

## **Příloha 4/D**

### **Podpisy zdrojů 2010**

#### ***Těžké kovy***

V rámci skupiny těžkých kovů byly analyzovány:

7Li	9Be	23Na	24Mg	27Al	29Si
39K	44Ca	47Ti	51V	52Cr	55Mn
56Fe	59Co	60Ni	63Cu	65Cu	66Zn
69Ga	75As	77Ar Cl	82Se	83Kr	85Rb
88Sr	95Mo	105Pd	107Ag	111Cd	115In
118Sn	121Sb	125Te	133Cs	137Ba	139La
140Ce	141Pr	146Nd	147Sm	153Eu	157Gd
159Tb	163Dy	165Ho	166Er	169Tm	172Yb
175Lu	178Hf	181Ta	182W	185Re	195Pt
202Hg	205Tl	206Pb	207Pb	208Pb	209Bi
238U					

Hodnoty koncentrací těžkých kovů byly analyzovány v pevné fázi ve frakci tuhých částic PM<sub>2,5</sub>.

**Technologie – spalování HU v malém topeništi – fáze 1 – rozhořívání**

	<b>7Li</b>	<b>9Be</b>	<b>23Na</b>	<b>24Mg</b>	<b>27Al</b>	<b>29Si</b>
Koncentrace (ug/m <sup>3</sup> )	0.2073	0.0301	110.8795	17.8178	34.2491	31.8892
Hmot. tok (ug/hod)	96.4	14.0	51 559.0	8 285.3	15 925.8	14 828.5
	<b>39K</b>	<b>44Ca</b>	<b>47Ti</b>	<b>51V</b>	<b>52Cr</b>	<b>55Mn</b>
Koncentrace (ug/m <sup>3</sup> )	53.4928	106.5135	2.3767	0.6383	1.4218	0.8227
Hmot. tok (ug/hod)	24 874.1	49 528.8	1 105.2	296.8	661.1	382.6
	<b>56Fe</b>	<b>59Co</b>	<b>60Ni</b>	<b>63Cu</b>	<b>65Cu</b>	<b>66Zn</b>
Koncentrace (ug/m <sup>3</sup> )	17.2308	0.3299	2.2616	2.2734	2.4013	62.9327
Hmot. tok (ug/hod)	8 012.3	153.4	1 051.7	1 057.2	1 116.6	29 263.7
	<b>69Ga</b>	<b>75As</b>	<b>77Ar Cl</b>	<b>82Se</b>	<b>83Kr</b>	<b>85Rb</b>
Koncentrace (ug/m <sup>3</sup> )	1.7760	27.8575	0.0000	6.0927	0.0000	0.4364
Hmot. tok (ug/hod)	825.8	12 953.8	0.0	2 833.1	0.0	202.9
	<b>88Sr</b>	<b>95Mo</b>	<b>105Pd</b>	<b>107Ag</b>	<b>111Cd</b>	<b>115In</b>
Koncentrace (ug/m <sup>3</sup> )	0.5545	0.1374	0.0073	0.0373	0.5967	0.0547
Hmot. tok (ug/hod)	257.8	63.9	3.4	17.3	277.5	25.4
	<b>118Sn</b>	<b>121Sb</b>	<b>125Te</b>	<b>133Cs</b>	<b>137Ba</b>	<b>139La</b>
Koncentrace (ug/m <sup>3</sup> )	2.1938	0.6245	0.1883	0.1134	1.0325	0.0150
Hmot. tok (ug/hod)	1 020.1	290.4	87.6	52.7	480.1	7.0
	<b>140Ce</b>	<b>141Pr</b>	<b>146Nd</b>	<b>147Sm</b>	<b>153Eu</b>	<b>157Gd</b>
Koncentrace (ug/m <sup>3</sup> )	0.0320	0.0069	0.0347	0.0117	0.0042	0.0218
Hmot. tok (ug/hod)	14.9	3.2	16.1	5.4	2.0	10.2
	<b>159Tb</b>	<b>163Dy</b>	<b>165Ho</b>	<b>166Er</b>	<b>169Tm</b>	<b>172Yb</b>
Koncentrace (ug/m <sup>3</sup> )	0.0024	0.0115	0.0024	0.0073	0.0012	0.0083
Hmot. tok (ug/hod)	1.1	5.3	1.1	3.4	0.5	3.8
	<b>175Lu</b>	<b>178Hf</b>	<b>181Ta</b>	<b>182W</b>	<b>185Re</b>	<b>195Pt</b>
Koncentrace (ug/m <sup>3</sup> )	0.0008	0.0088	0.0149	0.0150	0.0133	0.0006
Hmot. tok (ug/hod)	0.4	4.1	7.0	7.0	6.2	0.3
	<b>202Hg</b>	<b>205Tl</b>	<b>206Pb</b>	<b>207Pb</b>	<b>208Pb</b>	<b>209Bi</b>
Koncentrace (ug/m <sup>3</sup> )	3.6324	0.8991	29.5784	25.7926	27.7690	0.9257
Hmot. tok (ug/hod)	1 689.1	418.1	13 753.9	11 993.5	12 912.6	430.5
	<b>238U</b>	*	*	*	*	*
Koncentrace (ug/m <sup>3</sup> )	0.0108	*	*	*	*	*
Hmot. tok (ug/hod)	5.0	*	*	*	*	*

