食品及び飼料中の汚染物質及び毒素に関するコーデックス一般規格

http://www.mhlw.go.jp/topics/idenshi/codex/06/dl/codex_stan193.pdf

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CODEX STAN 193-1995

付属文書 1

原子力又は放射線緊急事態以後に汚染された食品中の放射性核種に関するガイドラインレベル改定原案の科学的根拠

食品中の放射性核種に関するガイドライン改定原案及び特に上記表 1 に示された値は、放射性物質に関する以下の全般的な考察と、食品中の放射性核種の管理に関する既存の国際基準及び国内基準の適用経験に基づいている。

コーデックス委員会が 1989 年にガイドラインレベル[4]（CAC/GL 5-1989）を発表したことから、ヒトが放射性物質を摂取することによる放射線量の評価が大きく改善され、利用可能となっている。

乳児及び成人：表 1 に記載の放射性核種を提案されるガイドラインレベルで含む食品の消費によるヒトの暴露レベルは、乳児と成人の双方に関して評価され、適切な線量基準への適合が確認されている。

食品中の放射性核種の摂取による公衆被曝とそれに伴う健康リスクを評価するには、食品消費率と摂取線量係数を推定する必要がある。参照資料（WHO、1988 年）によれば、成人は年間 550 kg の食品を消費すると想定される。乳児の線量計算に用いられた生後 1 年間の乳児用食品と乳の消費量は 200kg に相当し、これは現代人の習慣評価に基づいている（F. Luykx、1990 年[5]、US DoH、1998 年[6]、NRPB、2003 年[7]）。放射性核種別及び年齢別の

摂取線量係数の最も保守的な値、すなわち胃腸管から最も多く吸収され、体内組織に留まる放射性核種の化学形態に関する値は、「国際基本安全基準」（IAEA、1996 年）に基づいている。

放射線学的基準：下記の線量評価データとの比較に使用された適切な放射線学的基準は、例えば食品など、主要な製品中の放射線核種からの個人の年間線量に関する一般的な介入免除レベルである約 1mSV であり、公衆にとって安全なものとして国際放射線防護委員会が推奨するものである（ICRP、1999 年）[8]。

自然発生する放射性核種：天然由来の放射性核種は偏在しているため、さまざまな程度であらゆる食品に含まれている。食品の消費による放射線量は、通常、年間数十から数百マイクロシーベルトに及ぶ。つまり、食品中に自然に存在するこれらの放射性核種からの線量を管理することは容易ではなく、暴露量に影響を及ぼすために必要とされる資源は、得られる健康上の利益に見合わないと考えられる。これらの放射性核種には緊急性が伴わないため、本書における検討の対象からは除外される。

1 年間の暴露評価：保守的に想定すると、原子力又は放射線緊急事態による大規模な環境への放射能汚染が起きてから最初の 1 年間には、汚染地域からの輸入食品を影響されていない地域からの輸入食品に直ちに置き換えることは難しい。FAO の統計データによれば、世界各国による主食の平均輸入量率は 0.1 である。乳児及び一般集団が消費する食品に関する表 1 の値は、ある国が放射性核種によって汚染された地域から主食を輸入し続けた場合に、国民の平均年間内部線量が約 1mSv を超えないことを保証するために導き出されたものである（付属文書 2 を参照）。この結論は、種類の限られた乳を基本食とする乳児の場合のように、汚染食品の比率が 0.1 を超えていることが判明した場合には、いくつかの放射性核種には当てはまらない可能性がある。

コーデックスは主食による被ばくだけを計算した

長期暴露評価：緊急事態から 1 年が経過して以降は、市販される汚染食品の比率は、各国の規制（市場からの回収）、他の農産物への転換、農業対策、及び放射性崩壊によって一般に減少することになる。

輸入される汚染食品の比率が 100 以上の要因によって長期的に減少することは、これまでの例からも明らかである。天然の林産物などの特定の食品分類については、汚染レベルの持続、又は時には増加が認められることもある。その他の食品分類は、徐々に管理から除外することができる。とはいえ、汚染食品による個人の暴露レベルが無視できる程度であると認められるまでには、長年を要すると予測しなければならない。

