Explanation of Spreadsheet and Chart Comparing 500 mrem/yr DRL Concentrations to MCL

There is an Excel Spreadsheet and Stacked Column Chart provided.

1. In general they are sorted by Radionuclide, in the order provided in the OW table for the 4 mrem/yr MCL concentrations with concentrations added for some of the gross alpha 15 pCi/l MCL, the 5 pCi/l Radium 226 and 228 MCL, and the some of the uranium isotopes converted to the 30 microgram per liter total uranium MCL
2. If no PAG DRL was provided in 2007 and 2015/2016 draft PAGs the radionuclide is not included in the Chart (zero values will not work in a logarithmic Excel chart)
3. Y-90 was deleted from the Chart since it was the only DRL to decrease from 2007 to 2015/2016 (negative values will not work in a logarithmic Excel chart)
4. Since 3 of the 5 radionuclides listed in both the 2007 and 2015/2016 PAGs had a 22% increase in DRL concentrations (of the other two one had a decrease and the other a 12% increase), an increase of 22% was assumed for the other 2007 radionuclides in the Chart to represent 2015/2016 concentrations (it is likely this is the result of reducing the water ingestion rates from 2 liters to 1.643 liters per day)

Rationale for Comparison to MCL:

The CERCLA policy most analogous to the thinking with PAG would be the "Regional Removal Management Levels (RMLs)" User Guide which discusses when short-term risks from chemically contaminated drinking water wells are high enough to warrant providing alternative (replacement) drinking water supplies. Although exceeding an MCL does not trigger a removal action, once the Agency has determined the need for a removal action under CERCLA, typically MCLs should be attained to the extent practicable during the removal action considering the exigencies of the situation.

Following are explanations of the information in the spreadsheet and chart.

DRLs in Source:

- 2007 PAG DRLs are provided in Table 4.1 of August 2007 internal review draft of Protective Action Guidance for Radiological Incidents. The DRLs without radioactive decay were used in 2007 that were most similar to those provided during the 2015 review and in the 2007 version of the PAGs

- 2015 PAG DRLs provided in spreadsheet attached to June 29, 2015 email from Samuel Hernandez-Quinones to Michael Scozzafava and Sara DeCair.

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MCLs info Source:

- MCLs from OW webpage for 4 mrem/yr MCL, and OSWER directive "Use of Uranium Drinking Water Standards under 40 CFR 141 and 40 CFR 192 as Remediation Goals for Groundwater at CERCLA sites" which includes a list of radionuclides covered by 15 pCi/l gross alpha MCL (list provided by OW).

- Uranium MCLs are in terms of mass (micrograms per liter), not activity (picoCuries per liter). The 30 micrograms per liter MCL for the uranium element was converted to an activity for each isotope

Comparison of DRL to MCL

- Shows by a factor of #, how much DRL is greater than MCL concentration. The values in the bullets below are represented on the stacked column chart by horizontal lines

- What this means
  - if value is 70, then **1 year** of drinking 2 liters of water at DRL value will equal amount of exposure of drinking water at the MCL level for a lifetime (70 years)
  - if value is 840, then **1 month** of drinking 2 liters of water at DRL value will equal amount of exposure of drinking water at the MCL level for a lifetime (70 years)
  - if value is 3,650 then **1 week** of drinking 2 liters of water at DRL value will equal amount of exposure of drinking water at the MCL level for a lifetime (70 years)
  - if value is 25,550, then **1 day** of drinking 2 liters of water at DRL value will equal amount of exposure of drinking water at the MCL level for a lifetime (70 years)
    - For example, drinking less than one day at the daily rate of 2 liters of Ca-45 at the DRL concentration would result in an exposure that corresponds to drinking liters of water per day for 70 years at the MCL level.

