

From: "OHARA, Kevin" <Kevin.OHARA@mdsinc.com>
To: "Judith Joustra @ NRC" <JAJ@nrc.gov>
Date: 6/21/05 3:16PM
Subject: RE: CFC Responses

P-8

37-30804-02

03036239

Dear Judy,

The MCA analyses are attached. The Ge efficiency calibration for Cobalt energy levels is approximately 2%, primarily due to the increased penetration of high-energy photons.

Best regards,

Kevin
Kevin P.J. O'Hara
Senior Radiation Physicist
Ion Technologies Business Unit

MDS Nordion Inc.
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-----Original Message-----

From: Judith Joustra [mailto:JAJ@nrc.gov]
Sent: June 21, 2005 1:13 PM
To: OHARA, Kevin
Subject: Re: CFC Responses

Also what is the efficiency of your detector for the materials of concern (ie. Co-60)?

>>> "OHARA, Kevin" <Kevin.OHARA@mdsinc.com> 06/21/05 01:00PM >>>

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NMCC/ROM MATERIALS-002

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HEADER INFORMATION in WP007427.S0

Identification	Acquisition
User : G Chupick	Started : May/20/2005 11:13:35AM
MCArd : 1	Stopped : May/20/2005 11:23:36AM
Detector : MCA #2	True Time : 600.072 sec
Geometry : Paper Swipe	Live Time : 600.000 sec
Sample : 1	Dead Time : 0.01 %
Channels : 16384	Gross Count : 1961 counts
	LTC : 1.0000017
	Gross Rate : 3.26834 cps

Sample
Sampled from May/20/2005 11:23:36AM to May/20/2005 11:13:35AM

Energy Calibration May/16/2005 8:53:58AM WP007407.S0
Resolution Calibration Jul/18/2003 1:58:18PM WP005870.S0
Efficiency Calibration Aug/6/2003 2:29:47PM WP005916.S0
Isotope Library NORDION.LIB Aug/12/2002 11:30:02AM

ROI STATISTICS INFORMATION in WP007427.S0

ROI (#)	Error	Centroid keV	FWHM keV	FWTM keV	FWTM/FWHM ratio	H/L ratio
1	115.47 %	663.45	0.12			
2	81.65 %	723.75	0.12	2.70	21.80	6.900/14.90
3	100.00 %	758.75	0.19			
4	2000.00 %	765.80				
5	70.71 %	1173.27				
6	115.47 %	1332.01	0.12			

Errors Quoted at 2 Sigma

ACTIVITY INFORMATION for WP007427.S0

Name	Energy keV	Activity Flag	nCi	Error nCi
Co-60	1173.23	*	0.01338	± 0.00958
Co-60	1332.51	*	0.005767	± 0.006693
Weighted Average			0.009572	± 0.008982
Cs-137	661.62	*	0.002961	± 0.003429
Nb-95	765.82	* <	0.01673	± 0.001552
Zr-95	724.18	*	0.01252	± 0.01029
Zr-95	756.72	*	0.007121	± 0.007151
Weighted Average			0.009533	± 0.008796
Grand Total			0.02207	± 0.01303

Activity (nCi) at May/20/2005 11:13:35AM
Errors Quoted at 2 Sigma
MDA's Quoted at 1.645 Sigma

Flags	Meaning
*	Forced MDA from identification
<	MDA value

*Wassal
2005 June 01*

*Gary Chupick
050520
Ⓢ*

HEADER INFORMATION in BKR10133.S0

Identification		Acquisition	
User	: G Chupick	Started	: May/31/2005 4:11:41PM
MCArd	: 1	Stopped	: May/31/2005 4:45:02PM
Detector	: MCA #2	True Time	: 2000.249 sec
Geometry	: 1 Litre Beaker	Live Time	: 2000.000 sec
Sample	: 1	Dead Time	: 0.01 %
Channels	: 8192	Gross Count	: 6759 counts
		LTC	: 1.0000005
		Gross Rate	: 3.3795 cps

Sample
 Sampled from May/31/2005 4:45:06PM to May/31/2005 4:11:41PM

Energy Calibration May/19/2005 8:37:41AM BKR10096.S0
 Resolution Calibration Jul/18/2003 2:47:43PM BKR07543.S0
 Efficiency Calibration Aug/6/2003 3:20:01PM BKR08066.S0
 Isotope Library NORDION.LIB Aug/12/2002 11:30:02AM

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ROI STATISTICS INFORMATION in BKR10133.S0

ROI (#)	Error	Centroid keV	FWHM keV	FTM keV	FTM/FWHM ratio	H/L ratio
1	2000.00 %	661.68				
2	2000.00 %	724.22				
3	2000.00 %	756.73				
4	66.67 %	764.67	0.25	3.92	15.80	8.900/6.900
5	103.07 %	1172.89	0.27	2.13	7.90	4.936/3.633
6	37.80 %	1332.39	0.66	1.97	2.98	2.848/5.102

Errors Quoted at 2 Sigma

ACTIVITY INFORMATION for BKR10133.S0

Name	Energy keV	Activity Flag	nCi	Error nCi
Co-60	1173.23	* <	0.03010	± 0.0008412
Co-60	1332.51	*	0.04604	± 0.01745
Weighted Average			0.04604	± 0.01745
Cs-137	661.62	* <	0.02221	± 0.0005087
Nb-95	765.82	*	0.009194	± 0.006134
Zr-95	724.18	* <	0.04746	± 0.001121
Zr-95	756.72	* <	0.04751	± 0.001139
Grand Total			0.05523	± 0.0185

Activity (nCi) at May/31/2005 4:11:41PM
 Errors Quoted at 2 Sigma
 MDA's Quoted at 1.645 Sigma

Jay Chupick
 050601

Flags	Meaning
*	Forced MDA from identification
<	MDA value

2524

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To: Jaj@nrc.gov **Date:** June 21, 2005
Sender: Kevin O'Hara **Copy:**
Senior Radiation Physicist
Total # of pages including this page: 1

Re: Analysis of sample

Dear Judy,

The .SO files following the energy, resolution and efficiency calibration dates and times refer to the certified data corresponding to that test. For example, the calibration file *.SO contains the certified peak energies for a calibrated source standard.

Conventionally the MDA is quoted when a peak, or count, is not detected (i.e. is not statistically significant). It is usually calculated as the activity equivalent of a peak area in net counts. In our case, it is converted to nCi. The estimated MDA (minimum detectable activity) for ⁶⁰Co in our geometry is approximately 0.01 nCi (10 pCi). The forced MDA from identification means that the user has requested that the software look for peaks for isotopes of interest (Co-60, Nb-95, Zr-95 and Cs-137).

Best regards

A handwritten signature in black ink, appearing to read "K. O'Hara".

Kevin O'Hara
Kevin P.J. O'Hara
Senior Radiation Physicist
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MDS Nordion - Applied Physics/Radiation Measurement
CFC Responses
