 3		1.99	
Average		N/A		Average		2.00	
Background		N/A		Pass/Fail		Pass	
Net Counts		N/A				Tolerance $\pm 10\%$	
Efficiency		N/A				Min: 1.800 Max: 2.200	
Low Sample Activity: Source #2: 21,247		High Sample Activity: Source #2: 80,256		Dead Time (DT): 4.570549E ⁻⁵		Calibration Constant (CC): 1.733837E ⁺¹⁰	
ATTACHMENTS				DETECTOR DATA: DOSE RATE PROBES (mR/Hr)			
Detector Setup Report		YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	Desired Exposure	Tolerance $\pm 10\%$	As Found	As Left
Barcode Report		YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	0.400	0.360-0.440	.404	0.402
Voltage Plateau:		YES <input checked="" type="checkbox"/>	NO <input type="checkbox"/>	1	0.90-1.10	.940	0.950
High Voltage: 700V				2	1.8-2.2	2.01	2.01
COMMENTS							
Calibrated with 5ft. Cable				Caled in accordance with RP-INS-I-245.			
STATEMENT OF CERTIFICATION							
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).							
Detector							
Certified By: 		Reviewed By: 		Date: 12-31-02			
Certification Date: 12/27/02				Certification Due: 06/27/03			

BACKGROUND PLATEAU 44-2 S/N121806

500	360
550	718
600	690
650	654
700	747
750	703
800	748
850	999
900	1697
950	4913
1000	43098

SOURCE PLATEAU Cs137 S/N:019461 5uCi

500	3254
550	3778
600	4208
650	4378
700	4285
750	4305
800	4502
850	5626
900	11620
950	32143

James F. Scott

12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D3 in the Model 2350.

Today's date is 12/31/2002.

The current time of day is: 13:40:15.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE: M

Comments:

Model 2350 Serial # =	120633.
User I.D. =	
High Voltage =	700 volts.
Threshold =	250.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	4.570549E-05.
Detector Calibration Constant =	1.733837E+10.
Detector Model =	44-2.
Detector Serial # =	121806.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.0 volts.

Model 2350 Serial #120633



H700\$K
Set High Voltage: 700



T250\$W
Set Threshold: 250



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



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



F12\$E
Set Scaler Count Time: 12



SU4\$F
Set Readout Units = R



SB2\$.
Set Readout Time Base = hr



SM0\$3
Set Readout Range Multiplier = auto



SL4.570549E-05\$%
Set Dead Time: 4.570549E-05



SC1.733837E+10\$W
Set Calibration Constant: 1.733837E+10



M44-2\$L
Set Detector Model: 44-2



N121806\$.
Set Detector Serial #: 121806



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




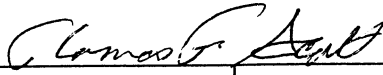
SP3\$9
SAVE PARAMETERS AS D3



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: 43-37B	
Contact Name: Thomas F. Scott				Serial Number: 092790	
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
Source Nuclide: C ¹⁴		Serial Number: 019708		Activity: 26,640dpm	
				Certification Date: 11/20/96	
Parameter	As Found	As Left	Precision Test		CPM
Count 1	4201	4185	Count 1 (Heel)		4362
Count 2	4294	4333	Count 2 (Center)		4350
Count 3	4307	4373	Count 3 (Toe)		4275
Count 4	4359	4235	Average		4329
Count 5	4219	4342	Pass/Fail		PASS
Count 6	4215	4221	High Voltage		1850V
Average	4265.8	4281.5			
Background (CPM)	1327.1	1233.9			
Net Counts	2938.7	3047.6			Tolerance ±10%
Efficiency	11.0%	11.4%			Min: 3896.1 Max: 4761.9
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.4E ⁻⁰⁶	Calibration Constant (CC): 1.0
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold
2350-1	120633	06/30/03	1233.9	1850	4 mV
Detector Setup Report YES ✓ NO		Barcode Report YES ✓ NO		Voltage Plateau YES ✓ NO	
COMMENTS					
Special Remarks: 1 layer Mylar (0.4mg/cm ²) 10 minute background performed			Caled in accordance with RP-INS-I-245 Efficiency performed on contact 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: 		Date: 12-31-02		
Certification Date: 12/31/02			Certification Due: 06/30/03		

BACKGROUND PLATEAU 43-37 #092790 5FT CABLE 12/31/02

900	0
950	0
1000	0
1050	0
1100	3
1150	2
1200	3
1250	5
1300	3
1350	3
1400	8
1450	3
1500	23
1550	53
1600	177
1650	277
1700	506
1750	754
1800	1058
1850	1238
1900	1307
1950	1351

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	98
1100	2087
1150	3797
1200	4120
1250	4247
1300	4218
1350	4430
1400	4409
1450	4146
1500	4358

BETA PLATEAU C14 #019708 26,640DPM

1400	5
1450	6
1500	196
1550	949
1600	2121
1650	2998
1700	3803
1750	4566
1800	5063
1850	5176
1900	5237
1950	5444



12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D4 in the Model 2350.
Today's date is 12/31/2002.
The current time of day is: 13:40:38.

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

Comments:

Model 2350 Serial # =	120633.
User I.D. =	
High Voltage =	1850 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.240000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-37C14.
Detector Serial # =	092790.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.0 volts.

DET4

Generated: 12/31/2002 13:59:13.

Model 2350 Serial #120633



H1850\$R
Set High Voltage: 1850



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



F60\$H
Set Scaler Count Time: 60



SB1\$-
Set Readout Time Base = min



SL2.240000E-05\$G
Set Dead Time: 2.240000E-05



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



M43-37C14\$2
Set Detector Model: 43-37C14



N092790\$3
Set Detector Serial #: 092790



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



SP4\$A
SAVE PARAMETERS AS D4



T100\$Q
Set Threshold: 100



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



SU7\$I
Set Readout Units = counts



SM0\$3
Set Readout Range Multiplier = auto

**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: 43-37A	
Contact Name: Thomas F. Scott				Serial Number: 092790	
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
Source Nuclide: Th ²³⁰		Serial Number: 119738		Activity: 18,600 dpm	
				Certification Date: 10/20/97	
Parameter	As Found	As Left	Precision Test		CPM
Count 1	3493	3520	Count 1 (Heel)		3610
Count 2	3561	3518	Count 2 (Center)		3567
Count 3	3582	3535	Count 3 (Toe)		3519
Count 4	3617	3606	Average		3565.3
Count 5	3569	3525	Pass/Fail		PASS
Count 6	3521	3644	High Voltage		1300V
Average	3557.2	3558			
Background (CPM)	4.9	4.4			
Net Counts	3552.3	3553.6			Tolerance ±10%
Efficiency	19.1%	19.1%			Min: 3208.8 Max: 3921.8
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 19.3E-06	
				Calibration Constant (CC): 1.0	
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold
2350-1	120633	06/30/03	4.4	1300	4 mV
Detector Setup Report		YES ✓ NO	Barcode Report		YES ✓ NO
					Voltage Plateau YES ✓ NO
COMMENTS					
Special Remarks: 1 layer Mylar (0.4mg/cm ²) 10 minute background performed			Caled in accordance with RP-INS-I-245 Efficiency performed on contact 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: 12-31-02	
Certified By: <i>[Signature]</i>				Certification Due: 06/30/03	
Certification Date: 12/31/02					

BACKGROUND PLATEAU 43-37 #092790 5FT CABLE 12/31/02

900	0
950	0
1000	0
1050	0
1100	3
1150	2
1200	3
1250	5
<u>1300</u>	<u>3</u>
1350	3
1400	8
1450	3
1500	23
1550	53
1600	177
1650	277
1700	506
1750	754
1800	1058
1850	1238
1900	1307
1950	1351

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	98
1100	2087
1150	3797
1200	4120
1250	4247
<u>1300</u>	<u>4218</u>
1350	4430
1400	4409
1450	4146
1500	4358

BETA PLATEAU C14 #019708 26,640DPM

1400	5
1450	6
1500	196
1550	949
1600	2121
1650	2998
1700	3803
1750	4566
1800	5063
1850	5176
1900	5237
1950	5444

James F. Smith
12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D5 in the Model 2350.

Today's date is 12/31/2002.

The current time of day is: 13:40:57.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE: *7N*

Comments:

Model 2350 Serial # =	120633.
User I.D. =	
High Voltage =	1300 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.930000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-37A.
Detector Serial # =	092790.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.0 volt

Model 2350 Serial #120633



H1300\$H
Set High Voltage: 1300



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



F60\$H
Set Scaler Count Time: 60



SB1\$-
Set Readout Time Base = min



SL1.930000E-05\$L
Set Dead Time: 1.930000E-05



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



*M43-37A\$ *
Set Detector Model: 43-37A



N092790\$3
Set Detector Serial #: 092790



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



SP5\$B
SAVE PARAMETERS AS D5



T100\$Q
Set Threshold: 100



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



SU7\$I
Set Readout Units = counts



SM0\$3
Set Readout Range Multiplier = auto

SECTION 1 (To be completed at Initial Receipt Response Test)

Technician Signature: *Ch Miles*

INSTRUMENT & DETECTOR INFORMATION			DETECTOR TOLERANCE VALUES		EFF	SOURCE INFORMATION	
Instrument Model No.	2350-1	Cal Due Date	Minus 10%	Plus 10%	Net EFF	SEG ID / Serial No.	F0184 119635
Instrument Serial No.	120633		766.8	937.2	.203	Certification Date	
Detector Model No.	43-68B	Cal Due Date	Operating Conditions: <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Abnormal <input checked="" type="checkbox"/> Cable Length 25' ft. <input type="checkbox"/> Altitude N/A ft. <input type="checkbox"/> Temperature _____ °F		Nuclide	TC-99	
Detector Serial No.	92092522	02-13-03				Activity in dpm	4194

SECTION I Reviewed By:

Date:

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. **IF** the information above is incorrect, **DO NOT CONTINUE.**

[illegible]

REMARKS: Initial Response Test

NOTE: 1. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By:

Date: _____

66-21 (7b17)

766.8-937.2

[illegible]

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

Date: 11-05-02

Technician Signature:

SECTION I Reviewed By:

Date:

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. IF the information above is incorrect, DO NOT CONTINUE.

[illegible]

NOTE: 1. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

SECTION 2 (To be completed by RP Technician)

(259,740)
C-14

止

[illegible]

NOTE: 1. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

Date: 01-07-03

SECTION 1 (To be completed at Initial Receipt Response Test)

Technician Signature:

SECTION I Reviewed By:

Date:

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. IF the information above is incorrect, DO NOT CONTINUE.

[illegible]

NOTE: 1. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By:

Date:

SECTION 2 (To be completed by RP Technician)

20,578.5 - 36,151.5

259,740 dpm

Instrument Model		Instrument Serial #		Cal Due Date		Detector Model #		Detector Serial #		Source Serial #										
2350-1		120633		6-27-03		43-68B		PR092522		010002										
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance	Performed by								
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR)	Gross Cnts	Net CPM	Count 2 (SCR)	Gross Cnts	Net CPM		Count 3 (SCR)	Gross Cnts	Net CPM	Mean Net Source Count Rate MNSCR	Eff	Pass	Fall	Technician (Name Printed & Initialed)	Date/Time
SAT	✓	10	2058	206	34078	33872	33468	33588	33403	33273	33493	33287	35733	35527	35895	.138	✓		NR/ps / NRK	2-28-03 1325
SAT	✓	10	1948	195	33468	33273	33588	33403	33273	33493	33287	35733	35527	35895	.138	✓		NR/ps / NRK	3-5-03 1110	
SAT	✓	10	1845	185	33588	33403	33273	33588	33403	33273	33493	33287	35733	35527	35895	.138	✓		NR/ps / NRK	3-6-03 0820
SAT	✓	10	1951	195	34535	34340	33821	33026	35146	34951	34869	35084	35297	35167	35897	.138	✓		NR/ps / NRK	3-6-03 1308
SAT	✓	10	1816	182	32899	32717	37847	37865	35051	34869	35084	35297	35167	35897	35897	.138	✓		NR/ps / NRK	3-10-03 0755
SAT	✓	10	1740	174	32157	31983	37430	37156	36327	36153	35167	35897	35897	35897	35897	.138	✓		NR/ps / NRK	3-10-03 1120
SAT	✓	10	1848	185	32963	32778	37474	37289	35619	35434	35167	35897	35897	35897	35897	.138	✓		NR/ps / NRK	3-11-03 0755
SAT	✓	10	2194	219	34477	34258	39032	38813	34840	34621	35167	35897	35897	35897	35897	.138	✓		NR/ps / NRK	3-24-03 0800
SAT	✓	10	2152	215	33502	33287	39335	39100	32320	32105	34837	34837	34837	34837	34837	.134	✓		NR/ps / NRK	3-24-03 1625
SAT	✓	10	2268	227	33507	33280	36289	36062	33847	33620	34187	34187	34187	34187	34187	.135	✓		NR/ps / NRK	3-25-03 1020
SAT	✓	10	2101	210	31285	31075	36152	36442	34132	33922	34480	34480	34480	34480	34480	.133	✓		NR/ps / NRK	3-25-03 1140

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

(29,578.5 - 36,151.5)

259,740 dpm

Instrument Model 2350-1		Instrument Serial # 120633		Cal Due Date 06-27-03		Detector Model # 43683		Detector Serial # PR092522		Source Serial # 010002						
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1			
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time
SAT	✓	10	1871	187	33556	33369	36379	36192	32104	31917	33826	.130	✓		VMiles/TCM	01-07-03 0745
SAT	✓	10	2122	212	34086	33874	37087	36845	33781	33569	34773	.134	✓		VMiles/TCM	01-08-03 1015
SAT	✓	10	2381	238	33841	33603	38744	38506	34987	34749	35619	.137	✓		VMiles/TCM	01-09-03 0815
SAT	✓	10	1761	170	31036	30866	33530	33360	26013	25843	36023	.116	✓		VMiles/TCM	01-13-03 1000
SAT	✓	10	1627	163	33854	33691	35491	35328	29837	29674	32898	.127	✓		VMiles/TCM	01-14-03 0725
SAT	✓	10	1998	200	34248	34048	35716	35516	33662	33462	34342	.132	✓		VMiles/TCM	01-17-03 0725
SAT	✓	10	1954	195	34497	34302	37206	37011	34299	34104	35139	.135	✓		VMiles/TCM	01-22-03 0900
SAT	✓	10	1597	160	35438	35278	37000	36840	35486	35326	35815	.138	✓		VMiles/TCM	01-23-03 0725
SAT	✓	10	1934	193	32924	32731	36297	36104	33868	33675	34170	.132	✓		VMiles/TCM	01-28-03 1115
SAT	✓	10	1733	173	29594	29421	35137	34964	30956	30783	31723	.122	✓		NRKps / NRK	2-25-03 1440
SAT	✓	10	2072	207	33053	32848	38638	38431	35125	34918	35398	.136	✓		NRKps / NRK	2-24-03 0730
SAT	✓	10	1956	196	32899	32703	38179	37983	35663	35467	35384	.136	✓		NRKps / NRK	2-27-03 1025
SAT	✓	10	2058	206	33939	33789	38643	38437	36594	36393	36188		✓		NRKps / NRK	2-28-03 1820

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

Date: 01-06-03

SECTION I Reviewed By:

SECTION 1 Reviewed By: _____ Date: _____
SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. IF the information above is incorrect, DO NOT CONTINUE.

Initial Response Test

NOTE: 1. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

Instrument Model 2350-1 Instrument Serial # 120633 Cal Due Date 8-27-03 Detector Model # 43-68B Detector Serial # 19092522 Source Serial # F0184 4194 dpm

Alarm Test	Test Type		Background Data			Source Count Data							Tolerance		Performed by				
	Pre	Post	Count Time (min)	Gross BKG Counts	BKG CPM	Count Time (min)	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time	
SAT	✓		10	2058	206	1	1092	886	1204	998	1136	930	938	.224	✓			NRK/MS / NRK	2-28-03 1315
SAT	✓		10	1948	195	1	1118	923	1252	1057	1169	974	985	.235	✓			NRK/MS / NRK	3-5-03 1100
SAT	✓		10	1845	185	1	1160	975	1290	1105	1168	983	1021			✓		NRK/MS / NRK	3-6-03 0825
SAT	✓		10	1845	185	1	1054	869	1214	1029	1195	1010	969	.231	✓			NRK/MS / NRK	3-6-03 0830
SAT	✓		10	1951	195	1	1104	909	1189	994	1219	1024	976	.233	✓			NRK/MS / NRK	3-6-03 1510
SAT	✓		10	1816	182	1	1098	916	1202	1020	1184	1002	979	.234	✓			NRK/MS / NRK	3-10-03 0750
SAT	✓		10	1740	174	1	1102	928	1135	961	1164	990	960	.228	✓			NRK/MS / NRK	3-10-03 1115
SAT	✓		10	1848	185	1	1097	912	1186	1001	1176	991	968	.231	✓			NRK/MS / NRK	3-11-03 0750
SAT	✓		10	2194	219	1	1115	896	1232	1013	1184	965	958	.228	✓			NRK/MS / NRK	3-24-03 0250
SAT	✓		10	2152	215	1	1170	955	1250	1035	1250	1035	1008	.240	✓			NRK/MS / NRK	3-24-03 1620
SAT	✓		10	2268	227	1	1171	944	1244	1017	1115	888	950	.226	✓			NRK/MS / NRK	3-25-03 1015
SAT	✓		10	2101	210	1	1184	974	1308	1098	1156	946	1006	.240	✓			NRK/MS / NRK	3-25-03 1155

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

Instrument Model 2350-1 Instrument Serial # 120633 Cal Due Date 06-27-03 Detector Model # 43-6803 Detector Serial # PA092522 Source Serial # E0184 4194 dpm

Alarm Test	Test Type	Background Data			Source Count Data								Tolerance		Performed by						
		Pre	Post		Count Time (min)	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time				
SAT	✓			Count Time (min)	10	1871	187	Gross BKG Counts	10	1149	962	1155	968	1098	911	947	.226	✓		VMiles/ton	01-07-03 0735
SAT	✓			10	2122	212		1095	883	1200	988	1135	923			931	.222	✓		VMiles/ton	01-08-03 1020
SAT	✓			10	2381	238		1195	957	1275	1037	1135	897			964	.230	✓		VMiles/ton	01-09-03 0810
SAT	✓			10	1701	170		1010	840	1046	876	951	781			832	.198	✓		VMiles/ton	01-13-03 0950
SAT	✓			10	1627	163		957	794	981	818	690	727			780		✓		VMiles/ton	01-14-03 0730
SAT	✓			10	1627	163		01-15-03	com												
SAT	✓			10	1998	199		1023	823	1191	991	1099	899			904	.216	✓		VMiles/ton	01-17-03 0710
SAT	✓			10	1954	195		1077	882	1165	970	1160	965			939	.224	✓		VMiles/ton	01-22-03 0900
SAT	✓			10	1597	160		1037	877	1189	1029	1120	960			955	.228	✓		VMiles/ton	01-23-03 0715
SAT	✓			10	1934	193		1153	960	1186	993	1093	900			951	.227	✓		VMiles/ton	01-24-03 1100
SAT	✓			10	1733	173		1012	829	1088	945	1019	846			867	.204	✓		NRps / NRK	2-25-03 1410
SAT	✓			10	2072	207		1122	915	1262	1055	1201	994			988	.236	✓		NRps / NRK	2-26-03 0720
SAT	✓			10	1956	196		1158	962	1231	1035	1194	1003			1000	.238	✓		NRps / NRK	2-27-03 1020

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

**REDS-INST-201
REVISION 4**

SECTION 1 (To be completed at Initial Receipt Response Test)

SECTION 1 (To be completed at Initial Receipt Response Test)

Technician Signature: *zkimble*

Date: 01-15-03

INSTRUMENT & DETECTOR INFORMATION			ACCEPTABLE INSTRUMENT RESPONSE RANGES			SOURCE INFORMATION	
Instrument Model Number	2350-1	Cal Due Date	Geometry	Minus 20 %Net Counts	Plus 20 %Net Counts	SEG I/D No.	019453
Instrument Serial Number	120633	06-27-03	Position 1 @ Contact	436, 206.4	654, 309.6	Certificate Date	
Detector Model Number	44-2	Cal Due Date	Position 2 @ 6 Inches	7, 794.4	11, 691.6	Nuclide	
Detector Serial Number	121806	06-27-03	Position 3 @ 18 Inches	1, 162.4	1, 743.6	Activity in μ Ci	
			Operating Conditions:			°F	
			<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Abnormal: <input type="checkbox"/> Altitude _____ ft.			<input type="checkbox"/> Temperature _____ °F	
			<input type="checkbox"/> Cable Length _____ ft.				

SECTION 1 Reviewed By: _____

Date: _____

SECTION 2 (To be completed by RP Technician). Prior to beginning, verify the Instrument SNs listed above.

IF the above information is incorrect, DO NOT CONTINUE.

ACTUAL INSTRUMENT RESPONSE

[illegible]

NOTE 1: By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By:

Date: _____

OPERATION OF THE LUDLUM MODEL
2350 SERIES DATA LOGGERS

REDS-INS' 1
REVISION 4

GAMMA DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician).

Instrument Model <u>2350-1</u>		Instrument Serial # <u>120633</u>		Cal Due Date <u>6-27-03</u>		Detector Model # <u>44-2</u>		Detector Serial # <u>R21806</u>		Source Serial # <u>019453</u>						
Alarm Test	Test Type	Background Data			Count Time (min)	Source Count Data						Tolerance		Performed by See Note 1		
		Pre	Post	Count Time (min)		Gross BKG Counts	BKG CPM	Position 1 @ contact		Position 2 @ 6 inches		Position 3 @ 18 inches		Pass	Fail	Technician (Name Printed & Initialed)
SAT	✓			5	6990	1398	487908	466510	10631	9233	2682	1284	✓		NR/ps / NR	2-4-03 1600
SAT	✓			5	7145	1429	488843	465414	10161	8732	2669	1240	✓		NR/ps / NR	2-5-03 0710
SAT	✓			5	6961	1392	474940	473518	10381	8889	2832	1440	✓		NR/ps / NR	2-5-03 1505
SAT	✓			5	6806	1361	484814	483453	10401	9040	2803	1442	✓		NR/ps / NR	2-5-03 0715
SAT	✓			5	6734	1347	472140	470793	10399	9052	2801	1454	✓		NR/ps / NR	2-6-03 1022
SAT	✓			5	6783	1357	479030	477673	10508	9151	2823	1466	✓		NR/ps / NR	2-10-03 0720
SAT	✓			5	6748	1390	484870	483480	10469	8879	2757	1361	✓		NR/ps / NR	2-10-03 1100
SAT	✓			5	6986	1397	444904	443507	10569	9172	2826	1429	✓		NR/ps / NR	2-13-03 1424
SAT	✓			5	6865	1373	478817	477444	10721	9348	2863	1490	✓		NR/ps / NR	2-18-03 1625
SAT	✓			5	7066	1413	489983	468570	9878	8465	2733	1320			NR/ps / NR	3-20-03 0715
SAT	✓			5	7030	1406	484782	483376	9914	8543	2766	1366			NR/ps / NR	3-20-03 1115
SAT	✓			5	6860	1372	490465	489113	9849	8477	2842	1470			NR/ps / NR	4-3-03 1025
REMARKS:																

NOTE 1: By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

OPERATION OF THE LUDLUM MODEL
2350 SERIES DATA LOGGERS

REDS-INST-201
REVISION 4

GAMMA DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician).

Instrument Model 2350-1		Instrument Serial # 120633		Cal Due Date 06-27-03		Detector Model # 44-2		Detector Serial # 121806		Source Serial # 017453						
Alarm Test	Test Type	Background Data			Count Time (min)	Source Count Data						Tolerance		Performed by See Note 1		
		Pre	Post	Count Time (min)		Position 1 @ contact		Position 2 @ 6 inches		Position 3 @ 18 inches		Pass	Fail	Technician (Name Printed & Initialed)	Date/Time	
Sat/Unsat				Gross BKG Counts	BKG CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM					
SAT	✓			5	7324	1465	473798	472333	11267	9802	2918	1453	✓		Wmiles/co	01-23-03
SAT	✓			5	7053	1411	509064	507653	10772	9361	2996	1585	✓		Wmiles/co	01-23-03
SAT	✓			5	7104	1421	528708	527287	11236	9815	2923	1502	✓		Wmiles/co	01-23-03
SAT	✓			5	7144	1429	499134	497705	10121	8692	2879	1450	✓		Wmiles/co	01-23-03
SAT	✓			5	7074	1415	495016	487942	10450	9035	2897	1482	✓		Wmiles/co	01-23-03
SAT	✓			5	6924	1385	483979	482594	11119	9734	2852	1467	✓		Wmiles/co	01-23-03
SAT	✓			5	7136	1427	484057	482630	11067	9640	2949	1522	✓		Wmiles/co	01-23-03
SAT	✓			5	7101	1420	481986	480566	11308	9888	2934	1514	✓		Wmiles/co	01-23-03
SAT	✓			5	6731	1346	487410	486064	10455	9109	2827	1481	✓		Wmiles/co	01-23-03
SAT	✓			5	6733	1347	4799034	477687	11245	9898	2681	1334	✓		Wmiles/co	01-23-03
SAT	✓			5	6766	1353	479269	477916	10999	9646	2797	1444	✓		Wmiles/co	01-23-03
SAT	✓			5	6603	1321	449328	448007	11005	9684	2809	1488	✓		Wmiles/co	01-23-03
SAT	✓			5	6806	1361	477369	476008	10568	9207	2716	1355	✓		Wmiles/co	01-23-03

REMARKS:

NOTE 1: By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____



CALIBRATION CERTIFICATE

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

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

CUSTOMER INFORMATION			INSTRUMENT INFORMATION	
Customer Name: Duratek - Instrument Services Facility			Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763			Model: 2350-1	Serial Number: 95359
Contact Name: Thomas Scott			Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2002-01394		Calibration Method: Electronic	
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	
400K	400,000	401,581	401,581	Pulser: 101500 Cal Due: 09/11/03
40K	40,000	40,104	40,104	D-814: 2525 Cal Due: 02/18/03
4K	4,000	4,016	4,016	Psychron: 7480 Cal Due: 05/17/03
400	400	402	402	
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	
600	600	603	603	Temp: 23.4° C
1,200	1,200	1,195	1,195	Pressure: 746 mmHg
1,800	1,800	1,782	1,782	Humidity: 42%
Parameter	Tolerance (±10%)	As Found	As Left	
Low End Threshold	4 ± (3.6 to 4.4) mVDC	4.2	4.2	Geotropism: SAT ACK/Scroll: SAT
Midpoint Threshold	20 ± (18 to 22) mVDC	20	20	BAT>4.5: SAT Volume: SAT
High End Threshold	40 ± (36 to 44) mVDC	38.7	38.7	Count: SAT Audio Divide: SAT
Window Width	4 ± (3.6 to 4.6) mVDC	4	4	Alarms: SAT Lamp: SAT
Display-to-mV ratio:		100 to 4 mV	100 to 4 mV	Overload Test: SAT
STATEMENT OF CERTIFICATION				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument				
Calibrated By: <i>Nike Paul</i>	Reviewed By: <i>Thomas G. Scott</i>	Date: 12-12-02		
Calibration Date: 12/12/02		Calibration Due: 06/12/03		



DETECTOR CERTIFICATE

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

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

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68B			
Contact Name: Thomas Scott				Serial Number: 088917			
Customer Purchase Order Number: N/A		Work Order Number: 2003-00418		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: C-14		Serial Number: 020201		Activity (dpm) : 26,820		Certification Date: 2/5/02	
Parameter	As Found	As Left	Precision Test			CPM (Source #1)	
Count 1	4,261	4,261	Count 1(Heel)			4,029	
Count 2	4,464	4,464	Count 2(Center)			4,468	
Count 3	4,342	4,342	Count 3(Toe)			4,036	
Average	4,356	4,356	Average			4,178	
Background (cpm)	328.3	328.3	Pass/Fail			PASS	
Net Counts	4,027.7	4,027.7				Tolerance ±10%	
Efficiency	15.0%	15.0%				Min: 3,760	Max: 4,596
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.1E ⁻⁶		Calibration Constant (CC): 1.0	
SCALER INFORMATION			DETECTOR INFORMATION				
Model	Serial Number		Due Date	Background (cpm)	Operating Voltage	Threshold	
2350-1	95360		07/09/03	328.3	1800V	4 mV	
Detector Setup Report YES √ NO			Barcode Report YES √ NO			Voltage Plateau YES √ NO	
COMMENTS							
Calibrated with 25Ft. Cable				Caled in accordance with RP-INS-I-245.			
10 minute background		Efficiency determined w/43-68 source jig		Dead Time set to manufacturer's suggested setting			
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: Mike Paul			Reviewed By: <i>Alma G. Scott</i>		
Certification Date: 04/15/03		Date: 4-15-03			Certification Due: 10/15/03		

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D3 in the Model 2350.
Today's date is 04/15/2003.
The current time of day is: 13:11:40.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE: MP

Comments:

Model 2350 Serial # =	95360.
User I.D. =	95360.
High Voltage =	1800 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.210000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68C-14.
Detector Serial # =	088917.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.2 volts.

Model 2350 Serial #95360



H1800\$M
Set High Voltage: 1800



T100\$Q
Set Threshold: 100



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



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



F60\$H
Set Scaler Count Time: 60



SU7\$I
Set Readout Units = counts



SB1\$-
Set Readout Time Base = min



SM0\$3
Set Readout Range Multiplier = auto



SL2.210000E-05\$D
Set Dead Time: 2.210000E-05



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



M43-68C-14\$%
Set Detector Model: 43-68C-14



N088917\$9
Set Detector Serial #: 088917



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

background plateau 43-68#088917 25ft cable 4/15/03

900	0
950	0
1000	0
1050	0
1100	0
1150	1
1200	0
1250	1
1300	1
1350	1
1400	3
1450	0
1500	2
1550	20
1600	38
1650	79
1700	133
1750	263
1800	315
1850	378
1900	409
1950	439

beta plateau C-14#020201

1400	1
1450	5
1500	66
1550	636
1600	1742
1650	2816
1700	3767
1750	4573
1800	4472
1850	4762
1900	5026
1950	427056

Date: 4-17-03

8 of 11

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician) 4/19/94

Instrument Model **2350** Instrument Serial # **95359** Cal Due Date **6-12-03** Detector Model # **43-68-B** Detector Serial # **PR088917** Source Serial # **PR84**

Alarm Test	Test Type		Background Data			Source Count Data								Tolerance		Performed by		
	Pre	Post	Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time	
SAT		✓	10	2351	239	1189	950	1207	968	1186	947	955	.228	✓			NRK/MSK	4-17-03 1535
SAT	✓		10	2372	247	1243	946	1355	1058	1283	986	947	.238	✓			NRK/MSK	4-23-03 1325
SAT	✓		10	2784	278	1230	952	1240	962	1202	924	946	.226	✓			NRK/MSK	4-24-03 0740
SAT	✓		10	3256	326	1377	1051	1351	1025	1295	969	1015	.242	✓			NRK/MSK	4-25-03 0830
SAT		✓	10	2788	279	1293	1014	1294	995	1231	952	967	.235	✓			NRK/MSK	4-25-03 1430
SAT	✓		10	2925	293	1279	986	1313	1020	1318	1025	1010	.241	✓			NRK/MSK	4-26-03 0750
SAT		✓	10	3585	359	1374	1015	1293	934	1340	981	977	.233	✓			NRK/MSK	4-26-03 1030
REMARKS:																		

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____



CALIBRATION CERTIFICATE

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

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

CUSTOMER INFORMATION			INSTRUMENT INFORMATION		
Customer Name: GTS Duratek - Instrument Services Facility			Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763			Model: 2350-1	Serial Number: 126197	
Contact Name: Thomas Scott			Probe: N/A	Serial Number: N/A	
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with RP-INS-I-245 Rev 0	
400K	400,000	402,218	402,218	Pulser: 120935 Cal Due: 03/18/03	
40K	40,000	40,196	40,196	D-814: 2525 Cal Due: 02/18/03	
4K	4,000	4,020	4,020	Psychron: 7480 Cal Due: 05/17/03	
400	400	402	402	EPPROM Version: 37122N21	
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)		
600	600	611	611	Temp: 22.2° C	
1,200	1,200	1,209	1,209	Pressure: 744 mmHg	
1,800	1,800	1,804	1,804	Humidity: 34 %	
Parameter	Tolerance (±10%)	As Found	As Left		
Low End Threshold	4 ± (3.6 to 4.4) mVDC	4.22	4.22	Geotropism: SAT ACK/Scroll: SAT	
Midpoint Threshold	20 ± (18 to 22) mVDC	19.0	19.0	BAT>4.5: SAT Volume: SAT	
High End Threshold	40 ± (36 to 44) mVDC	37.5	37.5	Count: SAT Audio Divide: SAT	
Window Width	4 ± (3.6 to 4.6) mVDC	4	4	Alarms: SAT Lamp: SAT	
Display-to-mV ratio:	100 to 4 mV			Overload Test: SAT	
STATEMENT OF CERTIFICATION					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument		Reviewed By: <i>Thomas F. Scott</i>		Date: 12-31-02	
Calibrated By: <i>Paul By</i>					
Calibration Date: 12/30/02			Calibration Due: 06/30/03		

**DETECTOR
CERTIFICATE**

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

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

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68B			
Contact Name: Thomas Scott				Serial Number: 092524			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: C ¹⁴		Serial Number: 019708		Activity (dpm) : 26,640		Certification Date: 11/20/96	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)		
Count 1	4,520	4,550	Count 1(Heel)		4,512		
Count 2	4,474	4,506	Count 2(Center)		4,584		
Count 3	4,459	4,610	Count 3(Toe)		4,526		
Average	4,484.3	4,555.3	Average		4,540.6		
Background (cpm)	335.3	327.1	Pass/Fail		PASS		
Net Counts	4,149	4,228.2			Tolerance ±10%		
Efficiency	15.6%	15.9%			Min: 4,086.6	Max: 4,994.6	
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.1E ⁻⁶		Calibration Constant (CC): 1.0	
SCALER INFORMATION				DETECTOR INFORMATION			
Model	Serial Number		Due Date	Background (cpm)	Operating Voltage	Threshold	
2350-1	126197		06/30/03	327.1	1850	4 mV	
Detector Setup Report		YES <input checked="" type="checkbox"/> NO	Barcode Report		YES <input checked="" type="checkbox"/> NO	Voltage Plateau YES <input checked="" type="checkbox"/> NO	
COMMENTS							
Detector has one layer mylar at .4mg/cm ² **Calibrated with 25Ft. Cable** Caled in accordance with RP-INS-I-245.							
10 minute background performed Efficiency determined w/43-68 source jig Dead Time set to manufacturer's suggested setting							
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>[Signature]</i>		Reviewed By: <i>[Signature]</i>		Date: 12-31-02			
Certification Date: 12/30/02				Certification Due: 06/30/03			

BACKGROUND PLATEAU 43-68 #092524 25FT CABLE 12/27/02

900	0
950	0
1000	0
1050	0
1100	0
1150	0
1200	0
1250	2
1300	0
1350	1
1400	1
1450	1
1500	1
1550	6
1600	15
1650	38
1700	79
1750	173
1800	242
1850	329
1900	367
1950	375

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	0
1100	0
1150	2
1200	1626
1250	3047
1300	3657
1350	4066
1400	4178
1450	4259
1500	4203

BETA PLATEAU C14 #019708 26,640DPM

1400	4
1450	3
1500	2
1550	55
1600	578
1650	1642
1700	2769
1750	3734
1800	4460
1850	4563
1900	4707
1950	5044



12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D1 in the Model 2350.
Today's date is 12/31/2002.
The current time of day is: 13:45:34.

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

Comments:

Model 2350 Serial # =	126197.
User I.D. =	BSK0490.
High Voltage =	1850 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.210000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68B.
Detector Serial # =	092524.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.1 volts.

DET1

Generated: 12/31/2002 13:49:19.