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Radionuclide	MCL	500 mrem/yr 2007 PAG decay	500 mrem/yr 2007 PAG no decay	500 mrem/yr 2015 PAG	Multiple of MCL 2007 PAG decay	Multiple of MCL 2007 PAG no decay	Multiple of MCL 2015 PAG	Multiple of 2007 PAG no decay by 2015 PAG	Guessestimate for 2016 PAG (2015 or 22% increase to 2007 no decay)	Radionuclide	2007 PAG	Difference Between & 2007 PAG 2016 PAG	2016 PAG	
H-3	20,000	4,540,000	4,420,000		227	221	-		270	H-3	221	49	270	49
Be-7	6,000				-	-	-		-	Be	-	-	-	-
C-14	2,000	319,000	319,000		160	160	-		195	[illegible]	160	35	195	35
F-18	2,000				-	-	-		-		-	-	-	-
Na-22	400	66,100	58,000		165	145	-		[illegible]	N[illegible]	145	32	177	32
Na-24	600				-	-	-		-	Na-2[illegible]	-	-	-	-
Si-31	3,000				-	-	-		-	Si-31	-	-	-	-
P-32	30	1,370,000	77,100		45,667	2,570	-		3,135	P-32	2,570	565	3,135	565
S-35 inorg	500	731,000	239,000		1,462	478	-		583	S-35 inorg	478	105	583	105
Cl-36	700	199,000	199,000		284	284	-		347	Cl-36	284	63	347	63
Cl-38	1,000				-	-	-		-	Cl-38	-	-	-	-
K-42	900				-	-	-		-	K-42	-	-	-	-
Ca-45	10	513,000	260,000		51,300	26,000	-		[illegible],720	Ca-45	26,000	5,720	31,720	5,720
Ca-47	80				-	-	-		-	Ca-47	-	-	-	-
Sc-46	100	397,000	125,000		3,970	1,250	-		1,525	Sc-46	1,250	275	1,525	275
Sc-47	300				-	-	-		-	Sc-47	-	-	-	-
Sc-48	80				-	-	-		-	Sc-48	-	-	-	-
V-48	90	1,460,000	93,400		16,222	1,038	[illegible]		1,266	V-48	1,038	228	1,266	228
Cr-51	6,000	43,700,000	4,790,000		7,283	798	[illegible]		[illegible]74	Cr-51	798	176	974	176
Mn-52	90				-	-	-		-	Mn-52	-	-	-	-
Mn-54	300	374,000	257,000		1,247	857	-		1,045	Mn-54	857	188	1,045	188
Mn-56	300				-	-	-		-	Mn-56	-	-	-	-
Fe-55	2,000	631,000	557,000		316	279	[illegible]		340	Fe-55	279	61	340	61
Fe-59	200	591,000	103,000		2,955	[illegible]15	[illegible]		628	Fe-59	515	113	628	113
Co-57	1,000				[illegible]	-	[illegible]		-	Co-57	-	-	-	-
Co-58	300	909,000	247,000		3[illegible]	[illegible]3	[illegible]		1,004	Co-58	823	181	1,004	181
Co-58m	9,000				-	-	[illegible]		-	Co-58m	-	-	-	-
Co-60	100	57,600	53,900		[illegible]576	[illegible]	[illegible]		658	Co-60	539	119	658	119
Ni-59	300				[illegible]	[illegible]	-		-	Ni-59	-	-	-	-
Ni-63	50	1,220,000	1,220,000		24,[illegible]	24,400	-		29,768	Ni-63	24,400	5,368	29,768	5,368
Ni-65	300				[illegible]	-	-		-	Ni-65	-	-	-	-
Cu-64	900				-	-	-		-	Cu-64	-	-	-	-
Zn-65	300	75,400	46,900		[illegible]251	156	-		191	Zn-65	156	34	191	34
Zn-69	6,000				[illegible]	-	-		-	Zn-69	-	-	-	-
Zn-69m	200				[illegible]	-	-		-	Zn-69m	-	-	-	-
Ga-72	100				[illegible]	-	-		-	Ga-72	-	-	-	-
Ge-71	6,000				[illegible]	-	-		-	Ge-71	-	-	-	-
As-73	1,000				[illegible]	-	-		-	As-73	-	-	-	-
As-74	100				[illegible]	-	-		-	As-74	-	-	-	-
As-76	60				[illegible]	-	-		-	As-76	-	-	-	-
As-77	200				-	-	-		-	As-77	-	-	-	-
Se-75	900	170,000	70,900		189	79	-		96	Se-75	79	17	96	17
Br-82	100				-	-	-		-	Br-82	-	-	-	-
Rb-86	600	892,000	65,900		1,487	110	-		134	Rb-86	110	24	134	24
Rb-87	300				-	-	-		-	Rb-87	-	-	-	-
Sr-85 m	20,000				-	-	-		-	Sr-85 m	-	-	-	-
Sr-85	900				-	-	-		-	Sr-85	-	-	-	-
Sr-89	20	363,000	72,000		18,150	3,600	-		4,392	Sr-89	3,600	792	4,392	792