## Technologie – spalování HU v malém topeništi – fáze 2 – standardní provoz kotle

	<b>7Li</b>	<b>9Be</b>	<b>23Na</b>	<b>24Mg</b>	<b>27Al</b>	<b>29Si</b>
Koncentrace (ug/m <sup>3</sup> )	1.2270	0.0895	807.9338	13.6805	28.9577	19.7830
Hmot. tok (ug/hod)	546.0	39.8	359 530.5	6 087.8	12 886.2	8 803.4
	<b>39K</b>	<b>44Ca</b>	<b>47Ti</b>	<b>51V</b>	<b>52Cr</b>	<b>55Mn</b>
Koncentrace (ug/m <sup>3</sup> )	292.8852	76.8971	2.7679	1.2701	3.3177	2.1055
Hmot. tok (ug/hod)	130 333.9	34 219.2	1 231.7	565.2	1 476.4	936.9
	<b>56Fe</b>	<b>59Co</b>	<b>60Ni</b>	<b>63Cu</b>	<b>65Cu</b>	<b>66Zn</b>
Koncentrace (ug/m <sup>3</sup> )	32.2732	2.1430	7.6133	19.0111	19.9006	159.1607
Hmot. tok (ug/hod)	14 361.6	953.6	3 387.9	8 459.9	8 855.8	70 826.5
	<b>69Ga</b>	<b>75As</b>	<b>77Ar Cl</b>	<b>82Se</b>	<b>83Kr</b>	<b>85Rb</b>
Koncentrace (ug/m <sup>3</sup> )	16.5777	8.9674	0.0000	1.9827	0.0000	2.9487
Hmot. tok (ug/hod)	7 377.1	3 990.5	0.0	882.3	0.0	1 312.2
	<b>88Sr</b>	<b>95Mo</b>	<b>105Pd</b>	<b>107Ag</b>	<b>111Cd</b>	<b>115In</b>
Koncentrace (ug/m <sup>3</sup> )	0.4187	1.0949	0.0057	0.1127	0.4555	0.1157
Hmot. tok (ug/hod)	186.3	487.2	2.5	50.2	202.7	51.5
	<b>118Sn</b>	<b>121Sb</b>	<b>125Te</b>	<b>133Cs</b>	<b>137Ba</b>	<b>139La</b>
Koncentrace (ug/m <sup>3</sup> )	3.9206	1.7592	0.1878	0.6872	0.9167	0.0096
Hmot. tok (ug/hod)	1 744.7	782.9	83.6	305.8	407.9	4.3
	<b>140Ce</b>	<b>141Pr</b>	<b>146Nd</b>	<b>147Sm</b>	<b>153Eu</b>	<b>157Gd</b>
Koncentrace (ug/m <sup>3</sup> )	0.0282	0.0062	0.0298	0.0091	0.0034	0.0165
Hmot. tok (ug/hod)	12.5	2.7	13.3	4.1	1.5	7.3
	<b>159Tb</b>	<b>163Dy</b>	<b>165Ho</b>	<b>166Er</b>	<b>169Tm</b>	<b>172Yb</b>
Koncentrace (ug/m <sup>3</sup> )	0.0018	0.0084	0.0018	0.0056	0.0008	0.0055
Hmot. tok (ug/hod)	0.8	3.7	0.8	2.5	0.4	2.5
	<b>175Lu</b>	<b>178Hf</b>	<b>181Ta</b>	<b>182W</b>	<b>185Re</b>	<b>195Pt</b>
Koncentrace (ug/m <sup>3</sup> )	0.0007	0.0068	0.0313	0.1337	0.0310	0.0015
Hmot. tok (ug/hod)	0.3	3.0	13.9	59.5	13.8	0.7
	<b>202Hg</b>	<b>205Tl</b>	<b>206Pb</b>	<b>207Pb</b>	<b>208Pb</b>	<b>209Bi</b>
Koncentrace (ug/m <sup>3</sup> )	2.3591	1.4121	46.5499	40.4481	44.5135	0.7910
Hmot. tok (ug/hod)	1 049.8	628.4	20 714.7	17 999.4	19 808.5	352.0
	<b>238U</b>	*	*	*	*	*
Koncentrace (ug/m <sup>3</sup> )	0.0676	*	*	*	*	*
Hmot. tok (ug/hod)	30.1	*	*	*	*	*