Model 2350 Serial #126197



H1850\$R
Set High Voltage: 1850



T100\$Q
Set Threshold: 100



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



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



F60\$H
Set Scaler Count Time: 60



SU7\$I
Set Readout Units = counts



SB1\$-
Set Readout Time Base = min



SM0\$3
Set Readout Range Multiplier = auto



SL2.210000E-05\$D
Set Dead Time: 2.210000E-05



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



M43-68B\$0
Set Detector Model: 43-68B



N092524\$+
Set Detector Serial #: 092524



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
CERTIFICATE**

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

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

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68A			
Contact Name: Thomas Scott				Serial Number: 092524			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Th ²³⁰		Serial Number: 119738		Activity (dpm): 18,600		Certification Date: 10/20/97	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)		
Count 1	4,071	4,198	Count 1(Heel)		4,130		
Count 2	4,102	4,064	Count 2(Center)		4,172		
Count 3	4,123	4,170	Count 3(Toe)		3,982		
Average	4,098.7	4,144	Average		4,094.7		
Background (cpm)	2.3	2.0	Pass/Fail		PASS		
Net Counts	4,096.4	4,142			Tolerance ±10%		
Efficiency	22.2%	22.2%			Min: 3,685.3	Max: 4,504.1	
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 19.4E ⁻⁶		Calibration Constant (CC): 1.0	
SCALER INFORMATION				DETECTOR INFORMATION			
Model	Serial Number		Due Date	Background (cpm)	Operating Voltage	Threshold	
2350-1	126197		06/30/03	2.0	1400	4 mV	
Detector Setup Report YES <input checked="" type="checkbox"/> NO			Barcode Report YES <input checked="" type="checkbox"/> NO		Voltage Plateau YES <input checked="" type="checkbox"/> NO		
COMMENTS							
Detector has one layer mylar window **Calibrated with 25Ft. Cable** Calibrated in accordance with RP-INS-I-245.							
10 minute background Efficiency determined w/43-68 source jig Dead Time set to manufacturer's suggested setting							
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>[Signature]</i>			Reviewed By: <i>[Signature]</i> Date: 12-31-02		
Certification Date: 12/30/02				Certification Due: 06/30/03			

BACKGROUND PLATEAU 43-68 #092524 25FT CABLE 12/27/02

900	0
950	0
1000	0
1050	0
1100	0
1150	0
1200	0
1250	2
1300	0
1350	1
<u>1400</u>	<u>1</u>
1450	1
1500	1
1550	6
1600	15
1650	38
1700	79
1750	173
1800	242
1850	329
1900	367
1950	375

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	0
1100	0
1150	2
1200	1626
1250	3047
1300	3657
1350	4066
<u>1400</u>	<u>4178</u>
1450	4259
1500	4203

BETA PLATEAU C14 #019708 26,640DPM

1400	4
1450	3
1500	2
1550	55
1600	578
1650	1642
1700	2769
1750	3734
1800	4460
1850	4563
1900	4707
1950	5044



12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D2 in the Model 2350.
Today's date is 12/31/2002.
The current time of day is: 13:45:52.

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

Comments:

Model 2350 Serial # =	126197.
User I.D. =	BSK0490.
High Voltage =	1400 volts.
Threshold =	100.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.940000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68A.
Detector Serial # =	092524.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.1 volts.

Model 2350 Serial #126197



H1400\$I
Set High Voltage: 1400



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



F60\$H
Set Scaler Count Time: 60



SB1\$-
Set Readout Time Base = min



SL1.940000E-05\$M
Set Dead Time: 1.940000E-05



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



M43-68A\$%
Set Detector Model: 43-68A



N092524\$+
Set Detector Serial #: 092524



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



K1000000\$H
Set Scaler Alarm: 1000000



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



SP2\$8
SAVE PARAMETERS AS D2



T100\$Q
Set Threshold: 100



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



SU7\$I
Set Readout Units = counts



SM0\$3
Set Readout Range Multiplier = auto



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: 44-2			
Contact Name: Thomas Scott				Serial Number: 095085			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019463		Activity: 5μCi		Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711		Activity: Variable		Certification Date: 03/27/02	
Parameter		Precision Test		mR/Hr (Source #2)			
Count 1	N/A	Count 1		2.03			
Count 2	N/A	Count 2		2.00			
Count 3	N/A	Count 3		2.11			
Average	N/A	Average		2.05			
Background	N/A	Pass/Fail		Pass			
Net Counts	N/A			Tolerance ±10%			
Efficiency	N/A			Min: 1.845		Max: 2.255	
Low Sample Activity: Source #2: 21,093		High Sample Activity: Source #2: 77,886		Dead Time (DT): 5.036192E ⁻⁵		Calibration Constant (CC): 1.735619E ⁺¹⁰	
ATTACHMENTS			DETECTOR DATA: DOSE RATE PROBES (mR/Hr)				
Detector Setup Report	YES ✓	NO	Desired Exposure	Tolerance ±10%	As Found	As Left	
Barcode Report	YES ✓	NO	0.400	0.360-0.440	.397	.395	
Voltage Plateau:	YES ✓	NO	1	0.90-1.10	.98	.95	
High Voltage: 800V			2	1.8-2.2	2.18	2.05	
COMMENTS							
Calibrated with 5ft. Cable				Caled in accordance with RP-INS-I-245.			
STATEMENT OF CERTIFICATION							
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).							
Detector		Certified By: <i>Andy Hays</i>			Reviewed By: <i>Thomas G. Scott</i>		
		Date: 1-29-03					
Certification Date: 12/30/02				Certification Due: 06/30/03			

BACKGROUND PLATEAU 44-2 #095085 12/30/02 5FT CABLE

500	219
550	177
600	468
650	723
700	718
750	705
800	713
850	692
900	744
950	801
1000	812

SOURCE PLATEAU Cs137 #019461 5uCi

500	1541
550	3160
600	4197
650	4597
700	4941
750	5059
800	5096
850	5084
900	5139
950	5331
1000	6733

Thomas G. Bell

12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D3 in the Model 2350.
Today's date is 12/31/2002.
The current time of day is: 13:46:10.

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

Comments:

Model 2350 Serial # =	126197.
User I.D. =	BSK0490.
High Voltage =	800 volts.
Threshold =	250.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	5.036192E-05.
Detector Calibration Constant =	1.735619E+10.
Detector Model =	44-2.
Detector Serial # =	095085.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.1 volts.

DET3

Generated: 12/31/2002 13:50:30.

Model 2350 Serial #126197



H800\$L
Set High Voltage: 800



T250\$W
Set Threshold: 250



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



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



F12\$E
Set Scaler Count Time: 12



SU4\$F
Set Readout Units = R



SB2\$.
Set Readout Time Base = hr



SM0\$3
Set Readout Range Multiplier = auto



SL5.036192E-05\$Y
Set Dead Time: 5.036192E-05



SC1.735619E+10\$W
Set Calibration Constant: 1.735619E+10



M44-2\$L
Set Detector Model: 44-2



N095085\$3
Set Detector Serial #: 095085



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

**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: 43-37B			
Contact Name: Thomas F. Scott				Serial Number: 093963			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
Source Nuclide: C ¹⁴		Serial Number: 019708		Activity: 26,640dpm		Certification Date: 11/20/96	
Parameter	As Found	As Left	Precision Test			CPM	
Count 1	4264	4346	Count 1 (Heel)			4361	
Count 2	4315	4288	Count 2 (Center)			4376	
Count 3	4365	4237	Count 3 (Toe)			4290	
Count 4	4298	4161	Average			4342.3	
Count 5	4257	4368	Pass/Fail			PASS	
Count 6	4301	4288	High Voltage			1850V	
Average	4300	4218					
Background (CPM)	1139.7	1163.3					
Net Counts	3160.3	3054.7				Tolerance $\pm 10\%$	
Efficiency	11.9%	11.5%				Min: 3908.1	Max: 4776.5
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.4E- ⁰⁶		Calibration Constant (CC): 1.0	
SCALER INFORMATION			DETECTOR INFORMATION				
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold		
2350-1	126197	06/30/03	1163.3	1850	4 mV		
Detector Setup Report		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Barcode Report		YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	Voltage Plateau YES <input checked="" type="checkbox"/> NO <input type="checkbox"/>	
COMMENTS							
Special Remarks: 1 layer Mylar (0.4mg/cm ²) 10 minute background performed				Caled in accordance with RP-INS-I-245 Efficiency performed on contact 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>Anty Mij</i>		Reviewed By: <i>Thomas F. Scott</i>		Date: 12-31-02			
Certification Date: 12/31/02				Certification Due: 06/30/03			

BACKGROUND PLATEAU 43-37 #093963 5FT CABLE 12/30/02

900	1
950	0
1000	0
1050	0
1100	0
1150	3
1200	3
1250	2
1300	2
1350	4
1400	5
1450	3
1500	11
1550	40
1600	133
1650	213
1700	365
1750	612
1800	1007
1850	1196
1900	1231
1950	1292

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	1
1100	523
1150	2960
1200	4129
1250	4252
1300	4549
1350	4468
1400	4471
1450	4492
1500	4719

BETA PLATEAU C14 #019708 26,640DPM

1400	7
1450	15
1500	28
1550	392
1600	1428
1650	2599
1700	3589
1750	4495
1800	4834
1850	5215
1900	5264
1950	5528
2000	5812

Clonard G. Smith
12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D4 in the Model 2350.
Today's date is 12/31/2002.
The current time of day is: 13:46:32.

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

Comments:

Model 2350 Serial # =	126197.
User I.D. =	BSK0490.
High Voltage =	1850 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.240000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-37C14.
Detector Serial # =	093963.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.1 volts.

DET4

Generated: 12/31/2002 13:51:06.

Model 2350 Serial #126197



H1850\$R

Set High Voltage: 1850



T100\$Q

Set Threshold: 100



W1000\$W OFF\$P

Set Window: 1000, OFF



O400\$O OFF\$C

Set Overload: 400, OFF



F60\$H

Set Scaler Count Time: 60



SU7\$I

Set Readout Units = counts



SB1\$-

Set Readout Time Base = min



SM0\$3

Set Readout Range Multiplier = auto



SL2.240000E-05\$G

Set Dead Time: 2.240000E-05



SC1.000000E+00\$0

Set Calibration Constant: 1.000000E+00



M43-37C14\$2

Set Detector Model: 43-37C14



N093963\$6

Set Detector Serial #: 093963



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



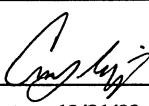
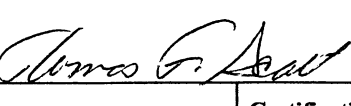
SP4\$A

SAVE PARAMETERS AS D4

**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: 43-37A			
Contact Name: Thomas F. Scott				Serial Number: 093963			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
Source Nuclide: Th ²³⁰		Serial Number: 119738		Activity: 18,600 dpm		Certification Date: 10/20/97	
Parameter	As Found	As Left	Precision Test			CPM	
Count 1	3578	3549	Count 1 (Heel)			3597	
Count 2	3498	3637	Count 2 (Center)			3612	
Count 3	3576	3540	Count 3 (Toe)			3535	
Count 4	3542	3495	Average			3581.3	
Count 5	3601	3570	Pass/Fail			PASS	
Count 6	3487	3602	High Voltage			1350V	
Average	3547	3565.5					
Background (CPM)	6.2	5.5					
Net Counts	3540.8	3560				Tolerance ±10%	
Efficiency	19.0%	19.1%				Min: 3223.2	Max: 3939.4
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 19.3E-06		Calibration Constant (CC): 1.0	
SCALER INFORMATION			DETECTOR INFORMATION				
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold		
2350-1	126197	06/30/03	5.5	1350	4 mV		
Detector Setup Report		YES ✓ NO	Barcode Report		YES ✓ NO	Voltage Plateau YES ✓ NO	
COMMENTS							
Special Remarks: 1 layer Mylar (0.4mg/cm ²) 10 minute background performed				Caled in accordance with RP-INS-I-245 Efficiency performed on contact 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: 		Date: 12-31-02			
Certification Date: 12/31/02				Certification Due: 06/30/03			

BACKGROUND PLATEAU 43-37 #093963 5FT CABLE 12/30/02

900	1
950	0
1000	0
1050	0
1100	0
1150	3
1200	3
1250	2
1300	2
<u>1350</u>	<u>4</u>
1400	5
1450	3
1500	11
1550	40
1600	133
1650	213
1700	365
1750	612
1800	1007
1850	1196
1900	1231
1950	1292

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	1
1100	523
1150	2960
1200	4129
1250	4252
1300	4549
<u>1350</u>	<u>4468</u>
1400	4471
1450	4492
1500	4719

BETA PLATEAU C14 #019708 26,640DPM

1400	7
1450	15
1500	28
1550	392
1600	1428
1650	2599
1700	3589
1750	4495
1800	4834
1850	5215
1900	5264
1950	5528
2000	5812

Charles G. Pratt
12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D5 in the Model 2350.
Today's date is 12/31/2002.
The current time of day is: 13:46:51.

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

Comments:

Model 2350 Serial # =	126197.
User I.D. =	BSK0490.
High Voltage =	1350 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.930000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-37A.
Detector Serial # =	093963.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.1 volts.

Model 2350 Serial #126197



H1350\$M

Set High Voltage: 1350



W1000\$WOFF\$P

Set Window: 1000,OFF



F60\$H

Set Scaler Count Time: 60



SB1\$-

Set Readout Time Base = min



SL1.930000E-05\$L

Set Dead Time: 1.930000E-05



SC1.000000E+00\$0

Set Calibration Constant: 1.000000E+00



*M43-37A\$ *

Set Detector Model: 43-37A



N093963\$6

Set Detector Serial #: 093963



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



SP5\$B

SAVE PARAMETERS AS D5



T100\$Q

Set Threshold: 100



O400\$OOFF\$C

Set Overload: 400,OFF



SU7\$I

Set Readout Units = counts



SM0\$3

Set Readout Range Multiplier = auto

SECTION 1 (To be completed at Initial Receipt Response Test)

Date: 1-7-03

SECTION I Reviewed By:

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. **IF** the information above is incorrect, **DO NOT CONTINUE.**

REMARKS: ~~A~~ Initial Response Test

Date:

SECTION 2 (To be completed by RP Technician)

[illegible]

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

Instrument Model		Instrument Serial #		Cal Due Date		Detector Model #		Detector Serial #		Source Serial #								
Alarm Test		Test Type		Background Data		Source Count Data						Tolerance		Performed by				
Sat/Unsat	Pre	Post	Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time	
						Gross Cnts	Net CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM							
SAT	✓		10	346.7	317	1407	1090	1326	1009	1343	1026	1042	228	✓			B5Kos BSK	7-11-03 0830
SAT	✓		10	342.2	343	1255	1012	1261	1018	1256	1013	1014	228	✓			B5Kos BSK	7-11-03 0840
SAT	✓		10	375.1	375	1208	1013	1383	1108	1272	997	1039	227	✓			B5Kos BSK	7-11-03 0845
SAT	✓		10	381.0	381	1260	979	1338	1057	1280	999	1013	221	✓			B5Kos BSK	7-11-03 0850
SAT	✓		10	365.8	366	1321	1055	1325	1089	1269	1003	1049	250	✓			B5Kos BSK	7-11-03 0855
SAT	✓		10	365.8	366	1283	1017	1129	873	1232	966	947	225	✓			B5Kos BSK	7-11-03 0900
SAT	✓		10	375.1	375	1187	912	1296	1021	1264	989	974	237	✓			B5Kos BSK	7-11-03 0905
SAT	✓		10	356.6	357	1283	1016	1274	1015	1273	1016	1019	228	✓			B5Kos BSK	7-11-03 0910
SAT	✓		10	354.9	355	1304	1049	1201	946	1158	903	966	230	✓			B5Kos BSK	7-11-03 0915
SAT	✓		10	352.7	353	1237	984	1254	1001	1242	987	991	236	✓			B5Kos BSK	7-11-03 0920
SAT	✓		10	329.3	330	1148	918	1210	980	1165	925	944	225	✓			B5Kos BSK	7-11-03 0925
SAT	✓		10	383.8	384	1239	925	1258	1074	1204	920	983	228	✓			B5Kos BSK	7-11-03 0930
SAT	✓		10	399.8	360	1251	951	1296	996	1254	954	967	231	✓			B5Kos BSK	7-11-03 0935

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

Instrument Model		Instrument Serial #		Cal Due Date		Detector Model #		Detector Serial #		Source Serial #								
2350-1		126197		6-30-03		83-688		093534		119653								
<p>856.8 - 1047.2</p> <p>799 dpm</p>																		
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by					
		Pre	Post	Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR)	Count 2 (SCR)	Count 3 (SCR)	Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time			
SAT	✓			10	2059	206	1203	997	1174	968	1167	963	976	233	✓		Billy S. Kios	3-5-03
SAT	✓			10	2020	233	1254	1032	1267	1145	1217	995	1034	244	✓		Billy S. Kios	3-6-03
SAT	✓			10	2396	270	1229	1019	1300	1060	1220	980	1020	245	✓		Billy S. Kios	3-6-03
SAT	✓			10	2012	201	1192	971	1263	1062	1169	968	1080	237	✓		Billy S. Kios	3-7-03
SAT	✓			10	2086	269	1314	1045	1290	1021	1302	1033	1033	246	✓		Billy S. Kios	3-7-03
SAT	✓			10	2480	348	1230	982	1246	1072	1245	997	956	248	✓		Billy S. Kios	3-7-03
SAT	✓			10	2024	262	1224	962	1227	995	1242	980	979	233	✓		Billy S. Kios	3-7-03
SAT	✓			10	2068	257	1255	998	1178	921	1225	968	962	244	✓		Billy S. Kios	3-7-03
SAT	✓			10	2326	233	1231	948	1242	1009	1311	1078	1028	245	✓		NRKos / NRK	4-3-03
SAT	✓			10	2398	240	1218	978	1241	1051	1234	999	1009	241	✓		NRKos / NRK	4-3-03
SAT	✓			10	2089	209	1158	889	1352	1083	1300	1031	1001	239	✓		NRKos / NRK	4-9-03
SAT	✓			10	2080	288	1201	913	1356	1068	1283	995	992	237	✓		NRKos / NRK	4-9-03
SAT	✓			10	2721	272	1268	996	1303	1031	1285	1013	1013	242	✓		Billy S. Kios	4-10-03

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

SECTION 1 (To be completed at Initial Receipt Response Test)

Technician Signature: 

Date: 1-7-23

INSTRUMENT & DETECTOR INFORMATION			DETECTOR TOLERANCE VALUES		EFF	SOURCE INFORMATION	
Instrument Model No.	2350-1	Cal Due Date	Minus 10%	Plus 10%	Net EFF	SEG ID / Serial No.	010002
Instrument Serial No.	136197	6-30-83	33971.7	41530.6		Certification Date	
Detector Model No.	43-688	Cal Due Date	Operating Conditions: <input checked="" type="checkbox"/> Normal <input type="checkbox"/> Cable Length _____ ft. <input type="checkbox"/> Abnormal <input type="checkbox"/> Altitude _____ ft. <input type="checkbox"/> Temperature _____ °F			Nuclide	C-14
Detector Serial No.	093537	6-30-83				Activity in dpm	259740

SECTION 1 Reviewed By:

Date:

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. **IF** the information above is incorrect, DO NOT CONTINUE.

[illegible]

NOTE: 1. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

Date: _____

SECTION 2 (To be completed by RP Technician)

[illegible]

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

Instrument Model		Instrument Serial #		Cal Due Date		Detector Model #		Detector Serial #		Source Serial #					
2350-1		126197		6-10-03		43-688		092528		000020					
Alarm Test		Test Type		Background Data		Source Count Data						Tolerance		Performed by	
Sat/Unsat	Pre	Post	Count Time (min)	Gross BKG CPM	Count 1 (SCR1)	Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MINSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time
					Gross Cnts	Net CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM					
SAT	✓		10	3167	317	34787	34420	32888	38971	37010	3693	✓		B5Kps	7-11-03
SAT	✓		10	2422	243	33499	32856	38502	38659	37151	36908	✓		B5Kps	7-11-03
SAT	✓		10	2751	275	34502	34227	39172	38897	35160	34885	✓		B5Kps	7-15-03
SAT	✓		10	2810	281	35741	35460	40074	37993	35215	34934	✓		B5Kps	7-15-03
SAT	✓		10	2658	266	37431	37165	39207	38943	36966	36700	✓		B5Kps	7-16-03
SAT	✓		10	2751	275	36901	36626	40879	39914	35870	35592	✓		B5Kps	7-16-03
SAT	✓		10	2566	257	33922	33665	39141	38884	37036	36779	✓		B5Kps	7-17-03
SAT	✓		10	2548	255	36051	35796	38825	38570	33184	32929	✓		B5Kps	7-17-03
SAT	✓		10	2527	253	34266	34003	37531	37178	35523	35270	✓		B5Kps	7-18-03
SAT	✓		10	2283	229	27897	27616	37801	37376	32841	32612	✓		B5Kps	7-18-03
SAT	✓		10	2839	284	36058	35794	38668	38384	33607	33323	✓		B5Kps	7-18-03
SAT	✓		10	2998	300	34583	34303	38208	37908	35352	35052	✓		B5Kps	7-18-03
SAT	✓		10	2744	274	35169	34925	38102	37638	35911	35637	✓		B5Kps	7-18-03

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

Instrument Model 2350-1 Instrument Serial # 136197 Cal Due Date 6-30-03 Detector Model # 43-68B Detector Serial # 0925574 Source Serial # 000002
33971.4 - 41520.6 259,740 dpm

Alarm Test	Test Type	Background Data			Source Count Data											Tolerance		Performed by See Note 1	
					Count Time (min)	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff						
						Gross Cnts	Net CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM								
SAT	✓		10	2059	206	34436	34430	38706	38706	38500	36170	32904	36328	137	✓	Billy S. Koss	3-3-03		
SAT	✓		10	2220	223	33786	33784	33960	33960	33838	3525	33030	35277	136	✓	Billy S. Koss	3-6-03		
SAT	✓		10	2396	240	31987	31741	33094	33094	33088	33401	33773	34792	134	✓	Billy S. Koss	3-6-03		
SAT	✓		10	2112	201	34496	34495	34614	34614	34623	34050	33849	35689	137	✓	Billy S. Koss	3-7-03		
SAT	✓		10	2686	269	36957	36688	39195	39195	39222	38333	3763	36759	142	✓	Billy S. Koss	08-35		
SAT	✓		10	2440	248	34791	34593	39920	39920	39172	34418	34170	35963	138	✓	Billy S. Koss	3-18-03		
SAT	✓		10	2674	263	33657	33657	38683	38683	38680	34899	34637	35960	138	✓	Billy S. Koss	3-30-03		
SAT	✓		10	2568	257	34898	34841	38365	38365	37941	34765	34508	35699	137	✓	Billy S. Koss	3-28-03		
SAT	✓		10	2326	233	34879	34846	38729	38729	38696	35678	35645	36329	140	✓	NRK/ps / NRK	4-3-03		
SAT	✓		10	2398	240	35225	34985	38778	38778	38538	36860	36820	36714	141	✓	NRK/ps / NRK	4-3-03		
SAT	✓		10	2689	264	34706	34437	37908	37908	37839	35012	34743	35606	137	✓	NRK/ps / NRK	4-9-03		
SAT	✓		10	2880	288	33260	32972	38773	38773	38485	36185	35901	35786	138	✓	NRK/ps / NRK	08-30		
SAT	✓		10	2741	273	34713	34441	39118	39118	38876	35472	35200	36162	139	✓	Billy S. Koss	4-10-03		
REMARKS:																			11-35

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

**REDS-INST-201
REVISION 4**

SECTION 1 (To be completed at Initial Receipt Response Test)

Technician Signature:

Date: 1-27-03

INSTRUMENT & DETECTOR INFORMATION			ACCEPTABLE INSTRUMENT RESPONSE RANGES			SOURCE INFORMATION	
Instrument Model Number	<u>D3SD-1</u>	Cal Due Date	Geometry	Minus 20 %Net Counts	Plus 20 %Net Counts	SEG I/D No.	<u>D19453</u>
Instrument Serial Number	<u>126197</u>	<u>6-30-03</u>	Position 1 @ Contact	<u>400985.6</u>	<u>601478.4</u>	Certificate Date	<u>1-1-92</u>
Detector Model Number	<u>44-2</u>		Position 2 @ 6 Inches	6385.6 ^{HOL 1-27-03} <u>7206.4</u>	12578.4 ^{HOL 1-27-03} <u>10809.6</u>	Nuclide	<u>Cs-137</u>
Detector Serial Number	<u>P8095085</u>	<u>6-30-03</u>	Position 3 @ 18 Inches	<u>1020.8</u>	<u>1531.2</u>	Activity in µCi	
Operating Conditions:			<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Abnormal: <input type="checkbox"/> Altitude _____ ft. <input type="checkbox"/> Temperature _____ °F <input type="checkbox"/> Cable Length _____ ft.				

SECTION 1 Reviewed By:

Date:

SECTION 2 (To be completed by RP Technician). Prior to beginning, verify the Instrument SNs listed above.

IF the above information is incorrect, DO NOT CONTINUE.

ACTUAL INSTRUMENT RESPONSE

[illegible]

Remarks:

NOTE 1: By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By:

Date: _____

OPERATION OF THE LUDLUM MODEL
2350 SERIES DATA LOGGERS

REDS-INST-201
REVISION 4

GAMMA DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician).

Instrument Model <u>2350-1</u>		Instrument Serial # <u>126197</u>		Cal Due Date <u>6-30-03</u>		Detector Model # <u>44-2</u>		Detector Serial # <u>009585</u>		Source Serial # <u>019953</u>						
Alarm Test	Test Type	Background Data			Count Time (min)	Source Count Data						Tolerance	Performed by See Note 1			
		Pre	Post	Count Time (min)		Position 1 @ contact		Position 2 @ 6 inches		Position 3 @ 18 inches			Pass	Fail	Technician (Name Printed & Initialed)	Date/Time
						Gross BKG Counts	BKG CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM					
SAT	✓			5	7659	1538	511893	510361	10933	9901	2797	1215	✓		Betty S. Kjos	1330
SAT	✓		✓	5	7371	1474	499370	497838	10916	8942	2827	1353	✓		Betty S. Kjos	1330
SAT	✓		✓	5	7648	1526	523389	521863	10887	8761	2873	1347	✓		Betty S. Kjos	1330
SAT	✓		✓	5	6677	1335	485889	484554	10226	8891	2697	1362	✓		Betty S. Kjos	1330
SAT	✓		✓	5	6887	1373	509548	508175	9884	8571	2664	1291	✓		Betty S. Kjos	1330
SAT	✓		✓	5	7052	1410	489282	487872	9903	8493	2727	1317	✓		Betty S. Kjos	1330
SAT	✓		✓	5	6583	1337	513930	512193	9920	8643	2766	1489	✓		Betty S. Kjos	1330
SAT	✓		✓	5	6697	1339	491446	490107	10097	8708	2735	1396	✓		Betty S. Kjos	1330
SAT	✓		✓	5	6993	1389	483325	481936	10294	8905	2703	1314	✓		Betty S. Kjos	1330
SAT	✓		✓	5	6925	1385	481631	480296	10241	8856	2805	1420	✓		Betty S. Kjos	1330
SAT	✓		✓	5	6541	1308	488554	487246	10176	8868	2610	1302	✓		Betty S. Kjos	1330
SAT	✓		✓	5	7446	1409	511564	510075	10514	9025	2905	1416	✓		Betty S. Kjos	1330
SAT	✓		✓	5	7764	1553	493762	492209	10638	9085	2803	1450	✓		Betty S. Kjos	1330

REMARKS:

NOTE 1: By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

OPERATION OF THE LUDLUM MODEL
2350 SERIES DATA LOGGERS

REDS-INST-201
REVISION 4

GAMMA DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician).

Instrument Model # 630-1		Instrument Serial # 126197		Cal Due Date 630-03		Detector Model # 74-2		Detector Serial # 080815		Source Serial # 019953						
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1			
		Pre	Post	Count Time (min)	Position 1 @ contact		Position 2 @ 6 inches		Position 3 @ 18 inches		Pass	Fail	Technician (Name Printed & Initialed)	Date/ Time		
					Gross Cnts	Net CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM						
SAT	✓			5	7049	1410	487918	486508	10670	9260	2783	1373	✓		B.S. Jps	3-30-03
SAT	✓			5	7485	1497	500177	498682	10219	8732	3753	1956	✓		B.S. Jps	3-30-03
SAT	✓			5	7219	1444	454844	453400	10170	8736	2635	1191	✓		B.S. Jps	3-30-03
SAT	✓			5	7345	1469	500353	498884	10166	8697	2669	1200	✓		B.S. Jps	3-30-03
SAT	✓			5	7331	1466	483725	483459	10305	8839	2821	1355	✓		B.S. Jps	3-30-03
SAT	✓			5	7748	1549	539964	537915	10453	8904	2668	1119	✓		D. Schumacher	4-24-03
SAT	✓			5	7092	1418	533185	531767	10162	8744	2721	1303	✓		D. Schumacher	4-24-03
REMARKS:																

NOTE 1: By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

**REDS-INST-201
REVISION 4**

Date: 9-5-02

Technician Signature:

Date: _____

SECTION 2 (To be completed by RP Technician). Prior to beginning, verify the Instrument SNs listed above.

ACTUAL INSTRUMENT RESPONSE

Remarks:

SECTION 2 Reviewed By:

Date:

Initial Response Test

OPERATION OF THE LUDLUM MODEL
2350 SERIES DATA LOGGERS

REDS-INST-201
REVISION 4

GAMMA DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician).

Instrument Model <u>2350-1</u>		Instrument Serial # <u>126197</u>		Cal Due Date <u>8-5-03</u>		Detector Model # <u>44-2</u>		Detector Serial # <u>095082</u>		Source Serial # <u>19953</u>							
Alarm Test	Test Type	Background Data			Count Time (min)	Source Count Data						Tolerance		Performed by See Note 1			
		Pre	Post	Count Time (min)		Position 1 @ contact		Position 2 @ 6 inches		Position 3 @ 18 inches		Pass	Fail	Technician (Name Printed & Initialed)	Date/ Time		
						Gross Cnts	Net CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM						
SAT	✓			5	8269	1794	1	488763	488469	11390	9596	3302	1508	✓		BSK/OS	8-20-03
SAT	✓			5	4261	1852	1	476873	475021	10805	8957	3321	1469	✓		BSK/OS	8-20-03
SAT	✓			5	8761	1752	1	489973	488221	10995	9243	3376	1624	✓		BSK/OS	8-20-03
SAT	✓			5	9142	1828	1	485184	483356	11209	9381	3323	1495	✓		BSK/OS	8-20-03
SAT	✓			5	8780	1756	1	490051	488295	11148	9392	3388	1632	✓		BSK/OS	8-20-03
SAT	✓			5	8805	1763	1	480831	479068	10998	9235	3318	1555	✓		BSK/OS	8-20-03
SAT	✓			5	8863	1773	1	483460	481687	11422	9649	3383	1610	✓		BSK/OS	8-20-03
SAT	✓			5	10689	2138	1	492308	490170	10904	8766	3323	1486	✓		BSK/OS	8-20-03
SAT	✓			5	9408	1887	1	507736	500884	11008	9136	3311	1327	✓		BSK/OS	8-20-03
REMARKS:																	

NOTE 1: By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

960.3 - 1173.7

(9.194) 72-99

Instrument Model		Instrument Serial #		Cal Due Date		Detector Model #		Detector Serial #		Source Serial #						
2350-1		126197		2-15-03		43-680		072524		119655						
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance	Performed by				
		Count Time (min)	Gross BKG CPM	BKG CPM	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)			Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time
Sat/Unsat	Pre	Post	Count Time (min)	Gross BKG CPM	BKG CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM					
SAT	✓		10	236	236	1309	1073	1396	1160	1210	974	1069	✓		B.S.Kjos	8-18-02
SAT	✓		10	233	233	1201	978	1210	987	1243	1019	995	✓		B.S.Kjos	8-29-02
SAT	✓		10	393	393	1442	1049	1410	1017	1332	939	1002	✓		B.S.Kjos	8-30-02
SAT	✓		10	311	311	1358	1047	1257	946	1168	857	950	✓		B.S.Kjos	9-3-02
SAT	✓		10	311	311	1323	1011	1384	1073	1130	819	968	✓		B.S.Kjos	9-3-02
SAT	✓		10	298	298	1385	1087	1392	1094	1296	998	1060	✓		B.S.Kjos	9-4-02
SAT	✓		10	267	267	1294	1077	1342	1075	1259	992	1048	✓		B.S.Kjos	9-5-02
SAT	✓		10	233	233	1097	903	1233	1029	1075	831	924	✓		B.S.Kjos	9-9-02
SAT	✓		10	230	230										B.S.Kjos	9-9-02
SAT	✓		10	296	296	1375	1079	1361	1065	1199	903	1016	✓		B.S.Kjos	9-10-02
SAT	✓		10	301	301										B.S.Kjos	9-10-02
SAT	✓		10	315	315										B.S.Kjos	9-10-02
SAT	✓		10	346	346	1394	1048	1431	1085	1393	1047	1060	✓		B.S.Kjos	9-12-02

REMARKS: * - did not use, ** had not let meter purge long enough *** changed m/lme

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

960.3 - 1173.7

(K199) T-99

Instrument Model 2350 1		Instrument Serial # 1266197		Cal Due Date 2-15-03		Detector Model # 43680		Detector Serial # 092527		Source Serial # 119655						
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1			
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time
SAT	✓	10	2440	244	1332	1088	1372	1128	1310	1066	1094	24	✓		B.S.Kjos BSK	9-13-02 0730
SAT	✓	10	2269	227	1295	268	1439	1112	1404	1077	1052	25	✓		B.S.Kjos BSK	9-16-02 0730
SAT	✓	10	2593	259	1370	1111	1474	1215	1315	1056	1127	29	✓		B.S.Kjos BSK	9-17-02 0730
SAT	✓	10	2568	257	1396	1139	1490	1233	1435	1178	1183	27	✓		B.S.Kjos BSK	9-18-02 1255
SAT	✓	10	3023	302	1347	1045	1481	1279	1378	1076	1100	26	✓		B.S.Kjos BSK	9-19-02 0735
SAT	✓	10	2407	241	1230	989	1337	1096	1330	1089	1058	25	✓		B.S.Kjos BSK	9-26-02 0710
SAT	✓	10	2636	263	1380	1117	1342	1079	1419	1156	1117	26	✓		B.S.Kjos BSK	9-27-02 0830
SAT	✓	10	2478	248	1285	1037	1300	1052	1251	1003	1031	26	✓		B.S.Kjos BSK	9-30-02 1010
SAT	✓	10	2540	254	1278	1024	1293	1027	1343	1089	1051	25	✓		B.S.Kjos BSK	10-1-02 0720
SAT	✓	10	2932	293	1254	961	1301	1008	1381	1088	1019	25	✓		B.S.Kjos BSK	10-2-02 0800
SAT	✓	10	2712	271	1244	973	1276	1005	1175	904	960.7	29	✓		Longley R. Kjos BSK	10-23-02 0715
SAT	✓	10	3066	307	1306	999	1320	1013	1298	991	1001	23	✓		Longley R. Kjos BSK	10-24-02 0815
SAT	✓	10	1873	187	1318	1121	1386	1129	1328	1141	1157	26	✓		B.S.Kjos BSK	10-30-02 0905

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

Instrument Model **2350-1** Instrument Serial # **126197** Cal Due Date **02-15-03** Detector Model # **48-688** Detector Serial # **092524** Source Serial # **119655**

960.3 - 1173.7

(4194)

TC-99

Alarm Test	Test Type		Background Data			Source Count Data										Tolerance		Performed by See Note 1	
						Count Time (min)	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MINSCR	Eff					
							Gross Cnts	Net CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM							
SAT	✓		10	2531	253	1	1472	1219	1474	1221	1267	1014	1151	.234	✓		VenMiles/ton	10-09-02 0850	
SAT	✓		10	2523	257	1	1350	1071	1373	1113	1319	1060	1081	.258	✓		B5Kjos	10-10-02 0755	
SAT	✓		10	2703	272	1	1250	954	1370	1094	1246	970	1006	.240	✓		B5Kjos	10-11-02 0713	
SAT	✓		10	2395	240	1	1534	1294	1549	1309	1333	1093	1233	.293	✓		B5Kjos	10-16-02 0730	
SAT	✓		10	3049	305	1	1306	1001	1338	1033	1253	948	994	.237	✓		B5Kjos	10-16-02 0848	
SAT	✓		10	2681	268	1	1259	991	1296	1028	1270	1002	1007	.240	✓		B5Kjos	10-17-02 0720	
SAT	✓		10	2397	240	1	1263	1023	1319	969	1150	910	967	.233	✓		B5Kjos	10-30-02 0845	
SAT	✓		10	2618	262	1	1209	947	1231	969	1190	928	948	.226	✓		VenMiles/ton	10-31-02 0825	
SAT	✓		10	2427	243	1	1251	1008	1296	1053	1125	882	981	.234	✓		VenMiles/ton	10-31-02 0755	
SAT	✓		10	2784	278	1	1292	1014	1304	1026	1225	947	996	✓	✓		VenMiles/ton	11-01-02 0820	
SAT	✓		10	2447	245	1	1159	949		B5K	1150						B5Kjos	11-5-02	
SAT	✓		10	2530	253	1	1231	978	1259	1006	1101	848	944	.225	✓		VenMiles/ton	11-11-02 0825	
SAT	✓		10	1907	191	1	1165	974	1265	1074	1182	991	1013	.242	✓		VenMiles/ton	11-11-02 0850	

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

SECTION 2 (To be completed by RP Technician)

[illegible]

NOTE: 1.. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

Date: 8-27-02

SECTION 1 Reviewed By: _____ Date: _____

SECTION 1 Reviewed By: _____ Date: _____

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. IF the information above is incorrect, DO NOT CONTINUE.