[8] 国際放射線防護委員会（1999 年）「長期被曝状況における公衆の防護に関する原則」。ICRP Publication 82、ICRP 紀要。

飲料水水質ガイドライン

Guidelines for drinking-water quality

第 4 版

（日本語版）

国立保健医療科学院

https://www.niph.go.jp/soshiki/suido/WHO_GDWQ_4th_jp.html

表9.2 一般大衆に対する一般的な[a]自然および人工放射性核種のガイダンスレベル

分類	放射性核種	線量換算係数(Sv/Bq)	ガイダンスレベル[b] (Bq/L)
ウラン崩壊系列を開始する自然放射性同位体[c]	ウラン-238	4.5×10^{-8}	10
ウラン崩壊系列に属する自然放射性同位体	ウラン-234	4.9×10^{-8}	1
	トリウム-230	2.1×10^{-7}	1
	ラジウム-226	2.8×10^{-7}	1
	鉛-210	6.9×10^{-7}	0.1
	ポロニウム-210	1.2×10^{-6}	0.1
トリウム崩壊系列を開始する自然放射性同位体	トリウム-232	2.3×10^{-7}	1
トリウム崩壊系列に属する自然放射性同位体	ラジウム-228	6.9×10^{-7}	0.1
	トリウム-228	7.2×10^{-8}	1
原子炉からの放出または核兵器実験で見られる核分裂生成物の一部として環境中に放出される可能性のある人工放射線核種	セシウム-134[d]	1.9×10^{-8}	10
	セシウム-137[d]	1.3×10^{-8}	10
	ストロンチウム-90[d]	2.8×10^{-8}	10
核分裂生成物として環境中に放出される可能性のある人工放射線核種(上記参照)。核医学法でも使用され、それにより下水処理水から水域に放出される可能性がある。	ヨウ素-131[d,e]	2.2×10^{-8}	10
原子力発電炉や核兵器実験による核分裂生成物として人工的に生成される水素の放射性同位体。環境中に微量自然に存在する場合がある。水源に存在する場合、産業汚染の可能性が示唆される。	トリチウム[e]	1.8×10^{-11}	10000
自然界に広く分布し有機化合物や人体に存在する自然放射性同位体	炭素-14	5.8×10^{-10}	100
天然のウラン鉱にも極微量存在し、原子炉で生成される人工同位体	プルトニウム-239[d]	2.5×10^{-7}	1
原子炉で生成される人工同位体の副生成物	アメリシウム-241[d]	2.0×10^{-7}	1

[a] 本リストは包括的ではない。ある特定の状況では、他の放射性核種を調査するべきである(付録6参照)。
[b] ガイダンスレベルは、その桁数に丸められている
[c] 放射能(すなわち、Bq/Lで表される)の観点から個々のウランの放射性同位体に対してガイダンスレベルを個別に定めている。飲料水中のウランの総量の暫定ガイドライン値は、その化学物質としての毒性に基づいて30 μg/Lであり、それは放射線学的毒性に比べて優勢である(第12章参照)。
[d] これらの放射性核種は、通常の状況では飲料水中に存在しないか、存在しても公衆衛生に対して重要となるレベルよりも極めて低い線量である。したがって、スクリーニングレベル超過後の調査の優先度は低い。
[e] ヨウ素とトリチウムは標準的な全放射能測定では検出されず、これらの放射性核種の日常的な分析は必要ではないが、これらが存在する可能性があると考えられる何らかの理由がある場合、放射性核種に特有の試料採取と測定の技術を用いるべきである。本表にこれらが含まれているのはこのことによる。

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Ground Water and Drinking Water

Ground Water and Drinking Water Home
Basic Information
Private Wells
Consumer Confidence Reports
Regulatory Requirements
Standards and Regulations
All Drinking Water Topics
Safe Drinking Water Information System
For Students and Teachers

National Primary Drinking Water Regulations

The National Primary Drinking Water Regulations (NPDWR) are legally enforceable primary standards and treatment techniques that apply to public water systems. Primary standards and treatment techniques protect public health by limiting the levels of contaminants in drinking water.

- Microorganisms
- Disinfectants
- Disinfection Byproducts
- Inorganic Chemicals
- Organic Chemicals
- Radionuclides

Printable version: Complete NPDWR Table

Related Info

- Find out how EPA develops drinking water regulations
- Learn about existing EPA drinking water regulations
- Read the drinking water section of the Code of Federal Regulations (40 CFR 141)

Microorganisms

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Cryptosporidium	zero	TT[3]	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)	Human and animal fecal waste
Giardia lamblia	zero	TT[3]	Gastrointestinal illness (such as diarrhea, vomiting, and cramps)	Human and animal fecal waste
Heterotrophic plate count (HPC)	n/a	TT[3]	HPC has no health effects; it is an analytic method used to measure the variety of bacteria that are common in water. The lower the concentration of bacteria in drinking water, the better maintained the water system is.	HPC measures a range of bacteria that are naturally present in the environment
Legionella	zero	TT[3]	Legionnaire's Disease, a type of pneumonia	Found naturally in water; multiplies in heating systems
Total Coliforms (including fecal coliform and *E. Coli*)	zero	5.0%[4]	Not a health threat in itself; it is used to indicate whether other potentially harmful	Coliforms are naturally present in the environment; as well as feces; fecal coliforms and