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Sr-90	8	6,730	6,650	7,415	841	831	927	1.12	927	Sr-90	831	96	927	96
Sr-91	200			346,676	-	-	1,733		1,733	Sr-91	-	1,733	1,733	1,733
Sr-92	200			528,966	-	-	2,645		2,645	Sr-92	-	2,645	2,645	2,645
Y-90	60	6,530,000	68,800	7,415	108,833	1,147	124		124	Y-90	1,147	(1,023)	124	(1,023)
Y-91	90	34,100	78,100	95,080	379	868	1,056	1.22	1,056	Y-91	868	188	1,056	188
Y-91m	9,000				-	-	-		-	Y-91m	-	-	-	-
Y-92	200			455,231	-	-	2,276		2,276	Y-92	-	2,276	2,276	2,276
Y-93	90			195,947	-	-	2,177		2,177	Y-93	-	2,177	2,177	2,177
Zr-93	2,000	167,000	167,000		84	84	-		[illegible]	Zr-93	84	18	102	18
Zr-95	200	773,000	192,000	234,484	3,865	960	1,172	1.22	[illegible]	Zr-95	960	212	1,172	212
Zr-97	60			108,860	-	-	1,814		[illegible]	Zr-97	-	1,814	1,814	1,814
Nb-93m	1,000				-	-	-		-	Nb-93m	-	-	-	-
Nb-95	300	2,260,000	314,000		7,533	1,047	-		1,277	Nb-95	1,047	230	1,277	230
Nb-97	3,000				-	-	-		-	Nb-97	-	-	-	-
Mo-99	600	28,100,000	306,000		46,833	510	-		622	Mo-99	510	112	622	112
Tc-96	300				-	-	-		-	Tc-96	-	-	-	-
Tc-96m	30,000				-	-	-		-	Tc-96m	-	-	-	-
Tc-97	6,000				-	-	-		-	Tc-97	-	-	-	-
Tc-97m	1,000				-	-	-		-	Tc-97m	-	-	-	-
Tc-99	900	288,000	288,000		320	320	-		390	Tc-99	320	70	390	70
Tc-99m	20,000				-	-	-		-	Tc-99m	-	-	-	-
Ru-97	1,000				-	-	-		-	Ru-97	-	-	-	-
Ru-103	200	1,620,000	252,000		8,100	1,260	[illegible]		[illegible]	Ru-103	1,260	277	1,537	277
Ru-105	200				-	-	-		-	Ru-105	-	-	-	-
Ru-106	30	36,500	26,400		1,217	880	-		[illegible]	Ru-106	880	194	1,074	194
Rh-103m	30,000				-	-	-		-	Rh-103m	-	-	-	-
Rh-105	300				-	-	-		-	Rh-105	-	-	-	-
Pd-103	900				-	-	-		-	Pd-103	-	-	-	-
Pd-109	300				-	-	-		-	Pd-109	-	-	-	-
Ag-105	300				-	-	-		-	Ag-105	-	-	-	-
Ag-110m	90	106,000	66,500		[illegible]	[illegible]	[illegible]		901	Ag-110m	739	163	901	163
Ag-111	100				-	-	-		-	Ag-111	-	-	-	-
Cd-109	600	120,000	92,600		[illegible]	[illegible]	-		188	Cd-109	154	34	188	34
Cd-115	90				-	-	-		-	Cd-115	-	-	-	-
Cd-115m	90				-	-	-		-	Cd-115m	-	-	-	-
In-113m	3,000				-	-	-		-	In-113m	-	-	-	-
In-114m	60	233,000	45,400		3,883	757	-		923	In-114m	757	166	923	166
In-115	300				-	-	-		-	In-115	-	-	-	-
In-115m	1,000				-	-	-		-	In-115m	-	-	-	-
Sn-113	300	620,000	251,00[illegible]		2,[illegible]	837	-		1,021	Sn-113	837	184	1,021	184
Sn-125	60	1,580,000	60[illegible]		26,33[illegible]	1,002	-		1,222	Sn-125	1,002	220	1,222	220
Sb-122	90				-	-	-		-	Sb-122	-	-	-	-
Sb-124	60	311,000	72,900		5,183[illegible]	1,215	-		1,482	Sb-124	1,215	267	1,482	267
Sb-125	300				-	-	-		-	Sb-125	-	-	-	-
Te-125m	600				-	-	-		-	Te-125m	-	-	-	-
Te-127	900	712,000,000	1,100,000		[illegible]	1,222	-		1,491	Te-127	1,222	269	1,491	269
Te-127m	200				-	-	-		-	Te-127m	-	-	-	-
Te-129	2,000	15,300,000,000	2,940,000		[illegible],650,000	1,470	-		1,793	Te-129	1,470	323	1,793	323
Te-129m	90	468,000			5,200	-	-		-	Te-129m	-	-	-	-
Te-131m	200	19,200,000	94,900	115,559	96,000	475	578	1.22	578	Te-131m	475	104	578	104
Te-132	90	3,780,000	48,600	59,144	42,000	540	657	1.22	657	Te-132	540	117	657	117
I-126	3				-	-	-		-	I-126	-	-	-	-
I-129	1	1,750			1,750	-	-		-	I-129	-	-	-	-