REMARKS: Initial Response Test

NOTE: 1. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

34780.5 — 43509.5

(259740) C-14

Instrument Model		Instrument Serial #		Cal Due Date		Detector Model #		Detector Serial #		Source Serial #					
2350-1		126197		2-15-03		43-68B		092524		010022					
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by		
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)	Count 2 (SCR2)	Count 3 (SCR3)	Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time		
SAT	✓	10	2356	236	38956	41070	40874	34763	38557	37860	146	✓		A.S. Kjos	8-28-02
SAT	✓	10	2236	223	35936	40484	40261	35316	35093	37019	143	✓		A.S. Kjos	8-29-02
SAT	✓	10	3931	393	39001	40270	37049	36656	36656	38511	148	✓		A.S. Kjos / R/K	8-30-02
SAT	✓	10	3111	311	38877	39043	38732	34939	34618	36639	141	✓		A.S. Kjos	8-30-02
SAT	✓	10	2979	298	39710	39917	39619	34261	37763	37665	145	✓		A.S. Kjos	9-1-02
SAT	✓	10	2674	267	39376	40388	40121	33918	33651	37637	145	✓		A.S. Kjos	9-5-02
SAT	✓	10	1935	194										A.S. Kjos / R/K	9-9-02
SAT	✓	10	1300	130										A.S. Kjos / R/K	9-9-02
SAT	✓	10	2857	286	39391	39748	39452	35457	35161	37903	146	✓		A.S. Kjos / R/K	9-10-02
SAT	✓	10	3006	301	37496	43258	42957	38597	38246	39483	152	✓		A.S. Kjos / R/K	9-11-02
SAT	✓	10	3148	315											
SAT	✓	10	3456	346	37596	40733	40376	36301	35955	37794	146	✓		A.S. Kjos	9-12-02
SAT	✓	10	3440	344	35998	40458	40314	36179	35955	37301	144	✓		A.S. Kjos	9-13-02

REMARKS: * - Did not let meter purge long enough ** - did not use *** - changed m/lac

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

Instrument Model 2350-1 Instrument Serial # 126197 Cal Due Date 2-15-03 Detector Model # 43-685 Detector Serial # 092587 Source Serial # 010023 2470.5 - 42509.5 (259.70) C-14

Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by			
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MINSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time
SAT	✓	10	3269	327	36551	36084	40630	40023	37914	37587	38038	146	✓		B.S.Kjos	9-16-02 0800
SAT	✓	10	2593	259	36981	36084	40760	40501	37731	37492	38233	147	✓		B.S.Kjos	9-17-02 1010
SAT	✓	10	2568	257	35989	35733	4208	4111	38293	38035	38793	149	✓		B.S.Kjos	9-18-02 1305
SAT	✓	10	3023	302	34574	34072	41067	40825	38579	38277	37705	145	✓		B.S.Kjos	9-19-02 0900
SAT	✓	10	2407	241	36191	35920	40704	40466	39005	38764	38393	148	✓		B.S.Kjos	9-20-02 0720
SAT	✓	10	2626	263	35622	35322	40639	40763	37730	37467	37735	149	✓		B.S.Kjos	9-27-02 0845
SAT	✓	10	2478	248	36257	36011	37650	37402	36596	36398	35587	137	✓		B.S.Kjos	9-30-02 1015
SAT	✓	10	2540	254	36051	35974	40379	40025	36656	36702	37355	138	✓		B.S.Kjos	10-1-02 0745
SAT	✓	10	2932	293	34429	3442	37912	37507	35500	35364	36373	140	✓		B.S.Kjos	10-2-02 0810
SAT	✓	10	2712	271	36193	35922	40227	39956	36703	36432	37437	144	✓		B.S.Kjos	10-3-02 0725
SAT	✓	10	3066	307	35646	35339	38124	37817	34858	34551	35902	138	✓		W.Miller	10-04-02 0825
SAT	✓	10	1873	187	35112	34925	39115	38828	34461	34394	36142	139	✓		B.S.Kjos	10-8-02 0715
SAT	✓	10	2531	253	33245	33092	38288	38035	34824	34571	35199	136	✓		W.Miller	10-09-02 0835

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

34710.5 - 43509.5

(239740)

C-14

Instrument Model # 2350-1		Instrument Serial # 136197		Cal Due Date 3-15-03		Detector Model # 43-6180		Detector Serial # 023524		Source Serial # 00003						
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1			
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time
SAT	✓	10	2593	259	3337	3540	3838	3809	33784	33525						
SAT	✓	10	2703	276	33452	33776	38777	38061	34736	34450	35242	136	✓		B.S. Jps	10-11-02
SAT	✓	10	3019	305	35705	35900	39679	39269	39658	33553	36041	139	✓		B.S. Jps	10-16-02
SAT	✓	10	2681	268	34960	34887	38244	37976	33388	3430	34929	134	✓		B.S. Jps	10-17-02
SAT	✓	10	2377	240	35611	35373	36814	36574	34920	34680	35522	137	✓		B.S. Jps	10-30-02
SAT	✓	10	2618	262	33342	33719	37421	37178	33552	33309	34735	134	✓		V. Miles	10-31-02
SAT	✓	10	2427	243	35477	35234	37129	36886	33871	33628	35249	136	✓		V. Miles	10-31-02
SAT	✓	10	2784	278	34759	34491	36808	36320	37036	36758	35923	138	✓		V. Miles	11-01-02
SAT	✓	10	2477	243				11-5-02							B.S. Jps	11-5-02
SAT	✓	10	2530	253				11-11-02								
SAT	✓	10	1907	191	35344	35153	37777	37526	35181	34990	35890	138	✓		V. Miles	11-11-02
SAT	✓	10	3205	321	36680	36397	41044	40723	38092	37771	38784	147	✓		B.S. Jps	11-12-02

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

SECTION 2 (To be completed by RP Technician)

Instrument Model	Instrument Serial #	Cal Due Date	Detector Model #	Detector Serial #	Source Serial #
3350-1	126197	2-15-03	43-68B	092524	010002

34780.5 - 42509.5 (297.740) C-14

[illegible]

NOTE: 1. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

Date: 10-07-02

Technician Signature: *Amila*

SECTION I Reviewed By:

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. **IF** the information above is incorrect, **DO NOT CONTINUE.**

REMARKS:

SECTION 2 Reviewed By: _____ Date: _____

SECTION 2 (To be completed by RP Technician)			
Instrument Model	2350-1	Instrument Serial #	126197
Cal Due Date	02-15-03	Detector Model #	43-68A
Detector Serial #	092524	Source Serial #	119737
		(18,720) 74-230	

[illegible]

SECTION 2 Reviewed By: _____ Date: _____



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

CALIBRATION CERTIFICATE

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

CUSTOMER INFORMATION		INSTRUMENT INFORMATION	
Customer Name: GTS Duratek - Instrument Services Facility		Manufacturer:	Ludlum
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 2350-1	Serial Number: 129401
Contact Name: Thomas Scott		Probe: N/A	Serial Number: N/A
Customer Purchase Order Number: N/A	Work Order Number: 2002-01434	Calibration Method: Electronic and Source	

INSTRUMENT CALIBRATION INFORMATION

Instrument Range (CPM)	Calibration Standard Value (CPM)	Instrument Response		Comments
		Before Calibration	After Calibration	Calibrated in accordance with RP-INS-I-245 Rev 0
400K	400,000	403,048	403,048	Pulser: 120935 Cal Due: 03/18/03
40K	40,000	40,322	40,322	D-814: 2525 Cal Due: 02/18/03
4K	4,000	4,044	4,044	Psychron: 7480 Cal Due: 05/17/03
400	400	407	407	EPPROM Version: 37122N21
HV Cal Values (M2350 HV Entry)	Desired HV (Voltmeter) (VDC)	As Found (VDC)	As Left (VDC)	
600	600	609	609	Temp: 22.2°C
1,200	1,200	1,204	1,204	Pressure: 744 mmHg
1,800	1,800	1,798	1,798	Humidity: 34 %
Parameter	Tolerance ($\pm 10\%$)	As Found	As Left	
Low End Threshold	4 \pm (3.6 to 4.4) mVDC	4.10	4.10	Geotropism: SAT ACK/Scroll: SAT
Midpoint Threshold	20 \pm (18 to 22) mVDC	19.5	19.5	BAT>4.5: SAT Volume: SAT
High End Threshold	40 \pm (36 to 44) mVDC	38.0	38.0	Count: SAT Audio Divide: SAT
Window Width	4 \pm (3.6 to 4.6) mVDC	4	4	Alarms: SAT Lamp: SAT
Display-to-mV ratio:	100 to 4 mV			Overload Test: SAT

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:

Reviewed By:

Date: 12-31-02


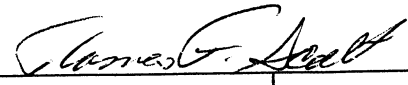
Calibration Date: 12/30/02

Calibration Due: 06/30/03

**DETECTOR
CERTIFICATE**

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

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

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68B			
Contact Name: Thomas Scott				Serial Number: 119337			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: C ¹⁴		Serial Number: 019708		Activity (dpm) : 26,640		Certification Date: 11/20/96	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)		
Count 1	4,209	4,287	Count 1(Heel)		4,184		
Count 2	4,297	4,187	Count 2(Center)		4,234		
Count 3	4,086	4,171	Count 3(Toe)		3,915		
Average	4,197.3	4,215	Average		4,111		
Background (cpm)	352.1	344.1	Pass/Fail		PASS		
Net Counts	3,845.2	3,870.9			Tolerance ±10%		
Efficiency	14.4%	14.5%			Min: 3,700	Max: 4,522	
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.1E ⁻⁶		Calibration Constant (CC): 1.0	
SCALER INFORMATION				DETECTOR INFORMATION			
Model	Serial Number		Due Date	Background (cpm)	Operating Voltage	Threshold	
2350-1	129401		06/30/03	344.1	1800	4 mV	
Detector Setup Report YES <input checked="" type="checkbox"/> NO			Barcode Report YES <input checked="" type="checkbox"/> NO		Voltage Plateau YES <input checked="" type="checkbox"/> NO		
COMMENTS							
Detector has one layer mylar at .4mg/cm ² **Calibrated with 25Ft. Cable** Caled in accordance with RP-INS-I-245.							
10 minute background performed Efficiency determined w/43-68 source jig Dead Time set to manufacturer's suggested setting							
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: 		Date: 12-31-02			
Certification Date: 12/30/02				Certification Due: 06/30/03			

BACKGROUND PLATEAU 43-68 #119337 25FT CABLE 12/30/02

900	1
950	0
1000	0
1050	0
1100	0
1150	0
1200	1
1250	5
1300	3
1350	4
1400	1
1450	3
1500	4
1550	7
1600	34
1650	82
1700	136
1750	266
1800	306
1850	319
1900	402

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	0
1100	8
1150	879
1200	2354
1250	3327
1300	3828
1350	3894
1400	3931
1450	4163
1500	4125

BETA PLATEAU C14 #019708 26,640DPM

1400	39
1450	395
1500	1178
1550	2132
1600	2891
1650	3452
1700	3770
1750	3791
1800	3892
1850	4292
1900	4911
1950	5958



12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D1 in the Model 2350.
Today's date is 12/31/2002.
The current time of day is: 14:08:08.

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

Comments:

Model 2350 Serial # =	129401.
User I.D. =	DRK2986.
High Voltage =	1800 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.210000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68B.
Detector Serial # =	119337.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.4 volts.

DET1

Generated: 12/31/2002 14:00:46.

Model 2350 Serial #129401



H1800\$M
Set High Voltage: 1800



T100\$Q
Set Threshold: 100



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



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



F60\$H
Set Scaler Count Time: 60



SU7\$I
Set Readout Units = counts



SB1\$-
Set Readout Time Base = min



SM0\$3
Set Readout Range Multiplier = auto



SL2.210000E-05\$D
Set Dead Time: 2.210000E-05



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



M43-68B\$0
Set Detector Model: 43-68B



N119337\$0
Set Detector Serial #: 119337



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

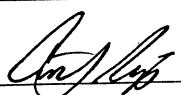



SP1\$7
SAVE PARAMETERS AS D1

**DETECTOR
CERTIFICATE**

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

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

CUSTOMER INFORMATION				DETECTOR INFORMATION			
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum			
Address: 628 Gallaher Rd Kingston, TN 37763				Detector Model: 43-68A			
Contact Name: Thomas Scott				Serial Number: 119337			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Th ²³⁰		Serial Number: 119738		Activity (dpm): 18,600		Certification Date: 10/20/97	
Parameter	As Found	As Left	Precision Test		CPM (Source #1)		
Count 1	4,085	4,096	Count 1(Heel)		3,800		
Count 2	4,135	4,123	Count 2(Center)		4,109		
Count 3	4,199	4,172	Count 3(Toe)		3,866		
Average	4,139.7	4,130.3	Average		3,925		
Background (cpm)	1.7	1.2	Pass/Fail		PASS		
Net Counts	4,138	4,129.1			Tolerance ±10%		
Efficiency	22.2%	22.2%			Min: 3,532.5	Max: 4,317.5	
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 19.4E ⁻⁶		Calibration Constant (CC): 1.0	
SCALER INFORMATION				DETECTOR INFORMATION			
Model	Serial Number		Due Date	Background (cpm)	Operating Voltage	Threshold	
2350-1	129401		06/30/03	1.2	1400	4 mV	
Detector Setup Report		YES ✓ NO	Barcode Report		YES ✓ NO	Voltage Plateau YES ✓ NO	
COMMENTS							
Detector has one layer mylar window **Calibrated with 25Ft. Cable** Calibrated in accordance with RP-INS-I-245.							
10 minute background Efficiency determined w/43-68 source jig Dead Time set to manufacturer's suggested setting							
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: 		
Certification Date: 12/30/02		Date: 12-31-02			Certification Due: 06/30/03		

BACKGROUND PLATEAU 43-68 #119337 25FT CABLE 12/30/02

900	1
950	0
1000	0
1050	0
1100	0
1150	0
1200	1
1250	5
1300	3
1350	4
1400	1
1450	3
1500	4
1550	7
1600	34
1650	82
1700	136
1750	266
1800	306
1850	319
1900	402

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	0
1100	8
1150	879
1200	2354
1250	3327
1300	3828
1350	3894
1400	3931
1450	4163
1500	4125

BETA PLATEAU C14 #019708 26,640DPM

1400	39
1450	395
1500	1178
1550	2132
1600	2891
1650	3452
1700	3770
1750	3791
1800	3892
1850	4292
1900	4911
1950	5958



12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D2 in the Model 2350.
Today's date is 12/31/2002.
The current time of day is: 14:08:27.

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

Comments:

Model 2350 Serial # =	129401.
User I.D. =	DRK2986.
High Voltage =	1400 volts.
Threshold =	100.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.940000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-68A.
Detector Serial # =	119337.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.4 volts.

DET2

Generated: 12/31/2002 14:05:30.

Model 2350 Serial #129401



H1400\$I

Set High Voltage: 1400



T100\$Q

Set Threshold: 100



W1000\$WOFF\$P

Set Window: 1000,OFF



O400\$OOFF\$C

Set Overload: 400,OFF



F60\$H

Set Scaler Count Time: 60



SU7\$I

Set Readout Units = counts



SB1\$-

Set Readout Time Base = min



SM0\$3

Set Readout Range Multiplier = auto



SL1.940000E-05\$M

Set Dead Time: 1.940000E-05



SC1.000000E+00\$0

Set Calibration Constant: 1.000000E+00



M43-68A\$%

Set Detector Model: 43-68A



N119337\$0

Set Detector Serial #: 119337



J1.000000E+09\$V

Set Ratemeter Alarm: 1.000000E+09



K1000000\$H

Set Scaler Alarm: 1000000



P1.000000E+09\$.

Set Dose Alarm: 1.000000E+09



SP2\$8

SAVE PARAMETERS AS D2



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: 44-2			
Contact Name: Thomas Scott				Serial Number: 088920			
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source			
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION							
1) Source Nuclide: Cs ¹³⁷		Serial Number: 019463		Activity: 5μCi		Certification Date: N/A (Used for Plateau Only)	
2) Source Nuclide: Cs ¹³⁷		Serial Number: 049711		Activity: Variable		Certification Date: 03/27/02	
Parameter		Precision Test		mR/Hr (Source #2)			
Count 1	N/A	Count 1		2.01			
Count 2	N/A	Count 2		1.98			
Count 3	N/A	Count 3		1.96			
Average	N/A	Average		1.98			
Background	N/A	Pass/Fail		Pass			
Net Counts	N/A			Tolerance ±10%			
Efficiency	N/A			Min: 1.782		Max: 2.188	
Low Sample Activity: Source #2: 20,687		High Sample Activity: Source #2: 78,734		Dead Time (DT): 4.922908E ⁻⁵		Calibration Constant (CC): 1.695410E ⁺¹⁰	
ATTACHMENTS				DETECTOR DATA: DOSE RATE PROBES (mR/Hr)			
Detector Setup Report	YES ✓	NO	Desired Exposure	Tolerance ±10%	As Found	As Left	
Barcode Report	YES ✓	NO	0.400	0.360-0.440	.405	.420	
Voltage Plateau:	YES ✓	NO	1	0.90-1.10	.97	.95	
High Voltage: 850V			2	1.8-2.2	2.14	1.98	
COMMENTS							
Calibrated with 5ft. Cable				Caled in accordance with RP-INS-I-245.			
STATEMENT OF CERTIFICATION							
We Certify that the detector listed above was evaluated for proper operation prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this detector).							
Detector							
Certified By: <i>[Signature]</i>		Reviewed By: <i>[Signature]</i>				Date: 1-22-03	
Certification Date: 12/30/02				Certification Due: 06/30/03			

BACKGROUND PLATEAU 44-2 #088920 12/30/02 5FT CABLE

500	7
550	29
600	158
650	412
700	681
750	692
800	706
850	685
900	720
950	688
1000	647

SOURCE PLATEAU Cs137 #019461 5uCi

500	21
550	1851
600	3773
650	5378
700	5836
750	6619
800	6618
850	6521
900	6587
950	6474
1000	6627

James F. Agost

12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D3 in the Model 2350.
Today's date is 12/31/2002.
The current time of day is: 14:08:45.

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

Comments:

Model 2350 Serial # =	129401.
User I.D. =	DRK2986.
High Voltage =	850 volts.
Threshold =	250.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	12 seconds.
Readout Units =	R.
Readout Time Base =	hr.
Readout Range Multiplier =	auto.
Detector Dead Time =	4.922908E-05.
Detector Calibration Constant =	1.695410E+10.
Detector Model =	44-2.
Detector Serial # =	088920.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.4 volts.

DET3

Generated: 12/31/2002 14:06:02.

Model 2350 Serial #129401



H850\$Q
Set High Voltage: 850



T250\$W
Set Threshold: 250



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



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



F12\$E
Set Scaler Count Time: 12



SU4\$F
Set Readout Units = R



SB2\$.
Set Readout Time Base = hr



SM0\$3
Set Readout Range Multiplier = auto



SL4.922908E-05\$%
Set Dead Time: 4.922908E-05



SC1.695410E+10\$Q
Set Calibration Constant: 1.695410E+10



M44-2\$L
Set Detector Model: 44-2



N088920\$3
Set Detector Serial #: 088920



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

**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: 43-37B	
Contact Name: Thomas F. Scott				Serial Number: 093717	
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
Source Nuclide: C ¹⁴		Serial Number: 019708		Activity: 26,640dpm	
				Certification Date: 11/20/96	
Parameter	As Found	As Left	Precision Test		CPM
Count 1	4290	4407	Count 1 (Heel)		4471
Count 2	4301	4455	Count 2 (Center)		4248
Count 3	4368	4266	Count 3 (Toe)		4321
Count 4	4326	4183	Average		4346.7
Count 5	4403	4323	Pass/Fail		PASS
Count 6	4372	4343	High Voltage		1850V
Average	4343.3	4329			
Background (CPM)	1302	1209.7			
Net Counts	3041.3	3119.3			Tolerance ±10%
Efficiency	11.4%	11.7%			Min: 3912.1 Max: 4781.3
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 22.4E ⁻⁰⁶ Calibration Constant (CC): 1.0	
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold
2350-1	129401	06/30/03	1209.7	1850	4 mV
Detector Setup Report YES ✓ NO		Barcode Report YES ✓ NO		Voltage Plateau YES ✓ NO	
COMMENTS					
Special Remarks: 1 layer Mylar (0.4mg/cm ²) 10 minute background performed			Caled in accordance with RP-INS-I-245 Efficiency performed on contact 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>[Signature]</i>		Reviewed By: <i>[Signature]</i>		Date: 12-31-02	
Certification Date: 12/31/02			Certification Due: 06/30/03		

BACKGROUND PLATEAU 43-37 #093717 5FT CABLE 12/30/02

900	0
950	0
1000	0
1050	0
1100	2
1150	1
1200	4
1250	2
1300	3
1350	4
1400	3
1450	5
1500	11
1550	22
1600	94
1650	206
1700	347
1750	552
1800	945
1850	1203
1900	1457
1950	27406

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	0
1100	1
1150	892
1200	2793
1250	3377
1300	3648
1350	3760
1400	3724
1450	3855
1500	3975

BETA PLATEAU C14 #019708 26,640DPM

1400	3832
1450	3860
1500	3850
1550	3863
1600	4152
1650	4670
1700	4990
1750	5319
1800	5798
1850	6087
1900	6412
1950	8648

James F. Salt
12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D4 in the Model 2350.

Today's date is 12/31/2002.

The current time of day is: 14:09:08.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE:

JA

Comments:

Model 2350 Serial # =	129401.
User I.D. =	DRK2986.
High Voltage =	1850 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.240000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-37C14.
Detector Serial # =	093717.
Ratemeter Alarm Setting =	.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.4 volts.

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D4 in the Model 2350.

Today's date is 12/31/2002.

The current time of day is: 14:09:08.

I have verified the list below

has NO discrepancies with the DETECTOR SETTINGS TABLE: PR

Comments:

Model 2350 Serial # =	129401.
User I.D. =	DRK2986.
High Voltage =	1850 volts.
Threshold =	100.
Window =	1000,Off.
Overload Current =	40.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	2.240000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-37C14.
Detector Serial # =	093717.
Ratemeter Alarm Setting =	.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.4 volts.

DET4

Generated: 12/31/2002 14:06:52.

Model 2350 Serial #129401



H1850\$R

Set High Voltage: 1850



T100\$Q

Set Threshold: 100



W1000\$WOFF\$P

Set Window: 1000,OFF



O400\$OOFF\$C

Set Overload: 400,OFF



F60\$H

Set Scaler Count Time: 60



SU7\$I

Set Readout Units = counts



SB1\$-

Set Readout Time Base = min



SM0\$3

Set Readout Range Multiplier = auto



SL2.240000E-05\$G

Set Dead Time: 2.240000E-05



SC1.000000E+00\$0

Set Calibration Constant: 1.000000E+00



M43-37C14\$2

Set Detector Model: 43-37C14



N093717\$3

Set Detector Serial #: 093717



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



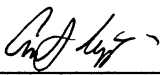

SP4\$A

SAVE PARAMETERS AS D4

**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: 43-37A	
Contact Name: Thomas F. Scott				Serial Number: 093717	
Customer Purchase Order Number: N/A		Work Order Number: 2002-01434		Evaluation Method: Source	
DETECTOR EFFICIENCY/RESPONSE/PRECISION INFORMATION					
Source Nuclide: Th ²³⁰		Serial Number: 119738		Activity: 18,600 dpm	
				Certification Date: 10/20/97	
Parameter	As Found	As Left	Precision Test		CPM
Count 1	3657	3,951	Count 1 (Heel)		3672
Count 2	3721	3,986	Count 2 (Center)		3753
Count 3	3766	3,869	Count 3 (Toe)		3876
Count 4	3812	3,947	Average		3767
Count 5	3705	3,953	Pass/Fail		PASS
Count 6	3783	3,938	High Voltage		1350V
Average	3740.7	3940.7			
Background (CPM)	7.3	5.5			
Net Counts	3733.4	3935.2			Tolerance ±10%
Efficiency	20.1%	21.2%			Min: 3,390.3 Max: 4,143.7
Low Sample Activity: Source #: N/A		High Sample Activity: Source #: N/A		Dead Time (DT): 19.3E ⁻⁰⁶	Calibration Constant (CC): 1.0
SCALER INFORMATION			DETECTOR INFORMATION		
Model	Serial Number	Due Date	Background (cpm)	Operating Voltage	Threshold
2350-1	129401	06/30/03	5.5	1350	4 mV
Detector Setup Report		YES ✓ NO	Barcode Report		YES ✓ NO
			Voltage Plateau		YES ✓ NO
COMMENTS					
Special Remarks: 1 layer Mylar (0.4mg/cm ²) 10 minute background performed			Caled in accordance with RP-INS-I-245 Efficiency performed on contact 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: 		Date: 12-31-02	
Certification Date: 12/31/02			Certification Due: 06/30/03		

BACKGROUND PLATEAU 43-37 #093717 5FT CABLE 12/30/02

900	0
950	0
1000	0
1050	0
1100	2
1150	1
1200	4
1250	2
1300	3
1350	4
1400	3
1450	5
1500	11
1550	22
1600	94
1650	206
1700	347
1750	552
1800	945
1850	1203
1900	1457
1950	27406

ALPHA PLATEAU TH-230 #119738 18,600DPM

900	0
950	0
1000	0
1050	0
1100	1
1150	892
1200	2793
1250	3377
1300	3648
1350	3760
1400	3724
1450	3855
1500	3975

BETA PLATEAU C14 #019708 26,640DPM

1400	3832
1450	3860
1500	3850
1550	3863
1600	4152
1650	4670
1700	4990
1750	5319
1800	5798
1850	6087
1900	6412
1950	8648

James F. Seal
12-31-02

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D5 in the Model 2350.

Today's date is 12/31/2002.

The current time of day is: 14:09:31.

I have verified the list below

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

Comments:

Model 2350 Serial # =	129401.
User I.D. =	DRK2986.
High Voltage =	1350 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	0.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.930000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-37A.
Detector Serial # =	093717.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.4 volt

Model 2350 Serial #129401



H1350\$M
Set High Voltage: 1350



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



F60\$H
Set Scaler Count Time: 60



SB1\$-
Set Readout Time Base = min



SL1.95\$B
Set Dead Time: 1.95



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



*M43-37A\$ *
Set Detector Model: 43-37A



N093717\$3
Set Detector Serial #: 093717



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



SP5\$B
SAVE PARAMETERS AS D5



T100\$Q
Set Threshold: 100



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



SU7\$I
Set Readout Units = counts



SM0\$3
Set Readout Range Multiplier = auto

DETECTOR SETUP CHECK LIST REPORT

The following list is stored as detector setup D5 in the Model 2350.
Today's date is 12/31/2002.

The current time of day is: 14:09:31.

I have verified the list below

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

Comments:

Model 2350 Serial # =	129401.
User I.D. =	DRK2986.
High Voltage =	1350 volts.
Threshold =	100.
Window =	1000, Off.
Overload Current =	0.0 micro amperes.
Scaler Count Time =	60 seconds.
Readout Units =	counts.
Readout Time Base =	min.
Readout Range Multiplier =	auto.
Detector Dead Time =	1.930000E-05.
Detector Calibration Constant =	1.000000E+00.
Detector Model =	43-37A.
Detector Serial # =	093717.
Ratemeter Alarm Setting =	1.000000E+09.
Scaler Alarm Setting =	1000000.
Integrated Dose Alarm Setting =	1.000000E+09.
Low Count Alarm Setting =	X.
Operating Battery Voltage =	5.4 volt

DET5

Generated: 12/31/2002 14:07:23.

Model 2350 Serial #129401



H1350\$M

Set High Voltage: 1350



T100\$Q

Set Threshold: 100



W1000\$W OFF\$P

Set Window: 1000, OFF



O400\$O OFF\$C

Set Overload: 400, OFF



F60\$H

Set Scaler Count Time: 60



SU7\$I

Set Readout Units = counts



SB1\$-

Set Readout Time Base = min



SM0\$3

Set Readout Range Multiplier = auto



SL1.95\$B

Set Dead Time: 1.95



SC1.000000E+00\$0

Set Calibration Constant: 1.000000E+00



*M43-37A\$ *

Set Detector Model: 43-37A



N093717\$3

Set Detector Serial #: 093717



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



SP5\$B

SAVE PARAMETERS AS D5

SECTION 1 (To be completed at Initial Receipt Response Test)

Date:

SECTION I Reviewed By:

Date:

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. **IF** the information above is incorrect, **DO NOT CONTINUE.**

REMARKS:

NOTE: 1. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

Date:

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

942.6 - 1152

4194 dpm

Instrument Model 2350-1		Instrument Serial # 129401		Cal Due Date 2-13-03		Detector Model # 43-683		Detector Serial # AR 19337		Source Serial # 19655 FA184						
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1			
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR)		Count 2 (SCR)		Count 3 (SCR)		Mean Net Source Count Rate MINSR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time
SAT	✓	10	2782	278	1302	1024	1320	1042	1201	923	946	.238	✓		James R. Kips / NOK	9-13-02 0715
SAT	✓	10	2920	292	1258	966	1294	1002	1284	942	987	.235	✓		James R. Kips / NOK	9-16-02 0730
SAT	✓	10	2848	285	1229	944	1310	1025	1259	974	981	.234	✓		James R. Kips / NOK	9-17-02 0720
SAT	✓	10	2919	292	1277	985	1299	1007	1298	1006	999	.238	✓		James R. Kips / NOK	9-18-02 0700
SAT	✓	10	3013	301	1283	982	1361	1060	1296	995	1012	.241	✓		James R. Kips / NOK	9-19-02 0705
SAT	✓	10	2852	285	1257	972	1283	948	1227	942	971	.231	✓		James R. Kips / NOK	9-20-02 2815
SAT	✓	10	2797	280	1338	1058	1392	1112	1347	1067	1079	.257	✓		James R. Kips / NOK	9-23-02 1105
SAT	✓	10	3246	325	1355	1030	1286	961	1302	977	989	.236	✓		James R. Kips / NOK	9-24-02 0700
SAT	✓	10	2860	286	1274	988	1367	1081	1161	875	981	.234	✓		James R. Kips / NOK	9-25-02 0755
SAT	✓	10	2891	289	1260	971	1323	1034	1249	960	988	.236	✓		James R. Kips / NOK	9-26-02 0745
SAT	✓	10	2765	277	1322	1045	1302	1025	1235	958	1009	.240	✓		James R. Kips / NOK	9-27-02 0710
SAT	✓	10	2617	262	1221	959	1279	1017	1198	936	971	.231	✓		James R. Kips / NOK	9-30-02 1025
SAT	✓	10	2736	274	1382	1108	1407	1133	1445	1171	1137	.271	✓		James R. Kips / NOK	10-1-02 0740

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

942.6-1152

4/24/02

Instrument Model 2350-1		Instrument Serial # 129401		Cal Due Date 2-13-03		Detector Model # 473-683		Detector Serial # R114337		Source Serial # 114655/FJ184						
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1			
		Count Time (min)	Gross BKG CPM	BKG CPM	Count 1 (SCR)	Count 2 (SCR)		Count 3 (SCR)		Mean Net Source Count Rate MINSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time	
SAT	✓	10	3283	328	1240	912	1361	1033	1359	1031	992	.237	✓		W. Miles / JCM	10-02-02 0715
SAT	✓	10	3508	351	1429	1078	1413	1062	1402	1051	1064	.234	✓		W. Miles / JCM	10-03-02 0710
SAT	✓	10	2962	296	1224	928	1239	943	1308	1012	961	.227	✓		W. Miles / JCM	10-07-02 1045
SAT	✓	10	2981	298	1285	987	1323	1025	1228	930	981	.234	✓		W. Miles / JCM	10-07-02 1350
SAT	✓	10	2330	233	1169	936	1260	1027	1219	986	983	.234	✓		W. Miles / JCM	10-10-02 1105
SAT	✓	10	2336	234	1146	962	1190	956	1281	1047	988	.236	✓		W. Miles / JCM	10-15-02 0720
SAT	✓	10	2677	263	1144	881	1238	965	1241	978	944	.224	✓		B.S. Fjos / JCM	10-22-02 0820
SAT	✓	10	2553	255	1143	887	1238	983	1238	973	947	.226	✓		B.S. Fjos / JCM	10-22-02 0840
SAT	✓	10	2567	257	1247	990	1213	1056	1249	992	1013	.224	✓		B.S. Fjos / JCM	10-23-02 0800
SAT	✓	10	2729	273	1247	974	1187	914	1194	921	936	.223	✓		W. Miles / JCM	10-29-02 0945
SAT	✓	10	2334	233	1235	1002	1267	1034	1179	946	994	.237	✓		W. Miles / JCM	10-29-02 1045
SAT	✓	10	2501	250	1240	990	1241	991	1245	995	992	.237	✓		W. Miles / JCM	10-30-02 0845
SAT	✓	10	2732	273	1226	953	1234	1011	1233	960	975	.232	✓		W. Miles / JCM	10-31-02 0735

REMARKS:

NOTE: 1. By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

94206 - 1152

4194 dpm

Instrument Model 2350-1		Instrument Serial # 129401		Cal Due Date 2-13-03		Detector Model # 43-688		Detector Serial # 18119327		Source Serial # 11185/10114					
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1		
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)	Count 2 (SCR2)	Count 3 (SCR3)	Mean Net Source Count Rate MINSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time		
SAT	✓	10	2577	258	1313	1325	1067	1355	1097	1073	238	✓		Junglas R Kps / noc	11-1-02 0800
SAT	✓	10	2443	244	1203	1240	996	1210	966	974	232	✓		Junglas R Kps / noc	11-5-02 0710
SAT	✓	10	2715	272	1237	1242	970	1268	996	977	233	✓		Junglas R Kps / noc	11-11-02 0730
SAT	✓	10	2618	262	1185	1271	1009	1214	952	961	229	✓		Junglas R Kps / noc	11-10-02 0740
SAT	✓	10	2850	285	1251	1311	1026	1351	1066	1019	248	✓		VCMiles / noc	11-5-02 1010
SAT	✓	10	2988	299	1242	1251	958	1271	972	958	238	✓		BKps / noc	11-10-02 0830
SAT	✓	10	3523	315	1293	1299	984	1302	987	983	234	✓		BKps / noc	11-10-02 0733
SAT	✓	10	2714	271	1240	1333	1062	1284	1013	1015	242	✓		11Kps / noc	12-2-02 1125
SAT	✓	10	2659	266	1234	1238	972	1218	952	964	230	✓		VCMiles / noc	12-03-02 0755
SAT	✓	10	2224	222	1186	1193	971	1176	954	913	230	✓		Junglas R Kps / noc	12-13-02 0830

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

SECTION 1 (To be completed at Initial Receipt Response Test)

INSTRUMENT & DETECTOR INFORMATION			DETECTOR TOLERANCE VALUES		EFF	SOURCE INFORMATION		
Instrument Model No.	2350-1	Cal Due Date	Minus 10%	Plus 10%	Net EFF	SEG ID / Serial No.	010002	
Instrument Serial No.	129401	2-13-03	32726.4	39998.9		Certification Date	12-14-99	
Detector Model No.	43-68B	Cal Due Date	Operating Conditions: <input type="checkbox"/> Normal <input type="checkbox"/> Abnormal <input type="checkbox"/> Cable Length _____ ft. <input type="checkbox"/> Altitude _____ ft. <input type="checkbox"/> Temperature _____ °F					
Detector Serial No.	PR119337	2-13-03	Nuclide					C-14
			Activity in dpm					259,740

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. IF the information above is incorrect, DO NOT CONTINUE.