Radionuclides

[Quick Reference Guide]

Contaminant	MCLG[1] (mg/L)[2]	MCL or TT[1] (mg/L)[2]	Potential Health Effects from Long-Term Exposure Above the MCL (unless specified as short-term)	Sources of Contaminant in Drinking Water
Alpha particles	none[7] ---------- zero	15 picocuries per Liter (pCi/L)	Increased risk of cancer	Erosion of natural deposits of certain minerals that are radioactive and may emit a form of radiation known as alpha radiation
Beta particles and photon emitters	none[7] ---------- zero	4 millirems per year	Increased risk of cancer	Decay of natural and man-made deposits of certain minerals that are radioactive and may emit forms of radiation known as photons and beta radiation
Radium 226 and Radium 228 (combined)	none[7] ---------- zero	5 pCi/L	Increased risk of cancer	Erosion of natural deposits
Uranium	zero	30 ug/L as of 12/08/03	Increased risk of cancer, kidney toxicity	Erosion of natural deposits

Notes

[1]Definitions:

- Maximum Contaminant Level Goal (MCLG) - The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety and are non-enforceable public health goals.
- Maximum Contaminant Level (MCL) - The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to MCLGs as feasible using the best available treatment technology and taking cost into consideration. MCLs are enforceable standards.
- Maximum Residual Disinfectant Level Goal (MRDLG) - The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
- Treatment Technique (TT) - A required process intended to reduce the level of a contaminant in drinking water.
- Maximum Residual Disinfectant Level (MRDL) - The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

[2] Units are in milligrams per liter (mg/L) unless otherwise noted. Milligrams per liter are equivalent to parts per million (PPM).

[3] EPA's surface water treatment rules require systems using surface water or ground water under the direct influence of surface water to

a. Disinfect their water, and
b. Filter their water, or
c. Meet criteria for avoiding filtration so that the following contaminants are controlled at the following levels:

- *Cryptosporidium*: Unfiltered systems are required to include *Cryptosporidium* in their existing watershed control provisions
- *Giardia lamblia*: 99.9% removal/inactivation.
- Viruses: 99.99% removal/inactivation.
- *Legionella*: No limit, but EPA believes that if *Giardia* and viruses are removed/inactivated, according to the treatment techniques in the Surface Water Treatment Rule, *Legionella* will also be controlled.
- Turbidity: For systems that use conventional or direct filtration, at no time can turbidity (cloudiness of water) go higher than 1 Nephelometric Turbidity Unit (NTU), and samples for turbidity must be less than or equal to 0.3 NTUs in at least 95 percent of the samples in any month. Systems that use filtration other than the conventional or direct filtration must follow state limits, which must include turbidity at no time exceeding 5 NTUs.
- Heterotrophic Plate Count (HPC): No more than 500 bacterial colonies per milliliter.
- Long Term 1 Enhanced Surface Water Treatment: Surface water systems or groundwater under the direct influence (GWUDI) systems serving fewer than 10,000 people must comply with the applicable Long Term 1 Enhanced Surface Water Treatment Rule provisions (such as turbidity standards, individual filter monitoring, *Cryptosporidium* removal requirements, updated watershed control requirements for unfiltered systems).
- Long Term 2 Enhanced Surface Water Treatment Rule: This rule applies to all surface water systems or ground water systems under the direct influence of surface water. The rule targets additional *Cryptosporidium* treatment requirements for higher risk systems and includes provisions to reduce risks from uncovered finished water storage facilities and to ensure that the systems maintain microbial protection as they take steps to reduce the formation of disinfection byproducts.
- Filter Backwash Recycling: This rule requires systems that recycle to return specific recycle flows through all processes of the system's existing conventional or direct filtration system or at an alternate location approved by the state.

[4] No more than 5.0% samples total coliform-positive (TC-positive) in a month. (For water systems that collect fewer than 40 routine samples per month, no more than one sample can be total coliform-positive per month.) Every sample that has total coliform must be analyzed for either fecal coliforms or *E. coli* if two consecutive TC-positive samples, and one is also positive for *E.coli* fecal coliforms, system has an acute MCL violaton.

