

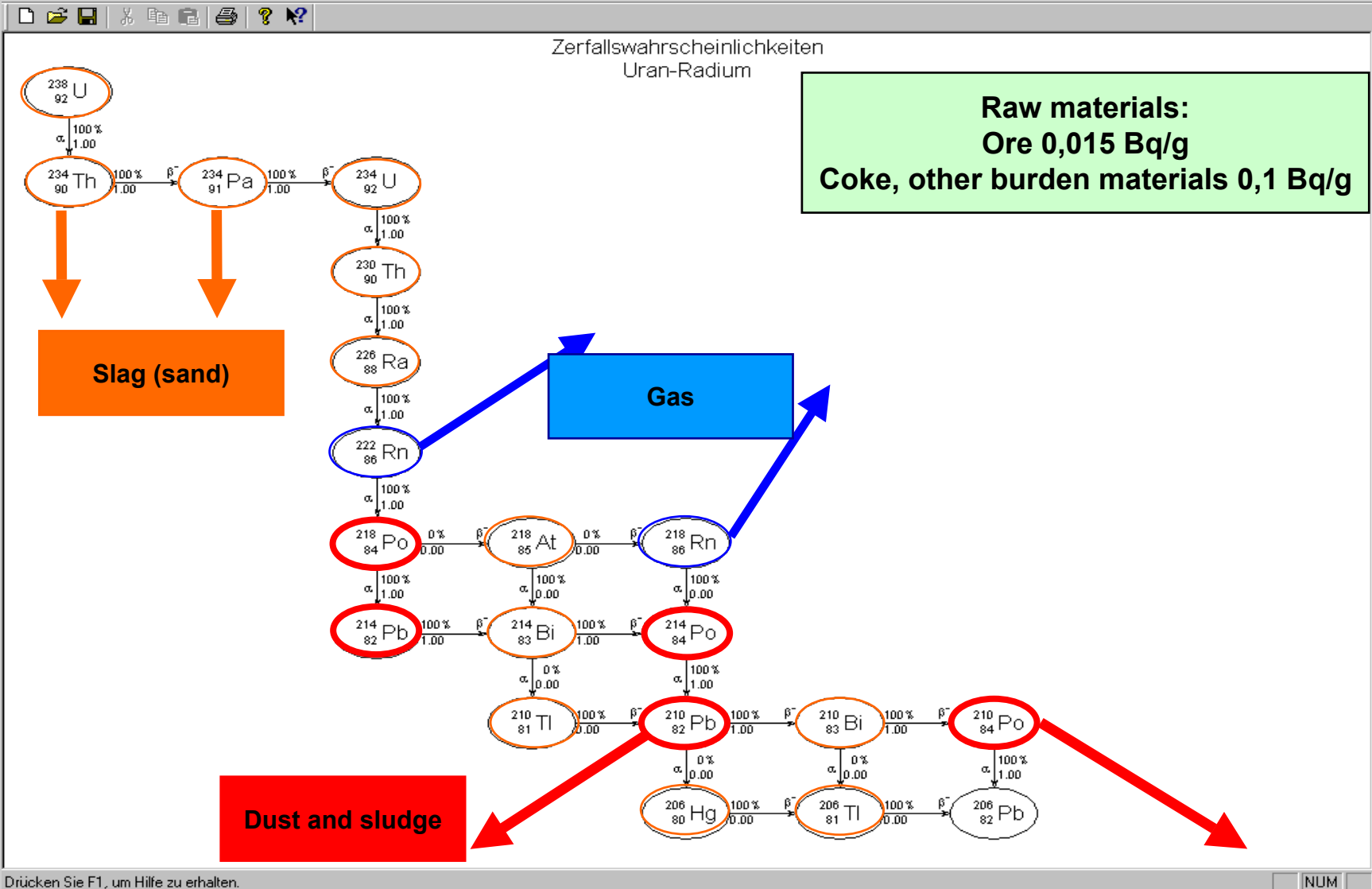
ALARA Workshop

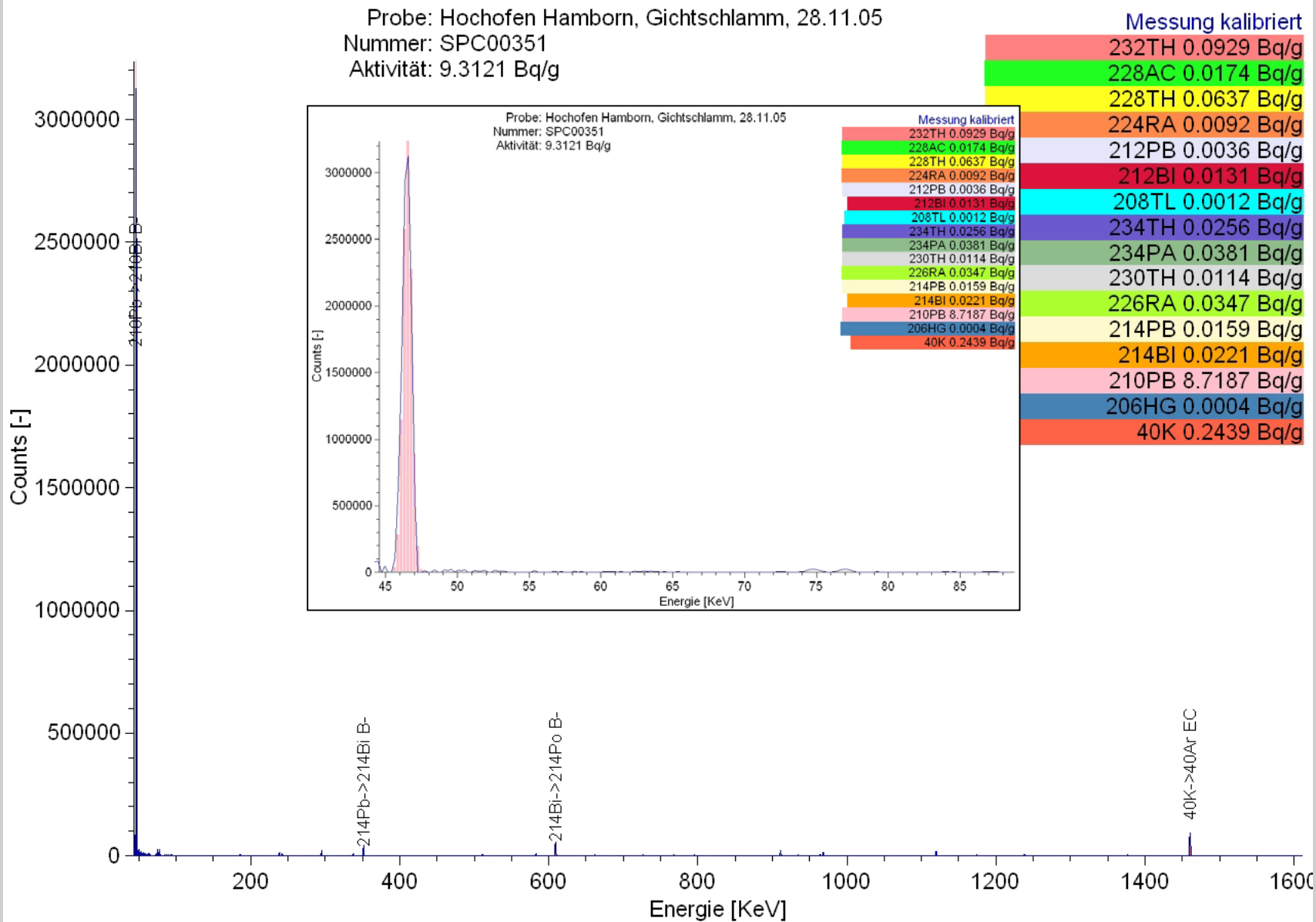
Experience and expectation of NORM in the German hot metal production