[illegible]

Date:

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

32726.4-39998.9

859740 dm

Instrument Model 2350-1		Instrument Serial # 179401		Cal Due Date 2-13-03		Detector Model # 43-48B		Detector Serial # PR 119337		Source Serial # 010002					
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1		
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)	Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time
SAT	✓	10	2782	278	344768	34490	36376	34409	34831	35166	.135	✓		James R Vps / NEX	9-13-02 0720
SAT	✓	10	2920	292	34385	34093	36743	35031	34739	35094	.135	✓		James R Vps / NEX	9-16-02 0735
SAT	✓	10	2848	285	35485	35200	36196	35134	34849	35320	.136	✓		James R Vps / NEX	9-17-02 0730
SAT	✓	10	2919	292	33290	32988	36536	34567	31275	34506	.133	✓		James R Vps / NEX	9-18-02 0715
SAT	✓	10	3013	301	35749	35448	36505	35407	35106	35686	.137	✓		James R Vps / NEX	9-19-02 0710
SAT	✓	10	2852	285	35166	34881	36649	35478	35193	35479	.137	✓		James R Vps / NEX	9-20-02 0720
SAT	✓	10	2797	280	34576	34296	36616	35295	35015	35216	.136	✓		James R Vps / NEX	9-23-02 1110
SAT	✓	10	3246	325	32688	32343	36086	35203	34878	34334	.132	✓		James R Vps / NEX	9-24-02 0705
SAT	✓	10	2860	286	34214	33928	36458	35622	35622	35041	.135	✓		James R Vps / NEX	9-25-02 0800
SAT	✓	10	2891	289	35447	35158	36313	35618	35329	35504	.137	✓		James R Vps / NEX	9-26-02 0755
SAT	✓	10	2765	277	33360	33083	35905	33475	33198	33770	.131	✓		James R Vps / NEX	9-27-02 0720
SAT	✓	10	2617	262	33302	33040	36207	35945	34600	34328	.132	✓		James R Vps / NEX	9-30-02 1030
SAT	✓	10	2736	274	34652	34378	35957	35439	35165	35075	.135	✓		James R Vps / NEX	10-1-02 0750

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

32726.4-39998.9

259740 dm

Instrument Model 2350-1		Instrument Serial # 129401		Cal Due Date 2-13-03		Detector Model # 43-483		Detector Serial # R14837		Source Serial # 010002						
Alarm Test	Test Type	Background Data			Source Count Data							Tolerance		Performed by See Note 1		
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time
SAT	✓	10	3283	328	34998	34670	36471	36143	35434	35106	35306	.136	✓		VCM/les/ren	10-02-02 0720
SAT	✓	10	3508	351	35175	34824	36160	36609	35760	35409	35614	.137	✓		R/Kes / MEX	10-5-02 0720
SAT	✓	10	2962	296	32935	32635	35648	35352	34323	34027	34006	.131	✓		James R/Kes / MEX	10-7-02 1055
SAT	✓	10	2961	298	33544	33246	36351	36053	34684	34386	34562	.133	✓		James R/Kes / MEX	10-7-02 1355
SAT	✓	10	2330	233	33741	33508	35167	34934	34049	33816	34086	.131	✓		VCM/les/ren	10-10-02 1100
SAT	✓	10	2336	234	34124	33880	26432	36198	34082	33846	34645	.133	✓		James R/Kes / MEX	10-15-02 0730
SAT	✓	10	2553	255	32909	32609	35696	35844	33998	33193	33763	.130	✓		B.S.K/yes BSC	10-22-02 0850
SAT	✓	10	2567	257	33258	33001	35969	35713	32846	32587	33767	.130	✓		B.S.K/yes BSC	10-23-02 0812
SAT	✓	10	2729	273											James R/Kes / MEX	10-29-02
SAT	✓	10	2334	233	33599	33366	35229	34996	33451	33218	33860	.130			VCM/les/ren	10-29-02 1010
SAT	✓	10	2501	250	33418	33163	35164	34914	33735	33485	33856	.130	✓		James R/Kes / MEX	10-30-02 0846
SAT	✓	10	2732	273	34279	34006	35822	35549	34233	33960	34505	.133	✓		James R/Kes / MEX	10-31-02 0725
SAT	✓	10	2577	258	34331	34073	36123	36265	34817	34559	34999	.135	✓		James R/Kes / MEX	11-1-02 0750

REMARKS: * - New Background taken

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

32726.4 - 39998.9

259,790

Instrument Model 2350-1		Instrument Serial # 129401		Cal Due Date 2-13-03		Detector Model # 43-688		Detector Serial # R191337		Source Serial # 010002						
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1			
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)	Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time	
✓	✓	10	2443	244	33663	3349	34910	54726	33625	33381	33842	.130	✓		J. Miles / R. K.	11-5-02
✓	✓	10	2715	272	35332	35060	36312	36010	34678	34406	35169	.135	✓		J. Miles / R. K.	11-10-02
✓	✓	10	2618	262	33790	33528	34441	36194	33769	33507	34405	.132	✓		J. Miles / R. K.	11-12-02
✓	✓	10	2850	285	34544	34259	35599	35714	34242	33957	34643	.133	✓		J. Miles / R. K.	11-15-02
✓	✓	10	2988	299	36010	35711	35734	35425	33871	33573	34906	.134	✓		J. Miles / R. K.	11-25-02
✓	✓	10	3153	315	34239	33884	35370	33875	33736	33441	34307	.137	✓		J. Miles / R. K.	11-26-02
✓	✓	10	2714	271	34069	33798	35976	35705	33991	33720	34408	.132	✓		J. Miles / R. K.	12-2-02
✓	✓	10	2659	266	34037	33771	35396	35130	34124	33858	34253	.132	✓		J. Miles / R. K.	12-03-02
✓	✓	10	2224	222	33768	33546	35408	35166	33564	33362	34031	.131	✓		J. Miles / R. K.	12-13-02

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

Date: 1-6-03

SECTION I Reviewed By:

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. **IF** the information above is incorrect, DO NOT CONTINUE.

REMARKS:

Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

881.1-1076.9

4994

Instrument Model <u>2350-1</u>		Instrument Serial # <u>129401</u>		Cal Due Date <u>6-30-03</u>		Detector Model # <u>4348B</u>		Detector Serial # <u>PRM337</u>		Source Serial # <u>AD184</u>						
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1			
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)	Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/ Time	
SAT	✓	10	2440	244	1182	938	1282	1038	1219	975	984	235	✓		<u>Boyle R. Kps/BK</u>	<u>1-9-03</u> <u>1100</u>
SAT	✓	10	2709	271	1164	893	1195	924	1209	938	918	219	✓		<u>Boyle S. Kps/BK</u>	<u>1-13-03</u> <u>1010</u>
SAT	✓	10	2239	223	1159	936	1196	973	1145	923	944	222	✓		<u>Boyle S. Kps/BK</u>	<u>1-14-03</u> <u>0730</u>
SAT	✓	10	2444	248	1129	881	1237	989	1143	895	922	220	✓		<u>Boyle S. Kps/BK</u>	<u>1-14-03</u> <u>1030</u>
SAT	✓	10	2568	257	1160	903	1245	988	1180	923	938	224	✓		<u>Boyle S. Kps/BK</u>	<u>1-18-03</u> <u>1020</u>
SAT	✓	10	2486	249	1189	940	1272	1026	1188	939	968	231	✓		<u>Boyle S. Kps/BK</u>	<u>1-23-03</u> <u>1030</u>
SAT	✓	10	2220	225	1125	910	1175	950	1159	934	931	222	✓		<u>Boyle S. Kps/BK</u>	<u>1-31-03</u> <u>1000</u>
SAT	✓	10	2420	242	1141	899	1208	966	1190	948	938	224	✓		<u>Boyle S. Kps/BK</u>	<u>1-3-03</u> <u>0830</u>
SAT	✓	10	3121	212	1089	877	1170	950	1129	917	917	219	✓		<u>Boyle S. Kps/BK</u>	<u>3-10-03</u> <u>0722</u>
SAT	✓	10	2653	265	1217	923	1224	959	1248	983	965	230	✓		<u>Boyle S. Kps/BK</u>	<u>1-13-03</u> <u>0725</u>
SAT	✓	10	2240	224	1135	911	1205	981	1149	925	939	223	✓		<u>Boyle S. Kps/BK</u>	<u>3-13-03</u> <u>1500</u>
SAT	✓	10	2087	206	1203	999	1174	908	1169	963	976	225	✓		<u>Boyle S. Kps/BK</u>	<u>3-5-03</u> <u>1115</u>
R					N/A											

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

881-1 / 1076.9

4/19/04

Instrument Model 2350-1		Instrument Serial # 129401		Cal Due Date 6-30-03		Detector Model # 43-68-13		Detector Serial # 119337		Source Serial # FD184								
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1					
		Pre	Post	Count Time (min)	Count 1 (SCR1)	Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time			
SAT	✓			10	2679	268	1170	902	1257	989	1221	953	948	226	✓		D. Schuman	3-18-03
SAT		✓		10	2625	263	1158	895	1213	950	1228	965	936	223	✓		D. Schuman	3-18-03
SAT	✓			10	2578	258	1165	907	1247	989	1225	967	954	228	✓		NRKos / NRK	4-9-03
SAT	✓			10	2603	260	1168	908	1239	979	1227	967	951	227	✓		NRKos / NRK	4-10-03
SAT	✓			10	2726	273	1268	995	1254	981	1224	951	976	233	✓		NRKos / NRK	4-11-03
SAT	✓			10	2536	254	1222	968	1240	986	1255	1001	985	235	✓		NRKos / NRK	4-14-03
SAT	✓			10	2453	245	1119	874	1222	977	1289	1044	965	230	✓		NRKos / NRK	4-15-03
SAT		✓		10	2498	250	1198	948	1254	1004	1245	995	982	234	✓		NRKos / NRK	4-15-03
SAT	✓			10	2579	258	1195	937	1256	998	1188	930	955	228	✓		NRKos / NRK	4-16-03
SAT		✓		10	2476	248	1220	972	1233	985	1241	993	983	234	✓		NRKos / NRK	4-16-03
SAT	✓			10	2503	250	1227	977	1258	1008	1255	1005	997	238	✓		NRKos / NRK	4-17-03
SAT	✓			10	3254	325	1271	946	1343	1018	1281	956	973	232	✓		D. Schuman	4-21-03
SAT	✓			10	2885	290	1256	966	1271	981	1233	943	963	229	✓		D. Schuman	4-22-03

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

Instrument Model 2350-1 Instrument Serial # 129401 Cal Due Date 6-30-03 Detector Model # 43-68B Detector Serial # 119337 Source Serial # FD184 4194dpm

Alarm Test	Test Type		Background Data			Source Count Data										Tolerance		Performed by See Note 1	
	Pre	Post	Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)		Count 2 (SCR2)		Count 3 (SCR3)		Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time		
SAT	✓		10	2862	286	1309	1023	1324	1038	1247	961	1007	240	✓			D. Schumacher	4-23-03 0730	
SAT	✓		10	2994	299	1274	975	1249	950	1309	1010	978	23	✓			D. Schumacher	4-24-03 0730	
SAT	✓		10	3127	313	1315	1002	1310	997	1281	968	989	235	✓			D. Schumacher	4-25-03 0730	
SAT	✓		10	2980	298	1386	1088	1331	1033	1319	1021	1047	250	✓			NRK/NEK	4-26-03 1045	
SAT	✓		10	3122	312	1268	956	1339	1027	1276	964	982	234	✓			NRK/NEK	4-26-03 1830	
SAT	✓		10	2962	296	1280	984	1281	985	1223	977	982	234	✓			NRK/NEK	4-26-03 0730	
SAT	✓		10	3256	326	1252	926	1314	988	1220	884	936	223	✓			NRK/NEK	4-26-03 1545	
SAT	✓		10	3012	301	1213	912	1394	1093	1315	1014	1006	240	✓			NRK/NEK	4-29-03 0650	
SAT	✓		10	2651	265	1260	995	1264	1019	1234	969	994	237	✓			NRK/NEK	4-29-03 2040	
SAT	✓		10	2454	245	1252	1007	1299	1054	1248	1063	1021	244	✓			NRK/NEK	4-30-03 1250	
SAT	✓		10	2586	259	1182	923	1231	972	1202	943	946	226	✓			NRK/NEK	4-30-03 1425	

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST FORM

SECTION 1 (To be completed at Initial Receipt Response Test)

Technician Signature: *Rob R. B.*

Date: 1-6-03

INSTRUMENT & DETECTOR INFORMATION		DETECTOR TOLERANCE VALUES		EFF		SOURCE INFORMATION	
Instrument Model No.	2350-1	Minus 10%	Plus 10%	Net EFF		SEG ID / Serial No.	010002
Instrument Serial No.	129401	30394.8	3749.2	.13		Certification Date	12-14-99
Detector Model No.	43-68B	Operating Conditions:				Nuclide	C-14
Detector Serial No.	R119337	<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Abnormal	<input type="checkbox"/> Altitude _____ ft. <input type="checkbox"/> Temperature _____ °F			Activity in dpm	259,740

SECTION 1 Reviewed By: _____ Date: _____

SECTION 2 (To be completed by RP Technician) Prior to beginning, verify the Instrument SNs listed above. IF the information above is incorrect, DO NOT CONTINUE.

Alarm Test	Test Type	Background Data				Source Count Data						Efficiency	Performed by See Note 1		
		Count Time (min)	Gross BKG Counts	BKG CPM		Count 1 (SCR1)	Count 2 (SCR2)	Count 3 (SCR3)	Mean Net Source Count Rate MNSCR	Tolerance					
SAT	✓	10	2608	261		33331	33270	35376	35115	33993	32932	33772	✓	.13	1-6-03 1540 <i>Joseph R. King / MEX</i>
SAT	✓	10	2679	268		34511	32843	34176	33908	31620	31352	32167	✓	.123	3/16/03 1022 <i>D. Schumann</i>
SAT	✓	10	2625	263		30929	30161	34284	34121	32901	32638	32273	✓	.124	3/16/03 1022 <i>D. Schumann</i>
REMARKS:															

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

30394.8 - 37149.2

259,740 dpm

Instrument Model 2350-1		Instrument Serial # 129401		Cal Due Date 6-30-03		Detector Model # 43-68-B		Detector Serial # PR19337		Source Serial # 010002										
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1							
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)	Gross Cnts	Net CPM	Count 2 (SCR2)	Gross Cnts	Net CPM	Count 3 (SCR3)	Gross Cnts	Net CPM	Mean Net Source Count Rate MINSR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time	
SAT	✓	10	2440	244	32347	32103	36063	32734	32490	32490	32490	32490	32490	32490	32490	✓			1-7-03 1055	
SAT	✓	10	3709	371	30811	30590	35607	37901	37630	37630	37630	37630	37630	37630	37630	✓			1-13-03 1030	
SAT	✓	10	2289	223	31618	31395	35798	34975	31300	31077	31077	31077	31077	31077	31077	✓			1-14-03 0740	
SAT	✓	10	2484	248	31229	30991	34942	34984	31137	30889	30889	30889	30889	30889	30889	✓			1-14-03 0850	
SAT	✓	10	3568	357	30933	30666	35185	34931	32850	32593	32593	32593	32593	32593	32593	✓			1-18-03 1030	
SAT	✓	10	2486	249	30601	30322	35373	35114	32780	32531	32531	32531	32531	32531	32531	✓			1-19-03 1045	
SAT	✓	10	2350	235	31862	30591	35378	35153	33044	32889	32889	32889	32889	32889	32889	✓			1-31-03 1830	
SAT	✓	10	2420	242	31186	30944	35269	35027	33683	32441	32441	32441	32441	32441	32441	✓			3-3-03 0835	
SAT	✓	10	2121	212	30597	30383	35283	35031	32216	32004	32004	32004	32004	32004	32004	✓			3-10-03 0800	
SAT	✓	10	2653	265	31977	31712	36456	36191	33920	33655	33655	33655	33655	33655	33655	✓			3-12-03 0750	
SAT	✓	10	2540	254	31560	31306	35340	35066	32680	32436	32436	32436	32436	32436	32436	✓			3-13-03 1550	
SAT	✓	10	2057	206	31446	31200	35706	35470	32670	32424	32424	32424	32424	32424	32424	✓			3-5-03 1100	

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

30394.8 - 37149.2

259,740 gpm

Instrument Model 2350-1		Instrument Serial # 129401		Cal Due Date 6-30-03		Detector Model # 43-68		Detector Serial # PR119337		Source Serial # C10002					
Alarm Test	Test Type	Background Data			Source Count Data							Tolerance		Performed by See Note 1	
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)	Count 2 (SCR2)	Count 3 (SCR3)	Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time		
SAT	✓	10	2578	258	31579	35417	32410	32152	32877	.127	✓		NR/KS / NRK	4-9-03 1605	
SAT	✓	10	2603	260	31543	35392	32379	32119	32845	.126	✓		NR/KS / NRK	4-10-03 0950	
SAT	✓	10	2726	273	33849	37005	33745	33472	34593	.133	✓		NR/KS / NRK	4-11-03 0830	
SAT	✓	10	2536	254	32927	35451	33257	33003	33624	.129	✓		NR/KS / NRK	4-14-03 0805	
SAT	✓	10	2463	245	33342	35781	33167	32922	33852	.130	✓		NR/KS / NRK	4-15-03 0845	
SAT	✓	10	2498	250	33842	36154	31632	31382	33459	.129	✓		NR/KS / NRK	4-15-03 1610	
SAT	✓	10	2579	258	33119	36265	33523	33265	34044	.131	✓		NR/KS / NRK	4-16-03 0850	
SAT	✓	10	2476	248	31244	36200	33447	33199	33382	.129	✓		NR/KS / NRK	4-16-03 1610	
SAT	✓	10	2503	250	33174	36336	32700	32450	33820	.130	✓		NR/KS / NRK	4-17-03 0835	
SAT	✓	10	3254	325	34914	35859	33688	33363	34495	.132	✓		D. Schumacher	4-21-03 0800	
SAT	✓	10	2895	290	32718	36805	34488	34198	34411	.132	✓		D. Schumacher	4-22-03 0730	
SAT	✓	10	2862	286	32646	36651	33946	33660	34095	.131	✓		D. Schumacher	4-23-03 0730	
SAT	✓	10	2994	299	33544	36683	34466	34167	34598	.135	✓		D. Schumacher	4-24-03 0750	

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

COUNT RATE DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician)

30394.8 - 37149.2

259,740 dpm

Instrument Model 2350-1		Instrument Serial # 129 Y01		Cal Due Date 6-30-03		Detector Model # Y3-68C		Detector Serial # 119337		Source Serial # 010602					
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1		
		Count Time (min)	Gross BKG Counts	BKG CPM	Count 1 (SCR1)	Count 2 (SCR2)	Count 3 (SCR3)	Mean Net Source Count Rate MNSCR	Eff	Pass	Fail	Technician (Name Printed & Initialed)	Date/Time		
SAT	✓	10	3127	313	33343	33030	36204	2891	34784	34471	34464	132	✓		D.S. 4-25-03
SAT	✓	10	2980	298	34049	33751	37162	2864	35181	34883	35166	135	✓		NRK / NRK 4-26-03
SAT	✓	10	3122	312	33494	3387	37359	27047	33817	33505	34580	133	✓		NRK / NRK 4-26-03
SAT	✓	10	2962	296	32762	32446	36400	36104	32907	32611	33727	130	✓		NRK / NRK 4-28-03
SAT	✓	10	2856	326	33035	32709	37158	28832	34539	34213	34585	133	✓		NRK / NRK 4-28-03
SAT	✓	10	3012	301	34115	33814	36847	36546	34722	34421	34927	135	✓		NRK / NRK 4-29-03
SAT	✓	10	2951	265	34059	33794	37364	37099	35231	34966	35286	136	✓		NRK / NRK 4-29-03
SAT	✓	10	2454	245	34715	34530	36354	2660	33946	33701	34974	135	✓		NRK / NRK 4-30-03
SAT	✓	10	2586	259	32008	3749	36813	36554	33314	33055	33786	130	✓		NRK / NRK 4-30-03

REMARKS:

NOTE: 1. By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

OPERATION OF THE LUDLUM MODEL
2350 SERIES DATA LOGGERS

REDS-INST-201
REVISION 4

GAMMA DETECTOR RESPONSE TEST FORM

SECTION 1 (To be completed at Initial Receipt Response Test)

Technician Signature: *[Signature]*

Date: 1-7-03

INSTRUMENT & DETECTOR INFORMATION			ACCEPTABLE INSTRUMENT RESPONSE RANGES			SOURCE INFORMATION		
Instrument Model Number	2350-1	Cal Due Date	Geometry	Minus 20 %Net Counts	Plus 20 %Net Counts	SEG I/D No.	019453	
Instrument Serial Number	129401	06-30-03	Position 1 @ Contact	381552	572328	Certificate Date	1-1-92	
Detector Model Number	44-2		Position 2 @ 6 Inches	7528.8	11298.2	Nuclide	Cs-137	
Detector Serial Number	PR088920	06-30-03	Position 3 @ 18 Inches	1190.4	1785.6	Activity in µCi		
Operating Conditions:			<input checked="" type="checkbox"/> Normal <input type="checkbox"/> Abnormal: <input type="checkbox"/> Altitude ft. <input type="checkbox"/> Temperature °F					

SECTION 1 Reviewed By: _____ Date: _____

SECTION 2 (To be completed by RP Technician). Prior to beginning, verify the Instrument SNs listed above.

IF the above information is incorrect, DO NOT CONTINUE.

ACTUAL INSTRUMENT RESPONSE

Alarm Test	Test Type		Count Time (min)	Gross BKG Counts	BKG CPM	Position 1 @ Contact		Position 2 @ 6 Inches		Position 3 @ 18 Inches		Pass	Fail	Performed by See Note 1	
	Pre	Post				Gross Counts	Net CPM	Gross Counts	Net CPM	Gross Counts	Net CPM			Technician Name Printed & Initialed	Date/Time
SAT	✓		5	6763	1353	478293	476940	10764	9411	2841	1488	✓		<i>[Signature]</i>	1-7-03

Remarks: _____

NOTE 1: By initialing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____

OPERATION OF THE LUDLUM MODEL
2350 SERIES DATA LOGGERS

REDS-INST-201
REVISION 4

GAMMA DETECTOR RESPONSE TEST CONTINUATION FORM

SECTION 2 (To be completed by RP Technician).

Instrument Model 2350-1		Instrument Serial # 129401		Cal Due Date 6-30-03		Detector Model # 44-2		Detector Serial # 18088120		Source Serial # 019453						
Alarm Test	Test Type	Background Data			Source Count Data						Tolerance		Performed by See Note 1			
		Pre	Post	Count Time (min)	Position 1 @ contact		Position 2 @ 6 inches		Position 3 @ 18 inches		Pass	Fail	Technician (Name Printed & Initialed)	Date/ Time		
					Gross Cnts	Net CPM	Gross Cnts	Net CPM	Gross Cnts	Net CPM						
SAT	✓			5	6792	1358	473674	472316	10973	9615	2854	1496	✓		James R. King / ROK	1-7-03 1558
SAT	✓			5	6681	1336	419862	418526	10080	8744	2883	1547	✓		W. Miles / ROK	1-7-03 1010
SAT		✓		5	6677	1335	464800	463465	10799	9464	2653	1318	✓		W. Miles / ROK	1-9-03 1655
SAT	✓			5	7010	1402	516604	515202	10317	8915	2922	1520	✓		W. Miles / ROK	1-10-03 0815
SAT	✓			5	6683	1337	494718	493381	10322	8985	2746	1409	✓		W. Miles / ROK	1-10-03 1030
SAT	✓			5	7786	1557	475013	473456	9898	8391	2674	1117	✓		B. King / BSC	8-5-03 1320
SAT	✓			5	7027	1419	570592	569173	10104	8685	2649	1230	✓		D. Schumaker	8-6-03 1330
SAT		✓		5	7262	1452	480957	479505	10062	8610	2617	1165	✓		D. Schumaker	8-6-03 1340
SAT	✓			5	6539	1307	479322	478015	10044	8737	2606	1299	✓		D. Schumaker	8-6-03 1350
SAT	✓			5	6763	1353	478361	477008	9905	8552	2653	1310	✓		B. King / BSC	8-6-03 1355
SAT	✓			5	7177	1435	474312	472877	10223	8787	2653	1221	✓		B. King / BSC	8-6-03 1358
SAT	✓			5	6919	1384	483833	482449	10162	8778	2605	1221	✓		ROK / ROK	4-30-03 1440
SAT	✓			5	7184	1437	441375	439938	10223	8786	2672	1255	✓		ROK / ROK	4-30-03 1500

REMARKS: * NOT USED

NOTE 1: By initializing this block, the technician indicates that the instrument parameters have been checked and are verified to be correct.

SECTION 2 Reviewed By: _____ Date: _____



CALIBRATION CERTIFICATE

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

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

Customer Information			Instrument Information		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763			Model: 2929	Serial Number: 118419	
Contact Name: Thomas F. Scott			Probe: 43-10-1	Serial Number: 121393	
Customer Purchase Order Number: N/A		Work Order Number: 2002-00633	Calibration Method: Electronic And Source		
Instrument Calibration Information					
M&TE	ID Number	Calibration Due Date	Environmental Conditions		
Thermometer	2551	09/12/02	Temperature (°C)	22.8	
Barometer	2551	09/12/02	Pressure (mmHg)	743	
Hygrometer	5546	06/12/02	Humidity (%)	46%	
Pulse Generator	101500	08/23/02	Calibrated in accordance with RP-INS-I-241.		
DVM	TW12663	03/18/03			
Isotope	Source ID Number	Original Activity (dpm)	Source Cert. Date	Decayed Activity (dpm)	
Th ²³⁰	099612	23,280	08/08/96	23,280	
Tc ⁹⁹	119655	4,194	08/09/96	4,194	
Pu ²³⁹	019442	13,613	06/01/92	13,613	
Frequency Calibration					
Desired (cpm)	Tolerances (cpm)	Alpha As Found (cpm)	Alpha As Left (cpm)	Beta As Found (cpm)	Beta As Left (cpm)
40	40	40	40	40	40
400	(392-408)	399	399	402	402
4,000	(3,920-4,080)	4,002	4,002	4,024	4,024
40,000	(39.2K-40.8K)	40,364	40,364	40,223	40,223
400,000	(392K-408K)	402,557	402,557	401,403	401,403
Background Determination		Alpha As Found	Alpha As Left	Beta As Found	Beta As Left
Counts, C _b		21	12	1,546	1,728
Time, T _b (min)		20	20	20	20
Rate, R _b (cpm)		1.05	0.6	77.3	86.4
Statement of Certification					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument		I certify that the above information is correct:			
Calibrated By: Mike Pauli		Reviewed By: Thomas F. Scott		Date: 5-30-02	
Calibration Date: 05/29/02			Calibration Due: 05/29/03		

CROSS TALK SHEET

Initials/Date:

Instrument ID: 118419

As Found Alpha Threshold (mv)		As Left Alpha Threshold (mv)			
172		172			
Alpha Source: Cross Talk – Performed using Pu ²³⁹ 019442					
Paramter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found	Beta As Left	
Source Count, C _s	24,088	24,473	1,874	1,454	
Time, T _s (min)	5	5	5	5	
Rate, R _s (cpm)	R _{s[q]} = 4,817.6	R _{s[q]} = 4,894.6	R _{s[β]} = 374.8	R _{s[β]} = 290.8	
EFF (% c/d) (>25%)	N/A	N/A	N/A	N/A	
%Crosstalk [α to β] (< 10%)	$\frac{R_{s[\beta]} - R_{b[\beta]}}{R_{s[q]} - R_{b[q]}} = \frac{290.8 - 86.4}{4894.6 - 0.6} = 4.18\%$				
As Found Beta Low Threshold	As Left Beta Low Threshold	As Found Beta High Threshold	As Left Beta High Threshold		
4.2mv	4.2mv	48mv	48mv		
Beta Source: Cross Talk-Performed using Tc ⁹⁹ 119655					
Paramter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found	Beta As Left	
Source Count, C _s	1	6	5,393	5,786	
Time, T _s (min)	5	5	5	5	
Rate, R _s (cpm)	R _{s[q]} = 0.2	R _{s[q]} = 1.2	R _{s[β]} = 1,078.6	R _{s[β]} = 1,157.2	
EFF (% c/d) (>10%)	N/A	N/A	N/A	N/A	
%Crosstalk [β to q] (< 1%)	$\frac{R_{s[q]} - R_{b[q]}}{R_{s[\beta]} - R_{b[\beta]}} = \frac{1.2 - 0.6}{1157.2 - 86.4} = 0.056\%$				
High Voltage Power					
Desired Voltage	Tolerance	DVM As Found	DVM As Left	2929 Meter As Found	2929 Meter As Left
600	540 – 660	600	600	600	600
800	720 – 880	800	800	800	800
1,000	900 – 1,100	1,000	1,000	1,000	1,000
1,200	1,080 – 1,320	1,200	1,200	1,200	1,200
1,300	1,170 – 1,430	1,300	1,300	1,300	1,300
High Voltage		As Found	Vern Dial Reading	As Left	Vern Dial Reading
		830V	3.3	800V	3.20
Statement of Certification					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument		I certify that the above information is correct:			
Calibrated By: <u>Mike Paul</u>		Reviewed By: <u>Thomas F. Scott</u>		Date: <u>5-30-02</u>	
Calibration Date: 05/29/02			Calibration Due: 05/29/03		

EFFICIENCY SHEET

Initials/Date:

 Instrument ID: 118419

As Found Alpha Threshold (mv)		As Left Alpha Threshold (mv)	
172		172	
Alpha Source: Efficiency determined using Th ²³⁰ #099612			
Paramter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found
Source Count, C _s	38,239	37,827	7,548
Time, T _s (min)	5	5	5
Rate, R _s (cpm)	R _{s[q]} = 7,647.8	R _{s[q]} = 7,565.4	R _{s[q]} = 1,509.6
EFF (% c/d) (>25%)	32.8%	32.5%	N/A
%Crosstalk [α to β] (< 10%)	$\frac{R_{s[\beta]} - R_{b[\beta]}}{R_{s[q]} - R_{b[q]}} = \frac{N/A}{N/A} = N/A$		
As Found Beta Low Threshold	As Left Beta Low Threshold	As Found Beta High Threshold	As Left Beta High Threshold
4.2mv	4.2mv	48mv	48mv
Beta Source: Efficiency determined using Tc ⁹⁹ #119655			
Paramter and Tolerance	Alpha As Found	Alpha As Left	Beta As Found
Source Count, C _s	1	6	5,393
Time, T _s (min)	5	5	5
Rate, R _s (cpm)	R _{s[q]} = 0.2	R _{s[q]} = 1.2	R _{s[q]} = 1,078.6
EFF (% c/d) (>10%)	N/A	N/A	23.9%
%Crosstalk [β to α] (< 1%)	$\frac{R_{s[q]} - R_{b[q]}}{R_{s[\beta]} - R_{b[\beta]}} = \frac{N/A}{N/A} = N/A$		
Statement of Certification			
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).			
Instrument		I certify that the above information is correct:	
Calibrated By: <u>Nike Paul</u>		Reviewed By: <u>[Signature]</u> Date: <u>5-30-02</u>	
Calibration Date: 05/29/02		Calibration Due: 05/29/03	

Initials/Date:

Instrument ID: 118419

Source and Background Plateau Worksheet

High Voltage	Background		Alpha Source		Beta Source		Cross Talk	
	Alpha	Beta	Alpha	Beta	Alpha	Beta	α to β	β to α
600	0	15	3,125	584	0	159	18.2%	0%
650	1	30	4,242	472	1	497	10.4%	0%
700	1	44	4,760	479	1	744	9.14%	0%
750	0	86	4,700	358	1	1,167	5.8%	0.09%
800	1	86	4,963	309	1	1,146	4.5%	0.09%
850	4	106	5,026	710	2	1,027	12.0%	-0.22%
900								
950								
1000								
1050								
1100								
1150								
1200								
1250								
1300								

Statement of Certification

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

Instrument

I certify that the above information is correct:

Calibrated By:

Nike Pauli

Reviewed By:

Donald A. Ault

Date:

5-30-02

Calibration Date: 05/29/02

Calibration Due: 05/29/03

Chi-Square Test

GTS Duratek

MODEL 2929 Serial #118419

Th-230

Source # 119737

18,720dpm

Background Counts = 0.6 CPM

<u>Count Number (N)</u>	<u>Source Count (x)</u>	<u>x-Mean</u>	<u>(x-Mean)²</u>
1	5442	-133.7	17875.69
2	5622	46.3	2143.69
3	5522	-53.7	2883.69
4	5665	89.3	7974.49
5	5426	-149.7	22410.09
6	5578	2.3	5.29
7	5620	44.3	1962.49
8	5645	69.3	4802.49
9	5576	0.3	0.09
10	5651	75.3	5670.09
11	5567	-8.7	75.69
12	5617	41.3	1705.69
13	5523	-52.7	2777.29
14	5585	9.3	86.49
15	5492	-83.7	7005.69
16	5602	26.3	691.69
17	5538	-37.7	1421.29
18	5609	33.3	1108.89
19	5547	-28.7	823.69
20	<u>5687</u>	111.3	<u>12387.69</u>
$\Sigma =$ 111514		(x-Mean) ² =	93812.20

Mean = 5575.70

Ch² = 16.83

$\sigma =$ 70.27

2 $\sigma =$ 140.5345

Reduce Chi Square= 0.885536

3 $\sigma =$ 210.80

Reduced Chi Pass/Fail= PASS

Performed By/Date Mike Paul / 8/13/02

Reviewed By/Date James Paul / 8-13-02

ENCLOSURE 9.1
PERFORMANCE DATA SHEET

Instrument ID # 118419

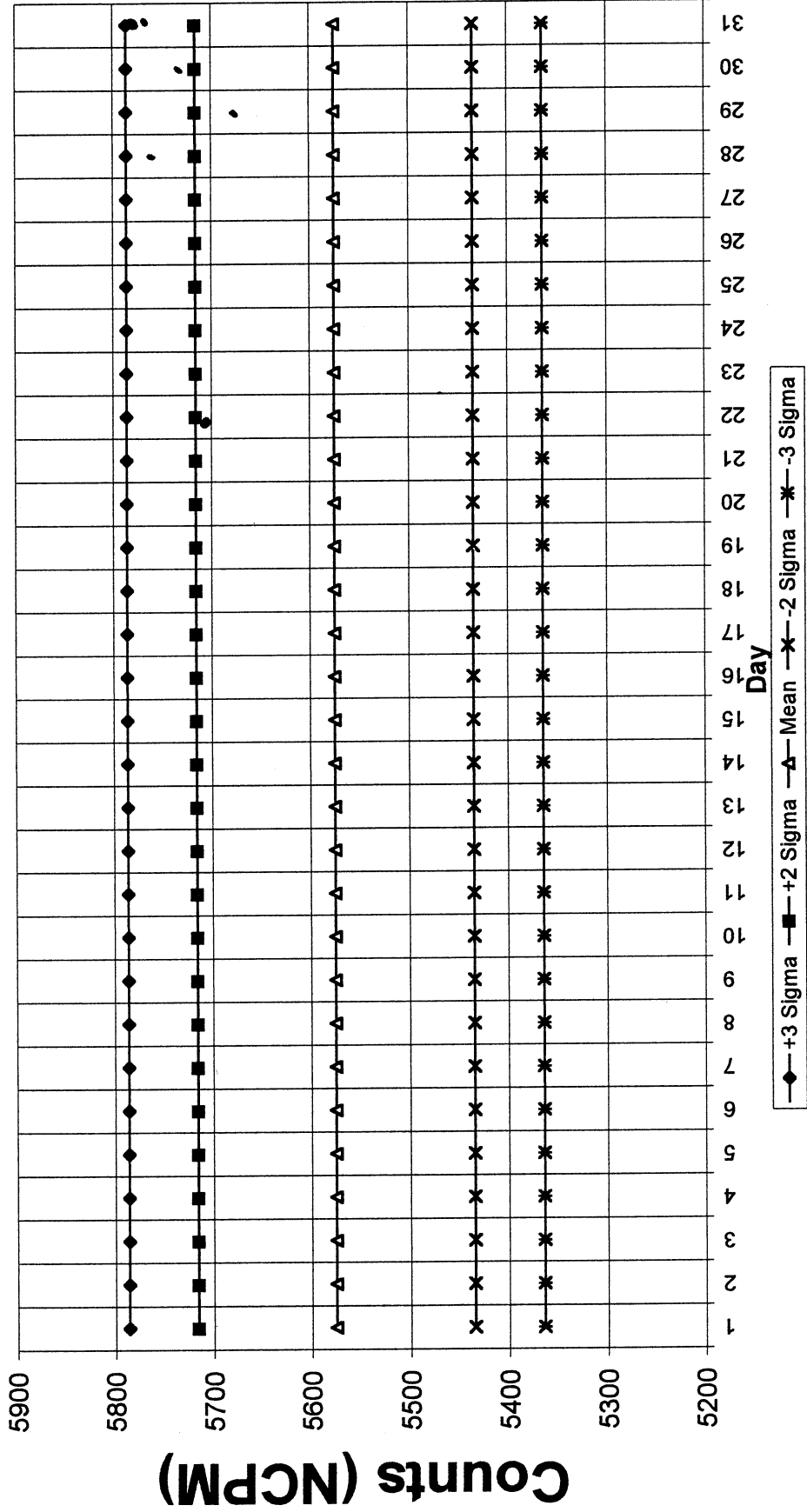
BACKGROUND					ALPHA SOURCE					BETA SOURCE					
count time = 20 minutes					count time = 5 minutes					count time = 5 minutes					
ALPHA CHANNEL		BETA CHANNEL			BETA CH	ALPHA CHANNEL				ALPHA CH	BETA CHANNEL				
Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)		Counts	Counts	Count Rate, R_{del} (cpm)	Net Count Rate, R_{del} (cpm)		Count s	Counts	Count Rate, R_{del} (cpm)	Net Count Rate, R_{del} (cpm)	Date	Performed By
C_{del}		C_{del}			C_{del}	C_{del}				C_{del}	C_{del}				
1	.05	1000	50		4455	28515	5763	5702.95		2	5477	1095.4	1045.4	8-22-02	B.S.Kjos
5	.25	1018	51		4982	28608	5722	5721.75		1	5693	1138.6	1087.6	8-27-02	B.S.Kjos
6	.30	1035	52		5187	28840	5768	5767.70		1	5808	1161.6	1109.6	8-28-02	NRKjs
9	.45	1095	55		4961	28430	5684	5685.55		1	5583	1116.6	1061.6	8-29-02	NRKjs
4	.20	1038	52		4984	28711	5742.2	5742		1	5805	1161	1109	8-30-02	NRKjs
6	.30	1037	52		5118	28955	5790.6	5790.3		2	5769	1153.8	1101.8	8-31-02	NRKjs
4	.20	1049	52		5108	28757	5751.8	5699.8		2	5736	1147.2	1088.2	9-3-02	B.S.Kjos