[5] Fecal coliform and *E. coli* are bacteria whose presence indicates that the water may be contaminated with human or animal wastes. Disease-causing microbes (pathogens) in these wastes can cause diarrhea, cramps, nausea, headaches, or other symptoms. These pathogens may pose a special health risk for infants, young children, and people

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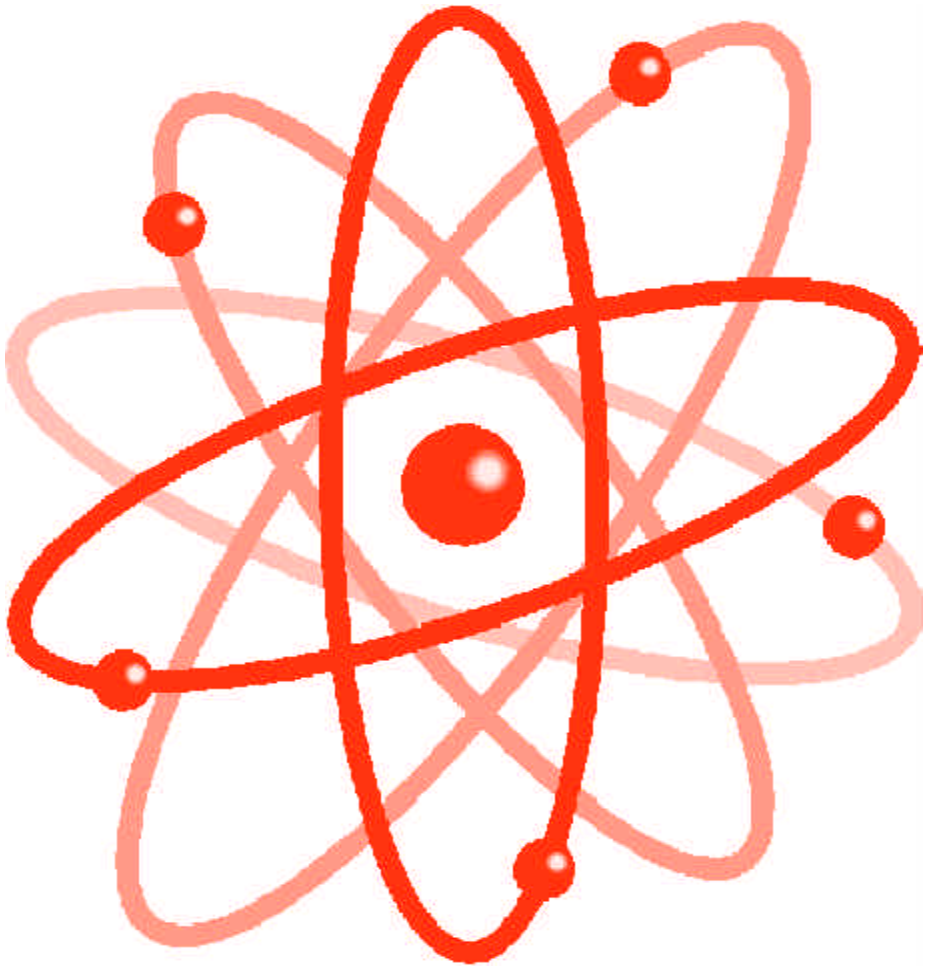
Radionuclides in Drinking Water: A Small Entity Compliance Guide



Derived Concentrations (pCi/l) of Beta and Photon Emitters in Drinking Water

Yielding a Dose of 4 mrem/yr to the Total Body or to any Critical Organ as defined in NBS Handbook 69