**Technologie – spalování HU v malém topeništi – fáze 3 – dohořívání**

	<b>7Li</b>	<b>9Be</b>	<b>23Na</b>	<b>24Mg</b>	<b>27Al</b>	<b>29Si</b>
Koncentrace (ug/m <sup>3</sup> )	0.0576	0.0084	26.1000	9.9217	12.9309	35.3063
Hmot. tok (ug/hod)	17.7	2.6	8 038.8	3 055.9	3 982.7	10 874.3
	<b>39K</b>	<b>44Ca</b>	<b>47Ti</b>	<b>51V</b>	<b>52Cr</b>	<b>55Mn</b>
Koncentrace (ug/m <sup>3</sup> )	25.3815	73.7840	0.4988	0.0805	1.1341	0.2590
Hmot. tok (ug/hod)	7 817.5	22 725.5	153.6	24.8	349.3	79.8
	<b>56Fe</b>	<b>59Co</b>	<b>60Ni</b>	<b>63Cu</b>	<b>65Cu</b>	<b>66Zn</b>
Koncentrace (ug/m <sup>3</sup> )	8.5146	0.3022	1.6114	1.2248	1.2840	9.2525
Hmot. tok (ug/hod)	2 622.5	93.1	496.3	377.3	395.5	2 849.8
	<b>69Ga</b>	<b>75As</b>	<b>77Ar Cl</b>	<b>82Se</b>	<b>83Kr</b>	<b>85Rb</b>
Koncentrace (ug/m <sup>3</sup> )	0.2153	6.4352	0.0000	0.8396	0.0000	0.1452
Hmot. tok (ug/hod)	66.3	1 982.0	0.0	258.6	0.0	44.7
	<b>88Sr</b>	<b>95Mo</b>	<b>105Pd</b>	<b>107Ag</b>	<b>111Cd</b>	<b>115In</b>
Koncentrace (ug/m <sup>3</sup> )	0.3821	0.0691	0.0017	0.0079	0.0650	0.0086
Hmot. tok (ug/hod)	117.7	21.3	0.5	2.4	20.0	2.7
	<b>118Sn</b>	<b>121Sb</b>	<b>125Te</b>	<b>133Cs</b>	<b>137Ba</b>	<b>139La</b>
Koncentrace (ug/m <sup>3</sup> )	0.4612	0.1191	0.0334	0.0333	0.9217	0.0044
Hmot. tok (ug/hod)	142.1	36.7	10.3	10.2	283.9	1.4
	<b>140Ce</b>	<b>141Pr</b>	<b>146Nd</b>	<b>147Sm</b>	<b>153Eu</b>	<b>157Gd</b>
Koncentrace (ug/m <sup>3</sup> )	0.0080	0.0022	0.0099	0.0025	0.0013	0.0056
Hmot. tok (ug/hod)	2.5	0.7	3.0	0.8	0.4	1.7
	<b>159Tb</b>	<b>163Dy</b>	<b>165Ho</b>	<b>166Er</b>	<b>169Tm</b>	<b>172Yb</b>
Koncentrace (ug/m <sup>3</sup> )	0.0004	0.0022	0.0004	0.0014	0.0002	0.0014
Hmot. tok (ug/hod)	0.1	0.7	0.1	0.4	0.1	0.4
	<b>175Lu</b>	<b>178Hf</b>	<b>181Ta</b>	<b>182W</b>	<b>185Re</b>	<b>195Pt</b>
Koncentrace (ug/m <sup>3</sup> )	0.0002	0.0023	0.0105	0.0072	0.0030	0.0002
Hmot. tok (ug/hod)	0.1	0.7	3.2	2.2	0.9	0.1
	<b>202Hg</b>	<b>205Tl</b>	<b>206Pb</b>	<b>207Pb</b>	<b>208Pb</b>	<b>209Bi</b>
Koncentrace (ug/m <sup>3</sup> )	1.0369	0.0570	6.6497	5.7917	6.2258	0.2000
Hmot. tok (ug/hod)	319.4	17.5	2 048.1	1 783.8	1 917.6	61.6
	<b>238U</b>	*	*	*	*	*
Koncentrace (ug/m <sup>3</sup> )	0.0029	*	*	*	*	*
Hmot. tok (ug/hod)	0.9	*	*	*	*	*

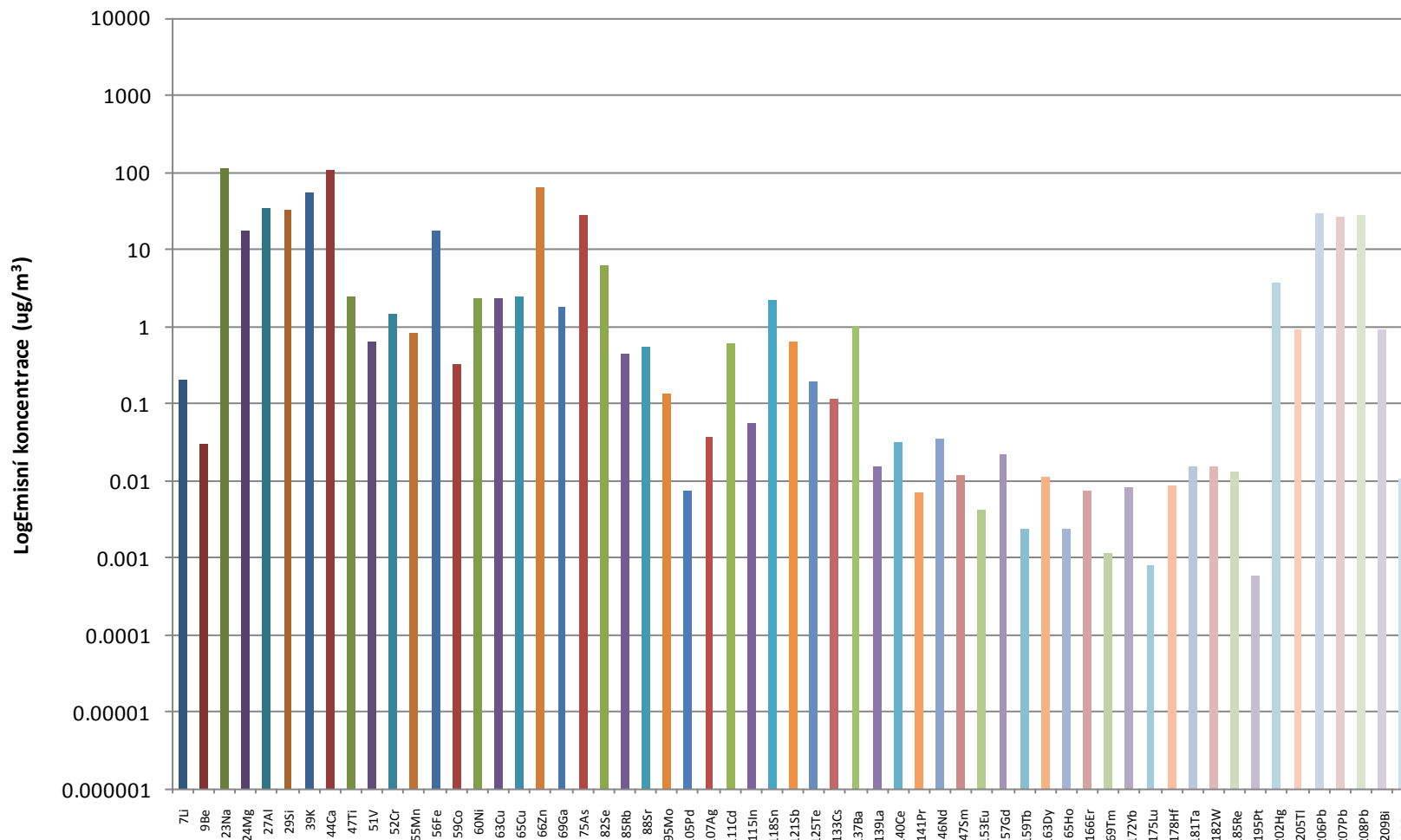
## Technologie – velký energetický zdroj na HU