REMARKS

Reviewed By/Date _____ /

Control Chart Month Of August 2002

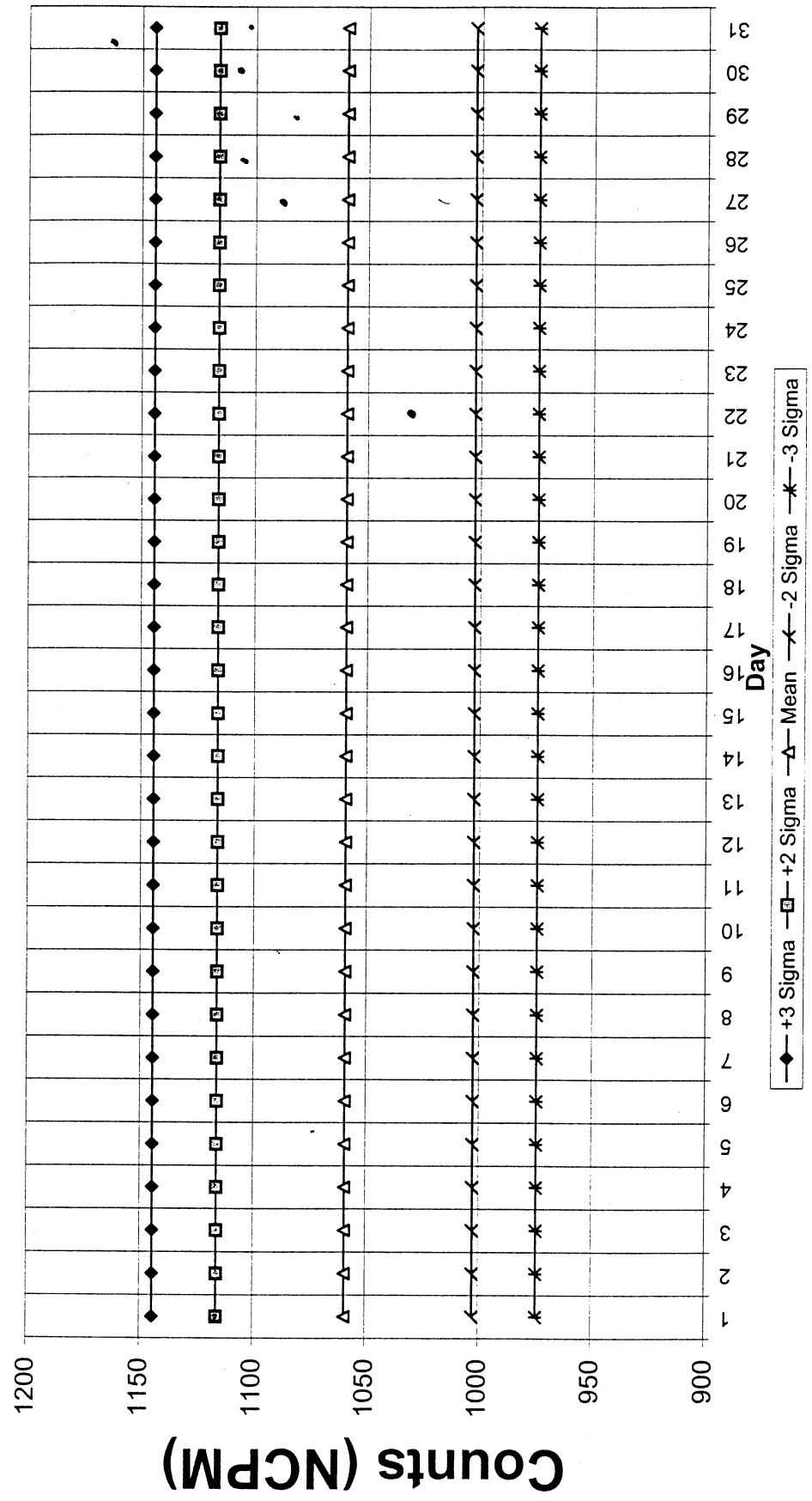
Instrument 2929, Source# 119737, Isotope Th-230



Reviewed By _____ Date _____

Control Chart Month Of August 2002

Instrument 2929, Source# 119655, Isotope 1C-99



Reviewed By _____ Date _____

ENCLOSURE 9.1
PERFORMANCE DATA SHEET

Instrument ID # 118419

BACKGROUND				ALPHA SOURCE				BETA SOURCE			
count time = 20 minutes				count time = 5 minutes				count time = 5 minutes			
ALPHA CHANNEL		BETA CHANNEL		BETA CH		ALPHA CHANNEL		ALPHA CH		BETA CHANNEL	
Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)
C_{del}		C_{del}		C_{del}		C_{del}		C_{del}		C_{del}	
4	.20	1049	52	5168	28259	5751.8	5751.6	2	5736	1147.2	1085.2
4	.20	1089	54	5094	28974	5794.9	5794.6	1	5596	1119.2	1065.2
3	.15	1039	52	5106	28359	5671.8	5671.65	5	5596	1134	1082
5	.25	1073	51	4923	28681	5736.2	5735.75	2	5516	1103.2	1052.2
1	.30	1031	52	4938	28718	5783.6	5783.4	0	5576	1115.2	1063.2
2	.10	1074	54	5004	28816	5763.2	5763.1	1	5733	1146.6	1092.6
6	.30	1109	55	5105	28590	5718	5717.7	3	5548	1109.6	1054.6
5	.25	1012	51	5089	28631	5726.2	5725.95	3	5685	1137	1080
3	.15	1058	53	5128	28897	5759.4	5759.2	4	5823	1164.6	1111.6
5	.25	1036	52	4984	28890	5778	5777.75	1	5664	1132.8	1080.8

REMARKS

Reviewed By/Date

ENCLOSURE 9.1
PERFORMANCE DATA SHEET

Instrument ID # 118419

Instrument ID # 118217

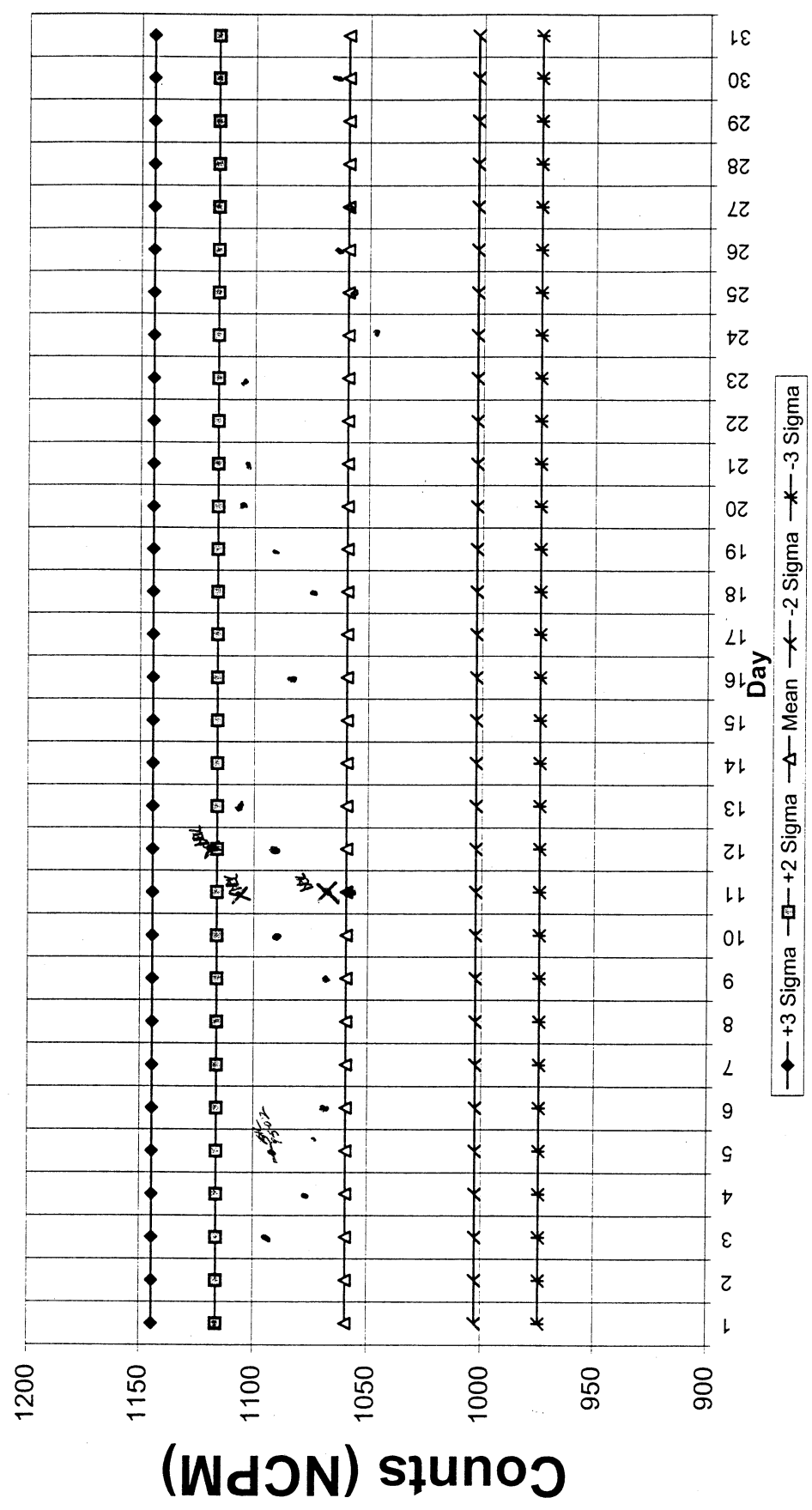
BACKGROUND				ALPHA SOURCE				BETA SOURCE			
count time = 20 minutes				count time = 5 minutes				count time = 5 minutes			
ALPHA CHANNEL		BETA CHANNEL		BETA CH		ALPHA CHANNEL		ALPHA CH		BETA CHANNEL	
Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)
C_{del}		C_{del}		C_{del}		C_{del}		C_{del}		C_{del}	
7	.35	1051	53	29877	5775.4	5775.4	5775.4	2	5827	1165.4	1112.4
5	.25	1028	51	5106	2849.6	5699.1	5698.5	0	5608	1121.6	1070.6
4	.20	1017	51	4998	2846.2	5692.4	5692.2	2	5684	1136.8	1085.8
5	.25	1074	54	5104	2881.6	5763.2	5762.9	3	5827	1165.8	1111.8
5	.25	1087	54	4994	2851.4	5702.8	5702.6	1	5777	1155.8	1101.8
4	.20	995	50	5087	2881.0	5763.2	5761.8	3	5813	1162.6	1112.6
6	.30	1023	51	5045	2861.4	5722.8	5722.5	2	5499	1099.8	1048.8
6	.30	1075	54	5044	2831.6	5663.2	5662.9	3	5340	1108	1054
6	.30	1053	53	5006	2871.8	5743.6	5743.3	2	5568	1113.6	1060.6
4	.20	1011	51	5538	2878.4	5756.8	5756.6	2	5538	1107.6	1056.6
				4975							
				5538							
				28784							

REMARKS

Reviewed By/Date

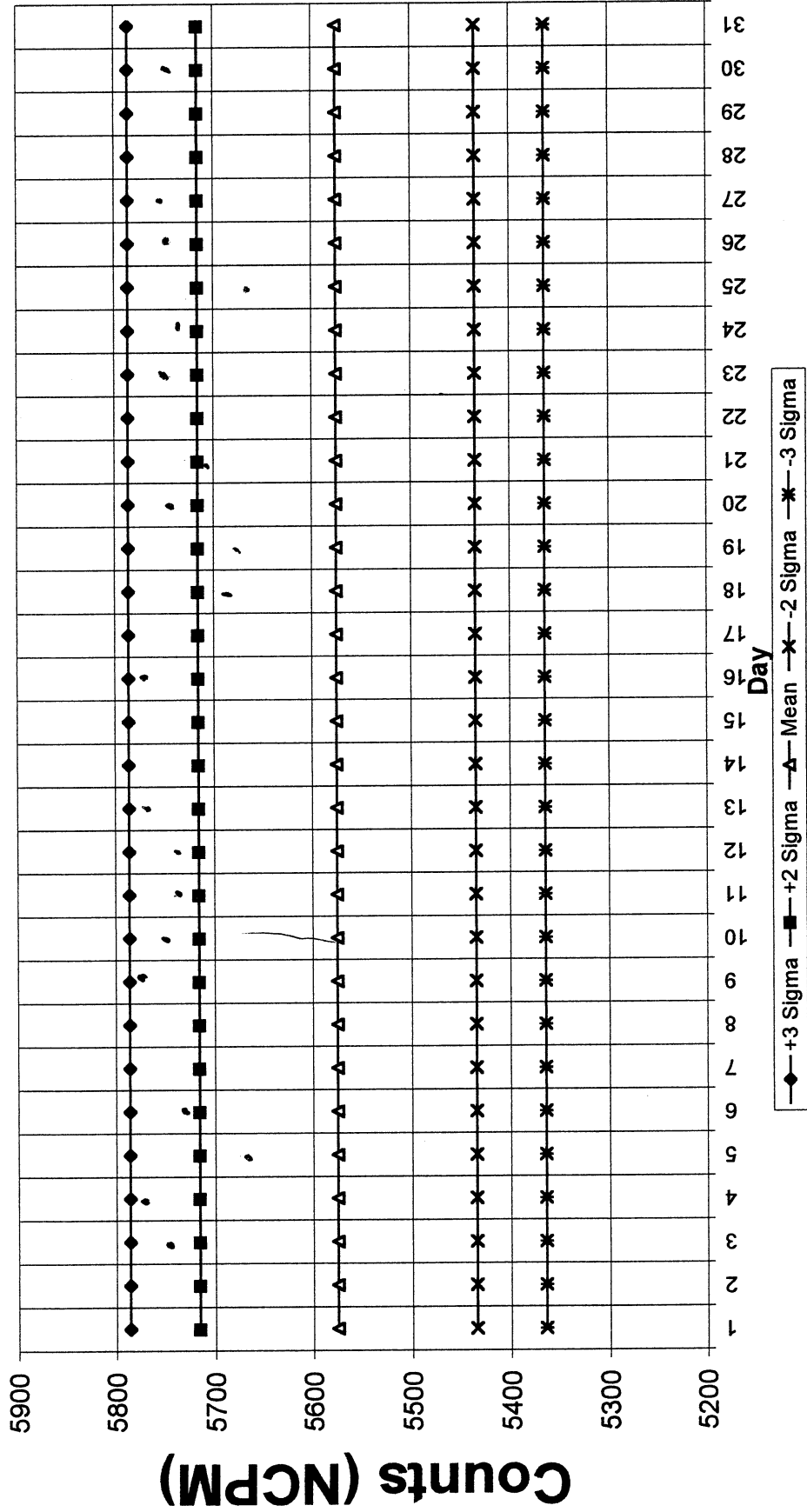
Control Chart Month Of September 20 02

Instrument 2929, Source# 119655, Isotope 12-99



Reviewed By _____ Date _____

Control Chart Month Of September 20 02
 Instrument 2729, Source# 119737, Isotope Th-230



Reviewed By _____ Date _____

ENCLOSURE 9.1
PERFORMANCE DATA SHEET

Instrument ID # 2929 / # 1849

BACKGROUND				ALPHA SOURCE				BETA SOURCE			
count time = 20 minutes				count time = 5 minutes				count time = 5 minutes			
ALPHA CHANNEL		BETA CHANNEL		BETA CH		ALPHA CHANNEL		ALPHA CH		BETA CHANNEL	
Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)
C_{del}		C_{del}		C_{del}		C_{del}		C_{del}		C_{del}	
4	.2	1030	52	4973	5729.4	28647	5729.2	1	5538	1107.6	1055.6
5	.25	1027	51.4	5093	5743.8	28819	5763.6	1	5695	1139	1087.6
3	.15	1065	53.25	5052	5777	28885	5776.85	2	5649	1129.8	1076.55
4	.2	1034	51.7	5059	5770.8	28504	5770.6	1	5638	1127.6	1075.9
4	.2	1042	52.1	5129	5711.8	28559	5711.6	0	5832	1166.4	1114.3
5	.25	1009	50.4	5116	5719.8	28599	5719.6	2	5716	1143.2	1092.8
5	.25	1090	54.5	5010	5752	28760	5751.8	4	5777	1155.4	1100.9
3	.15	1061	53.1	4904	5769	28845	5768.9	2	5642	1128.4	1075.3
3	.15	1064	53.2	4976	5772.2	28486	5772.05	2	5836	1167.2	1114
5	.25	1093	54.7	5077	5784.6	28923	5784.4	0	5633	1126.6	1071.9

REMARKS

Reviewed By/Date

ENCLOSURE 9.1
PERFORMANCE DATA SHEET

Instrument ID # 2929/118419

BACKGROUND					ALPHA SOURCE					BETA SOURCE				
count time = 20 minutes					count time = 5 minutes					count time = 5 minutes				
ALPHA CHANNEL		BETA CHANNEL			BETA CH		ALPHA CHANNEL			ALPHA CH		BETA CHANNEL		
Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Net Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Count Rate, R_{del} (cpm)	Net Count Rate, R_{del} (cpm)	Performed By
C_{del}		C_{del}		C_{del}	C_{del}		C_{del}			C_{del}				
1	.05	1112	55.6	4975	28761	5752.2	5752.15	5752.2	5752.15	1	5678	1135.6	1080	10-17-02 VCM
5	.25	1056	52.8	5004	28755	5751	5698.2	5751	5698.2	2	5727	1145.4	1145.2	10-18-02 VCM
6	.3	1035	51.8	4921	28473	5674.6	5642.8	5674.6	5642.8	1	5565	1113	1061.2	10-21-02 VCM
2	.1	1064	53.2	4955	28837	5727.4	5767.3	5727.4	5767.3	0	5642	1128.4	1075.2	10-22-02 VCM
5	.25	1076	53.8	5015	28346	5692	5688.95	5692	5688.95	1	5685	1137	1083.2	10-23-02 ARK
3	.15	1012	50.6	4790	28324	5664.8	5664.65	5664.8	5664.65	2	5638	1127.6	1077	10-24-02 VCM
4	.2	1036	51.8	6862	28445	5689	5637.2	5689	5637.2	1	5552	1110.4	1058.6	10-25-02 VCM
3	.15	1053	52.7	4960	28617	5733.4	5723.25	5733.4	5723.25	0	5672	1134.4	1081.7	10-28-02 BSC
5	.25	1084	54.2	5147	28522	5722.4	5702.15	5722.4	5702.15	2	5835	1167	1127.8	10-27-02 BSC
3	.15	1025	51.3	5005	28755	5751	5750.9	5751	5750.9	0	5765	1153	1101.7	10-30-02 VCM

REMARKS

Reviewed By/Date

ENCLOSURE 9.1 PERFORMANCE DATA SHEET

Instrument ID # 2929/118419

[illegible]

REMARKS

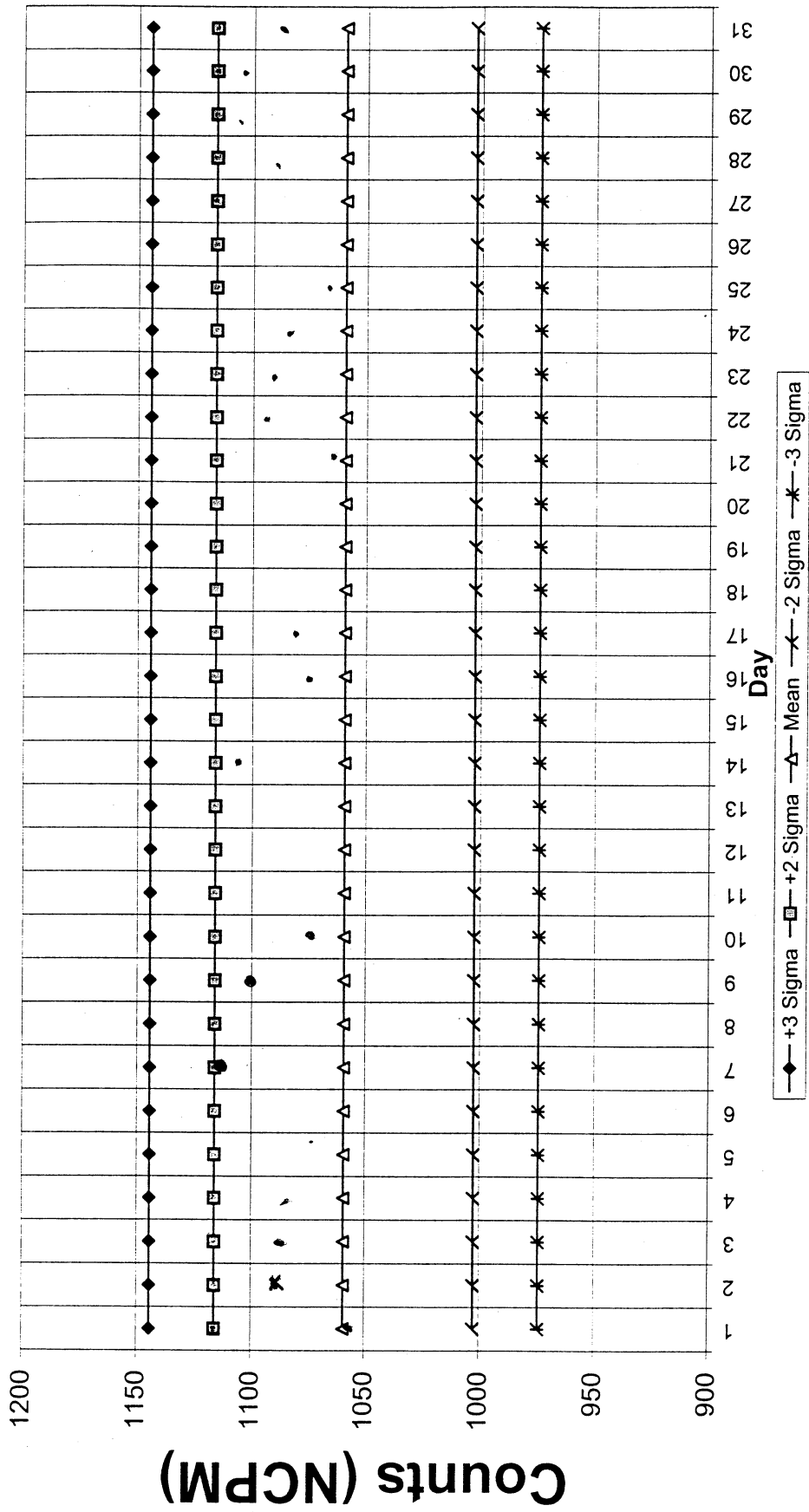
Reviewed By/Date

I:350_FKOC INS1 INS_240.KVI

Page 12 of 13

REV.1

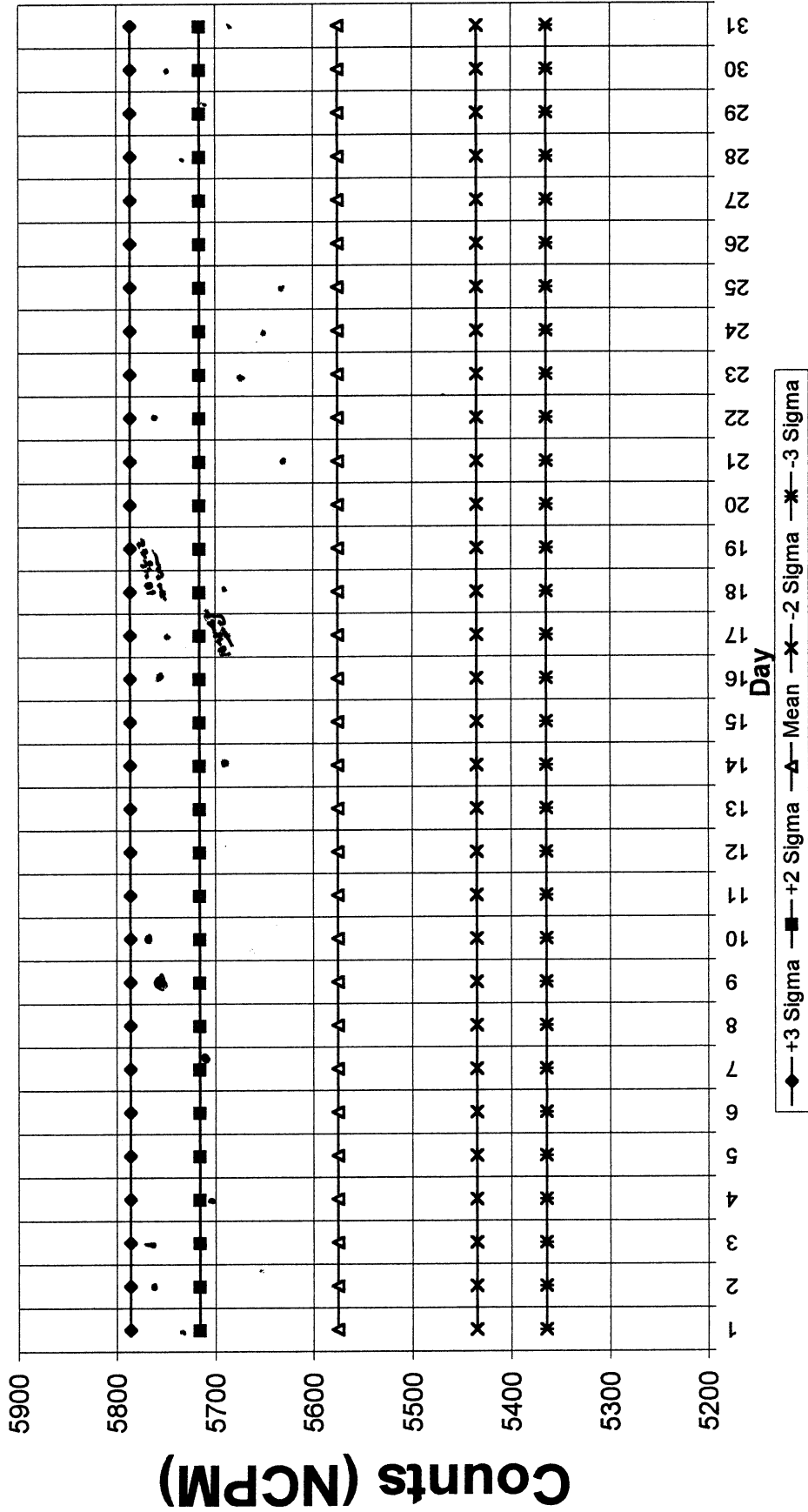
Control Chart Month Of October 2002
 Instrument 2924, Source# 11455, Isotope K-99



Reviewed By _____ Date _____

Control Chart Month Of October 20 02

Instrument 2929 Source# 119737 Isotope Th-230



Reviewed By _____ Date _____

ENCLOSURE 9.1
PERFORMANCE DATA SHEET

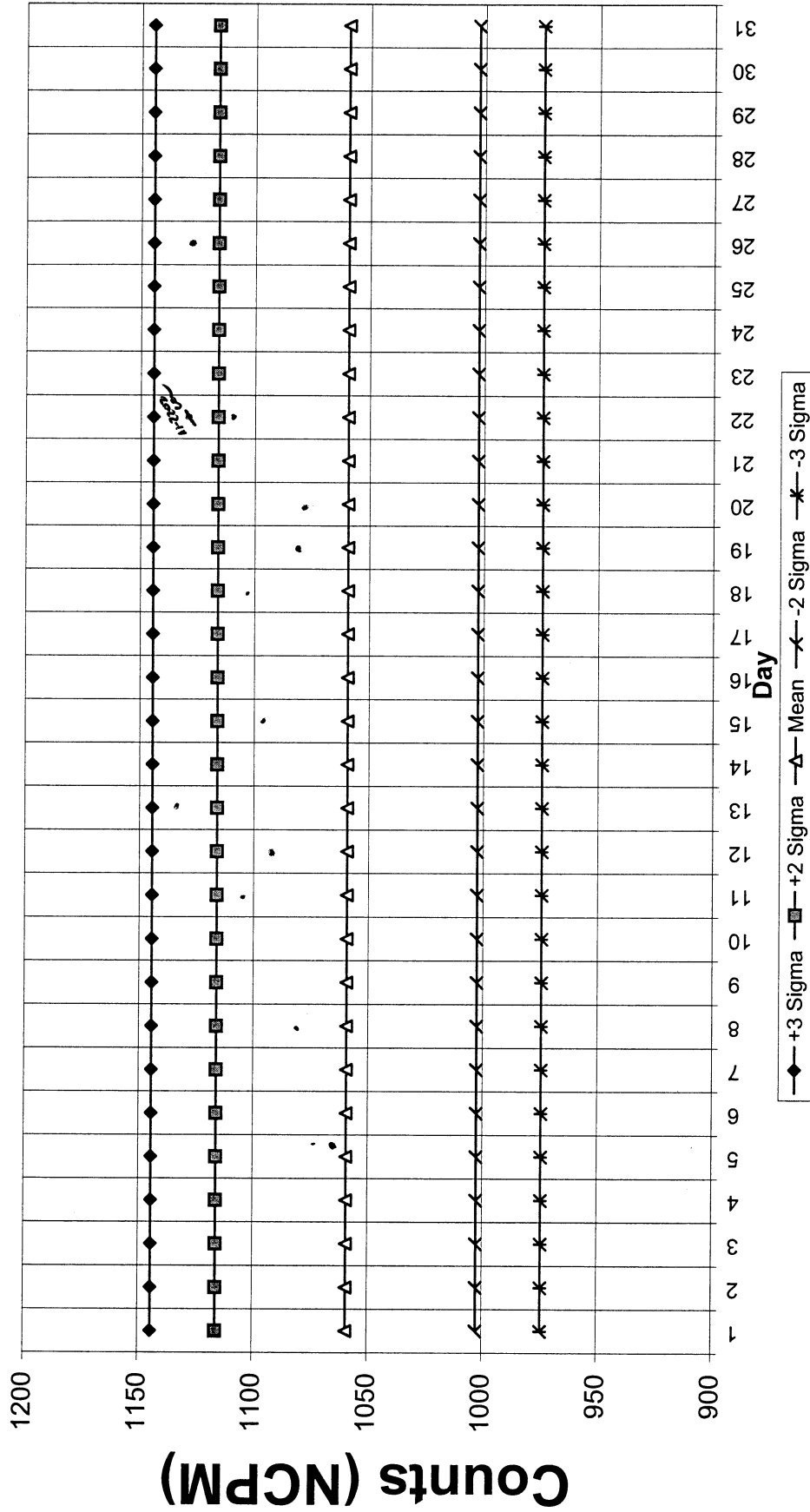
Instrument ID # 2929/118419

BACKGROUND						ALPHA SOURCE						BETA SOURCE					
count time = 20 minutes						count time = 5 minutes						count time = 5 minutes					
ALPHA CHANNEL			BETA CHANNEL			BETA CH			ALPHA CHANNEL			ALPHA CH			BETA CHANNEL		
Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)
4	.2	1052	52.6	—	NOT USED	—	—	—	—	—	—	—	—	—	—	—	—
4	.2	1045	52.3	4883	28642	5728.4	5728.2	0	5612	1122.4	1070.1	11502	1070.1	11502	1070.1	11502	1070.1
1	.05	1054	52.7	4903	28637	5727.4	5727.5	4	5711	1123.3	1089.5	11802	1123.3	11802	1089.5	11802	1089.5
6	.3	1044	52.2	5021	28619	5723.8	5723.5	2	5779	1155.8	1103.6	11102	1155.8	11102	1103.6	11102	1103.6
7	.35	1462	73.1	5188	28637	5727.4	5727.05	2	5662	1132.4	1059.3	1112-02	1132.4	1112-02	1059.3	1112-02	1059.3
4	.2	992	49.6	5226	29645	5929	5928.8	0	5956	1191.2	1141.6	1113-02	1191.2	1113-02	1141.6	1113-02	1141.6
4	.2	992	49.6	5136	28895	5779	5778.8	0	5956	1191.2	1141.6	1113-02	1191.2	1113-02	1141.6	1113-02	1141.6
2	.1	1034	51.7	5187	28634	5726.8	5726.7	4	5748	1149.6	1097.9	1115-02	1149.6	1115-02	1097.9	1115-02	1097.9
3	.15	1163	58.2	4891	28595	5719	5718.8	2	5802	1160.4	1102.2	1118-02	1160.4	1118-02	1102.2	1118-02	1102.2
3	.15	1015	50.7	4982	28632	5726.4	5726.2	1	5641	1128.2	1077.5	1119-02	1128.2	1119-02	1077.5	1119-02	1077.5

REMARKS * Source check failed - re-lab source check

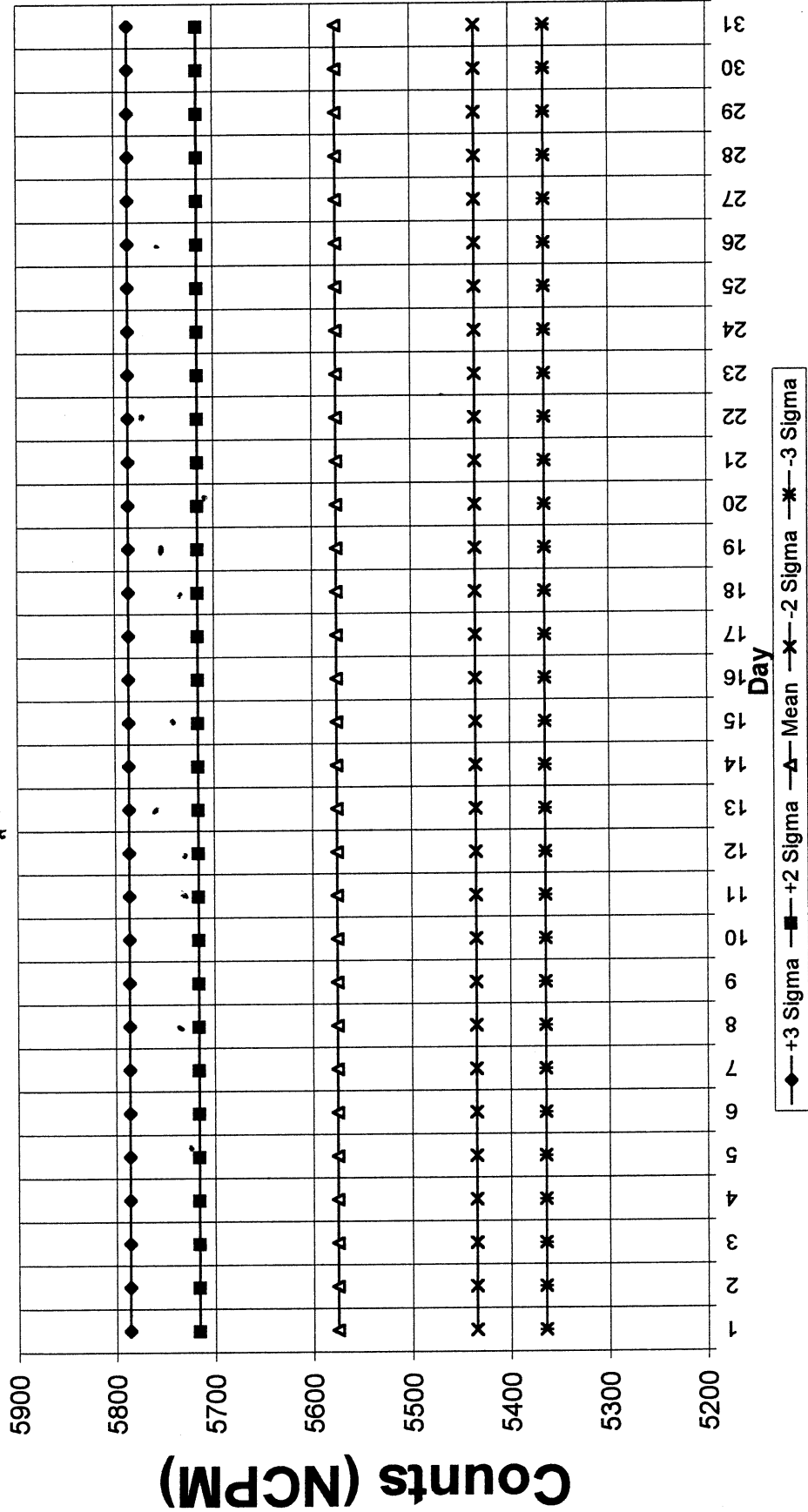
Reviewed By/Date _____

Control Chart Month Of November 20 02
 Instrument 2929, Source# 119655, Isotope Tl-99