Nuclide	pCi/l	Nuclide	pCi/l	Nuclide	pCi/l	Nuclide	pCi/l	Nuclide	pCi/l	Nuclide	pCi/l
H-3	20,000	Ni-65	300	Nb-95	300	Sb-124	60	Nd-147	200	Os-191	600
Be-7	6,000	Cu-64	900	Nb-97	3,000	Sb-125	300	Nd-149	900	Os-191m	9,000
C-14	2,000	Zn-65	300	Mo-99	600	Te-125m	600	Pm-147	600	Os-193	200
F-18	2,000	Zn-69	6,000	Tc-96	300	Te-127	900	Pm-149	100	Ir-190	600
Na-22	400	Zn-69m	200	Tc-96m	30,000	Te-127m	200	Sm-151	1,000	Ir-192	100
Na-24	600	Ga-72	100	Tc-97	6,000	Te-129	2,000	Sm-153	200	Ir-194	90
Si-31	3,000	Ge-71	6,000	Tc-97m	1,000	Te-129m	90	Eu-152	200	Pt-191	300
P-32	30	As-73	1,000	Tc-99	900	Te-131m	200	Eu-154	60	Pt-193	3,000
S-35 inorg	500	As-74	100	Tc-99m	20,000	Te-132	90	Eu-155	600	Pt-193m	3,000
Cl-36	700	As-76	60	Ru-97	1,000	I-126	3	Gd-153	600	Pt-197	300
Cl-38	1,000	As-77	200	Ru-103	200	I-129	1	Gd-159	200	Pt-197m	3,000
K-42	900	Se-75	900	Ru-105	200	I-131	3	Tb-160	100	Au-196	600
Ca-45	10	Br-82	100	Ru-106	30	I-132	90	Dy-165	1,000	Au-198	100
Ca-47	80	Rb-86	600	Rh-103m	30,000	I-133	10	Dy-166	100	Au-199	600
Sc-46	100	Rb-87	300	Rh-105	300	I-134	100	Ho-166	90	Hg-197	900
Sc-47	300	Sr-85 m	20,000	Pd-103	900	I-135	30	Er-169	300	Hg-197m	600
Sc-48	80	Sr-85	900	Pd-109	300	Cs-131	20,000	Er-171	300	Hg-203	60
V-48	90	Sr-89	20	Ag-105	300	Cs-134	80	Tm-170	100	Tl-200	1,000
Cr-51	6,000	Sr-90	8	Ag-110m	90	Cs-134m	20,000	Tm-171	1,000	Tl-201	900
Mn-52	90	Sr-91	200	Ag-111	100	Cs-135	900	Yb-175	300	Tl-202	300
Mn-54	300	Sr-92	200	Cd-109	600	Cs-136	800	Lu-177	300	Tl-204	300
Mn-56	300	Y-90	60	Cd-115	90	Cs-137	200	Hf-181	200	Pb-203	1,000
Fe-55	2,000	Y-91	90	Cd-115m	90	Ba-131	600	Ta-182	100	Bi-206	100
Fe-59	200	Y-91m	9,000	In-113m	3,000	Ba-140	90	W-181	1,000	Bi-207	200
Co-57	1,000	Y-92	200	In-114m	60	La-140	60	W-185	300	Pa-230	600
Co-58	300	Y-93	90	In-115	300	Ce-141	300	W-187	200	Pa-233	300
Co-58m	9000	Zr-93	2,000	In-115m	1,000	Ce-143	100	Re-186	300	Np-239	300
Co-60	100	Zr-95	200	Sn-113	300	Ce-144	30	Re-187	9,000	Pu-241	300
Ni-59	300	Zr-97	60	Sn-125	60	Pr-142	90	Re-188	200	Bk-249	2,000
Ni-63	50	Nb-93m	1,000	Sb-122	90	Pr-143	100	Os-185	200		

1pCi＝0.037Bq

3.0 Bq/l

7.4 Bq/l

等量ずつだと
4.2 Bq/l

https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=20001ZIN.txt

with this subpart beginning January 1, 2004.

(2) Transient NCWSs. Subpart H systems serving 10,000 or more persons and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2002. Subpart H systems serving fewer than 10,000 persons and using chlorine dioxide as a disinfectant or oxidant and systems using only ground water not under the direct influence of surface water and using chlorine dioxide as a disinfectant or oxidant must comply with the chlorine dioxide MRDL beginning January 1, 2004.

(c) The Administrator, pursuant to Section 1412 of the Act, hereby identifies the following as the best technology, treatment techniques, or other means available for achieving compliance with the maximum residual disinfectant levels identified in paragraph (a) of this section: control of treatment processes to reduce disinfectant demand and control of disinfection treatment processes to reduce disinfectant levels.

[63 FR 69465, Dec. 16, 1998, as amended at 66 FR 3776, Jan. 16, 2001]

最大汚染レベル

§ 141.66 Maximum contaminant levels for radionuclides.

(a) [Reserved]

(b) *MCL for combined radium-226 and -228.* The maximum contaminant level for combined radium-226 and radium-228 is 5 pCi/L. The combined radium-226 and radium-228 value is determined by the addition of the results of the analysis for radium-226 and the analysis for radium-228.

(c) *MCL for gross alpha particle activity (excluding radon and uranium).* The maximum contaminant level for gross alpha particle activity (including radium-226 but excluding radon and uranium) is 15 pCi/L.

(d) *MCL for beta particle and photon radioactivity.* (1) The average annual concentration of beta particle and photon radioactivity from man-made radionuclides in drinking water must not produce an annual dose equivalent to the total body or any internal organ greater than 4 millirem/year (mrem/year).