	<b>7Li</b>	<b>9Be</b>	<b>23Na</b>	<b>24Mg</b>	<b>27Al</b>	<b>29Si</b>
Koncentrace (ug/m <sup>3</sup> )	0.6946	0.0803	17.4857	38.3562	348.6857	3.5258
Hmot. tok (ug/hod)	151 354.6	17 505.0	3 810 089.5	8 357 693.2	75 977 572.7	768 263.9
	<b>39K</b>	<b>44Ca</b>	<b>47Ti</b>	<b>51V</b>	<b>52Cr</b>	<b>55Mn</b>
Koncentrace (ug/m <sup>3</sup> )	41.9981	106.1345	8.3790	2.1808	0.3163	2.5027
Hmot. tok (ug/hod)	9 151 261.6	23 126 394.4	1 825 768.0	475 180.1	68 930.7	545 328.1
	<b>56Fe</b>	<b>59Co</b>	<b>60Ni</b>	<b>63Cu</b>	<b>65Cu</b>	<b>66Zn</b>
Koncentrace (ug/m <sup>3</sup> )	137.1149	0.4615	1.6380	2.1264	2.2149	2.9580
Hmot. tok (ug/hod)	29 876 931.2	100 561.4	356 905.6	463 328.7	482 627.4	644 544.1
	<b>69Ga</b>	<b>75As</b>	<b>77Ar Cl</b>	<b>82Se</b>	<b>83Kr</b>	<b>85Rb</b>
Koncentrace (ug/m <sup>3</sup> )	0.6074	0.4876	0.0000	3.0084	0.0000	0.2438
Hmot. tok (ug/hod)	132 352.2	106 238.9	0.0	655 514.8	0.0	53 115.4
	<b>88Sr</b>	<b>95Mo</b>	<b>105Pd</b>	<b>107Ag</b>	<b>111Cd</b>	<b>115In</b>
Koncentrace (ug/m <sup>3</sup> )	5.3530	0.0498	0.0414	0.0079	0.0180	0.0035
Hmot. tok (ug/hod)	1 166 409.5	10 844.1	9 013.5	1 714.5	3 931.8	762.3
	<b>118Sn</b>	<b>121Sb</b>	<b>125Te</b>	<b>133Cs</b>	<b>137Ba</b>	<b>139La</b>
Koncentrace (ug/m <sup>3</sup> )	0.0972	0.0460	0.0046	0.0389	8.7098	0.1363
Hmot. tok (ug/hod)	21 180.5	10 019.3	1 001.0	8 476.2	1 897 837.8	29 708.8
	<b>140Ce</b>	<b>141Pr</b>	<b>146Nd</b>	<b>147Sm</b>	<b>153Eu</b>	<b>157Gd</b>
Koncentrace (ug/m <sup>3</sup> )	0.3032	0.0801	0.3442	0.0870	0.0274	0.1740
Hmot. tok (ug/hod)	66 056.0	17 448.9	74 992.6	18 954.4	5 975.4	37 908.7
	<b>159Tb</b>	<b>163Dy</b>	<b>165Ho</b>	<b>166Er</b>	<b>169Tm</b>	<b>172Yb</b>
Koncentrace (ug/m <sup>3</sup> )	0.0151	0.0681	0.0129	0.0432	0.0059	0.0425
Hmot. tok (ug/hod)	3 286.4	14 833.6	2 817.1	9 419.5	1 296.5	9 253.0
	<b>175Lu</b>	<b>178Hf</b>	<b>181Ta</b>	<b>182W</b>	<b>185Re</b>	<b>195Pt</b>
Koncentrace (ug/m <sup>3</sup> )	0.0051	0.0133	0.0000	0.0182	0.0001	0.0004
Hmot. tok (ug/hod)	1 102.7	2 905.2	3.2	3 959.8	31.2	83.3
	<b>202Hg</b>	<b>205Tl</b>	<b>206Pb</b>	<b>207Pb</b>	<b>208Pb</b>	<b>209Bi</b>
Koncentrace (ug/m <sup>3</sup> )	3.7452	0.0376	1.1117	0.9713	1.0441	0.0537
Hmot. tok (ug/hod)	816 070.2	8 183.9	242 234.6	211 644.9	227 500.3	11 701.7
	<b>238U</b>	*	*	*	*	*
Koncentrace (ug/m <sup>3</sup> )	0.0947	*	*	*	*	*
Hmot. tok (ug/hod)	20 636.0	*	*	*	*	*