Reviewed By _____ Date _____

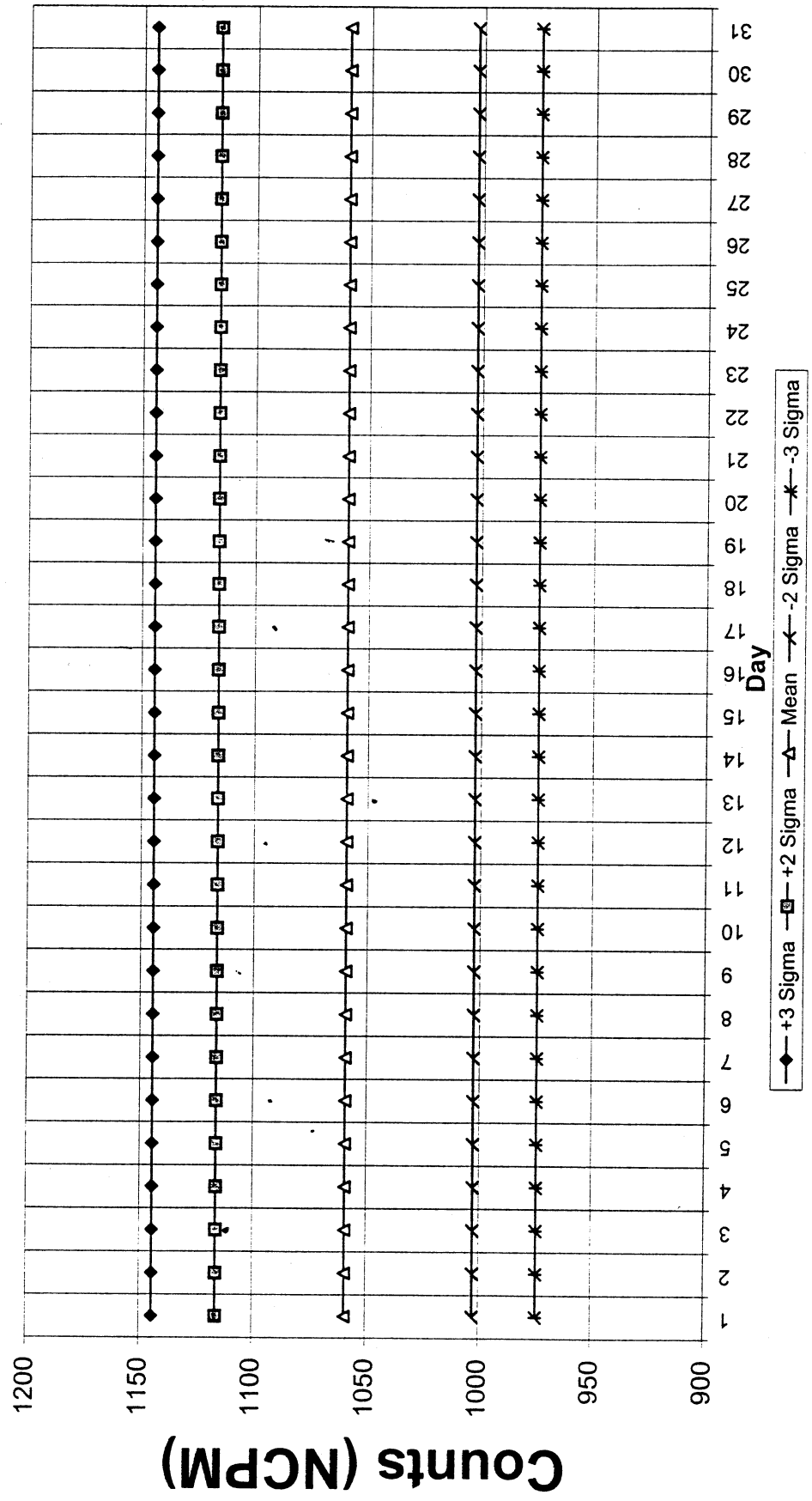
Control Chart Month Of November 20 02
 Instrument 2929, Source# 119737, Isotope Th-230



Reviewed By _____ Date _____

* Source checked failed
 Re-run source checked
 11/30/02
 11/30/02

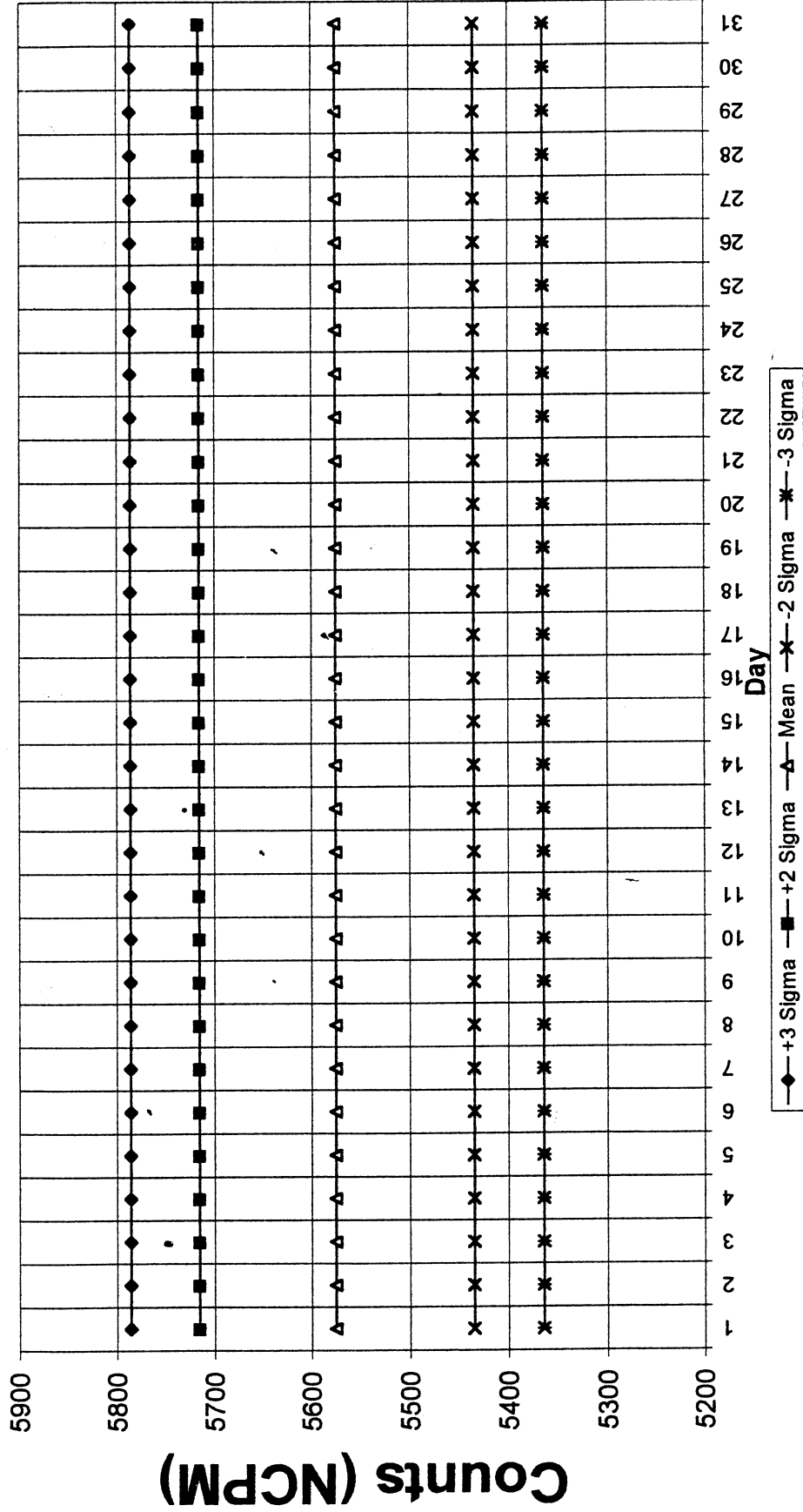
Control Chart Month Of December 20 02
 Instrument 2929 Source# 19155 ~~40655~~, Isotope Tc-99



Reviewed By _____ Date _____

Control Chart Month Of December 20 02

Instrument 229, Source# 19737, Isotope Th-230



Reviewed By _____ Date _____

ENCLOSURE 9.1
PERFORMANCE DATA SHEET

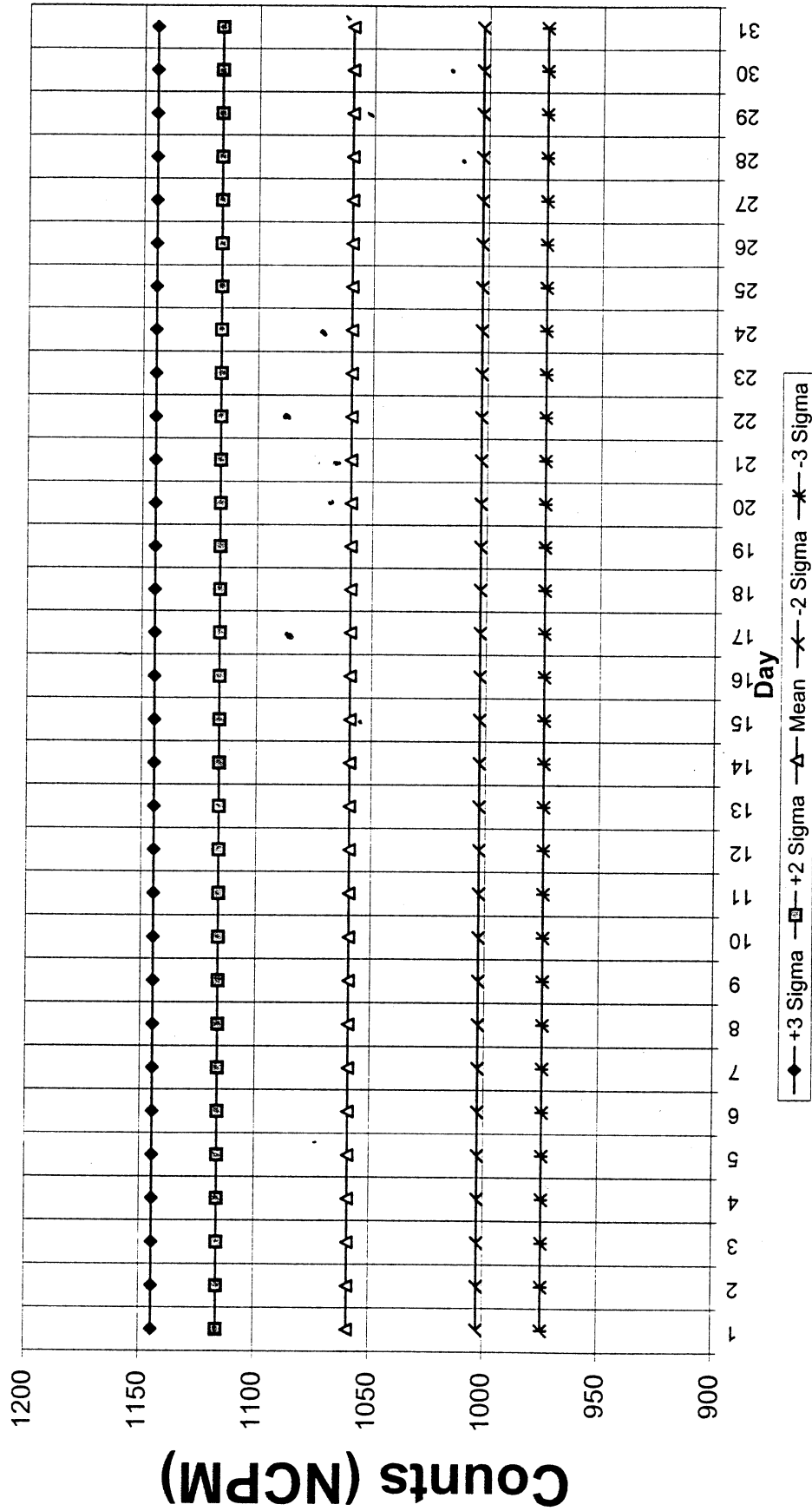
Instrument ID # 2929/113419

BACKGROUND					ALPHA SOURCE					BETA SOURCE				
count time = 20 minutes					count time = 5 minutes					count time = 5 minutes				
ALPHA CHANNEL		BETA CHANNEL			BETA CH	ALPHA CHANNEL			ALPHA CH	BETA CHANNEL				
Counts	Count Rate, R_{del} (cpm)	Counts	Count Rate, R_{del} (cpm)	Counts	Counts	Counts	Count Rate, R_{del} (cpm)	Net Count Rate, R_{net} (cpm)	Counts	Count Rate, R_{del} (cpm)	Count Rate, R_{del} (cpm)	Net Count Rate, R_{net} (cpm)	Date	Performed By
C_{del}		C_{del}		C_{del}	C_{del}	C_{del}			C_{del}	C_{del}				
5	.25	1059	53	5000	28288	5657.6	5657.6	5657.6	1	5525	1105	1052	1-15-03	B.S. Kjos
7	.35	1056	53	4809	28065	5613	5612.7	5612.7	2	5659	1132	1079	1-17-03	W. M. J.
5	.25	1115	56	5582	28524	5705	5704.8	5704.8	0	5582	1116	1060	1-20-03	W. M. J.
2	.1	1115	56	4825	28046	5609	5608.9	5608.9	3	5556	1111	1055	01-21-03	W. M. J.
5	.25	1034	52	4907	28174	5634.6	5634.6	5634.6	6	5677	1135	1083	01-22-03	W. M. J.
7	.35	1097	55	4933	28398	5679.3	5679.3	5679.3	2	5578	1116	1061	01-24-03	W. M. J.
4	.20	1071	54	4741	28409	5681.6	5681.6	5681.6	0	5449	1036	1036	1-28-03	B.S. Kjos
6	.30	1022	51	4851	28555	5710.7	5710.7	5710.7	1	5511	1102	1051	1-29-03	B.S. Kjos
3	.15	1090	52	4906	28211	5642.8	5642.8	5642.8	0	5393	1079	1027	1-30-03	B.S. Kjos
4	.20	1063	53	4846	28914	5687.6	5687.6	5687.6	1	5545	1109	1056	1-31-03	B.S. Kjos

REMARKS

Reviewed By/Date

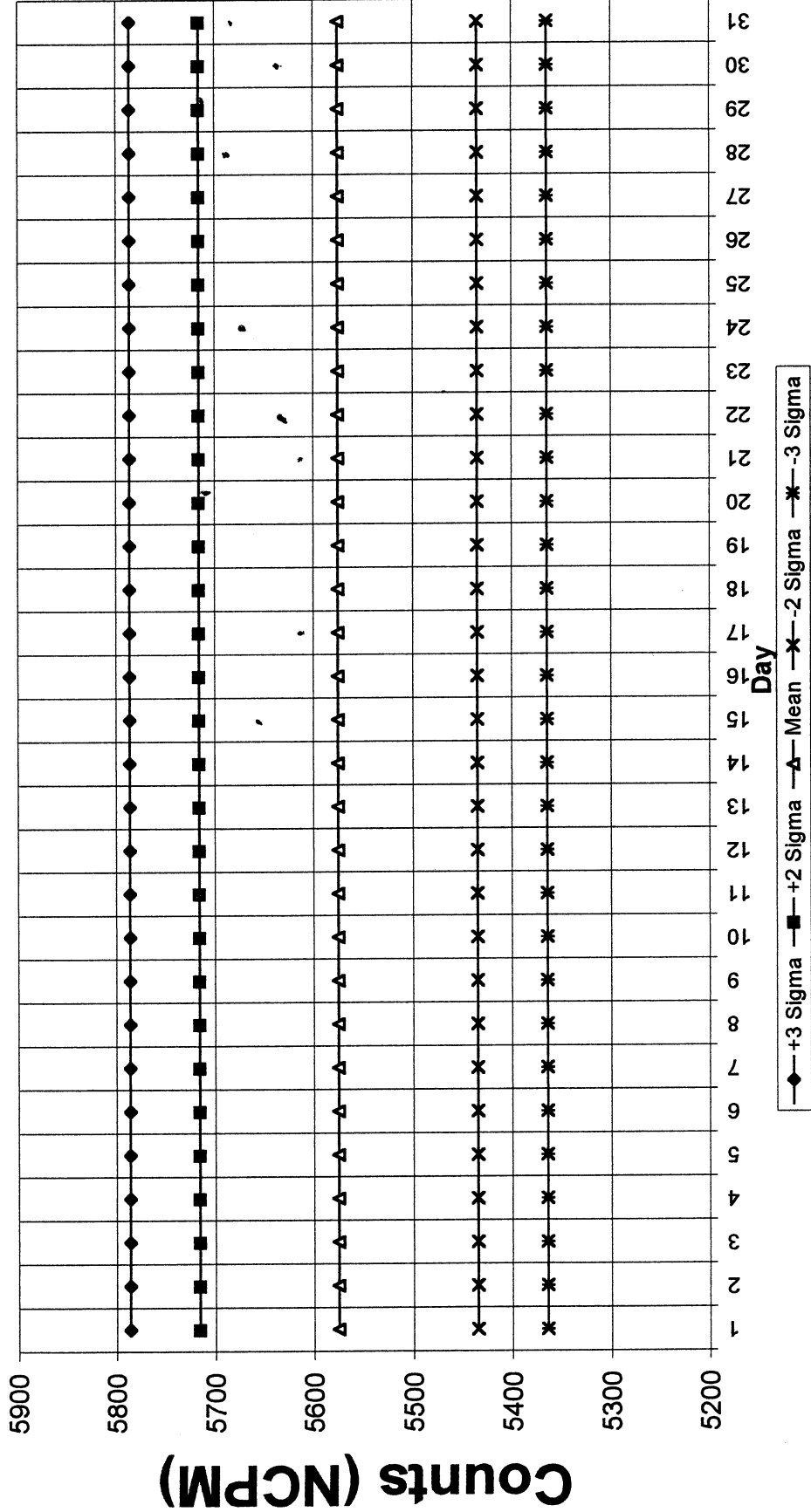
Control Chart Month Of January 20 03
 Instrument 2939 Source# 119655 ~~1184-10x~~ Isotope Te-99



Reviewed By _____ Date _____

Control Chart Month Of January 20 23

Instrument 2929, Source# 119737, Isotope Th-230



Reviewed By _____ Date _____

ENCLOSURE 9.1
PERFORMANCE DATA SHEET

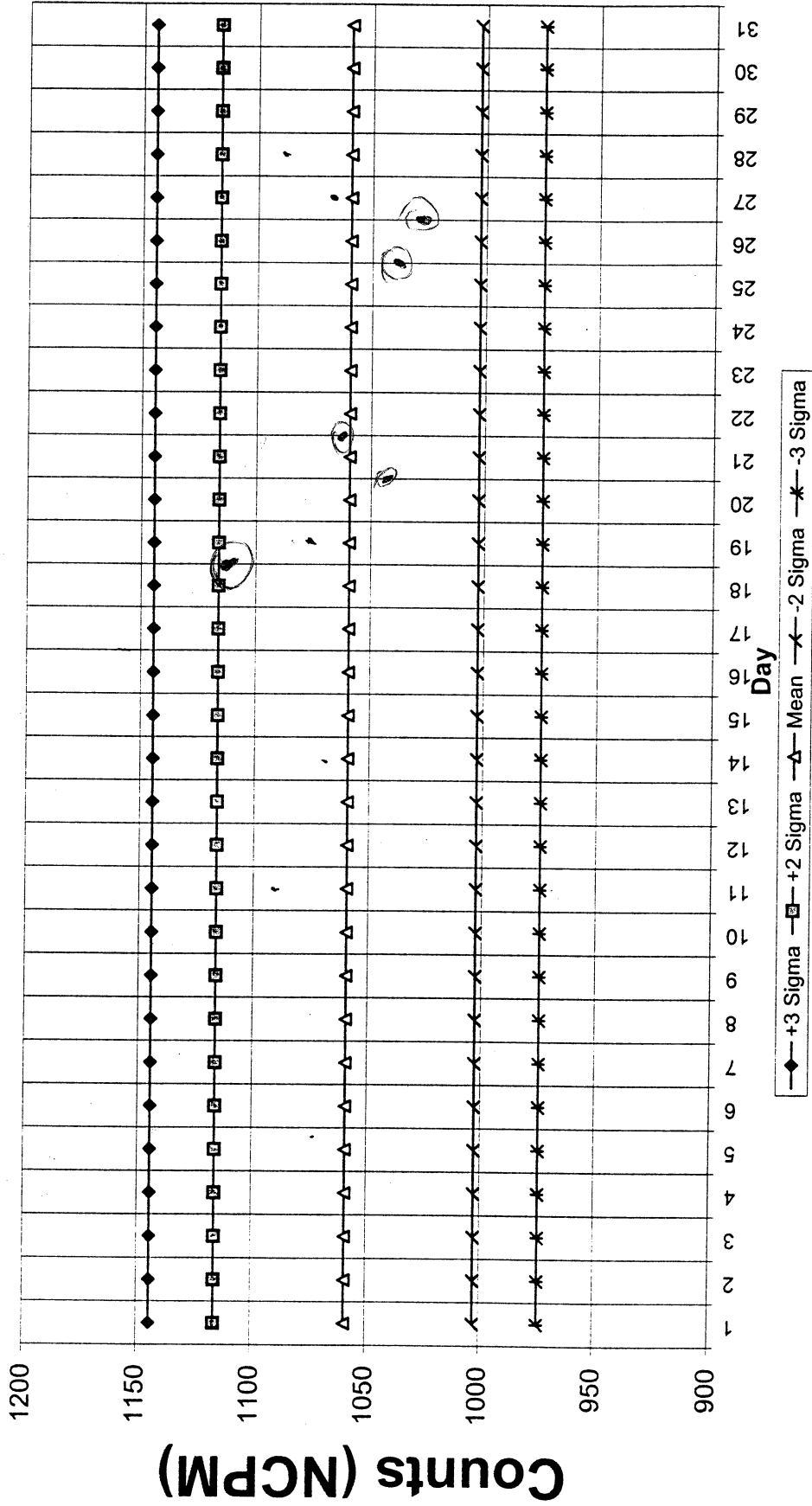
Instrument ID # 2929/118419

BACKGROUND				ALPHA SOURCE				BETA SOURCE			
count time = 20 minutes				count time = 5 minutes				count time = 5 minutes			
ALPHA CHANNEL		BETA CHANNEL		BETA CH		ALPHA CHANNEL		ALPHA CH		BETA CHANNEL	
Counts	Count Rate, $R_{\alpha(e)}$ (cpm)	Counts	Count Rate, $R_{\beta(e)}$ (cpm)	Counts	Count Rate, $R_{\alpha(e)}$ (cpm)	Counts	Count Rate, $R_{\beta(e)}$ (cpm)	Counts	Count Rate, $R_{\alpha(e)}$ (cpm)	Counts	Count Rate, $R_{\beta(e)}$ (cpm)
3	.15	1020	51	4708	28158	5611.6	2611.9	0	5723	1145	1094
4	0.20	1033	52	4967	28692	5732.4	5738.2	4	5554	1110.8	1059
2	.1	1045	53	4987	28508	5701.6	5701.5	5	5578	1115.6	1064
6	0.3	1035	52	5424	28342	5668.4	5668.1	4	5865	1173.0	1121
3	.15	1000	50	4927	28308	5641.6	5641.7	1	5576	1165.3	1065
6	0.3	1086	54	5056	28276	5655.2	5654.9	6	5480	1097.4	1043
4	0.2	1083	54	4921	28402	5680	5680	4	5583	1113	1059
6	0.3	1062	53	4802	28456	5691	5691	0	5456	1091	1038
2	0.1	1143	57	4852	28236	5645	5645	2	5411	1082	1025
3	0.15	1022	51.1	5023	28496	5692	5692.05	1	5572	1114.4	1063.3

REMARKS

Reviewed By/Date

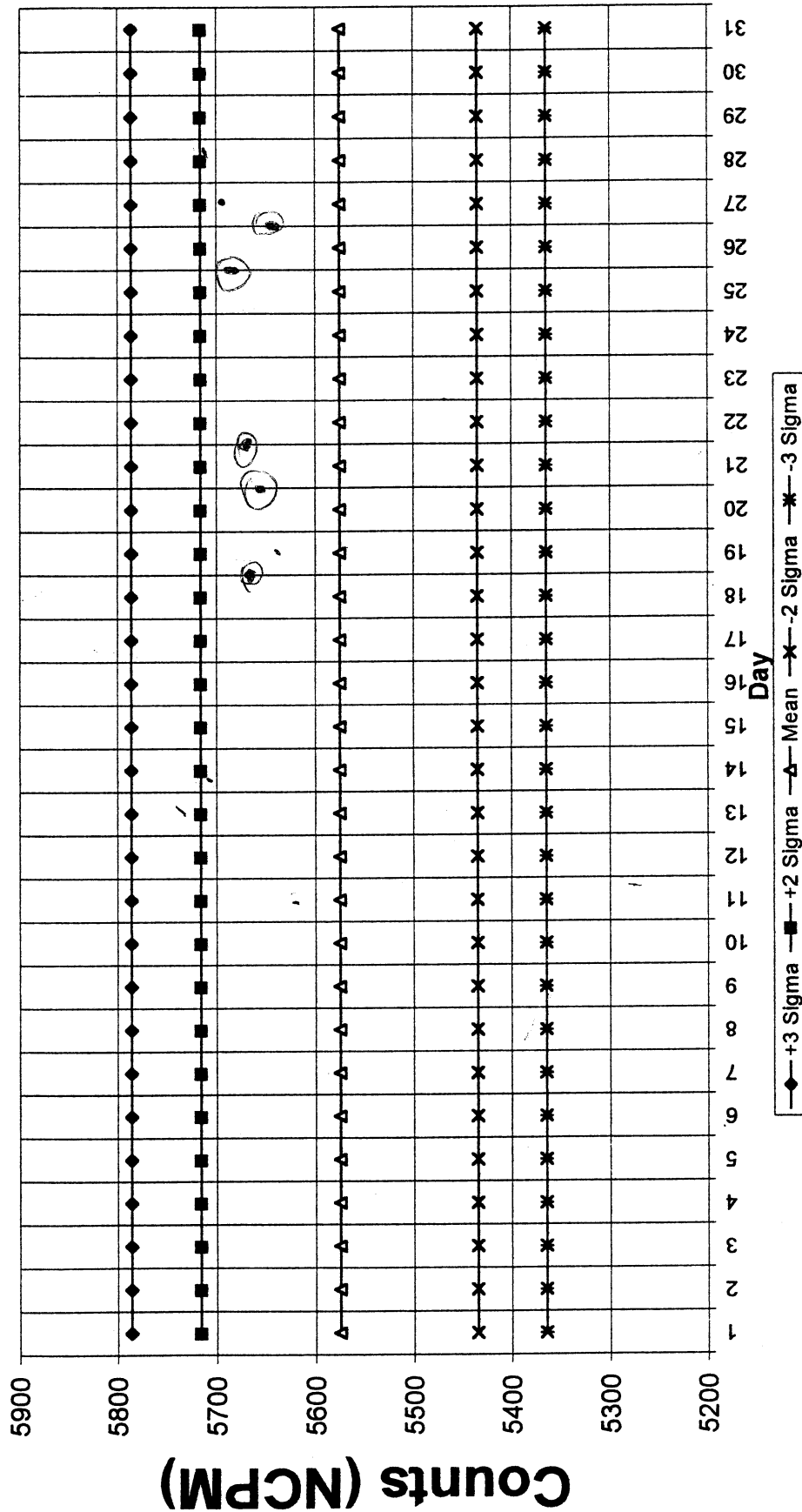
Control Chart Month Of February 20 03
Instrument 3939, Source# 119655, Isotope TC-99



Reviewed By _____ Date _____

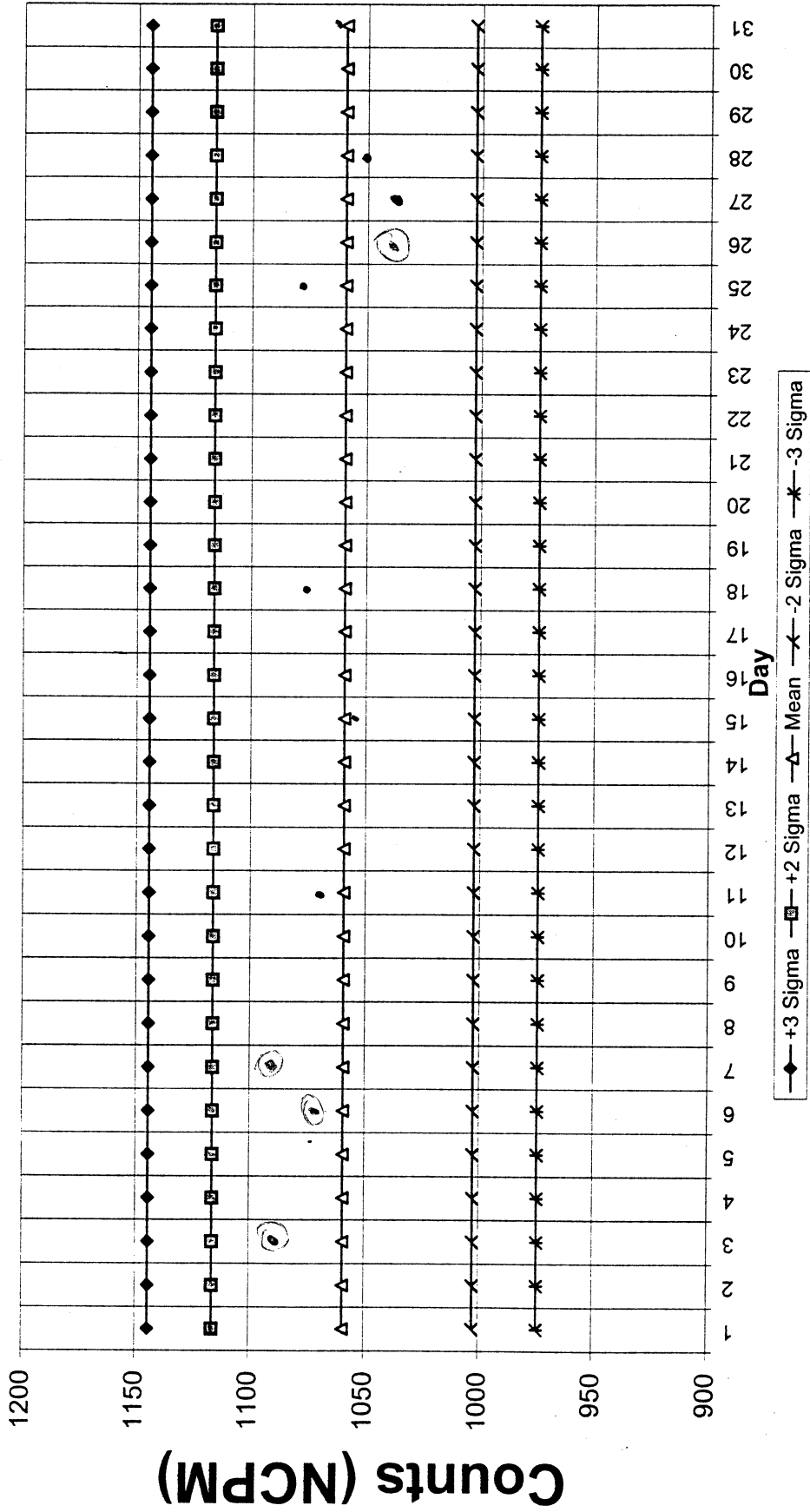
Control Chart Month Of February 2003

Instrument 8937, Source# 119737, Isotope Th-230



Reviewed By _____ Date _____

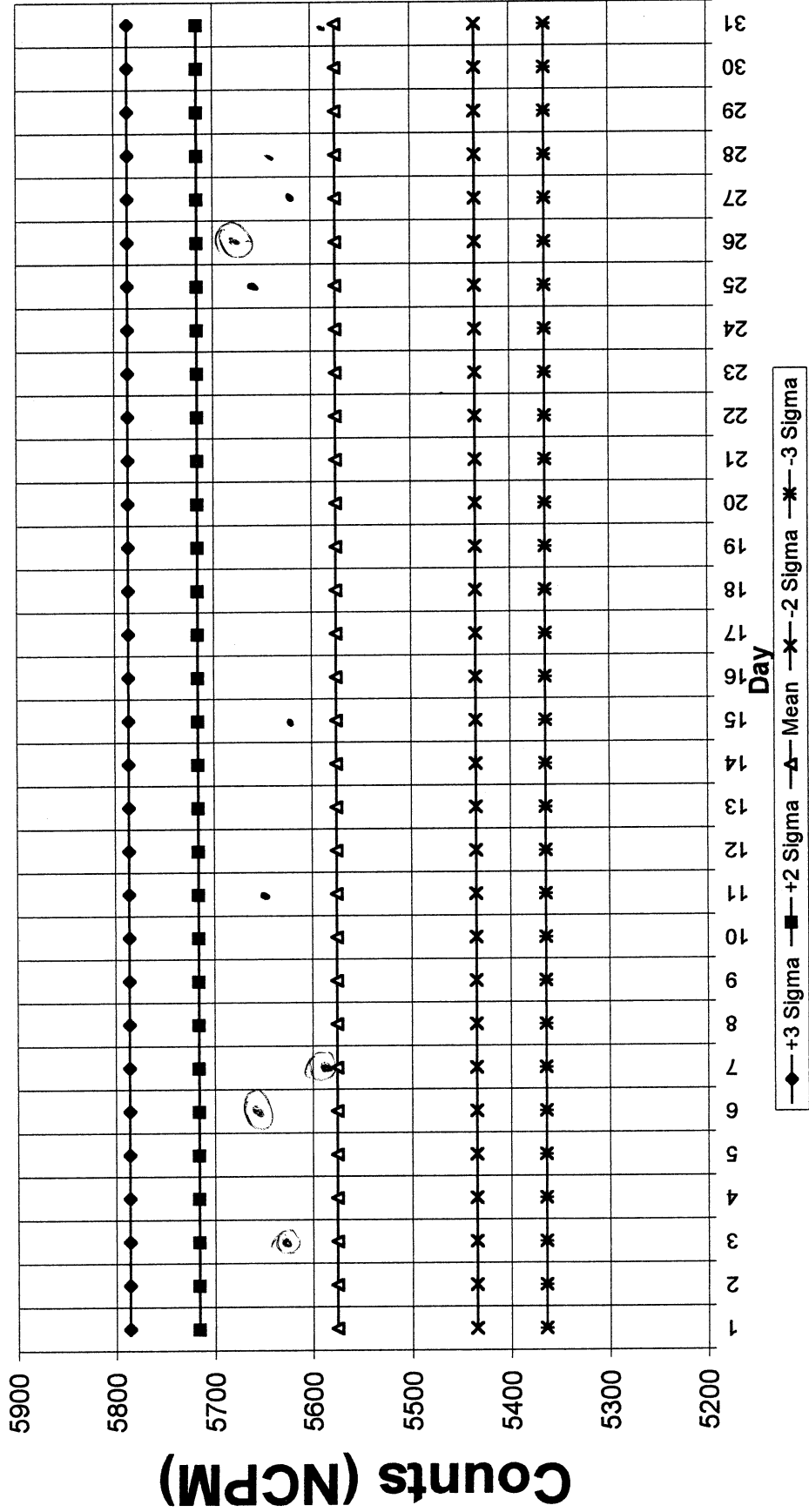
Control Chart Month Of March 20 03
 Instrument 2429, Source# 11%SS, Isotope Tc-99



Reviewed By _____ Date _____

Control Chart Month Of March 20 03

Instrument 2929 Source# 119732 Isotope Th-230



Reviewed By _____ Date _____

ENCLOSURE 9.1
PERFORMANCE DATA SHEET

Instrument ID # 2929 / 1849

BACKGROUND					ALPHA SOURCE					BETA SOURCE				
count time = 20 minutes					count time = 5 minutes					count time = 5 minutes				
ALPHA CHANNEL		BETA CHANNEL			BETA CH	ALPHA CHANNEL				ALPHA CH	BETA CHANNEL			
Counts	Count Rate, R_{α} (cpm)	Counts	Count Rate, R_{β} (cpm)		Counts	Counts	Count Rate, R_{α} (cpm)	Count Rate, R_{β} (cpm)	Net Count Rate, R_{net} (cpm)	Counts	Count Rate, R_{β} (cpm)	Count Rate, R_{β} (cpm)	Net Count Rate, R_{net} (cpm)	Performed By
C_{α}		C_{β}			C_{β}	C_{α}				C_{α}				
5	0.25	1081	54		4821	28863	5633	5633.7	5633.7	1	5595	1119	1065	65805
5	0.25	1092	54.6		4843	28047	5619.4	5619.15	5619.15	0	5536	1107.2	1052.6	NR
4	0.2	1013	51		4826	28020	5604	5603.8	5603.8	1	5509	1101.8	1050.8	NR
5	0.25	1023	51		4798	28079	5615.8	5615.5	5615.5	1	5543	1108.6	1057	NR
7	0.35	1009	50.45		4782	27769	5553.8	5553.48	5553.48	2	5457	1091.4	1042.95	NR
5	0.25	1024	51.2		4556	28054	5610.8	5610.5	5610.5	2	5476	1095.2	1044	NR
3	0.15	1055	53		4735	27580	5516	5515.85	5515.85	1	5603	1120.6	1067.6	NR
5	0.25	1037	51.85		4852	28054	5610.8	5609.55	5609.55	3	5638	1127.6	1075.75	NR
6	0.30	1045	52.25		4800	28370	5662	5661.7	5661.7	2	5630	1126	1073.75	NR
6	0.30	1027	51.35		4789	27957	5591.4	5591.1	5591.1	0	5666	1133.2	1081.85	NR

