National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Pacific Northwest National Laboratory / Battelle
Battelle Boulevard
P.O. Box 999
Richland, WA 99354
Mr. R. Kim Piper
Phone: 509-375-7339 Fax: 509-375-7340
E-mail: kim.piper@pnl.gov
URL: http://cra.pnl.gov

CALIBRATION LABORATORIES **NVLAP LAB CODE 105020-0**

NVLAP Code: 20/A01 ANSI/NCSL Z540-1-1994; Part 1 Compliant

IONIZING RADIATION

NVLAP Code: 20/I01
Dosimetry of X-Rays, Gamma Rays & Electrons

Irradiation of Artifacts

Radiation Type	*Source or Beam Code*	*Nominal Range in Air Kerma (mGy) (≥ value shown)* note 4	*Nominal Range in Exposure (R) (≥ value shown)* note 4	*Expanded Uncertainty of Delivered Quantity %* notes 1, 2
Gamma	^{241}Am	0.02	0.002	5.4
	^{137}Cs	0.14	0.016	1.6
	^{60}Co	0.0085	0.00092	3.2
X-ray	L40	0.29	0.033	2.4
	L50	0.29	0.033	2.4
	L80	0.37	0.042	2.4
	L100	0.44	0.050	2.4
X-ray	M20	0.22	0.025	2.4
	M30	0.22	0.025	2.4
	M40	0.22	0.025	2.4
	M50	0.22	0.025	2.4

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	M60	0.22	0.025	2.4
	M100	0.22	0.025	2.4
	M150	0.29	0.033	2.4
	M200	0.29	0.033	2.4
	M250	0.29	0.033	2.4
	M300	0.15	0.017	2.4
X-ray	H30	0.004	0.0005	2.4
	H40	0.002	0.0002	2.4
	H50	0.005	0.0006	2.4
	H60	0.004	0.0005	2.4
	H100	0.002	0.0002	2.4
	H150	0.07	0.008	2.4
	H200	0.07	0.008	2.4
	H250	0.07	0.008	2.4
	H300	0.04	0.005	2.4
X-ray	S60	0.07	0.008	2.4
	S75	0.29	0.033	2.4
X-ray	HK30	0.22	0.025	2.4
	HK60	0.15	0.017	2.4
	HK100	0.15	0.017	2.4
	HK200	0.29	0.033	2.4
	HK250	0.44	0.050	2.4
	HK280	0.44	0.050	2.4
	HK300	0.51	0.058	2.4
X-ray	WS60	0.02	0.002	2.4
	WS80	0.03	0.003	2.4
	WS110	0.02	0.002	2.4
	WS150	0.04	0.005	2.4
	WS200	0.07	0.008	2.4
	WS250	0.07	0.008	2.4
	WS300	0.07	0.008	2.4

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X-ray	NS20	0.02	0.002	2.4
	NS25	0.008	0.001	2.4
	NS30	0.005	0.0006	2.4
	NS40	0.003	0.0003	2.4
	NS60	0.004	0.0005	2.4
	NS80	0.003	0.0003	2.4
	NS100	0.002	0.0002	2.4
	NS120	0.002	0.0002	2.4
	NS150	0.07	0.008	2.4
	NS200	0.04	0.005	2.4
	NS250	0.04	0.005	2.4
	NS300	0.04	0.005	2.4
X-ray	LK30	0.0002	0.00002	2.4
	LK35	0.0006	0.00007	2.4
	LK55	0.0004	0.00004	2.4
	LK70	0.0004	0.00004	2.4
	LK100	0.0004	0.00004	2.4
	LK125	0.0004	0.00004	2.4

Radiation Type	***Source***	***Nominal Range in Tissue Kerma (mGy) (≥ value shown)*** [note 4]	***Nominal Range in Absorbed Dose to Tissue (rad) (≥ value shown)*** [note 4]	***Expanded Uncertainty of Delivered Quantity (%)*** [notes 1,2]
Beta	^{147}Pm	0.003	0.0003	5.0
	^{85}Kr	0.6	0.06	3.9
	^{204}Tl	0.02	0.002	3.6
	^{90}Sr/^{90}Y	0.03	0.003	3.6

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Calibration of Reference-Class and Survey Instruments

Calibration Category	*Radiation Type or Beam Code*	*Nominal Intensity Range in Air Kerma (mGy/h)*[note 4]	*Nominal Intensity Range in Exposure (in R/h)*[note 4]	*Expanded Uncertainty of Reference Field* [notes 1,3] *(%)*
Gamma	^{241}Am	1.10	0.125	5.2
	^{137}Cs	5 E-5 to 0.002	6 E-6 to 2 E-4	6.2 to 2.5
	^{137}Cs	0.002 to 0.04	2 E-4 to 5 E-3	4.5 to 2.5
	^{137}Cs	0.03 to 9.0	0.003 to 1.0	2.5 to 3.2
	^{137}Cs	18 to 1800	2.0 to 200	1.4
	^{60}Co	13 to 326,000	1.5 to 37,100	1.4
X-ray	L40	40 to 6500	4 to 740	1.5
	L50	40 to 7400	4 to 840	1.5
	L80	40 to 8800	5 to 1000	1.5
	L100	50 to 11000	6 to 1200	1.5
X-ray	M20	30 to 5300	3 to 600	1.5
	M30	30 to 4400	3 to 500	1.5
	M40	30 to 4400	3 to 500	1.5
	M50	30 to 6100	3 to 700	1.5
	M60	30 to 5300	3 to 600	1.5
	M100	30 to 5300	3 to 600	1.5
	M150	40 to 7000	4 to 800	1.5
	M200	40 to 5700	4 to 650	1.5
	M250	40 to 4400	4 to 500	1.5
	M300	20 to 1500	2 to 175	1.5
X-ray	H30	0.5 to 100	0.06 to 12	1.5
	H40	0.2 to 40	0.02 to 5	1.5
	H50	0.6 to 110	0.07 to 13	1.5
	H60	0.5 to 110	0.06 to 13	1.5
	H100	0.2 to 30	0.02 to 3	1.5
	H150	9 to 200	1 to 21	1.5