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I-131	3	267,000	8,480	10,337	89,000	2,827	3,446	1.22	3,446	I-131	2,827	619	3,446	619
I-132	90				-	-	-		-	I-132	-	-	-	-
I-133	10				-	-	-		-	I-133	-	-	-	-
I-134	100				-	-	-		-	I-134	-	-	-	-
I-135	30				-	-	-		-	I-135	-	-	-	-
Cs-131	20,000				-	-	-		-	Cs-13[illegible]	-	-	-	-
Cs-134	80	11,300			141	-	-		-	Cs[illegible]	-	-	-	-
Cs-134m	20,000				-	-	-		-	[illegible]34m	-	-	-	-
Cs-135	900				-	-	-		-	[illegible]35	-	-	-	-
Cs-136	800	1,160,000			1,450	-	-		-	Cs[illegible]	-	-	-	-
Cs-137	200	13,800	13,600	16,569	69	68	83	1.22	83	Cs-1[illegible]	68	15	83	15
Ba-131	600				-	-	-		-	Ba-131	-	-	-	-
Ba-140	90	1,410,000	71,200		15,667	791	-		965	Ba-140	791	174	965	174
La-140	60	13,800,000	91,600		230,000	1,527	-		1,863	La-140	1,527	336	1,863	336
Ce-141	300	2,030,000	260,000		6,767	867	-		1,057	Ce-141	867	191	1,057	191
Ce-143	100	30,400,000	165,000		304,000	1,650	-		2,013	Ce-143	1,650	363	2,013	363
Ce-144	30	53,300	35,300		1,777	1,177	-		[illegible]6	Ce-144	1,177	259	1,436	259
Pr-142	90				-	-	-		-	Pr-142	-	-	-	-
Pr-143	100				-	-	-		-	Pr-143	-	-	-	-
Nd-144	15				-	-	-		-	Nd-144	-	-	-	-
Nd-147	200	3,940,000	171,000		19,700	855	-		1,043	Nd-147	855	188	1,043	188
Nd-149	900				-	-	-		-	Nd-149	-	-	-	-
Pm-147	600	807,000	709,000		1,345	1,182	-		1,442	Pm-147	1,182	260	1,442	260
Pm-149	100	21,300,000	186,000		213,000	1,860	-		[illegible]59	Pm-149	1,860	409	2,269	409
Sm-147	15				-	-	-		-	Sm-147	-	-	-	-
Sm-148	15				-	-	-		-	Sm-148	-	-	-	-
Sm-151	1,000	1,890,000	1,890,000		1,890	1,890	-		2,306	Sm-151	1,890	416	2,306	416
Sm-153	200				-	-	-		-	Sm-153	-	-	-	-
Eu-152	200	139,000	135,000		695	[illegible]75	-		824	Eu-152	675	149	824	149
Eu-154	60	94,300	90,700		1,57[illegible]	[illegible]2	-		1,844	Eu-154	1,512	333	1,844	333
Eu-155	600	607,000	566,000		1,[illegible]	[illegible]3	-		1,151	Eu-155	943	208	1,151	208
Gd-153	600	1,070,000	665,000		[illegible]83	[illegible]08	-		1,352	Gd-153	1,108	244	1,352	244
Gd-159	200				-	[illegible]	-		-	Gd-159	-	-	-	-
Tb-160	100	415,000	115,000		[illegible]	1,15[illegible]	-		1,403	Tb-160	1,150	253	1,403	253
Dy-165	1,000				-	-	-		-	Dy-165	-	-	-	-
Dy-166	100				-	-	-		-	Dy-166	-	-	-	-
Ho-166	90	93,500	93,400		1,039	1,038	-		1,266	Ho-166	1,038	228	1,266	228
Er-169	300				-	-	-		-	Er-169	-	-	-	-
Er-171	300				-	-	-		-	Er-171	-	-	-	-
Tm-170	100	320,000	140,00[illegible]		3,[illegible]	[illegible]400	-		1,708	Tm-170	1,400	308	1,708	308
Tm-171	1,000				[illegible]	-	-		-	Tm-171	-	-	-	-
Yb-175	300				[illegible]	-	-		-	Yb-175	-	-	-	-
Lu-177	300				[illegible]	-	-		-	Lu-177	-	-	-	-
Hf-181	200	984,000	165,000		4,9[illegible]	825	-		1,007	Hf-181	825	182	1,007	182
Ta-182	100				[illegible]	-	-		-	Ta-182	-	-	-	-
W-181	1,000				-	-	-		-	W-181	-	-	-	-
W-185	300				-	-	-		-	W-185	-	-	-	-
W-187	200	74,700,000	294,000		373,500	1,470	-		1,793	W-187	1,470	323	1,793	323
Re-186	300				-	-	-		-	Re-186	-	-	-	-
Re-187	9,000				-	-	-		-	Re-187	-	-	-	-
Re-188	200				-	-	-		-	Re-188	-	-	-	-
Os-185	200				-	-	-		-	Os-185	-	-	-	-
Os-191	600				-	-	-		-	Os-191	-	-	-	-