ベータ線、ガンマ線核種

4ミリレム =0.04mSv

(2) Except for the radionuclides listed in table A, the concentration of man-made radionuclides causing 4 mrem total body or organ dose equivalents must be calculated on the basis of 2 liter per day drinking water intake using the 168 hour data list in ''Maximum Permissible Body Burdens and Maximum Permissible Concentrations of Radionuclides in Air and in Water for Occupational Exposure,'' NBS (National Bureau of Standards) Handbook 69 as amended August 1963, U.S. Department of Commerce. This incorporation by reference was approved by the Director of the Federal Register in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Copies of this document are available from the National Technical Information Service, NTIS ADA 280 282, U.S. Department of Commerce, 5285 Port Royal Road, Springfield, Virginia 22161. The toll-free number is 800–553–6847. Copies may be inspected at EPA's Drinking Water Docket, 401 M Street, SW., Washington, DC 20460; or at the Office of the Federal Register, 800 North Capitol Street, NW., Suite 700, Washington, DC. If two or more radionuclides are present, the sum of their annual dose equivalent to the total body or to any organ shall not exceed 4 mrem/year.

TABLE A—AVERAGE ANNUAL CONCENTRATIONS ASSUMED TO PRODUCE: A TOTAL BODY OR ORGAN DOSE OF 4 MREM/YR

1. Radionuclide	Critical organ	pCi per liter
2. Tritium	Total body	20,000
3. Strontium-90	Bone Marrow	8

(e) *MCL for uranium.* The maximum contaminant level for uranium is 30 μg/L.

(f) *Compliance dates.* (1) Compliance dates for combined radium-226 and -228, gross alpha particle activity, gross beta particle and photon radioactivity, and uranium: Community water systems must comply with the MCLs listed in paragraphs (b), (c), (d), and (e) of this section beginning December 8, 2003 and compliance shall be determined in accordance with the requirements of §§ 141.25 and 141.26. Compliance with reporting requirements for the radionuclides under appendix A to subpart O and appendices A and B to subpart Q is required on December 8, 2003.

2003年12月8日　適用開始

ＦＤＡ（米国 保健福祉省 食品医薬品局）

CPG Sec. 560.750 Radionuclides in Imported Foods - Levels of Concern

輸入食品

This guidance document represents the Food and Drug Administration's (FDA's) current thinking on this topic. It does not create or confer any rights for or on any person and does not operate to bind FDA or the public.

I. INTRODUCTION

The purpose of this document is to present guidance levels for radionuclide activity concentration, called derived intervention levels (DILs), which FDA has adopted to help determine whether domestic food in interstate commerce or food offered for import into the United Statespresents a safety concern. This Compliance Policy Guide (CPG) rescinds and replaces CPG Sec. 560.750 Radionuclides in Imported Foods — Levels of Concern (CPG 7119.14).

Derived Intervention Levels (DILs) for Each Radionuclide Group for Food in Domestic Commerce and Food Offered for Import[a,b]

Radionuclide Group	**DIL (Bq/kg)**
Strontium-90	160
Iodine-131	170
Cesium-134 + Cesium-137	1200

Radionuclide Group	**DIL (Bq/kg)**
Plutonium-238 + Plutonium-239 + Americium-241	2
Ruthenium-103 + Ruthenium-106[c]	$(C_3 / 6800) + (C_6 / 450) < 1$

[a]The DIL for each radionuclide group is applied independently. Each DIL applies to the sum of the concentrations of the radionuclides in the group at the time of measurement.

[b]Applicable to foods as prepared for consumption. For dried or concentrated products such as powdered milk or concentrated juices, adjust by a factor appropriate to reconstitution, and assume the reconstitution water is not contaminated. For spices, which are consumed in very small quantities, use a dilution factor of 10.

[c]Due to the large differences in DILs for Ruthenium-103 and Ruthenium-106, the individual concentrations of Ruthenium-103 and Ruthenium-106 are divided by their respective DILs and then summed. The DIL for the Ruthenium group is set at less than one. C3 and C6 are the concentrations, at the time of measurement, for Ruthenium-103 and Ruthenium-106, respectively.

COUNCIL DIRECTIVE 2013/51/EURATOM

of 22 October 2013

laying down requirements for the protection of the health of the general public with regard to radioactive substances in water intended for human consumption

人間が消費するための水に含まれる放射性物質

Article 2

Definitions

For the purposes of this Directive the following definitions apply:

(1) 'water intended for human consumption' means: 「人間が消費するための水」の定義

(a) all water, either in its original state or after treatment, intended for drinking, cooking, food preparation or other domestic purposes, regardless of its origin and whether it is supplied from a distribution network, a tanker, or in bottles or containers;

(b) all water used in any food-production undertaking for the manufacture, processing, preservation or marketing of products or substances intended for human consumption unless the competent national authorities are satisfied that the quality of the water cannot affect the wholesomeness of the foodstuff in its finished form;

(2) 'radioactive substance' means any substance that contains one or more radionuclides the activity or concentration of which cannot be disregarded as far as radiation protection is concerned;