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	H200	9 to 100	1 to 14	1.5
	H250	8 to 90	0.9 to 10	1.5
	H300	5 to 50	0.6 to 6	1.5
X-ray	S60	9 to 2000	1 to 230	1.5
	S75	40 to 7700	4 to 880	1.5
X-ray	HK30	30 to 4400	3 to 500	1.5
	HK60	20 to 2600	2 to 300	1.5
	HK100	20 to 3500	2 to 400	1.5
	HK200	40 to 5300	4 to 600	1.5
	HK250	50 to 7000	6 to 800	1.5
	HK280	50 to 5300	6 to 600	1.5
	HK300	60 to 7000	7 to 800	1.5
X-ray	WS60	2 to 350	0.2 to 40	1.5
	WS80	3 to 600	0.3 to 68	1.5
	WS110	2 to 440	0.2 to 50	1.5
	WS150	5 to 900	0.6 to 100	1.5
	WS200	9 to 1400	1 to 160	1.5
	WS250	9 to 1400	1 to 160	1.5
	WS300	9 to 1500	1 to 170	1.5
X-ray	NS20	2 to 350	0.2 to 40	1.5
	NS25	0.9 to 260	0.1 to 30	1.5
	NS30	0.6 to 130	0.07 to 15	1.5
	NS40	0.4 to 70	0.04 to 8	1.5
	NS60	0.5 to 120	0.06 to 14	1.5
	NS80	0.3 to 60	0.03 to 7	1.5
	NS100	0.2 to 40	0.02 to 4	1.5
	NS120	0.2 to 40	0.02 to 4	1.5
	NS150	9 to 250	1 to 28	1.5
	NS200	5 to 70	0.6 to 8	1.5
	NS250	5 to 60	0.6 to 7	1.5
	NS300	5 to 50	0.6 to 6	1.5

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X-ray	LK30	0.02 to 4	0.002 to 0.4	1.5
	LK35	0.07 to 20	0.008 to 2	1.5
	LK55	0.04 to 9	0.005 to 1	1.5
	LK70	0.04 to 9	0.005 to 1	1.5
	LK100	0.04 to 9	0.005 to 1	1.5
	LK125	0.04 to 9	0.005 to 1	1.5

Radiation Type	***Source***	***Nominal Intensity Range in Tissue Kerma (mGy/h)[note 4]***	***Nominal Intensity Range in Absorbed Dose to Tissue (rad/h)[note 4]***	***Expanded Uncertainty of Delivered Quantity (%) [notes 1,2]***
Beta	^{147}Pm	0.3	0.003	1.5
	^{85}Kr	80	8	1.4
	^{204}Tl	2.0	0.2	3.3
	^{90}Sr/^{90}Y	4 to 190	0.4 to 19	3.3

NVLAP Code: 20/I03
Neutron Sources and Dosimeters

Irradiation of Artifacts

Radiation Type	***Source***	***Nominal Range in Dose Equivalent (mSv) (≥ value shown)[note 4]***	***Nominal Range in Dose Equivalent (rem) (≥ value shown)[note 4]***	***Expanded Uncertainty of Delivered Quantity %[notes 1,2]***
Neutron	^{252}Cf Bare	0.02	0.002	14
	^{252}Cf Moderated	0.004	0.0004	22

Calibration of Reference – Class and Survey Instruments

Radiation Type	***Source***	***Nominal Intensity Range in Dose Equivalent (mSv/h) [note 4]***	***Nominal Intensity Range in Dose Equivalent (rem/h) [note 4]***	***Expanded Uncertainty of Delivered Quantity (%) [notes 1,3]***
Neutron	^{252}Cf Bare	0.0005 to 60	0.00005 to 6	4.8 to 5.7
	^{252}Cf Moderated	0.0002 to 20	0.00002 to 2	11 to 12

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1. Represents an expanded uncertainty using a coverage factor, k = 2.
2. Uncertainties are valid for units and nominal range shown at left.
3. Uncertainties are valid for units and nominal range shown at left. Uncertainties expressed as a range correlate to the expressed left (lower range) and right (upper range) values of the intensity range of the field. In between the upper and lower range of intensity, there is no direct relationship to the stated uncertainty range.
4. For irradiations/calibrations outside the nominal range shown, uncertainties would be determined commensurate with the parameters of the reference field calibration.

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