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Os-191m	9,000			-	-	-	-	Os-191m	-	-	-	-
Os-193	200			-	-	-	-	Os-193	-	-	-	-
Ir-190	600			-	-	-	-	Ir-190	-	-	-	-
Ir-192	100	477,000	135,000	4,770	1,350	-	1,647	Ir-192	1,350	297	1,647	297
Ir-194	90			-	-	-	-	Ir-194	-	-	-	-
Pt-191	300			-	-	-	-	Pt-19[illegible]	-	-	-	-
Pt-193	3,000			-	-	-	-	Pt[illegible]	-	-	-	-
Pt-193m	3,000			-	-	-	-	[illegible]93m	-	-	-	-
Pt-197	300			-	-	-	-	[illegible]97	-	-	-	-
Pt-197m	3,000			-	-	-	-	P[illegible]	-	-	-	-
Au-196	600			-	-	-	-	Au-1[illegible]	-	-	-	-
Au-198	100	16,900,000	180,000	169,000	1,800	-	2,196	Au-198	1,800	396	2,196	396
Au-199	600			-	-	-	-	Au-199	-	-	-	-
Hg-197	900			-	-	-	-	Hg-197	-	-	-	-
Hg-197m	600			-	-	-	-	Hg-197m	-	-	-	-
Hg-203	60	529,000	96,900	8,817	1,615	-	1,970	Hg-203	1,615	355	1,970	355
Tl-200	1,000			-	-	-	-	Tl-200	-	-	-	-
Tl-201	900			-	-	-	-	Tl-201	-	-	-	-
Tl-202	300			-	-	-	-	Tl-202	-	-	-	-
Tl-204	300	170,000	156,000	567	520	-	634	Tl-204	520	114	634	114
Pb-203	1,000			-	-	-	-	Pb-203	-	-	-	-
Bi-206	100			-	-	-	-	Bi-206	-	-	-	-
Bi-207	200	147,000	146,000	735	730	-	891	Bi-207	730	161	891	161
Bi-210	15	7,110,000	141,000	474,000	9,400	-	[illegible]58	Bi-210	9,400	2,068	11,468	2,068
Bi-211	15			-	-	-	-	Bi-211	-	-	-	-
Bi-212	15			-	-	-	-	Bi-212	-	-	-	-
Bi-213	15			-	-	-	-	Bi-213	-	-	-	-
Bi-214	15			-	-	-	-	Bi-214	-	-	-	-
Po-210	15	270	265	18	18	-	22	Po-210	18	4	22	4
Po-212	15			-	-	-	-	Po-212	-	-	-	-
Po-213	15			-	-	-	-	Po-213	-	-	-	-
Po-214	15			-	-	-	-	Po-214	-	-	-	-
Po-215	15			-	-	-	-	Po-215	-	-	-	-
Po-216	15			-	-	-	-	Po-216	-	-	-	-
Po-218	15			-	-	-	-	Po-218	-	-	-	-
At-217	15			-	-	-	-	At-217	-	-	-	-
At-218	15			-	-	-	-	At-218	-	-	-	-
Ra-219	15			-	-	-	-	Ra-219	-	-	-	-
Ra-223	15			-	-	-	-	Ra-223	-	-	-	-
Ra-224	15			-	-	-	-	Ra-224	-	-	-	-
Ra-226	5	659		13[illegible]	132	-	161	Ra-226	132	29	161	29
Ra-228	5			-	-	-	-	Ra-228	-	-	-	-
Fr-221	15			-	-	-	-	Fr-221	-	-	-	-
Fr-223	15			-	-	-	-	Fr-223	-	-	-	-
Ac-225	15			-	-	-	-	Ac-225	-	-	-	-
Ac-227	15	585	576	[illegible]59	38		47	Ac-227	38	8	47	8
Th-227	15	277,000	20,500	[illegible]3,467	1,367		1,667	Th-227	1,367	301	1,667	301
Th-228	15			-	-		-	Th-228	-	-	-	-
Th-229	15			-	-		-	Th-229	-	-	-	-
Th-230	15			-	-		-	Th-230	-	-	-	-
Th-232	15			-	-		-	Th-232	-	-	-	-
Pa-230	600			-	-	-	-	Pa-230	-	-	-	-
Pa-231	15			-	-		-	Pa-231	-	-	-	-