(3) 'indicative dose' or 'ID' means the committed effective dose for one year of ingestion resulting from all the radionuclides whose presence has been detected in a supply of water intended for human consumption, of natural and artificial origin, but excluding tritium, potassium-40, radon and short-lived radon decay products;

指標線量（ＩＤ）は、１年間に摂取した全放射性物質による預託実効線量（ただしトリチウム、カリウム 40、ラドンとその崩壊による短半減期核種を除く）

第３条
範囲と適用除外

Article 3

Scope and exemptions

1. This Directive applies to water intended for human consumption.

2. This Directive does not apply to: **適用除外**

(a) natural mineral waters recognised as such by the competent national authorities, in accordance with Directive 2009/54/EC; 指示 2009/54/ＥＣに合致すると所管官庁が認めた自然のミネラルウォーター

(b) waters which are medicinal products within the meaning of Directive 2001/83/EC.
指示 2001/83/EC の範囲内の医薬品の水

ANNEX I 添付資料１

PARAMETRIC VALUES FOR RADON, TRITIUM AND ID OF WATER INTENDED FOR HUMAN CONSUMPTION

Parameter	Parametric value	Unit	Notes
Radon	100	Bq/l	(Note 1)
Tritium	100	Bq/l	(Note 2)
ID	0,10	mSv	

指標線量（ID）は 0.1mSv

ANNEX III　添付資料３

MONITORING FOR INDICATIVE DOSE AND ANALYTICAL PERFORMANCE CHARACTERISTICS　指標線量（ID）のモニタリングと分析性能

1. Monitoring for compliance with the ID

Member States may use various reliable screening strategies to indicate the presence of radioactivity in water intended for human consumption. These strategies may include screening for certain radionuclides, or screening for an individual radionuclide, or gross alpha activity or gross beta activity screening.

2. Calculation of the ID　指標線量（ID）の計算

The ID shall be calculated from the measured radionuclide concentrations and the dose coefficients laid down in Annex III, Table A of Directive 96/29/Euratom or more recent information recognised by the competent authorities in the Member State, on the basis of the annual intake of water (730 l for adults). Where the following formula is satisfied, Member States may assume that the ID is less than the parametric value of 0,1 mSv and no further investigation shall be required:

指標線量（ID）は、測定された放射性物質濃度と添付資料３などに規定された線量係数から、成人の飲料水摂取量年間 730 リットルを基礎に計算する。
左の式が満たされていれば、指標線量は 0.1mSv 未満であり、それ以上の調査は必要ない。

$$\sum_{i=1}^{n} \frac{C_i\,(obs)}{C_i\,(der)} \leq 1$$

where

$C_i(obs)$ = observed concentration of radionuclide *i*　観察された放射性物質濃度

$C_i(der)$ = derived concentration of radionuclide *i*　放射性物質の指標濃度（添付資料 3）

n = number of radionuclides detected.　検出された放射性物質の種類数

Derived concentrations for radioactivity in water intended for human consumption [(2)]

Origin	Nuclide	Derived concentration
Natural	U-238 [(3)]	3,0 Bq/l
	U-234 [(3)]	2,8 Bq/l
	Ra-226	0,5 Bq/l
	Ra-228	0,2 Bq/l
	Pb-210	0,2 Bq/l
	Po-210	0,1 Bq/l
Artificial	C-14	240 Bq/l
	Sr-90	4,9 Bq/l
	Pu-239/Pu-240	0,6 Bq/l
	Am-241	0,7 Bq/l
	Co-60	40 Bq/l
	Cs-134	7,2 Bq/l
	Cs-137	等量ずつだと8.7 Bq/l　11 Bq/l
	I-131	6,2 Bq/l

セシウム 134 と 137 が 4.3Bq/l の場合、
4.3/7.2＋4.3/11＝0.60+0.39＝0.99

REGULATIONS

COUNCIL REGULATION (Euratom) 2016/52

of 15 January 2016

欧州原子力共同体理事会指令 2016/52（2016. 1. 15）

laying down maximum permitted levels of radioactive contamination of food and feed following a nuclear accident or any other case of radiological emergency, and repealing Regulation (Euratom) No 3954/87 and Commission Regulations (Euratom) No 944/89 and (Euratom) No 770/90

核事故あるいはその他の放射能緊急事態後の食品と飼料の最大許容放射能汚染レベルを制定し、Regulation (Euratom) No 3954/87 、Commission Regulations (Euratom) No 944/89 および (Euratom) No 770/90 を廃止する。

THE COUNCIL OF THE EUROPEAN UNION,

Having regard to the Treaty establishing the European Atomic Energy Community, and in particular Articles 31 and 32 thereof,

Having regard to the proposal from the European Commission, drawn up after obtaining the opinion of the group of persons appointed by the Scientific and Technical Committee from among scientific experts in the Member States,

Having regard to the opinion of the European Parliament ([1]),

Having regard to the opinion of the European Economic and Social Committee ([2]),

Whereas:

(1) Council Directive 2013/59/Euratom ([3]) lays down basic safety standards for the protection against the dangers arising from exposure to ionising radiation.