## Technologie – rotační cementářská pec

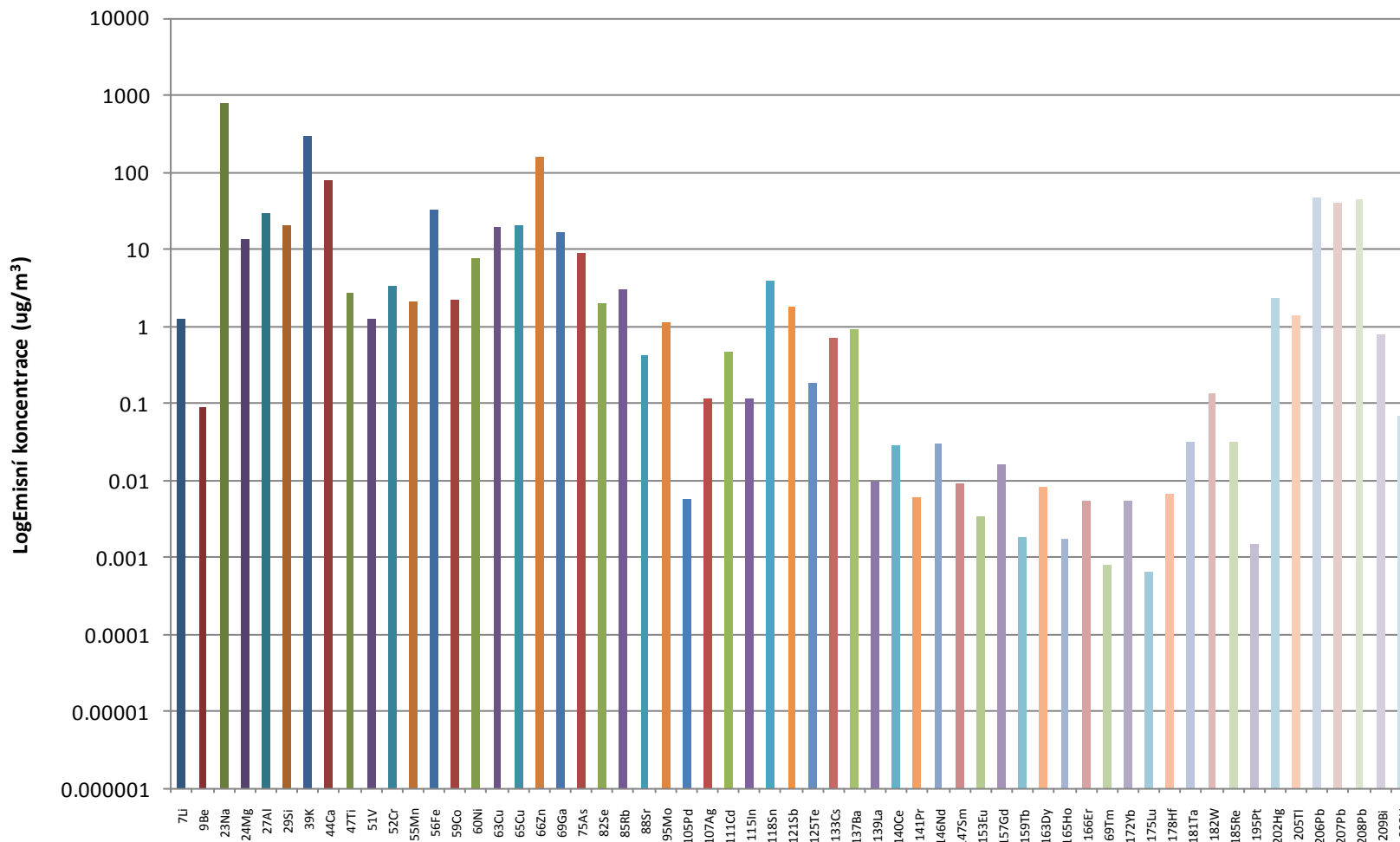
	<b>7Li</b>	<b>9Be</b>	<b>23Na</b>	<b>24Mg</b>	<b>27Al</b>	<b>29Si</b>
Koncentrace (ug/m <sup>3</sup> )	0.2456	0.0048	68.5599	20.0202	40.1508	5.2918
Hmot. tok (ug/hod)	26 190.8	511.1	7 311 361.7	2 134 994.1	4 281 759.4	564 329.0
	<b>39K</b>	<b>44Ca</b>	<b>47Ti</b>	<b>51V</b>	<b>52Cr</b>	<b>55Mn</b>
Koncentrace (ug/m <sup>3</sup> )	1336.5196	828.5410	1.5656	0.1579	0.2620	2.9803
Hmot. tok (ug/hod)	142 529 127.5	88 357 268.8	166 954.3	16 837.7	27 936.9	317 821.3
	<b>56Fe</b>	<b>59Co</b>	<b>60Ni</b>	<b>63Cu</b>	<b>65Cu</b>	<b>66Zn</b>
Koncentrace (ug/m <sup>3</sup> )	140.7807	0.0224	0.1560	0.1778	0.1902	6.5446
Hmot. tok (ug/hod)	15 013 133.5	2 383.7	16 641.5	18 956.5	20 280.7	697 931.7
	<b>69Ga</b>	<b>75As</b>	<b>77Ar Cl</b>	<b>82Se</b>	<b>83Kr</b>	<b>85Rb</b>
Koncentrace (ug/m <sup>3</sup> )	0.0280	0.1225	0.0000	0.1793	0.0000	16.0097
Hmot. tok (ug/hod)	2 985.0	13 066.0	0.0	19 123.2	0.0	1 707 308.6
	<b>88Sr</b>	<b>95Mo</b>	<b>105Pd</b>	<b>107Ag</b>	<b>111Cd</b>	<b>115In</b>
Koncentrace (ug/m <sup>3</sup> )	2.2591	0.0548	0.0083	0.0347	0.0559	0.0009
Hmot. tok (ug/hod)	240 916.4	5 839.5	881.4	3 697.1	5 962.6	91.2