Carl Ulrich Wieters

Dresden, 2007



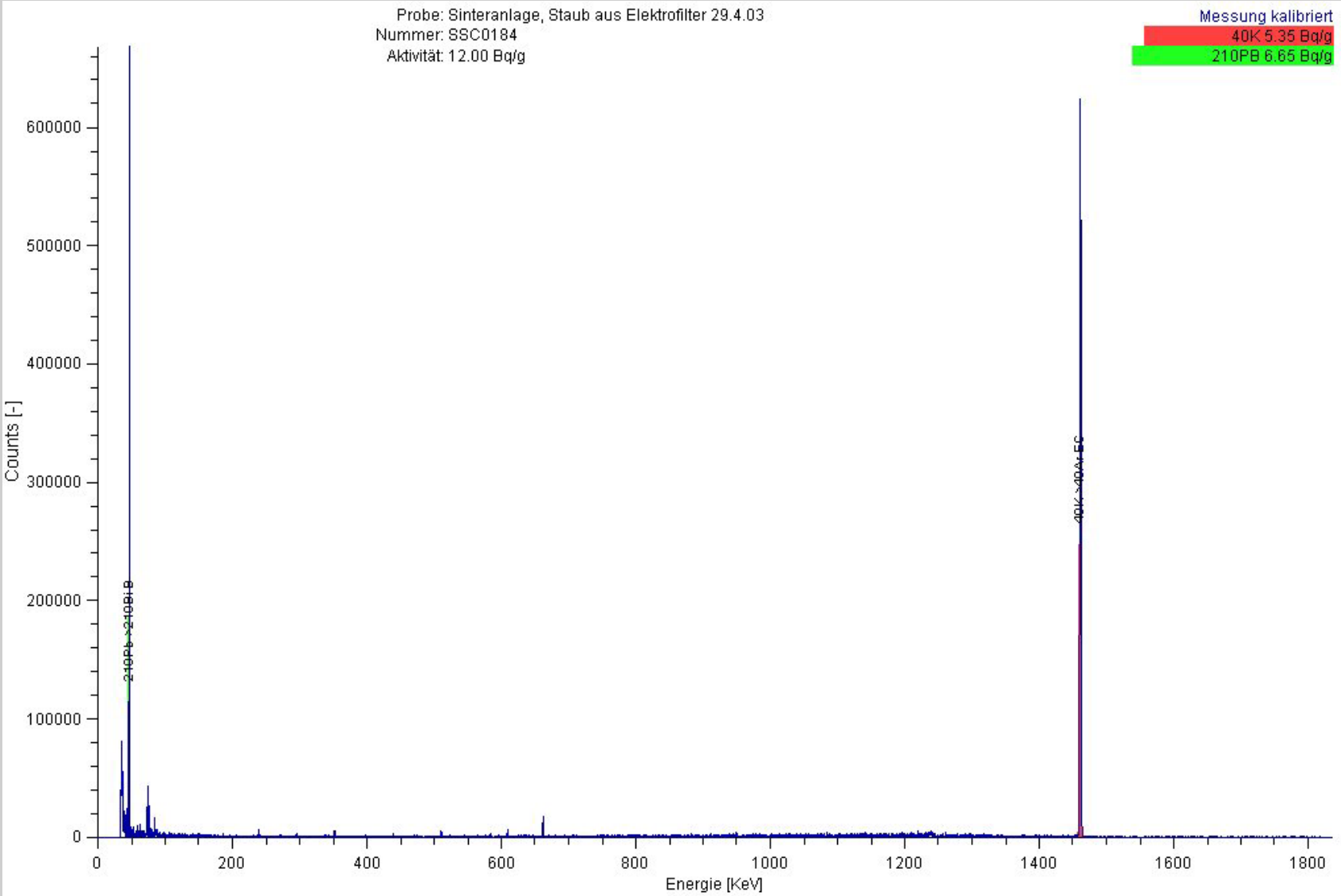




Tk Steel

Spectra of γ out of sludge