REMARKS

Reviewed By/Date

ENCLOSURE 9.1
PERFORMANCE DATA SHEET

Instrument ID # 2929/11849

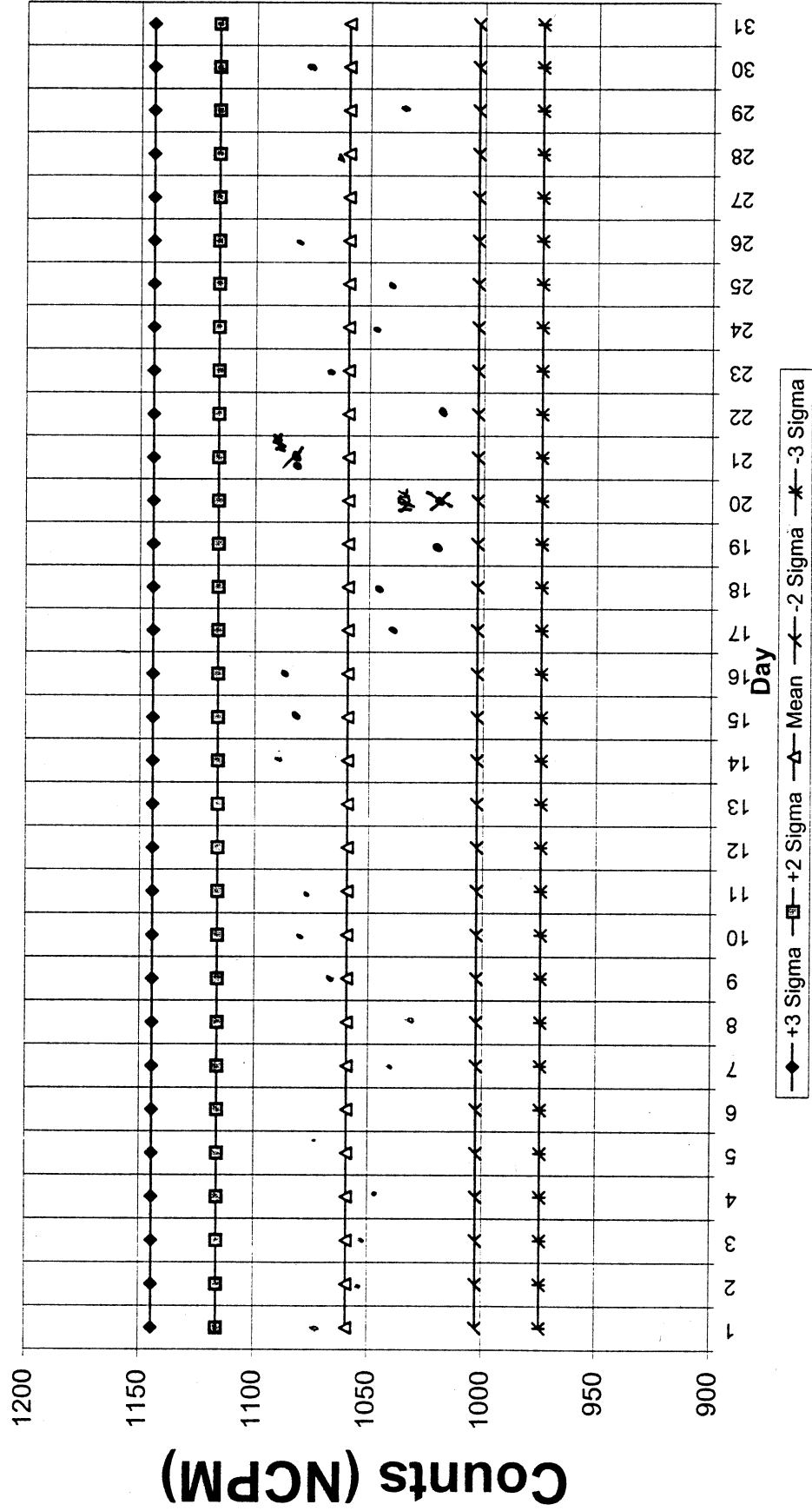
BACKGROUND				ALPHA SOURCE				BETA SOURCE			
count time = 20 minutes				count time = 5 minutes				count time = 5 minutes			
ALPHA CHANNEL		BETA CHANNEL		BETA CH		ALPHA CHANNEL		ALPHA CH		BETA CHANNEL	
Counts C_{del}	Count Rate, R_{del} (cpm)	Counts C_{bet}	Count Rate, R_{bet} (cpm)	Counts C_{del}	Count Rate, R_{del} (cpm)	Counts C_{bet}	Count Rate, R_{bet} (cpm)	Counts C_{del}	Count Rate, R_{del} (cpm)	Counts C_{bet}	Count Rate, R_{bet} (cpm)
4	0.20	1022	51.1	4660	28291	5658.2	565.8	2	5637	1127.4	1076.3
6	0.30	1136	58.8	4727	27763	5552.6	5552.3	1	5701	1140.2	1083.4
6	0.30	1079	53.95	4650	28091	5618.2	5617.9	2	5467	1093.4	1039.45
1	0.05	1092	54.6	4711	28440	5688	5687.95	1	5513	1102.6	1048
7	0.35	1026	51.3	4750	28659	5611.8	5611.45	2	5382	1076.4	1025.1
1	0.05	1058	52.9	4544	28149	5629.8	5629.75	0	5662	1132.4	1079.5
6	0.30	1026	51.3	4659	28194	5638.8	5638.5	3	5391	1078.2	1026.9
5	0.25	1093	54.65	4774	28167	5633.4	5633.15	2	5583	1116.6	1061.95
3	0.30	1099	54.95	4783	27949	5589.8	5589.5	2	5523	1104.6	1049.65
5	0.25	1102	55.1	4849	27971	5594.2	5593.95	5	5488	1097.6	1042.5

REMARKS

Reviewed By/Date

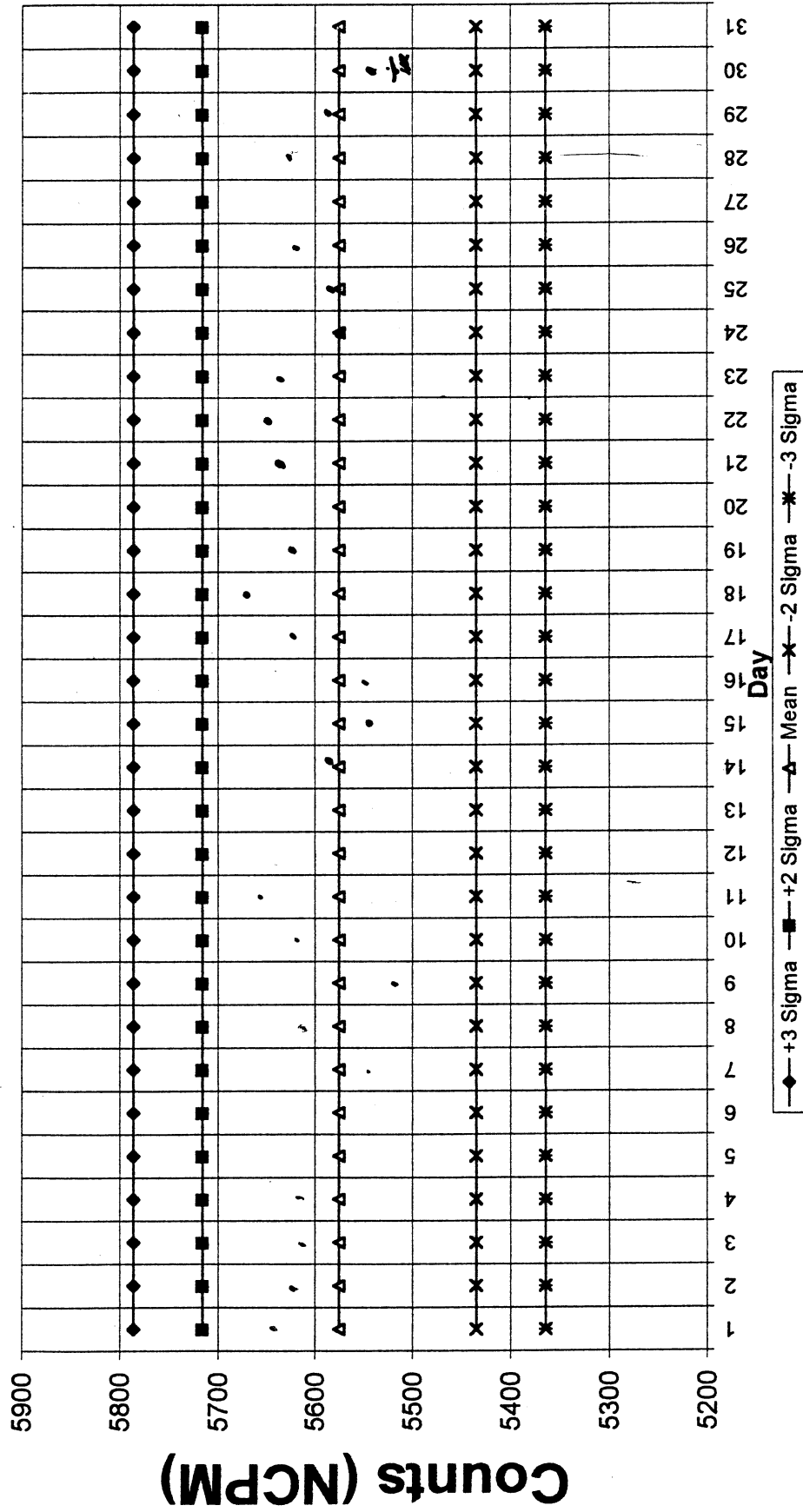
Control Chart Month Of April 20 03

Instrument 2924, Source# 11955, Isotope 12-99



Reviewed By _____ Date _____

Control Chart Month Of April 20 03
 Instrument 2929 Source# 119737 Isotope Th 232




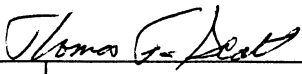
Reviewed By _____ Date _____



CALIBRATION CERTIFICATE

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


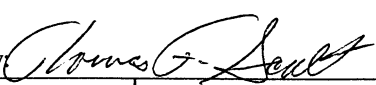
This Certificate will be accompanied by Calibration Charts or Readings where applicable

CUSTOMER INFORMATION			INSTRUMENT INFORMATION		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763			Model: 177	Serial Number: 44687	
Contact Name: Thomas Scott			Probe: 44-9	Serial Number: 163410	
Customer Purchase Order Number: N/A		Work Order Number: 2002-00842	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Instrument Response		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with RP-INS-I-235	
X 1	100	100	100	Pulser: 112860	Cal Due: 12/05/02
X 1	250	260	260	D-814: 2551	Cal Due: 09/12/02
X 1	400	390	390	Psychron: 7480	Cal Due: 05/17/03
X 10	1,000	1,000	1,000		
X 10	2,500	2,600	2,600		
X 10	4,000	4,100	4,100	Temp: 24.2° C	
X 100	10,000	10,000	10,000	Pressure: 746mmHg	
X 100	25,000	26,000	26,000	Humidity: 49%	
X 100	40,000	41,000	41,000	Background: 40cpm	
X 1000	100,000	100,000	100,000	Threshold: 35mV	
X 1000	250,000	260,000	260,000	HV (As found = 906V) (As left = 906V)	
X 1000	400,000	410,000	410,000	BAT: SAT	Volume: SAT
Efficiency Information			Audio: SAT	Geotropism: SAT	
X 1 EFF	Tc-99#119720	2,562dpm	12.4%	F/S Resp: SAT	Alarm: SAT
X 10 EFF	Tc-99#119718	20,520dpm	11.7%	HV Test: SAT	
X 100 EFF	Tc-99#099606	177,000dpm	10.7%	Limited Use: X1K scale for information only. Use with 44-9 probe.	
AVG EFF	N/A	N/A	11.6%		
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: 		Reviewed By: 		Date: 7-18-02	
Calibration Date: 07/17/02			Calibration Due: 01/17/03		

**CALIBRATION
CERTIFICATE**

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

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

CUSTOMER INFORMATION			INSTRUMENT INFORMATION		
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763			Model: 177	Serial Number: 44687	
Contact Name: Thomas Scott			Probe: 44-9	Serial Number: 118906	
Customer Purchase Order Number: N/A		Work Order Number: 2002-01440	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Instrument Response		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with RP-INS-I-235 Rev. 2	
X 1	100	100	100	Pulser: 120935	Cal Due: 03/18/03
X 1	250	250	250	DVM: 6565015	Cal Due: 09/30/03
X 1	400	400	400	D-814: 2525	Cal Due: 02/18/03
X 10	1,000	1,000	1,000	Psychron: 7480	Cal Due: 05/17/03
X 10	2,500	2,500	2,500		
X 10	4,000	4,000	4,000	Temp: 25.2°C	
X 100	10,000	10,000	10,000	Pressure: 737mmHg	
X 100	25,000	25,000	25,000	Humidity: 41%	
X 100	40,000	40,000	40,000	Background: 50cpm	
X 1000	100,000	100,000	100,000	Threshold: 34mV	
X 1000	250,000	250,000	250,000	HV (As found = 905V) (As left = 905V)	
X 1000	400,000	395,000	395,000	BAT: SAT	Volume: SAT
Efficiency Information				Audio: SAT	Geotropism: SAT
X 1 EFF	Tc-99#119720	2,562dpm	12.0%	F/S Resp: SAT	Alarm: SAT
X 10 EFF	Tc-99#119718	20,520dpm	10.7%	HV Test: SAT	
X 100 EFF	Tc-99#099606	177,000dpm	13.6%	Limited Use: X1K scale for information only. Use with 44-9 probe.	
AVG EFF	N/A	N/A	12.1%		
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: 		Reviewed By: 		Date: 1-2-03	
Calibration Date: 01/02/03			Calibration Due: 07/02/03		

ATTACHMENT 6.4
INITIAL REFERENCE RESPONSE TEST FORM
(example)

Instrument Model Number: <u>M-177</u>		Instrument ID: <u>44687</u>			
Scale or Decade	Reference Reading	±20% Value of Reference Reading	Jig and Source ID Number	Geometry	Remarks
X1	360	288 - 432	PRO89759	3rd Shelf	
X12	700	560 - 840	PRO89759	contact	
X100	N/A	N/A	N/A	N/A	information only
X1K	N/A	N/A	N/A	N/A	information only
Performed by/Date _____		Reviewed by/Date _____ / _____			

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
BSK 11-177 L-177	44687	✓		NRK	10-1-02
"	"	✓		LCM	10-02-02
"	"	✓		LCM	10-03-02
"	"	✓		LCM	10-04-02
"	"	✓		LCM	10-07-02
"	"	✓		BSK	10-8-02
"	"	✓		LCM	10-09-02
"	"	✓		BSK	10-10-02
"	"	✓		NRK	10-11-02
"	"	✓		NRK	10-12-02
"	"	✓		LCM	10-14-02
"	"	✓		LCM	10-15-02
"	"	✓		LCM	10-16-02
"	"	✓		NRK	10-17-02
"	"	✓		NRK	10-18-02
"	"	✓		NRK	10-21-02
"	"	✓		NRK	10-22-02
"	"	✓		LCM	10-23-02
"	"	✓		BSK	10-24-02
"	"	✓		LCM	10-25-02
"	"	✓		NRK	10-28-02
"	"	✓		LCM	10-29-02
"	"	✓		BSK	10-30-02

Reviewed by

Date

[illegible]

Date _____

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
L-177	44687	✓		PSK	11-1-02
"	"	✓		Con	11-4-02
"	"	✓		NRK	11-5-02
"	"	✓		NRK	11-6-02
"	"	✓		Con	11-07-02
"	"	✓		NRK	11-8-02
"	"	✓		Con	11-11-02
"	"	✓		Con	11-12-02
"	"	✓		Con	11-13-02
"	"	✓		Con	11-14-02
"	"	✓		PSK	11-15-02
"	"	✓		Con	11-18-02
"	"	✓		Con	11-19-02
"	"	✓		Con	11-20-02
"	"	✓		Con	11-21-02
"	"	✓		Con	11-22-02
"	"	✓		Con	11-25-02
"	"	✓		NRK	11-26-02

Reviewed by

Date

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
L-177	44687	✓		NRK	12-2-02
"	"	✓		YCR	12-03-02
"	"	✓		YCR	12-04-02
"	"	✓		YCR	12-05-02
"	"	✓		YCR	12-06-02
"	"	✓		YCR	12-09-02
"	"	✓		YCR	12-10-02
"	"	✓		YCR	12-11-02
"	"	✓		YCR	12-12-02
"	"	✓		YCR	12-13-02
"	"	✓		YCR	12-16-02
"	"	✓		YCR	12-17-02
"	"	✓		NRK	12-18-02
"	"	✓		YCR	12-19-02
"	"	✓		NRK	12-20-02

Reviewed by

Date

BL 9-4-23

REF ID: A63914


[illegible]

Date _____

**CALIBRATION
CERTIFICATE**

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

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

CUSTOMER INFORMATION				INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763				Model: 177	Serial Number: 94756
Contact Name: Thomas Scott				Probe: 44-9	Serial Number: 118906
Customer Purchase Order Number: N/A		Work Order Number: 2002-01440		Calibration Method: Electronic and Source	
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Instrument Response		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with RP-INS-I-235 Rev. 2	
X 1	100	100	100	Pulser: 120935	Cal Due: 03/18/03
X 1	250	250	250	DVM: 6565015	Cal Due: 09/30/03
X 1	400	400	400	D-814: 2525	Cal Due: 02/18/03
X 10	1,000	1,000	1,000	Psychron: 7480	Cal Due: 05/17/03
X 10	2,500	2,500	2,500		
X 10	4,000	4,000	4,000	Temp: 25.2° C	
X 100	10,000	10,000	10,000	Pressure: 737mmHg	
X 100	25,000	25,000	25,000	Humidity: 41%	
X 100	40,000	40,000	40,000	Background: 50cpm	
X 1000	100,000	100,000	100,000	Threshold: 35mV	
X 1000	250,000	250,000	250,000	HV (As found = 907V) (As left = 907V)	
X 1000	400,000	395,000	395,000	BAT: SAT	Volume: SAT
Efficiency Information				Audio: SAT	Geotropism: SAT
X 1 EFF	Tc-99#119720	2,562dpm	11.7%	F/S Resp: SAT	Alarm: SAT
X 10 EFF	Tc-99#119718	20,520dpm	10.5%	HV Test: SAT	
X 100 EFF	Tc-99#099606	177,000dpm	13.6%	Limited Use: X1K scale for information only. Use with 44-9 probe.	
AVG EFF	N/A	N/A	11.9%		
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: 		Reviewed By:		Date:	
Calibration Date: 01/02/03			Calibration Due: 07/02/03		



CALIBRATION CERTIFICATE

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

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

CUSTOMER INFORMATION		INSTRUMENT INFORMATION			
Customer Name: Duratek Instrument Services		Manufacturer: Ludlum			
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 177	Serial Number: 94756		
Contact Name: Thomas Scott		Probe: 44-9	Serial Number: 118906		
Customer Purchase Order Number: N/A	Work Order Number: 2002-01440	Calibration Method: Electronic and Source			
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Instrument Response		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with RP-INS-I-235 Rev. 2	
X 1	100	100	100	Pulser: 120935	Cal Due: 03/18/03
X 1	250	250	250	DVM: 6565015	Cal Due: 09/30/03
X 1	400	400	400	D-814: 2525	Cal Due: 02/18/03
X 10	1,000	1,000	1,000	Psychron: 7480	Cal Due: 05/17/03
X 10	2,500	2,500	2,500		
X 10	4,000	4,000	4,000	Temp: 25.2° C	
X 100	10,000	10,000	10,000	Pressure: 737mmHg	
X 100	25,000	25,000	25,000	Humidity: 41%	
X 100	40,000	40,000	40,000	Background: 50cpm	
X 1000	100,000	100,000	100,000	Threshold: 35mV	
X 1000	250,000	250,000	250,000	HV (As found = 907V) (As left = 907V)	
X 1000	400,000	395,000	395,000	BAT: SAT	Volume: SAT
				Audio: SAT	Geotropism: SAT
Efficiency Information				F/S Resp: SAT	Alarm: SAT
X 1 EFF	Tc-99#119720	2,562dpm	11.7%	HV Test: SAT	
X 10 EFF	Tc-99#119718	20,520dpm	10.5%	Limited Use: X1K scale for information only. Use with 44-9 probe.	
X 100 EFF	Tc-99#099606	177,000dpm	13.6%		
AVG EFF	N/A	N/A	11.9%		
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>Thomas F. Scott</i>		Date: 1-2-03	
Calibrated By: <i>Am/16</i>					
Calibration Date: 01/02/03			Calibration Due: 07/02/03		



CALIBRATION CERTIFICATE

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

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

CUSTOMER INFORMATION				INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763				Model: 177	Serial Number: 94756
Contact Name: Thomas Scott				Probe: 44-9	Serial Number: 103264
Customer Purchase Order Number: N/A		Work Order Number: 2002-00970		Calibration Method: Electronic and Source	
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Instrument Response		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with RP-INS-I-235	
X 1	100	100	100	Pulser: 101500	Cal Due: 08/23/02
X 1	250	250	250	DVM: TW12663	Cal Due: 03/18/03
X 1	400	400	400	D-814: 2551	Cal Due: 09/12/02
X 10	1,000	1,050	1,000	Psychron: 7480	Cal Due: 05/17/03
X 10	2,500	2,700	2,500		
X 10	4,000	4,300	4,000	Temp: 21.7° C	
X 100	10,000	10,000	10,000	Pressure: 746mmHg	
X 100	25,000	25,000	25,000	Humidity: 52%	
X 100	40,000	40,000	40,000	Background: 40cpm	
X 1000	100,000	100,000	100,000	Threshold: 35mV	
X 1000	250,000	250,000	250,000	HV (As found = 904V) (As left = 904V)	
X 1000	400,000	395,000	395,000	BAT: SAT	Volume: SAT
Efficiency Information				Audio: SAT	Geotropism: SAT
X 1 EFF	Tc-99#119720	2,562dpm	10.5%	F/S Resp: SAT	Alarm: SAT
X 10 EFF	Tc-99#119718	20,520dpm	11.0%	HV Test: SAT	
X 100 EFF	Tc-99#099606	177,000dpm	12.4%	Limited Use: X1K scale for information only. Use with 44-9 probe.	
AVG EFF	N/A	N/A	11.3%		
STATEMENT OF CERTIFICATION					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument		I certify that the above information is correct:			
Calibrated By: Mike Paul		Reviewed By: Thomas G. Scott		Date: 8-12-02	
Calibration Date: 08/12/02			Calibration Due: 02/12/03		

ATTACHMENT 6.4

Instrument ID: 94756

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
L-177	94756	✓		BSK	8-23-02
L-177	94756	✓		BSK	8-27-02
L-177	94756	✓		IREK	8-28-02
"	"	✓		BSK	8-29-02
"	"	✓		BSK	8-30-02 BSK 8-29-02
"	"	✓		BSK	9-3-02
"	"	✓		BSK	9-4-02
"	"	✓		BSK	9-5-02
"	"	✓		BSK	9-6-02
"	"	✓		BSK	9-9-02
"	"	✓		BSK	9-10-02
"	"	✓		BSK	9-11-02
"	"	✓		BSK	9-13-02 9-11-02
"	"	✓		BSK	9-13-02
"	"	✓		BSK	9-16-02
"	"	✓		BSK	9-17-02
"	"	✓		ICM	09-18-02
"	"	✓		ICM	09-19-02
"	"	✓		ICM	09-20-02
"	"	✓		BSK ICM	09-21-02 09-23-02
"	"	✓		ICM	09-23-02
"	"	✓		ICM	09-24-02
"	"	✓		ICM	09-25-02

Reviewed by

Date

[illegible]

Date _____

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
L-177	94756	✓		NRK	10-1-02
"	"	✓		TCM	10-02-02
"	"	✓		TCM	10-03-02
"	"	✓		TCM	10-04-02
"	"	✓		TCM	10-07-02
"	"	✓		BSK	10-8-02
"	"	✓		TCM	10-09-02
"	"	✓		BSK	10-10-02
"	"	✓		NRK	10-11-02
"	"	✓		NRK	10-12-02
"	"	✓		TCM	10-14-02
"	"	✓		TCM	10-15-02
"	"	✓		TCM	10-16-02
"	"	✓		NRK	10-17-02
"	"	✓		NRK	10-18-02
"	"	✓		NRK	10-21-02
"	"	✓		NRK	10-22-02
"	"	✓		TCM	10-23-02
"	"	✓		BSK	10-24-02
"	"	✓		TCM	10-25-02
"	"	✓		NRK	10-28-02
"	"	✓		TCM	10-29-02
"	"	✓		BSK	10-30-02

Reviewed by

Date

[illegible]

Date _____

[illegible]

Date _____

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-177	94756	✓		Tom	01-08-03
"	"	✓		BSK	1-9-03
"	"	✓		BSK	1-10-03
"	"	✓		BSK	1-13-03
"	"	✓		BSK	1-14-03
"	"	✓		Tom	01-15-03
"	"	✓		Tom	01-16-03
"	"	✓		BSK	1-17-03
"	"	✓		Tom	01-20-03
"	"	✓		Tom	01-21-03
"	"	✓		Tom	01-22-03
"	"	✓		Tom	01-23-03
"	"	✓		BSK	1-24-03
"	"	✓		BSK	1-27-03
"	"	✓		Tom	01-28-03
"	"	✓		Tom	01-29-03
"	"	✓		Tom	01-30-03
"	"	✓		Tom	01-31-03
"	"	✓		BSK	2-3-03
"	"	✓		BSK	2-4-03
"	"	✓		BSK	2-5-03
"	"	✓		BSK	2-6-03
"	"	✓		BSK	2-7-03

Reviewed by

Date

[illegible]

Date _____

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-177	94756	✓		NRK	3-3-03
"	"	✓		NRK	3-4-03
"	"	✓		NRK	3-5-03
"	"	✓		BSK	3-6-03
"	"	✓		BSK	3-7-03
"	"	✓		NRK	3-10-03
"	"	✓		NRK	3-11-03
"	"	✓		NRK	3-12-03
"	"	✓		NRK	3-13-03
"	"	✓		NRK	3-14-03
"	"	✓		NRK	3-17-03
"	"	✓		NRK	3-18-03
"	"	✓		NRK	3-19-03
"	"	✓		NRK	3-20-03
"	"	✓		NRK	3-21-03
"	"	✓		NRK	3-24-03
"	"	✓		NRK	3-25-03
"	"	✓		NRK	3-26-03
"	"	✓		NRK	3-27-03
"	"	✓		NRK	3-28-03
"	"	✓		NRK	3-31-03

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-177	94756	✓		NRK	4-1-03
"	"	✓		BSK	4-2-03
"	"	✓		BSK	4-3-03
"	"	✓		BSK	4-4-03
"	"	✓		NRK	4-7-03
"	"	✓		NRK	4-8-03
"	"	✓		NRK	4-9-03
"	"	✓		NRK	4-10-03
"	"	✓		NRK	4-11-03
"	"	✓		NRK	4-14-03
"	"	✓		NRK	4-15-03
"	"	✓		NRK	4-16-03
"	"	✓		NRK	4-17-03
"	"	✓		NRK	4-18-03
"	"	✓		NRK	4-19-03
"	"	✓		BSK	4-21-03
"	"	✓		NRK	4-22-03
"	"	✓		NRK	4-23-03

Reviewed by

Date



CALIBRATION CERTIFICATE

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

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

CUSTOMER INFORMATION				INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763				Model: 177	Serial Number: 91439
Contact Name: Thomas Scott				Probe: 44-9	Serial Number: 5723
Customer Purchase Order Number: N/A		Work Order Number: 2002-00970		Calibration Method: Electronic and Source	
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Instrument Response		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with RP-INS-I-235	
X 1	100	100	100	Pulser: 101500	Cal Due: 08/23/02
X 1	250	250	250	DVM: TW12663	Cal Due: 03/18/03
X 1	400	400	400	D-814: 2551	Cal Due: 09/12/02
X 10	1,000	1,050	1,000	Psychron: 7480	Cal Due: 05/17/03
X 10	2,500	2,700	2,500		
X 10	4,000	4,300	4,000	Temp: 21.7° C	
X 100	10,000	10,000	10,000	Pressure: 746mmHg	
X 100	25,000	25,000	25,000	Humidity: 52%	
X 100	40,000	40,000	40,000	Background: 60cpm	
X 1000	100,000	100,000	100,000	Threshold: 34mV	
X 1000	250,000	250,000	250,000	HV (As found = 905V) (As left = 905V)	
X 1000	400,000	390,000	390,000	BAT: SAT	Volume: SAT
Efficiency Information				Audio: SAT	Geotropism: SAT
X 1 EFF	Tc-99#119720	2,562dpm	10.5%	F/S Resp: SAT	Alarm: SAT
X 10 EFF	Tc-99#119718	20,520dpm	10.9%	HV Test: SAT	
X 100 EFF	Tc-99#099606	177,000dpm	12.4%	Limited Use: X1K scale for information only. Use with 44-9 probe.	
AVG EFF	N/A	N/A	11.3%		
STATEMENT OF CERTIFICATION					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument		I certify that the above information is correct:			
Calibrated By: <i>M. Paul</i>		Reviewed By: <i>Thomas Scott</i>		Date: 8-15-02	
Calibration Date: 08/12/02			Calibration Due: 02/12/03		

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
L-177	91439	✓		BSK	8-23-02
L-177	91439	✓		BSK	8-27-02
L-177	91439	✓		BSK	8-28-02
"	"	✓		BSK	8-29-02
"	"	✓		BSK	8-30-02
"	"	✓		BSK	8-31-02
"	"	✓		BSK	9-3-02
L-177	91439	✓		BSK	9-4-02
"	"	✓		BSK	9-5-02
"	"	✓		BSK	9-6-02
"	"	✓		BSK	9-9-02
"	"	✓		BSK	9-10-02
"	"	✓		BSK	9-11-02
"	"	✓		BSK	9-12-02
"	"	✓		BSK	9-13-02
"	"	✓		BSK	9-16-02
"	"	✓		BSK	9-17-02
"	"	✓		BSK	09-18-02
"	"	✓		BSK	09-19-02
"	"	✓		BSK	09-20-02
"	"	✓		BSK	09-21-02
"	"	✓		BSK	09-23-02
"	"	✓		BSK	09-23-02
"	"	✓		BSK	09-24-02

Reviewed by

Date

[illegible]

Date _____

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
L-177	91439	✓		NRK	10-1-02
"	"	✓		YCM	10-02-02
"	"	✓		YCM	10-03-02
"	"	✓		YCM	10-04-02
"	"	✓		YCM	10-07-02
"	"	✓		BSK	10-8-02
"	"	✓		YCM	10-09-02
"	"	✓		BSK	10-10-02
"	"	✓		NRK	10-11-02
"	"	✓		NRK	10-12-02
"	"	✓		YCM	10-14-02
"	"	✓		YCM	10-15-02
"	"	✓		YCM	10-16-02
"	"	✓		NRK	10-17-02
"	"	✓		NRK	10-18-02
"	"	✓		NRK	10-21-02
"	"	✓		NRK	10-22-02
"	"	✓		YCM	10-23-02
"	"	✓		BSK	10-24-02
"	"	✓		YCM	10-25-02
"	"	✓		NRK	10-28-02
"	"	✓		YCM	10-29-02
"	"	✓		BSK	10-30-02

Reviewed by

Date

[illegible]

Date _____

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
L-177	91439	✓		BSK	11-1-02
"	"	✓		CCM	11-04-02
"	"	✓		NRK	11-5-02
"	"	✓		NRK	11-6-02
"	"	✓		CCM	11-07-02
"	"	✓		NRK	11-8-02
"	"	✓		CCM	11-11-02
"	"	✓		CCM	11-12-02
"	"	✓		CCM	11-13-02
"	"	✓		CCM	11-14-02
"	"	✓		BSK	11-15-02
"	"	✓		CCM	11-18-02
"	"	✓		CCM	11-19-02
"	"	✓		CCM	11-20-02
"	"	✓		CCM	11-21-02
"	"	✓		CCM	11-22-02
"	"	✓		CCM	11-25-02
"	"	✓		NRK	11-26-02

Reviewed by

Date

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-177	91439	✓		NRK	12-2-02
"	"	✓		LCM	12-3-02
"	"	✓		LCM	12-04-02
"	"	✓		LCM	12-05-02
"	"	✓		LCM	12-06-02
"	"	✓		LCM	12-09-02
"	"	✓		LCM	12-10-02
"	"	✓		LCM	12-11-02
"	"	✓		LCM	12-12-02
"	"	✓		LCM	12-13-02
"	"	✓		LCM	12-16-02
"	"	✓		LCM	12-17-02
"	"	✓		NRK	12-18-02
"	"	✓		LCM	12-19-02
"	"	✓		NRK	12-20-02

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-177	91439	✓		NRKs	1-6-03
"	"	✓		Wiles	01-07-03
"	"	✓		ECm	01-08-03
"	"	✓		BSK	1-9-03
"	"	✓		BSK	1-10-03 1-9-03
"	"	✓		BSK	1-13-03
"	"	✓		BSK	1-14-03
"	"	✓		ECm	01-15-03
"	"	✓		ECm	01-16-03
"	"	✓		BSK	1-17-03
"	"	✓		ECm	01-20-03
"	"	✓		ECm	01-21-03
"	"	✓		ECm	01-22-03
"	"	✓		ECm	01-23-03
"	"	✓		BSK	1-24-03
"	"	✓		BSK	1-27-03
"	"	✓		ECm	01-28-03
"	"	✓		ECm	01-29-03
"	"	✓		ECm	01-30-03
"	"	✓		ECm	01-31-03
"	"	✓		BSK	2-3-03
"	"	✓		BSK	2-4-03
"	"	✓		BSK	2-5-03

Reviewed by

Date

[illegible]


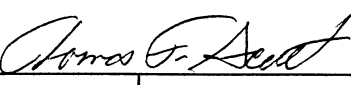
1 of 1



CALIBRATION CERTIFICATE

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

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

CUSTOMER INFORMATION				INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763				Model: 12	Serial Number: 162121
Contact Name: Thomas Scott				Probe: 44-9	Serial Number: 118906
Contract/Task Number: N/A		Work Order Number: 2002-01440		Calibration Method: Electronic and Source	
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Instrument Response		Comments	
		Before Calibration	After Calibration	Calibrated in accordance with RP-INS-1-223 Rev. 1	
X 1	100	100	100	Pulser: 120935 Cal Due: 03/18/03	
X 1	250	250	250	D-814: 2525 Cal Due: 02/18/03	
X 1	400	400	400	Psychron: 7480 Cal Due: 06/12/03	
X 10	1,000	1,000	1,000		
X 10	2,500	2,500	2,500	Temperature: 25.2°C	
X 10	4,000	4,000	4,000	Pressure: 737mmHg	
X 100	10,000	10,000	10,000	Humidity: 41%	
X 100	25,000	25,000	25,000		
X 100	40,000	40,000	40,000		
X 1000	100,000	100,000	100,000	Audio: SAT Batt. Check: SAT	
X 1000	250,000	250,000	250,000	Fast/Slow: SAT Reset: SAT	
X 1000	400,000	400,000	400,000	HV Pushbutton: SAT Overrange: SAT	
EFFICIENCY DETERMINATION					
EFF X1	Tc-99#119720	2,562dpm	11.7%	Background: 50cpm Threshold: 40mV	
EFF X10	Tc-99#119718	20,520dpm	10.5%		
EFF X100	Tc-99#099606	177,000dpm	13.5%	Limited Use: X1000 Scale for information only. Use with 44-9.	
Average	N/A	N/A	11.9%		
High Voltage	900V	901V	901V		
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: 		Reviewed By: 		Date: 1-2-03	
Calibration Date: 01/02/03			Calibration Due: 07/02/03		