	<b>118Sn</b>	<b>121Sb</b>	<b>125Te</b>	<b>133Cs</b>	<b>137Ba</b>	<b>139La</b>
Koncentrace (ug/m <sup>3</sup> )	0.0813	0.0094	0.0008	0.7992	0.4403	0.0319
Hmot. tok (ug/hod)	8 673.4	1 004.5	85.3	85 223.2	46 952.2	3 397.0
	<b>140Ce</b>	<b>141Pr</b>	<b>146Nd</b>	<b>147Sm</b>	<b>153Eu</b>	<b>157Gd</b>
Koncentrace (ug/m <sup>3</sup> )	0.0662	0.0173	0.0744	0.0172	0.0043	0.0319
Hmot. tok (ug/hod)	7 060.7	1 842.7	7 935.7	1 830.4	458.1	3 402.4
	<b>159Tb</b>	<b>163Dy</b>	<b>165Ho</b>	<b>166Er</b>	<b>169Tm</b>	<b>172Yb</b>
Koncentrace (ug/m <sup>3</sup> )	0.0028	0.0122	0.0022	0.0071	0.0008	0.0057
Hmot. tok (ug/hod)	298.2	1 302.7	239.3	753.8	89.8	607.2
	<b>175Lu</b>	<b>178Hf</b>	<b>181Ta</b>	<b>182W</b>	<b>185Re</b>	<b>195Pt</b>
Koncentrace (ug/m <sup>3</sup> )	0.0007	0.0017	0.0000	0.0155	0.0001	0.0001
Hmot. tok (ug/hod)	69.6	182.0	1.6	1 657.3	12.8	6.4
	<b>202Hg</b>	<b>205Tl</b>	<b>206Pb</b>	<b>207Pb</b>	<b>208Pb</b>	<b>209Bi</b>
Koncentrace (ug/m <sup>3</sup> )	25.1069	0.7250	4.0464	3.5979	3.9075	0.0110
Hmot. tok (ug/hod)	2 677 448.4	77 312.0	431 511.1	383 690.8	416 699.1	1 175.2
	<b>238U</b>	*	*	*	*	*
Koncentrace (ug/m <sup>3</sup> )	0.0074	*	*	*	*	*
Hmot. tok (ug/hod)	789.2	*	*	*	*	*