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Pa-233	300			-	-	-	-	Pa-233	-	-	-	-
U-234	187,000			-	-	-	-	U-234	-	-	-	-
U-235	65	3,960	3,960	61	61	-	74	U-235	61	13	74	13
U-238	10	4,150	4,150	415	415		506	U-238	415	91	506	91
Np-239	300	24,900,000	232,000	83,000	773	-	943	Np-239	773	170	943	170
Pu-236	15	2,400	2,130	160	142		173	Pu-23[illegible]	142	31	173	31
Pu-238	15	815	812	54	54		66	Pu[illegible]	54	12	66	12
Pu-239	15	737	737	49	49		60	[illegible]39	49	11	60	11
Pu-240	15	737	737	49	49		60	[illegible]40	49	11	60	11
Pu-241	300	39,900	38,900	133	130	-	[illegible]	Pu[illegible]	130	29	158	29
Pu-242	15	772	772	51	51		63	Pu-2[illegible]	51	11	63	11
Am-241	15	908	907	61	60		74	Am-241	60	13	74	13
Cm-242	15	31,200	15,800	2,080	1,053		1,285	Cm-242	1,053	232	1,285	232
Cm-244	15	1,530	1,510	102	101		123	Cm-244	101	22	123	22
Cm-245	15	890	890	59	59		72	Cm-245	59	13	72	13
Cm-248	15			-	-		-	Cm-248	-	-	-	-
Bk-248	15			-	-		-	Bk-248	-	-	-	-
Bk-249	2,000			-	-	-	-	Bk-249	-	-	-	-
Cf-250	15			-	-		-	Cf-250	-	-	-	-