ATTACHMENT 6.4

12

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	162121	✓		BSK	9-6-02
"	"	✓		BSK	9-9-02
"	"	✓		BSL	9-10-02
"	"	✓		BSK	9-11-02
"	"	✓		BSK	9-12-02
"	"	✓		BSK	9-13-02
"	"	✓		BSK	9-16-02
"	"	✓		BSK	9-17-02
"	"	✓		TCM	09-18-02
"	"	✓		TCM	09-19-02
"	"	✓		TCM	09-20-02
"	"	✓		BSK	09-21-02
"	"	✓		TCM	09-23-02
"	"	✓		TCM	09-24-02
"	"	✓		TCM	09-25-02
M-12	162121	✓		NRG	9-26-02
"	"	✓		NRG	9-27-02
"	"	✓		TCM	09-30-02

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	162121	✓		NEK	10-1-02
"	"	✓		YCM	10-02-02
"	"	✓		YCM	10-03-02
"	"	✓		YCM	10-04-02
"	"	✓		YCM	10-07-02
"	"	✓		BSK	10-8-02
"	"	✓		YCM	10-09-02
"	"	✓		BSK	10-10-02
"	"	✓		NEK	10-11-02
"	"	✓		NEK	10-12-02
"	"	✓		YCM	10-14-02
"	"	✓		YCM	10-15-02
"	"	✓		YCM	10-16-02
"	"	✓		NEK	10-17-02
"	"	✓		NEK	10-18-02
"	"	✓		NEK	10-21-02
"	"	✓		NEK	10-22-02
"	"	✓		YCM	10-23-02
"	"	✓		BSK	10-24-02
"	"	✓		YCM	10-25-02
"	"	✓		NEK	10-28-02
"	"	✓		YCM	10-29-02
"	"	✓		BSK	10-30-02

Reviewed by

Date

[illegible]

1 of 1

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	162121	✓		BSK	11-1-02
"	"	✓		Ycm	11-4-02
"	"	✓		NRK	11-5-02
"	"	✓		NRK	11-6-02
"	"	✓		Ycm	11-07-02
"	"	✓		NRK	11-8-02
"	"	✓		Ycm	11-11-02
"	"	✓		Ycm	11-12-02
"	"	✓		Ycm	11-13-02
"	"	✓		Ycm	11-14-02
"	"	✓		BSK	11-15-02
"	"	✓		Ycm	11-18-02
"	"	✓		Ycm	11-19-02
"	"	✓		Ycm	11-20-02
"	"	✓		Ycm	11-21-02
"	"	✓		Ycm	11-22-02
"	"	✓		Ycm	11-25-02
"	"	✓		NRK	11-26-02

Reviewed by

Date

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	162121	✓		BSK	1-8-03
"	"	✓		BSK	1-9-03
"	"	✓		BSK	1-10-03
"	"	✓		BSK	1-13-03
"	"	✓		BSK	1-14-03
"	"	✓		YCM	01-15-03
"	"	✓		YCM	01-16-03
"	"	✓		BSK	1-17-03
"	"	✓		YCM	01-20-03
"	"	✓		YCM	01-21-03
"	"	✓		YCM	01-22-03
"	"	✓		YCM	01-23-03
"	"	✓		BSK	1-24-03
"	"	✓		BSK	1-27-03
"	"	✓		YCM	01-28-03
"	"	✓		BSK	1-29-03
"	"	✓		YCM	01-30-03
"	"	✓		YCM	01-31-03
"	"	✓		BSK	2-3-03
"	"	✓		BSK	2-4-03
"	"	✓		BSK	2-5-03
"	"	✓		BSK	2-6-03
"	"	✓		BSK	2-7-03

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
111-12	162121	✓		BSK	2-10-03
"	"	✓		BSK	2-11-03
"	"	✓		BSK	2-12-03
"	"	✓		BSK	2-13-03
"	"	✓		BSK	2-14-03
"	"	✓		BSK	2-18-03
"	"	✓		BSK	2-19-03
"	"	✓		BSK	2-20-03
"	"	✓		BSK	2-21-03
"	"	✓		BSK	2-24-03
"	"	✓		BSK	2-25-03
"	"	✓		BSK	2-26-03
"	"	✓		BSK	2-27-03
"	"	✓		BSK	2-28-03

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	162/21	✓		NRK	3-3-03
"	"	✓		NRK	3-4-03
"	"	✓		NRK	3-5-03
"	"	✓		BSK	3-6-03
"	"	✓		BSK	3-7-03
"	"	✓		NRK	3-10-03
"	"	✓		NRK	3-11-03
"	"	✓		NRK	3-12-03
"	"	✓		NRK	3-13-03
"	"	✓		NRK	3-14-03
"	"	✓		NRK	3-17-03
"	"	✓		NRK	3-18-03
"	"	✓		NRK	3-19-03
"	"	✓		NRK	3-20-03
"	"	✓		NRK	3-21-03
"	"	✓		NRK	3-24-03
"	"	✓		NRK	3-25-03
"	"	✓		NRK	3-26-03
"	"	✓		NRK	3-27-03
"	"	✓		NRK	3-28-03
"	"	✓		NRK	3-31-03

Reviewed by

Date

ATTACHMENT 6.4

Instrument Model Number: <u>M-12</u>						Instrument ID: <u>162121</u>	
Scale or Decade	Reference Reading	$\pm 20\%$ Value of Reference Reading	Jig and Source ID Number	Geometry	Remarks		
X 1	360	288 - 732		3rd shelf			
X 10	600	480 - 790 520 - 780 ok		Contact			
X 100					For information only		
X 1K					For information only		
Performed by/Date <u>B5 Gjs</u>			<u>11-8-03</u>			Reviewed by/Date <u> </u>	

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	162121	✓		NRK	4-1-03
"	"	✓		BSK	4-2-03
"	"	✓		BSK	4-3-03
"	"	✓		BSK	4-7-03
"	"	✓		NRK	4-7-03
"	"	✓		NRK	4-8-03
"	"	✓		NRK	4-9-03
"	"	✓		NRK	4-10-03
"	"	✓		NRK	4-11-03
"	"	✓		NRK	4-12-03
"	"	✓		NRK	4-14-03
"	"	✓		NRK	4-15-03
"	"	✓		NRK	4-16-03
"	"	✓		NRK	4-17-03
"	"	✓		BSK	4-18-03
"	"	✓		NRK	4-19-03
"	"	✓		BSK	4-21-03
"	"	✓		NRK	4-22-03
"	"	✓		NRK	4-23-03

Reviewed by

Date



CALIBRATION CERTIFICATE

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

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

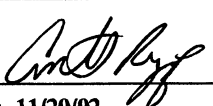
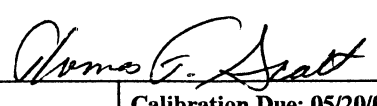
CUSTOMER INFORMATION		INSTRUMENT INFORMATION		
Customer Name: Duratek Instrument Services		Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 12	Serial Number: 117173	
Contact Name: Thomas Scott		Probe: 44-9	Serial Number: 030461	
Contract/Task Number: 106726.0010	Work Order Number: 2002-01050	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range	Calibration Standard Value	Instrument Response		Comments
		Before Calibration	After Calibration	
X 1	100	100	100	Pulser: 92851 Cal Due: 01/02/03
X 1	250	250	250	ESV: ES-17442 Cal Due: 08/13/03
X 1	400	420	420	D-812: 2551 Cal Due: 09/12/02
X 10	1,000	1,000	1,000	Psychron: 7480 Cal Due: 05/17/03
X 10	2,500	2,600	2,600	
X 10	4,000	4,100	4,100	Temperature: 22.0 °C
X 100	10,000	10,000	10,000	Pressure: 745 mmHg
X 100	25,000	25,000	25,000	Humidity: 44 %
X 100	40,000	41,000	41,000	
X 1000	100,000	100,000	100,000	Audio: SAT Batt. Check: SAT
X 1000	250,000	250,000	250,000	Fast/Slow: SAT Reset: SAT
X 1000	400,000	410,000	410,000	HV Pushbutton: SAT Overrange: SAT
EFFICIENCY DETERMINATION				
EFF X1	Tc-99 #119720	2,562 dpm	10.9%	Background: 40 cpm Threshold: 38 mV
EFF X10	Tc-99 #119718	20,520 dpm	12.5 %	Limited Use: X1000 Scale for information only. Use with 44-9.
EFF X100	Tc-99 #099606	177,000 dpm	13.0%	
High Voltage	900V	900 V	900 V	
STATEMENT OF CERTIFICATION				
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).				
Instrument		I certify that the above information is correct:		
Calibrated By: <i>Thomas Scott</i>		Reviewed By: <i>[Signature]</i>		Date: 9-4-02
Calibration Date: 09/04/02		Calibration Due: 03/04/03		



CALIBRATION CERTIFICATE

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

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

CUSTOMER INFORMATION			INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services			Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763			Model: 12	Serial Number: 117173
Contact Name: Thomas Scott			Probe: 44-9	Serial Number: 163412
Contract/Task Number: N/A		Work Order Number: 2002-01348	Calibration Method: Electronic and Source	
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range	Calibration Standard Value	Instrument Response		Comments
		Before Calibration	After Calibration	
X 1	100	N/A ¹	100	Pulser: 120935 Cal Due: 03/18/03
X 1	250	N/A ¹	250	DVM: 6565015 Cal Due: 09/30/03
X 1	400	N/A ¹	400	D-814: 2525 Cal Due: 02/18/03
X 10	1,000	N/A ¹	1,000	Psychron: 7480 Cal Due: 05/17/03
X 10	2,500	N/A ¹	2,500	
X 10	4,000	N/A ¹	4,000	Temperature: 24.3°C
X 100	10,000	N/A ¹	10,000	Pressure: 746mmHg
X 100	25,000	N/A ¹	25,000	Humidity: 43%
X 100	40,000	N/A ¹	40,000	
X 1000	100,000	N/A ¹	100,000	Audio: SAT Batt. Check: SAT
X 1000	250,000	N/A ¹	250,000	Fast/Slow: SAT Reset: SAT
X 1000	400,000	N/A ¹	400,000	HV Pushbutton: SAT Overrange: SAT
EFFICIENCY DETERMINATION				N/A ¹ No As Found—Meter Sticking
EFF X1	Tc-99#119720	2,562dpm	13.3%	Background: 60cpm Threshold: 35mV
EFF X10	Tc-99#119718	20,520dpm	11.6%	Limited Use: X1000 Scale for information only. Use with 44-9.
EFF X100	Tc-99#099606	177,000dpm	12.4%	
Average Efficiency	N/A	N/A	12.4%	
High Voltage	900V	900V	900V	
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: 		Reviewed By: 		Date: 11-20-02
Calibration Date: 11/20/02			Calibration Due: 05/20/03	

ATTACHMENT 6.4

Instrument Model Number: _____					
Instrument ID: <u>11717B</u>					
Scale or Decade	Reference Reading	+20% Value of Reference Reading	Jig and Source ID Number	Geometry	Remarks
X1	300	340 - 360	F0184 PR089759	zed shelf	
X10	800	640 - 960		Contact	
X100					For informative only
X1000					For informative only

Performed by/Date <u>B5Kjes</u>	Reviewed by/Date <u>1 Feb-02</u>
---------------------------------	----------------------------------

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	117173	✓		BSK	9-6-02
"	"	✓		BSK	9-9-02
"	"	✓		BSK	9-10-02
"	"	✓		BSK	9-11-02
"	"	✓		BSK	9-11-02
M-12	117173	✓		BSK	9-17-02
"	"	✓		Ycm	09-18-02
"	"	✓		Ycm	09-19-02
"	"	✓		Ycm	09-20-02
"	"	✓		BSK	09-21-02
"	"	✓		Ycm	09-23-02
"	"	✓		Ycm	09-24-02
"	"	✓		Ycm	09-25-02
M-12	117173	✓		NRKp	9-26-02
"	"	✓		NRKp	9-27-02
"	"	✓		Ycm	09-30-02

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	117173	✓		NRK	10-1-02
"	"	✓		Ycm	10-02-02
"	"	✓		Ycm	10-03-02
"	"	✓		Ycm	10-04-02
"	"	✓		Ycm	10-07-02
"	"	✓		BSK	10-8-02
"	"	✓		Ycm	10-09-02
"	"	✓		BSK	10-10-02
"	"	✓		NRK	10-11-02
"	"	✓		NRK	10-12-02
"	"	✓		Ycm	10-14-02
"	"	✓		Ycm	10-15-02
"	"	✓		Ycm	10-16-02
"	"	✓		NRK	10-17-02
"	"	✓		NRK	10-18-02
"	"	✓		NRK	10-21-02
"	"	✓		NRK	10-22-02
"	"	✓		Ycm	10-23-02
"	"	✓		BSK	10-24-02
"	"	✓		Ycm	10-25-02
"	"	✓		NRK	10-28-02
"	"	✓		Ycm	10-29-02
"	"		✓	Ycm	10-29-02

10-29-02
Ycm

Reviewed by

Date

[illegible]

Date _____

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	117173	✓		NRK	12-2-02
"	"	✓		ECM	12-03-02
"	"	✓		ECM	12-04-02
"	"	✓		ECM	12-05-02
"	"	✓		ECM	12-06-02
"	"	✓		ECM	12-09-02
"	"	✓		ECM	12-10-02
"	"	✓		ECM	12-11-02
"	"	✓		ECM	12-12-02
"	"	✓		ECM	12-13-02
"	"	✓		ECM	12-16-02
"	"	✓		ECM	12-17-02
"	"	✓		NRK	12-18-02
"	"	✓		ECM	12-19-02
"	"	✓		NRK	12-20-02

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	117173	✓		NRK	1-6-03
"	"	✓		com	01-07-03
"	"	✓		com	01-08-03
"	"	✓		BSK	1-9-03
"	"	✓		BSK	1-10-03
"	"	✓		BSK	1-13-03
"	"	✓		BSK	1-14-03
"	"	✓		com	01-15-03
"	"	✓		com	01-16-03
"	"	✓		BSK	1-17-03
"	"	✓		com	01-20-03
"	"	✓		com	01-21-03
"	"	✓		com	01-22-03
"	"	✓		com	01-23-03
"	"	✓		BSK	1-24-03
"	"	✓		BSK	1-27-03
"	"	✓		com	01-28-03
"	"	✓		com	01-29-03
"	"	✓		com	01-30-03
"	"	✓		com	01-31-03
"	"	✓		BSK	2-3-03
"	"	✓		BSK	2-4-03
"	"	✓		BSK	2-5-03

Reviewed by

Date

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M12	117173	✓		BSK	2-6-03
"	"	✓		BSK	2-7-03
"	"	✓		BSK	2-10-03
"	"	✓		BSK	2-11-03
"	"	✓		BSK	2-12-03
"	"	✓		BSK	2-13-03
"	"	✓		BSK	2-14-03
"	"	✓		BSK	2-18-03
"	"	✓		BSK	2-19-03
"	"	✓		BSK	2-20-03
"	"	✓		BSK	2-21-03
"	"	✓		BSK	2-24-03
"	"	✓		BSK	2-25-03
"	"	✓		BSK	2-26-03
"	"	✓		BSK	2-27-03
"	"	✓		BSK	2-28-03

Reviewed by _____

Date _____

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	117173	✓		NRK	3-3-03
"	"	✓		NRK	3-4-03
"	"	✓		NRK	3-5-03
"	"	✓		BSK	3-6-03
"	"	✓		BSK	3-7-03
"	"	✓		NRK	3-10-03
"	"	✓		NRK	3-11-03
"	"	✓		NRK	3-12-03
"	"	✓		NRK	3-13-03
"	"	✓		NRK	3-14-03
"	"	✓		NRK	3-17-03
"	"	✓		NRK	3-18-03
"	"	✓		NRK	3-19-03
"	"	✓		NRK	3-20-03
"	"	✓		NRK	3-21-03
"	"	✓		NRK	3-24-03
"	"	✓		NRK	3-25-03
"	"	✓		NRK	3-26-03
"	"	✓		NRK	3-27-03
"	"	✓		NRK	3-28-03
"	"	✓		NRK	3-31-03

Reviewed by

Date

ATTACHMENT 6.4
INITIAL REFERENCE RESPONSE TEST FORM
(example)

Instrument Model Number: <u>12</u>		Instrument ID: <u>117173</u>			
Scale or Decade	Reference Reading	±20% Value of Reference Reading	Jig and Source ID Number	Geometry	Remarks
X1	300	240-360	FD184 PK89759	3rd shelf	
X10	600	480-720 360-540 OK		Contact	
X100					For information only
X1000					For information only
Performed by/Date _____		Reviewed by/Date _____ / _____			

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	117173	✓		NRK	4-1-03
"	"	✓		BSK	4-2-03
"	"	✓		BSK	4-3-03
"	"	✓		BSK	4-4-03
"	"	✓		NRK	4-9-03
"	"	✓		NRK	4-8-03
"	"	✓		NRK	4-9-03
"	"	✓		NRK	4-10-03
"	"	✓		NRK	4-11-03
"	"	✓		NRK	4-12-03
"	"	✓		NRK	4-14-03
"	"	✓		NRK	4-15-03
"	"	✓		NRK	4-16-03
"	"	✓		NRK	4-17-03
"	"	✓		BSK	4-18-03
"	"	✓		NRK	4-19-03
"	"	✓		BSK	4-21-03
"	"	✓		NRK	4-22-03
"	"	✓		NRK	4-23-03

Reviewed by

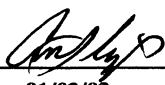

Date



CALIBRATION CERTIFICATE

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

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

CUSTOMER INFORMATION		INSTRUMENT INFORMATION		
Customer Name: Duratek Instrument Services		Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 12	Serial Number: 157641	
Contact Name: Thomas Scott		Probe: 44-9	Serial Number: 118906	
Contract/Task Number: N/A	Work Order Number: 2002-01440	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range	Calibration Standard Value	Instrument Response		Comments
		Before Calibration	After Calibration	
X 1	100	100	100	Calibrated in accordance with RP-INS-1-223 Rev. 1 Pulser: 120935 Cal Due: 03/18/03
X 1	250	250	250	D-814: 2525 Cal Due: 02/18/03
X 1	400	400	400	Psychron: 7480 Cal Due: 06/12/03
X 10	1,000	1,000	1,000	
X 10	2,500	2,500	2,500	Temperature: 25.2°C
X 10	4,000	4,000	4,000	Pressure: 737mmHg
X 100	10,000	10,000	10,000	Humidity: 41%
X 100	25,000	25,000	25,000	
X 100	40,000	40,000	40,000	
X 1000	100,000	100,000	100,000	Audio: SAT Batt. Check: SAT
X 1000	250,000	250,000	250,000	Fast/Slow: SAT Reset: SAT
X 1000	400,000	400,000	400,000	HV Pushbutton: SAT Overrange: SAT
EFFICIENCY DETERMINATION				
EFF X1	Tc-99#119720	2,562dpm	11.7%	Background: 50cpm Threshold: 40mV
EFF X10	Tc-99#119718	20,520dpm	11.5%	
EFF X100	Tc-99#099606	177,000dpm	12.4%	
Average	N/A	N/A	11.9%	Limited Use: X1000 Scale for information only. Use with 44-9.
High Voltage	900V	903V	903V	
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: 	Reviewed By: 	Date: 1-2-03		
Calibration Date: 01/02/03		Calibration Due: 07/02/03		

Instrument ID: 157641[illegible]

Performed by/Date	B.S. Kiser	1 9-6-02
Reviewed by/Date		

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	157641	✓		BSK	9-6-02
"	"	✓		BSK	9-9-02
"	"	✓		BSK	9-10-02
"	"	✓		BSK	9-11-02
"	"	✓		BSK	9-12-02
"	"	✓		BSK	9-13-02
"	"	✓		BSK	9-16-02
"	"	✓		BSK	9-17-02
"	"	✓		TCM	09-18-02
"	"	✓		TCM	09-19-02
"	"	✓		TCM	09-20-02
"	"	✓		BSK	09-21-02
"	"	✓		TCM	09-23-02
"	"	✓		TCM	09-24-02
"	"	✓		TCM	09-25-02
M-12	157641	✓		NRK	9-26-02
"	"	✓		NRK	9-27-02
"	"	✓		TCM	09-30-02

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	157641	✓		NRK	10-1-02
"	"	✓		TCM	10-02-02
"	"	✓		TCM	10-03-02
"	"	✓		TCM	10-04-02
"	"	✓		TCM	10-07-02
"	"	✓		BSK	10-8-02
"	"	✓		TCM	10-09-02
"	"	✓		NRK	10-10-02
"	"	✓		NRK	10-11-02
"	"	✓		NRK	10-12-02
"	"	✓		TCM	10-14-02
"	"	✓		TCM	10-15-02
"	"	✓		TCM	10-16-02
"	"	✓		NRK	10-17-02
"	"	✓		NRK	10-18-02
"	"	✓		NRK	10-21-02
"	"	✓		NRK	10-22-02
"	"	✓		TCM	10-23-02
"	"	✓		BSK	10-24-02
"	"	✓		TCM	10-25-02
"	"	✓		NRK	10-28-02
"	"	✓		TCM	10-29-02
"	"	✓		BSK	10-30-02

Reviewed by

Date

[illegible]

1 of 1

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	157641	✓		BSK	11-1-02
"	"	✓		Yor	11-04-02
"	"	✓		NRK	11-5-02
"	"	✓		NRK	11-6-02
"	"	✓		Yor	11-07-02
"	"	✓		NRK	11-8-02
"	"	✓		Yor	11-11-02
"	"	✓		Yor	11-12-02
"	"	✓		Yor	11-13-02
"	"	✓		Yor	11-14-02
"	"	✓		BSK	11-15-02
"	"	✓		Yor	11-18-02
"	"	✓		Yor	11-19-02
"	"	✓		Yor	11-20-02
"	"	✓		Yor	11-21-02
"	"	✓		Yor	11-22-02
"	"	✓		Yor	11-25-02
"	"	✓		NRK	11-26-02

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	157671	✓		BSK	2-3-03
"	"	✓		BSK	2-4-03
"	"	✓		BSK	2-5-03
"	"	✓		BSK	2-6-03
"	"	✓		BSK	2-7-03
"	"	✓		BSK	2-10-03
"	"	✓		BSK	2-11-03
"	"	✓		BSK	2-11-03
"	"	✓		BSK	2-13-03
"	"	✓		BSK	2-14-03
"	"	✓		BSK	2-15-03
"	"	✓		BSK	2-19-03
"	"	✓		BSK	2-20-03
"	"	✓		BSK	2-21-03
"	"	✓		BSK	2-24-03
"	"	✓		BSK	2-25-03
"	"	✓		BSK	2-26-03
"	"	✓		BSK	2-27-03
"	"	✓		BSK	2-28-03

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	157641	✓		NRK	3-3-03
"	"	✓		NRK	3-4-03
"	"	✓		NRK	3-5-03
"	"	✓		BSK	3-6-03
"	"	✓		BSK	3-7-03
"	"	✓		NRK	3-10-03
"	"	✓		NRK	3-11-03
"	"	✓		NRK	3-12-03
"	"	✓		NRK	3-13-03
"	"	✓		NRK	3-14-03
"	"	✓		NRK	3-17-03
"	"	✓		NRK	3-18-03
"	"	✓		NRK	3-19-03
"	"	✓		NRK	3-20-03
"	"	✓		NRK	3-21-03
"	"	✓		NRK	3-24-03
"	"	✓		NRK	3-25-03
"	"	✓		NRK	3-26-03
"	"	✓		NRK	3-27-03
"	"	✓		NRK	3-28-03
"	"	✓		NRK	3-31-03

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	157641	✓		NRK	4-1-03
"	"	✓		BSK	4-2-03
"	"	✓		BSK	4-3-03
"	"	✓		BSK	4-4-03
"	"	✓		NRK	4-7-03
"	"	✓		NRK	4-8-03
"	"	✓		NRK	4-9-03
"	"	✓		NRK	4-10-03
"	"	✓		NRK	4-11-03
4	"	✓		NRK	4-14-03
"	"	✓		NRK	4-15-03
"	"	✓		NRK	4-16-03
"	"	✓		NRK	4-17-03
"	"	✓		BSK	4-18-03
"	"	✓		NRK	4-19-03
"	"	✓		BSK	4-19-03
"	"	✓		NRK	4-22-03
"	"	✓		NRK	4-23-03

Reviewed by

Date



CALIBRATION CERTIFICATE

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

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

CUSTOMER INFORMATION				INSTRUMENT INFORMATION	
Customer Name: Duratek Instrument Services				Manufacturer: Ludlum	
Address: 628 Gallaher Road, Kingston, TN 37763				Model: 12	Serial Number: 75809
Contact Name: Thomas Scott				Probe: 44-9	Serial Number: 163410
Contract/Task Number: N/A		Work Order Number: 2002-00356		Calibration Method: Electronic and Source	
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Instrument Response		Comments	
		Before Calibration	After Calibration		
X 1	100	100	100	Pulser: 112860	Cal Due: 12/05/02
X 1	250	250	250	DVM: 6565015	Cal Due: 05/26/02
X 1	400	400	400	D-814: 2525	Cal Due: 02/18/03
X 10	1,000	1,000	1,000	Psychron: 5546	Cal Due: 06/12/02
X 10	2,500	2,500	2,500		
X 10	4,000	4,000	4,000	Temperature: 18.0 °C	
X 100	10,000	9,500	9,500	Pressure: 740mmHg	
X 100	25,000	25,000	25,000	Humidity: 31%	
X 100	40,000	40,000	40,000		
X 1000	100,000	95,000	95,000	Input Sensitivity: 35 mV	
X 1000	250,000	250,000	250,000	Background: 60cpm	
X 1000	400,000	400,000	400,000		
EFFICIENCY DETERMINATION					
EFF X1	Tc-99#119720	2,562dpm	12.5%	Limited Use: X1000 Scale for information only. Use with 44-9.	
EFF X10	Tc-99#119718	20,520dpm	10.0%		
EFF X100	Tc-99#099606	177,000dpm	11.3%		
High Voltage	900V	900V	11.3%		
STATEMENT OF CERTIFICATION					
We Certify that the instrument listed above was calibrated and inspected prior to shipment and that it met all the Manufacturers published operating specifications. We further certify that our Calibration Measurements are traceable to the National Institute of Standards and Technology. (We are not responsible for damage incurred during shipment or use of this instrument).					
Instrument		I certify that the above information is correct:			
Calibrated By: <i>Antley</i>		Reviewed By: <i>Thomas G. Scott</i>		Date: 3-25-02	
Calibration Date: 03/25/02			Calibration Due: 09/25/02		



CALIBRATION CERTIFICATE

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

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

CUSTOMER INFORMATION		INSTRUMENT INFORMATION			
Customer Name: Duratek Instrument Services		Manufacturer: Ludlum			
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 12	Serial Number: 75809		
Contact Name: Thomas Scott		Probe: 44-9	Serial Number: 166972		
Contract/Task Number: N/A	Work Order Number: 2002-01227	Calibration Method: Electronic and Source			
INSTRUMENT CALIBRATION INFORMATION					
Instrument Range	Calibration Standard Value	Instrument Response		Comments	
		Before Calibration	After Calibration		
X 1	100	100	100	Pulser: 101500	Cal Due: 09/11/03
X 1	250	250	250	DVM: TW12663	Cal Due: 03/18/03
X 1	400	400	400	D-814: 2525	Cal Due: 02/18/03
X 10	1,000	1,000	1,000	Psychron: 7480	Cal Due: 05/17/03
X 10	2,500	2,500	2,500		
X 10	4,000	4,000	4,000	Temperature: 23.8° C	
X 100	10,000	10,000	10,000	Pressure: 732mmHg	
X 100	25,000	25,000	25,000	Humidity: 47%	
X 100	40,000	40,000	40,000		
X 1000	100,000	100,000	100,000	Input Sensitivity: 35 mV	
X 1000	250,000	250,000	250,000	Background: 50cpm	
X 1000	400,000	395,000	395,000		
EFFICIENCY DETERMINATION					
EFF X1	Tc-99#119720	2,562dpm	10.1%	Limited Use: X1000 Scale for information only. Use with 44-9.	
EFF X10	Tc-99#119718	20,520dpm	10.5%		
EFF X100	Tc-99#099606	177,000dpm	13.0%		
High Voltage	900V	900V	11.2%		
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>Mike Paul</i>	Reviewed By: <i>Thomas F. Scott</i>	Date: 10-17-02			
Calibration Date: 10/17/02		Calibration Due: 04/17/03			

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	75809	✓		NRK	12-2-02
"	"	✓		LCM	12-03-02
"	"	✓		LCM	12-04-02
"	"	✓		LCM	12-05-02
"	"	✓		LCM	12-06-02
"	"	✓		LCM	12-09-02
"	"	✓		LCM	12-10-02
"	"	✓		LCM	12-11-02
"	"	✓		LCM	12-12-02
"	"	✓		LCM	12-13-02
"	"	✓		LCM	12-16-02
"	"	✓		LCM	12-17-02
"	"	✓		NRK	12-18-02
"	"	✓		LCM	12-19-02
"	"	✓		NRK	12-20-02

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	75809	✓		NRK	1-6-03
"	"	✓		TCM	01-07-03
"	"	✓		TCM	01-08-03
"	"	✓		BSK	1-9-03
"	"	✓		BSK	1-10-03
"	"	✓		BSK	1-13-03
"	"	✓		BSK	1-14-03
"	"	✓		TCM	01-15-03
"	"	✓		TCM	01-16-03
"	"	✓		BSK	1-17-03
"	"	✓		TCM	01-20-03
"	"	✓		TCM	01-21-03
"	"	✓		TCM	01-22-03
"	"	✓		TCM	01-23-03
"	"	✓		BSK	1-24-03
"	"	✓		BSK	1-27-03
"	"	✓		BSK	1-28-03
"	"	✓		BSK	1-29-03
"	"	✓		TCM	01-30-03
"	"	✓		TCM	01-31-03
"	"	✓		BSK	2-3-03
"	"	✓		BSK	2-4-03
"	"	✓		BSK	2-5-03

Reviewed by

Date

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	75809	✓		BSK	2-6-03
"	"	✓		BSK	2-7-03
"	"	✓		BSK	2-10-03
"	"	✓		BSK	2-11-03
"	"	✓		BSK	2-12-03
"	"	✓		BSK	2-13-03
"	"	✓		BSK	2-14-03
"	"	✓		BSK	2-18-03
"	"	✓		BSK	2-19-03
"	"	✓		BSK	2-20-03
"	"	✓		BSK	2-21-03
"	"	✓		BSK	2-24-03
"	"	✓		BSK	2-25-03
"	"	✓		BSK	2-26-03
"	"	✓		BSK	2-27-03
"	"	✓		BSK	2-28-03

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-12	75809	✓		NRK	3-3-03
"	"	✓		NRK	3-4-03
"	"	✓		NRK	3-5-03
"	"	✓		BSK	3-6-03
"	"	✓		BSK	3-7-03
"	"	✓		NRK	3-10-03
"	"	✓		NRK	3-11-03
"	"	✓		NRK	3-12-03
"	"	✓		NRK	3-13-03
"	"	✓		NRK	3-14-03
"	"	✓		NRK	3-17-03
"	"	✓		NRK	3-18-03
"	"	✓		NRK	3-19-03
"	"	✓		NRK	3-20-03
"	"	✓		NRK	3-21-03
"	"	✓		NRK	3-24-03
"	"	✓		NRK	3-25-03
"	"	✓		NRK	3-26-03
"	"	✓		NRK	3-27-03
"	"	✓		NRK	3-28-03
"	"	✓		NRK	3-31-03

Reviewed by

Date

ATTACHMENT 6.4

Instrument ID: 75809

[illegible]

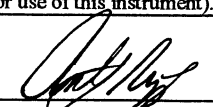
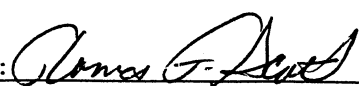
Date _____



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

CALIBRATION CERTIFICATE

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

CUSTOMER INFORMATION		INSTRUMENT INFORMATION		
Customer Name: Duratek Instrument Services		Manufacturer: Ludlum		
Address: 628 Gallaher Road, Kingston, TN 37763		Model: 3	Serial Number: 59576	
Contact Name: Thomas F. Scott		Probe: 44-9	Serial Number: 118906	
Contract/Task Number: N/A	Work Order Number: 2002-01277	Calibration Method: Electronic and Source		
INSTRUMENT CALIBRATION INFORMATION				
Instrument Range	Calibration Standard Value	Instrument Response		Comments
		Before Calibration	After Calibration	
X0.1	100	100	100	Pulser: 120935 Cal Due: 03/18/03
X0.1	250	250	250	D-814: 2525 Cal Due: 02/18/03
X0.1	400	400	400	DVM: 6565015 Cal Due: 09/30/03
X1	1,000	1,000	1,000	Psychron: 7480 Cal Due: 05/17/03
X1	2,500	2,500	2,500	
X1	4,000	4,000	4,000	Temperature: 24.6°C
X10	10,000	10,000	10,000	Pressure: 736mmHg
X10	25,000	25,000	25,000	Humidity: 50%
X10	40,000	40,000	40,000	
X100	100,000	100,000	100,000	Audio: SAT Batt. Check: SAT
X100	250,000	250,000	250,000	Fast/Slow: SAT Reset: SAT
X100	400,000	400,000	400,000	Background: 50 cpm Threshold: 24mV
EFFICIENCY DETERMINATION				Overage: SAT
EFF X0.1	Tc-99#119720	2,562dpm	11.7%	Limited Use: X100 Scale for information only. Use with 44-9.
EFF X1	Tc-99#119718	20,520dpm	11.2%	
EFF X10	Tc-99#099606	177,000dpm	10.7%	
Average Efficiency	N/A	N/A	11.2%	
High Voltage	900V (±5%)	904V	904V	
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: 	Reviewed By: 	Date: 10-30-02		
Calibration Date: 10/30/02		Calibration Due: 04/30/03 F-31-03 ASL		

ATTACHMENT 6.4

Instrument Model Number: <u>M-3</u>						Instrument ID: <u>59576</u>	
Scale or Decade	Reference Reading	±20% Value of Reference Reading	Jig and Source ID Number	Geometry	Remarks		
X 1	380	304-456	M-3 # 58576 R-99 # 119655	3rd shift			
X 10	700	560-840		Content			
X 100	N/A	N/A	N/A	N/A	Information Only		
X 1K	N/A	N/A	N/A	N/A	Information Only		

Performed by/Date _____ / _____		Reviewed by/Date _____ / _____	
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ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
113	59576	✓		DEK	11-1-02
"	"	✓		ICM	11-04-02
"	"	✓		NRK	11-5-02
"	"	✓		NRK	11-6-02
"	"	✓		ICM	11-07-02
"	"	✓		NRK	11-8-02
"	"	✓		ICM	11-11-02
"	"	✓		ICM	11-12-02
"	"	✓		ICM	11-13-02
"	"	✓		ICM	11-14-02
"	"	✓		DEK	11-15-02
"	"	✓		ICM	11-18-02
"	"	✓		ICM	11-19-02
"	"	✓		ICM	11-20-02
"	"	✓		ICM	11-21-02
"	"	✓		ICM	11-22-02
"	"	✓		ICM	11-25-02
"	"	✓		NRK	11-26-02

Reviewed by

Date

**ATTACHMENT 6.3
RESPONSE TEST FORM
(example)**

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-3	59576	✓		NRK	12-2-02
"	"	✓		TCm	12-3-02
"	"	✓		TCm	12-04-02
"	"	✓		TCm	12-05-02
"	"	✓		TCm	12-06-02
"	"	✓		TCm	12-09-02
"	"	✓		TCm	12-10-02
"	"	✓		TCm	12-11-02
"	"	✓		TCm	12-12-02
"	"	✓		TCm	12-13-02
"	"	✓		TCm	12-16-02
"	"	✓		TCm	12-17-02
"	"	✓		NRK	12-18-02
"	"	✓		TCm	12-19-02
"	"	✓		NRK	12-20-02

Reviewed by

Date

ATTACHMENT 6.3
RESPONSE TEST FORM
(example)

Instrument	Instrument ID	Pass	Fail	Performed by	Date
M-3	59576	✓		AKG	1-6-03
"	"	✓		ICM	01-07-03
"	"	✓		ICM	01-08-03
"	"	✓		BSK	1-9-03
"	"	✓		BSK	1-10-03 1-9-03
"	"	✓		BSK	1-13-03
"	"	✓		BSK	1-14-03
"	"	✓		ICM	01-15-03
"	"	✓		ICM	01-16-03
"	"	✓		BSK	1-17-03
"	"	✓		ICM	01-20-03
"	"	✓		ICM	01-21-03
"	"	✓		ICM	01-22-03
"	"	✓		ICM	01-23-03
"	"	✓		ICM	01-24-03
"	"	✓		BSK	1-27-03
"	"	✓		ICM	01-28-03
"	"	✓		ICM	01-29-03
"	"	✓		ICM	01-30-03
"	"	✓		BSK	2-3-03 2-9-03
AA-15					

Reviewed by

Date