### Emisní koncentrace - skupina těžké kovy - malé topeniště - fáze 1

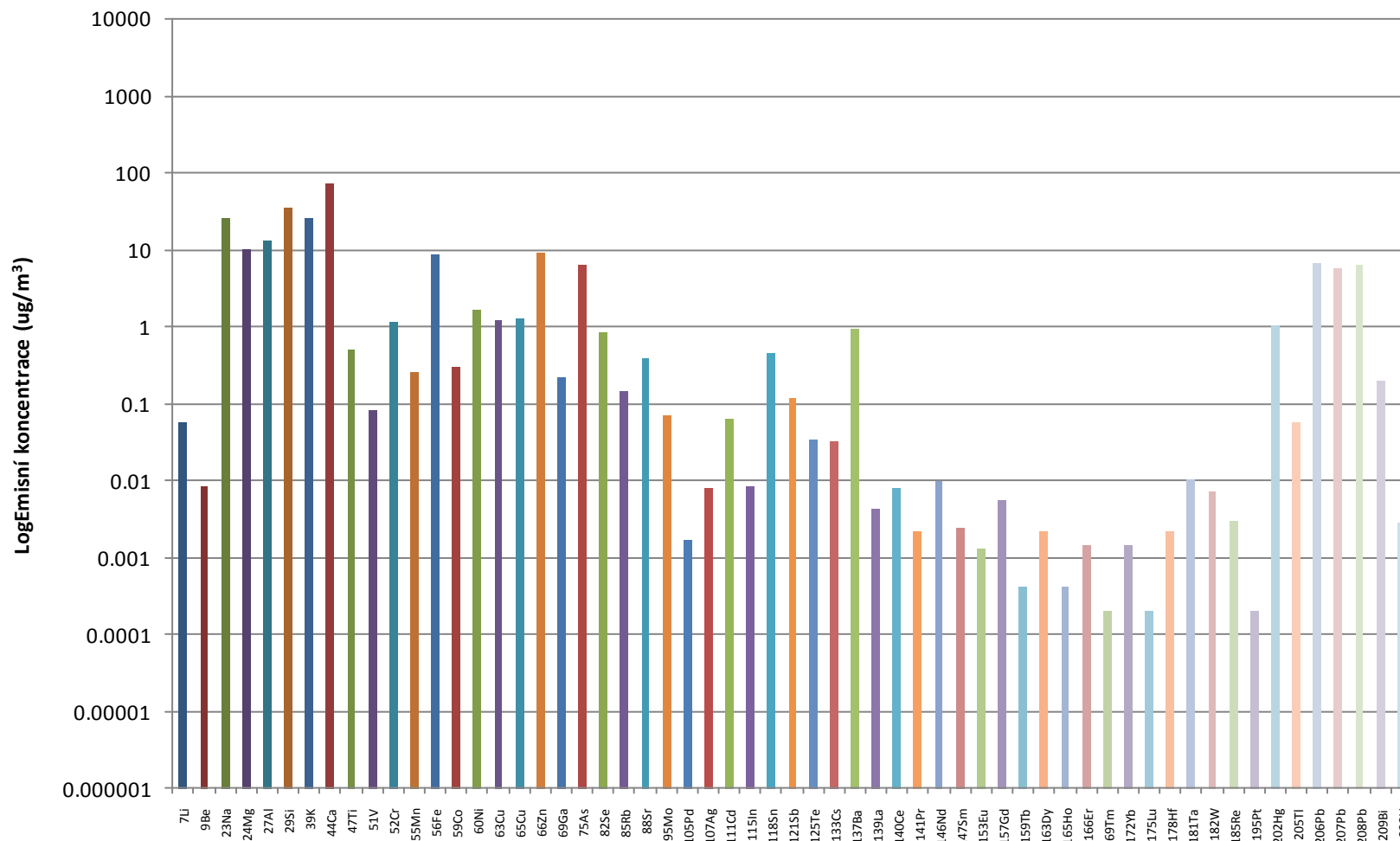




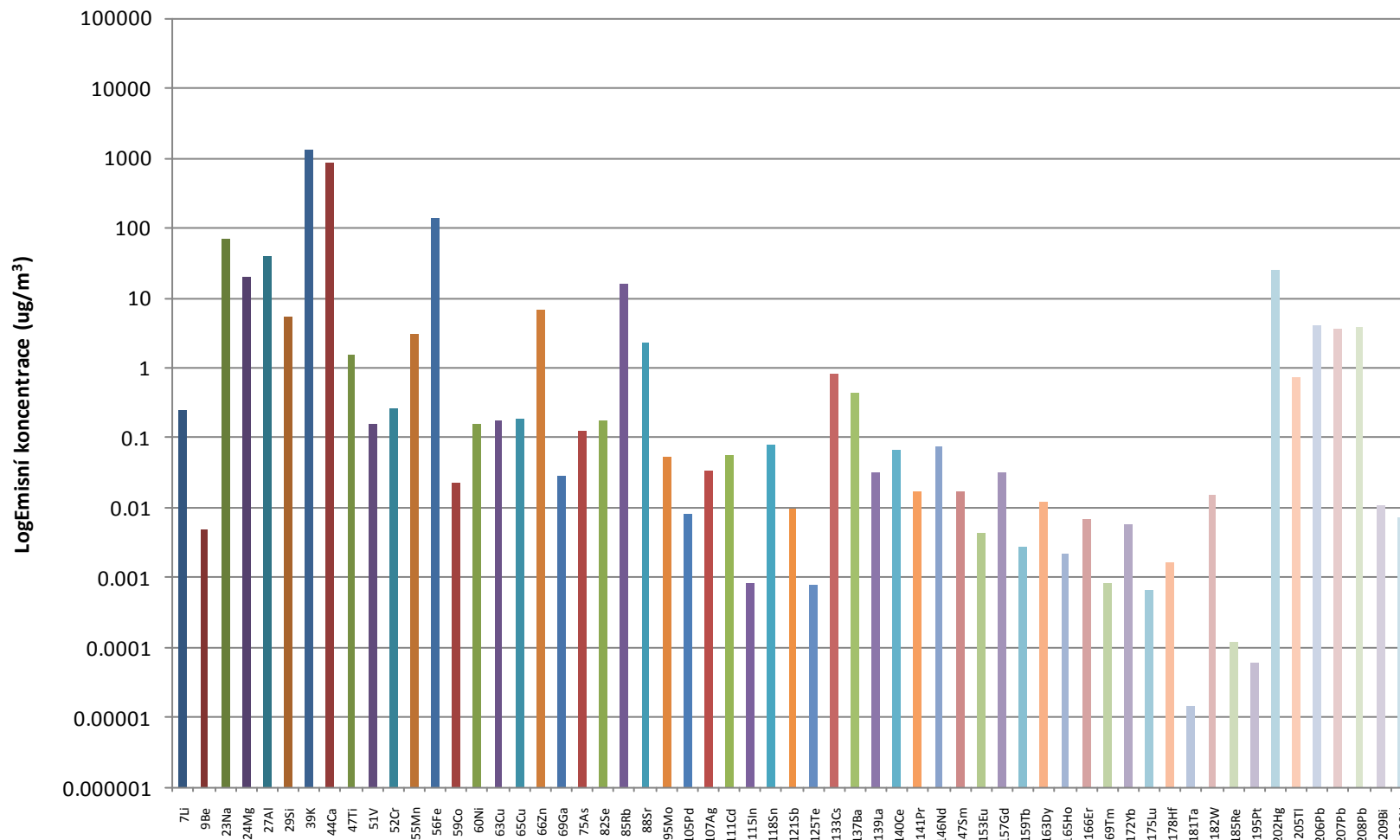
### Emisní koncentrace - skupina těžké kovy - malé topeniště - fáze 2