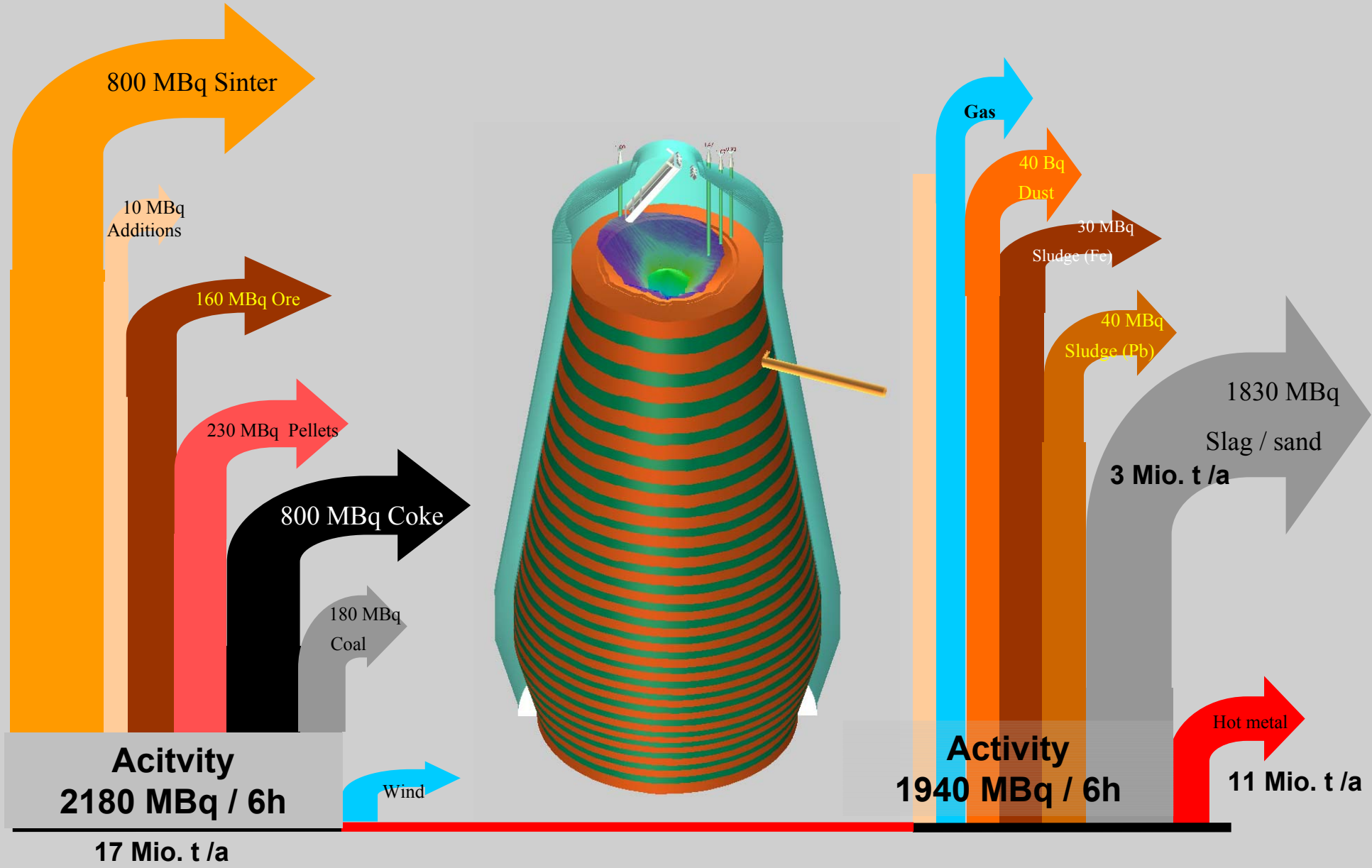




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Balance of NORM material for waste deposition