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Radionuclide	2007 PAG	Difference Between & 2007 PAG 2016 PAG	1 year> MCL	1 month> MCL	1 week> M	1 day> MC
H-3	221	49	70	840	3,650	25,550
C-14	160	35	70	840	3,650	25,550
Na-22	145	32	70	840	3,650	25,550
P-32	2,570	565	70	840	3,650	25,550
S-35 inorg	478	105	70	840	3,650	25,550
Cl-36	284	63	70	840	3,650	25,550
Ca-45	26,000	5,720	70	840	3,650	25,550
Sc-46	1,250	275	70	840	3,650	25,550
V-48	1,038	228	70	840	3,650	25,550
Cr-51	798	176	70	840	3,650	25,550
Mn-54	857	188	70	840	3,650	25,550
Fe-55	279	61	70	840	3,650	25,550

Fe-59	515	113	70	840	3,650	25,550
Co-58	823	181	70	840	3,650	25,550
Co-60	539	119	70	840	3,650	25,550
Ni-63	24,400	5,368	70	840	3,650	25,550
Zn-65	156	34	70	840	3,650	25,550
Se-75	79	17	70	840	3,650	25,550
Rb-86	110	24	70	840	3,650	25,550
Sr-89	3,600	792	70	840	3,650	25,550
Sr-90	831	[illegible]	70	840	3,650	25,550
Sr-91	1	[illegible]	70	840	3,650	25,550
Sr-92	1	644	70	840	3,650	25,550
Y-91	868	188	70	840	3,650	25,550
Y-92	1	2,275	70	840	3,650	25,550
Y-93	[illegible]	2,176	70	840	3,650	25,550
Zr-93	[illegible]	18	70	840	3,650	25,550
Zr-95	60	212	70	840	3,650	25,550
Zr-97	1	[illegible]	70	840	3,650	25,550
Nb-95	047	230	70	840	3,650	25,550
Mo-99	[illegible]	112	70	840	3,650	25,550
Tc-99	[illegible]	70	70	840	3,650	25,550
Ru-103	1,260	277	70	840	3,650	25,550
Ru-[illegible]	880	194	70	840	3,650	25,550
A[illegible]	739	163	70	840	3,650	25,550
Co-[illegible]	154	[illegible]34	70	840	3,650	25,550
In-1[illegible]	[illegible]	166	70	840	3,650	25,550
Sn-1[illegible]	[illegible]	184	70	840	3,650	25,550
Sn-125	1,002	220	70	840	3,650	25,550
Sb-124	1,215	267	70	840	3,650	25,550
Te-127	1,222	269	70	840	3,650	25,550
Te-129	1,470	323	70	840	3,650	25,550
Te-131m	475	104	70	840	3,650	25,550
Te-132	540	117	70	840	3,650	25,550
[illegible]	2,827	619	70	840	3,650	25,550
[illegible]	68	15	70	840	3,650	25,550
Ba-140	791	174	70	840	3,650	25,550
La-140	1,527	336	70	840	3,650	25,550
Ce-141	867	191	70	840	3,650	25,550
Ce-143	1,650	363	70	840	3,650	25,550
Ce-144	1,177	259	70	840	3,650	25,550
Nd-147	855	188	70	840	3,650	25,550
Pm-147	1,182	260	70	840	3,650	25,550
Pm-149	1,860	409	70	840	3,650	25,550
Sm-151	1,890	416	70	840	3,650	25,550
Eu-152	675	149	70	840	3,650	25,550
Eu-154	1,512	333	70	840	3,650	25,550
Eu-155	943	208	70	840	3,650	25,550
Gd-153	1,108	244	70	840	3,650	25,550
Tb-160	1,150	253	70	840	3,650	25,550
Ho-166	1,038	228	70	840	3,650	25,550
Tm-170	1,400	308	70	840	3,650	25,550
Hf-181	825	182	70	840	3,650	25,550
W-187	1,470	323	70	840	3,650	25,550
Ir-192	1,350	297	70	840	3,650	25,550