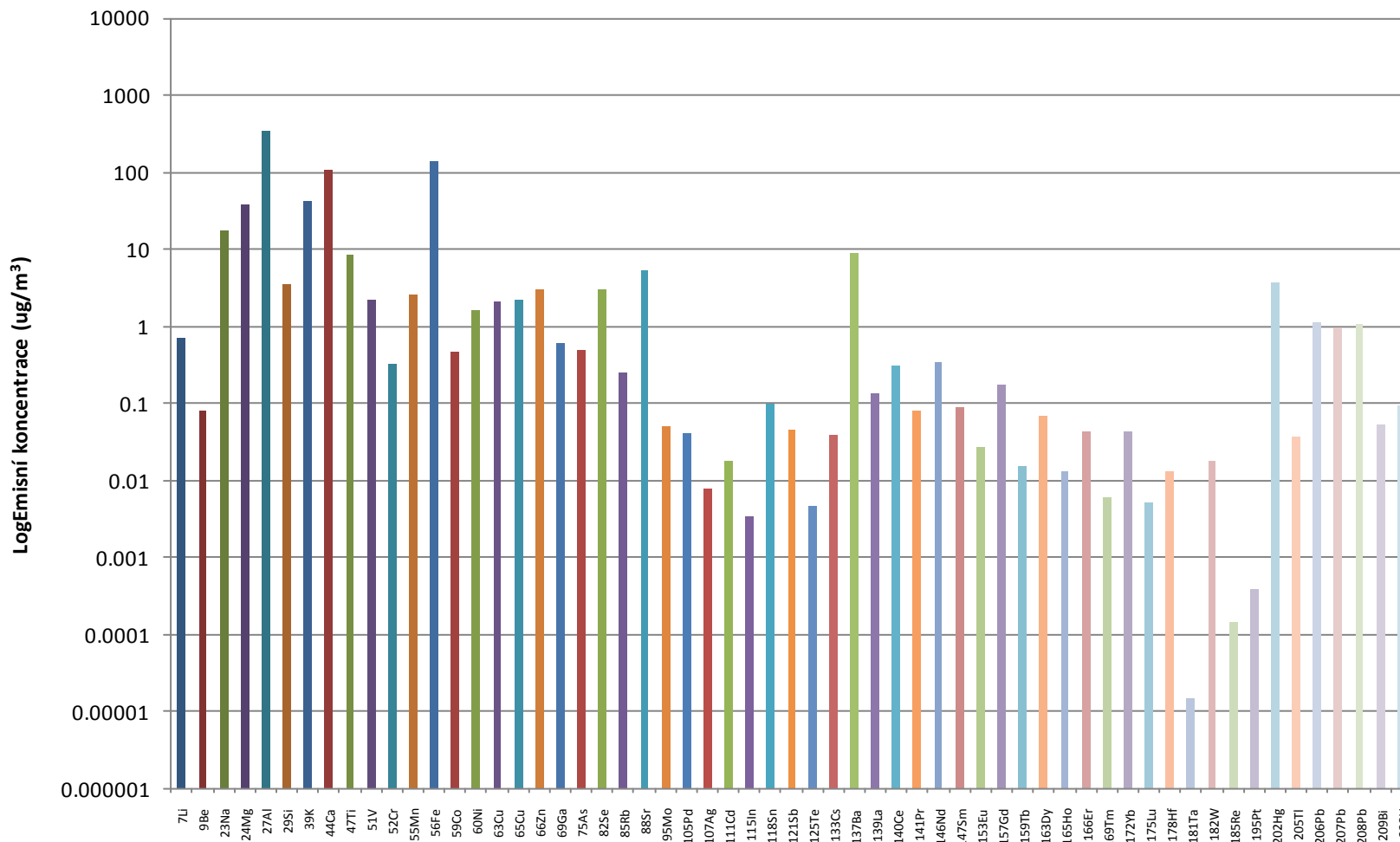
### Emisní koncentrace - skupina těžké kovy - malé topeniště - fáze 3



### Emisní koncentrace - skupina těžké kovy - technologie cementárna



### Emisní koncentrace - skupina těžké kovy - energetický zdroj HU



## Porovnání emisních koncentrací TK pro jednotlivé zdroje