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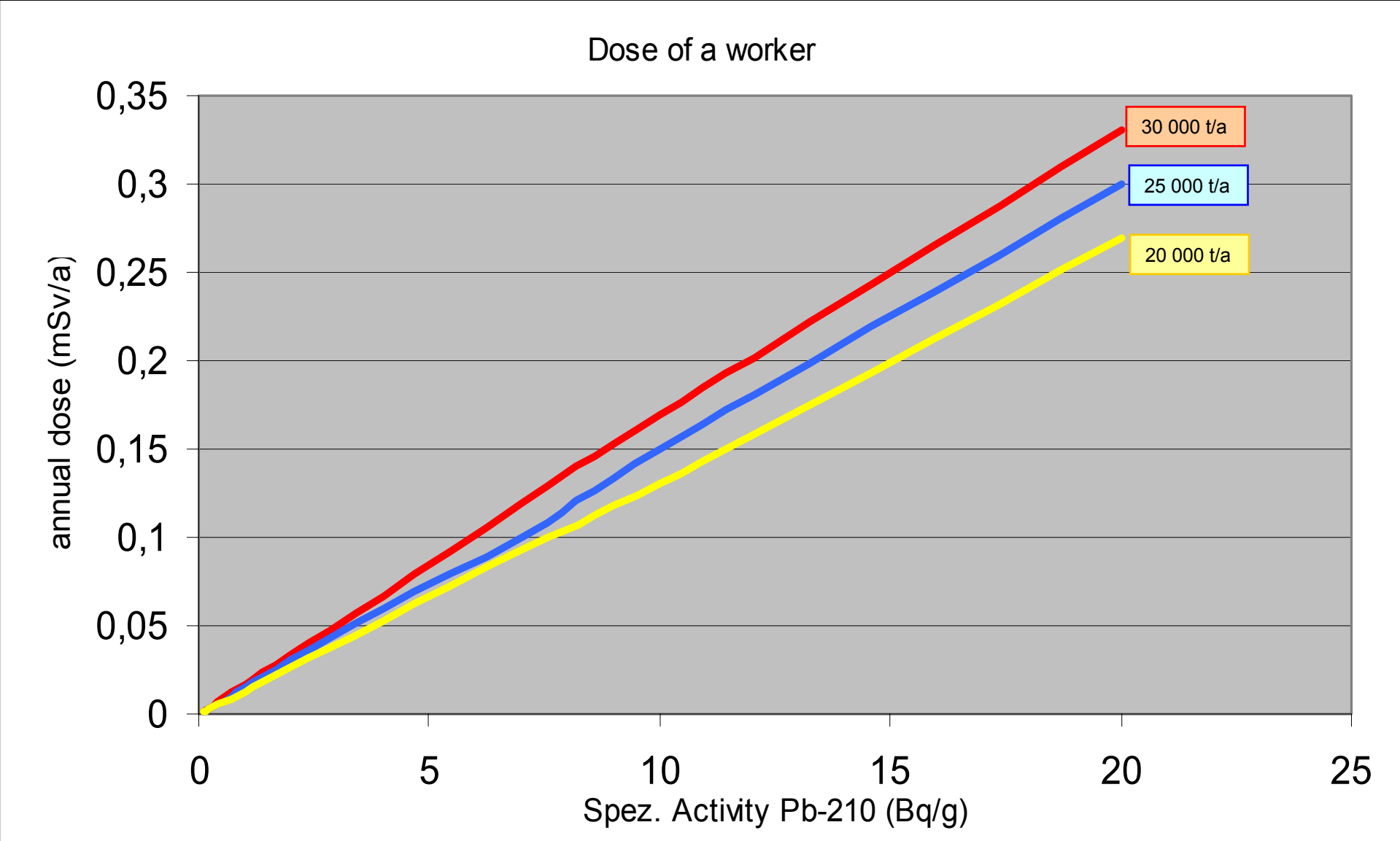
Example of a balance in a blast furnace during 6 hours (activity \pm 10%)(time of material in the furnace)