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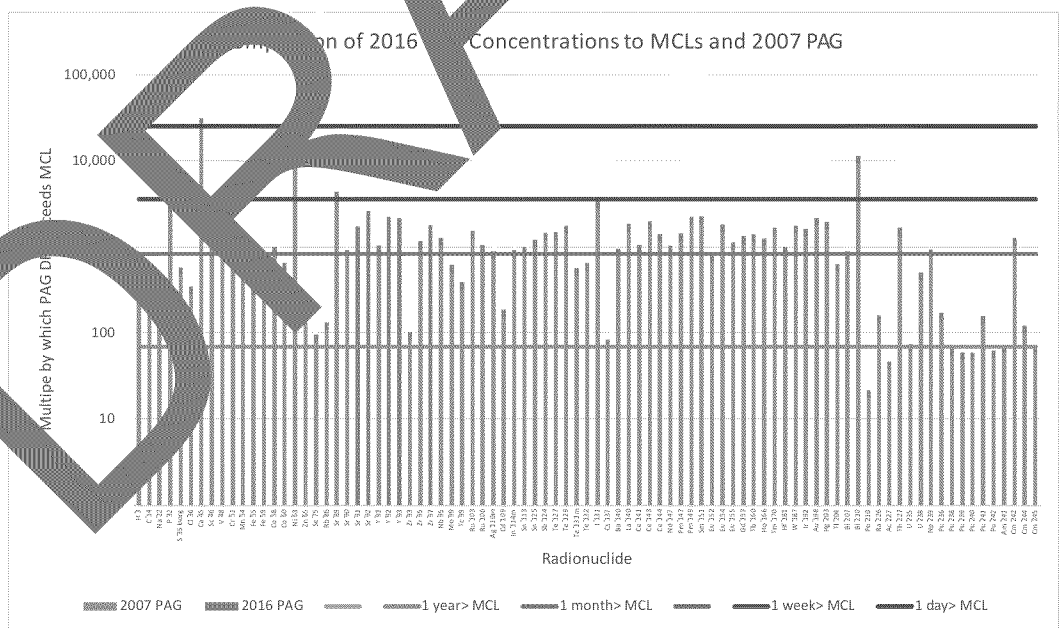
Au-198	1,800	396	70	840	3,650	25,550
Hg-203	1,615	355	70	840	3,650	25,550
Tl-204	520	114	70	840	3,650	25,550
Bi-207	730	161	70	840	3,650	25,550
Bi-210	9,400	2,068	70	840	3,650	25,550
Po-210	18	4	70	840	3,650	25,550
Ra-226	132	29	70	840	3,650	25,550
Ac-227	38	8	70	840	3,650	25,550
Th-227	1,367	3	70	840	3,650	25,550
U-235	61	5	70	840	3,650	25,550
U-238	415	91	70	840	3,650	25,550
Np-239	773	170	70	840	3,650	25,550
Pu-236	142	31	70	840	3,650	25,550
Pu-238	5	12	70	840	3,650	25,550
Pu-239		11	70	840	3,650	25,550
Pu-240	49	11	70	840	3,650	25,550
Pu-241	130	9	70	840	3,650	25,550
Pu-242	51	11	70	840	3,650	25,550
Am-241	2	13	70	840	3,650	25,550
Cm-242	1,	232	70	840	3,650	25,550
Cm-244	101	22	70	840	3,650	25,550
Cm-245	59	13	70	840	3,650	25,550

	1 year> MCL	1 month> MCL	1 week> MCL	1 day> MCL
0	70	840	867	3,650	25,550
1	2	70	840	867	3,650	25,550



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