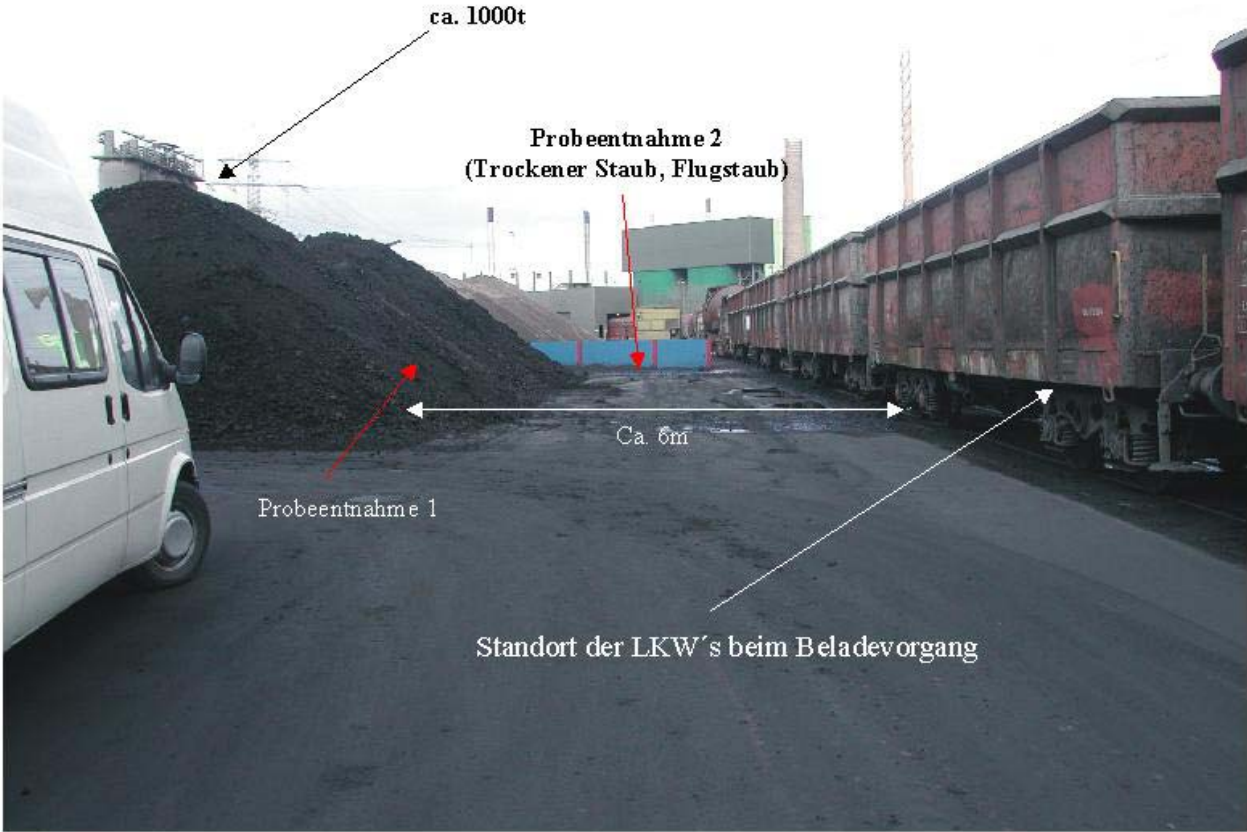


Month	Type	Production unit	Mass t	sp. Activity of Pb-210 Bq/g	Waste	Next 5 years
january	sludge	Ho-A	2411	7,5	A	A
	sludge	Ho-B	1694	12,2	B	B
	dust	Ho-C	137	27,7	C	C
february	sludge	Ho-A	0	5,1	A	A
	sludge	Ho-B	1928	8,1	B	B
	dust	Ho-C	119	1,0	C	C
march	sludge	Ho-A	3716	4,8	A	A
	sludge	Ho-B	2744	7,2	B	B
	dust	Ho-C	210	13,2	C	C
april	sludge	Ho-A	1748	6,0	A	A
	sludge	Ho-B	2187	4,9	B	B
	dust	Ho-C	270	9,7	C	C
may	sludge	Ho-A	495	9,1	A	A
	sludge	Ho-A	1088	9,1	D	D
	sludge	Ho-B	2058	9,0	B	B
	dust	Ho-C	307	2,9	C	C
june	sludge	Ho-A	2599	17,7	D	D
	sludge	Ho-B	2687	7,4	B	B
	dust	Ho-C	182	7,2	C	C
july	sludge	Ho-A	1669	5,8	D	D
	sludge	Ho-B	1610	17,8	B	B
	dust	Ho-C	34	31,4	C	C
august	sludge	Ho-A	2977	10,0	D	D
	sludge	Ho-B	2442	11,0	B	B
	dust	Ho-C	63	12,6	C	C
september	sludge	Ho-A	1591	8,2	D	D
	sludge	Ho-B	1708	11,0	B	B
	dust	Ho-C	78	7,5	C	C
october	sludge	Ho-A	2952	7,4	A	A
	sludge	Ho-A	55	7,4	D	D
	sludge	Ho-B	1576	23,3	B	B
	dust	Ho-C	120	15,2	C	C
november	sludge	Ho-A	2846	7,2	A	A
	sludge	Ho-B	2000	8,7	B	B
	dust	Ho-C	277	13,4	C	C
december	sludge	Ho-A	2994	12,9	A	A
	sludge	Ho-B	2058	8,7	B	B
	dust	Ho-C	616	18,6	C	C

Waste	Mass
B	24692
D	9979
C	2413
A	17162
Summe	54246 t









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Situation at a sinter plant filter





0,58 μ Sv/h

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Blast furnace runner





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Cyclone dust catcher





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Sludge preparation





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Sludge storage and transport units

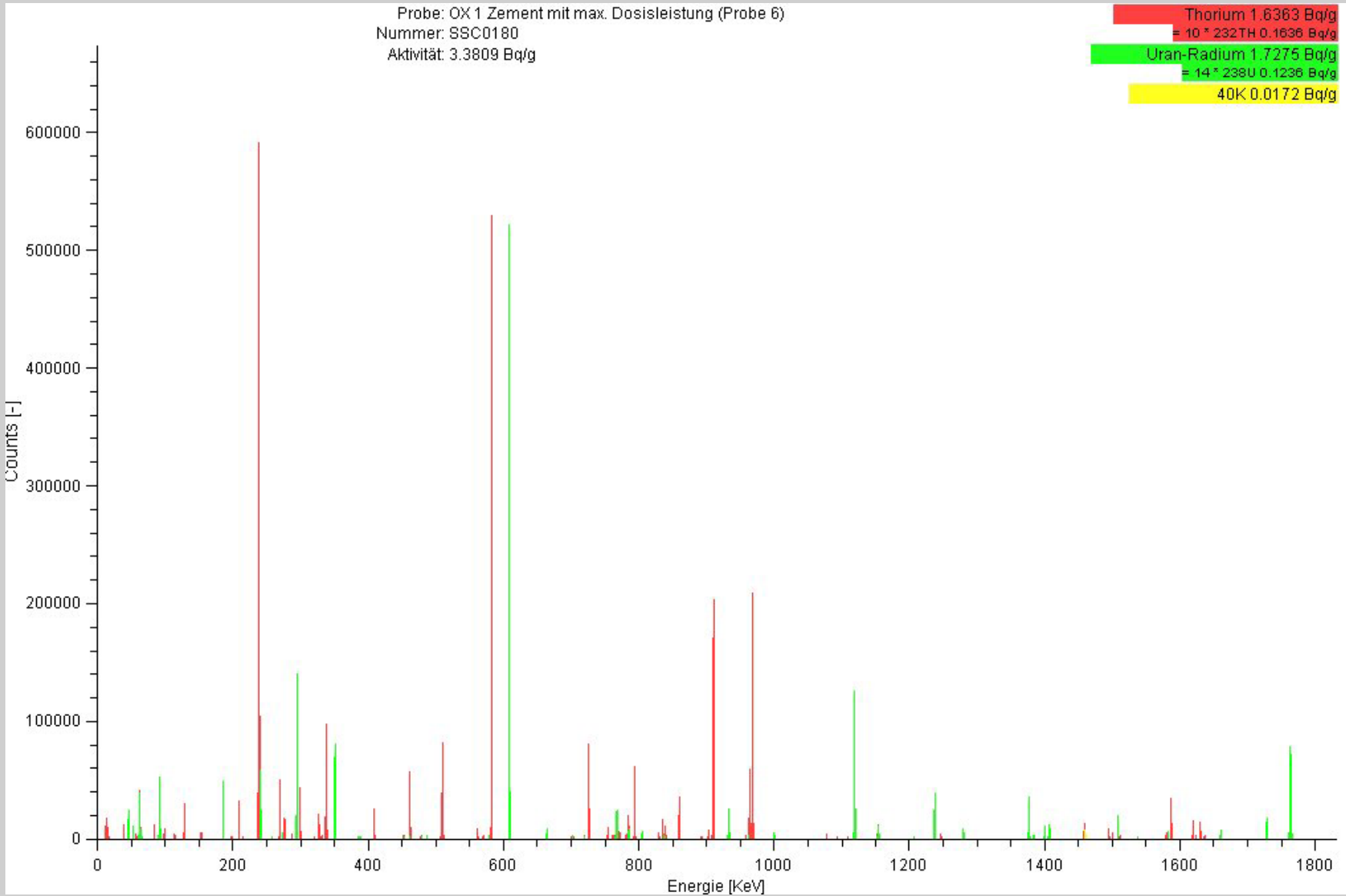




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Steel plant preparation of a steel ladle





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γ spectra of cement



Working place	German Limit Value $\mu\text{Sv/a}$	Inhalation Dose $\mu\text{Sv/a}$	External Dose $\mu\text{Sv/a}$	Exposition Time h/a	TKS Annual Dose $\mu\text{Sv/a}$
Sinter Plant					
Work with dust	1000				
Repair of filters		no	10	24	10
Blast Furnace					
Work at washing tower sludge	1000				
BF-plants with production of 8 Mio. HM t/a		100	60	571	160
BF-plants with production of 3,7 Mio. HM t/a		30	20	269	50
Work at hot metal runner (Replacement)	6000				
BF-plants with production of 8 Mio. HM t/a		412	238	410	650
BF-plants with production of 3,7 Mio. HM t/a		422	128	390	550
Waste Deposition					
Work at waste	1000				
Caterpillar driver (15000t/a)		227	33	300	260
Steel Plant					
Work with refractory material	6000				
		292	288	1440	580



Expectation of the steel industry for NORM

- o Reduction of administrative acts
- o Waste deposition and use of BF sludge without limits
- o Reduction of probes of known NORM-material
- o Radiation protection in the NORM with radiation protection measurement devices (ionisation chamber etc..) and not with spectrometers for activity values
- o Homogene radiation protection limits for annual doses for NORM, medicine and nuclear and other industries (all 6 mSv)