(2) Following the accident at the Chernobyl nuclear power station on 26 April 1986, considerable quantities of radioactive materials were released into the atmosphere, contaminating food and feed in several European countries to levels that were significant from the point of view of health. Measures were adopted to ensure that certain agricultural products are only introduced into the Union in accordance with the common arrangements which safeguard the health of the population while maintaining the unified nature of the market and avoiding deflections of trade.

(3) Council Regulation (Euratom) No 3954/87 ([4]) lays down maximum permitted levels of radioactive contamination to be applied following a nuclear accident or any other case of radiological emergency which is likely to lead or has led to significant radioactive contamination of food and feed. Those maximum permitted levels are still in line with the latest scientific advice as presently available internationally. The basis for the establishment of the maximum permitted levels set out in this Regulation has been reviewed and described in the Commission Radiation Protection Publication 105 (EU Food Restriction Criteria for Application after an Accident). In particular, those levels are based on a reference level of 1 mSv per year for the increment in individual effective dose by ingestion and on the assumption that 10 % of food consumed annually is contaminated. However, different assumptions apply to infants under 1 year.

（最大許容レベルは）個人の実効線量が 1 年間に 1 mSv 増加するという参考レベルと、1 年間に消費される食品の 10%が汚染されているという仮定に基づいている。

(4) Following the accident at the Fukushima nuclear power station on 11 March 2011, the Commission was informed that radionuclide levels in certain food products originating in Japan exceeded the action levels in food applicable in Japan. Such contamination could constitute a threat to public and animal health in the Union and therefore measures were adopted imposing special conditions governing the import of food and feed originating

([1]) Opinion of 9 July 2015 (not yet published in the Official Journal).

([2]) OJ C 226, 16.7.2014, p. 68.

(3) Council Directive 2013/59/Euratom of 5 December 2013 laying down basic safety standards for protection against the dangers arising from exposure to ionising radiation, and repealing Directives 89/618/Euratom, 90/641/Euratom, 96/29/Euratom, 97/43/Euratom and 2003/122/Euratom (OJ L 13, 17.1.2014, p. 1).

(4) Council Regulation (Euratom) No 3954/87 of 22 December 1987 laying down maximum permitted levels of radioactive contamination of foodstuffs and of feedingstuffs following a nuclear accident or any other case of radiological emergency (OJ L 371, 30.12.1987, p. 11).

in or consigned from Japan, in accordance with the opinion of the Standing Committee on the Food Chain and Animal Health, established by Regulation (EC) No 178/2002 of the European Parliament and of the Council ([1]).

(5) There is a need to set up a system allowing the Community, following a nuclear accident or any other case of radiological emergency which is likely to lead or has led to a significant radioactive contamination of food and feed, to establish maximum permitted levels of radioactive contamination regarding products to be placed on the market in order to protect the population.

(6) Like other food, drinking water is ingested directly or indirectly and therefore plays a role in the consumer's overall exposure to radioactive substances. With regard to radioactive substances, quality control of water intended for human consumption is already provided for in Council Directive 2013/51/Euratom ([2]), with the exclusion of mineral waters and waters which are medicinal products. This Regulation should apply to food, minor food and feed which could be placed on the market following a nuclear accident or any other case of radiological emergency, and not to water intended for human consumption for which Directive 2013/51/Euratom applies. However, in the case of a radiological emergency, Member States are free to choose to refer to the maximum levels for liquid food set out in this Regulation in order to manage the use of water intended for human consumption.

放射性物質に関しては、ヒトが消費する水の質的管理は、ミネラルウォーターと医薬品を例外として、すでに欧州原子力共同体理事会指令 2013/51 によって規定されている。他方、2016 年のこの規則は、核事故あるいはその他の放射能緊急事態後に市場に供される食品、小規模食品と飼料に適用されるものであり、欧州原子力共同体理事会指令 2013/51 が適用される、ヒトが消費する水に適用されてはならない。

ANNEX I

MAXIMUM PERMITTED LEVELS OF RADIOACTIVE CONTAMINATION OF FOOD

The maximum permitted levels to be applied to food shall not exceed the following:

Isotope group/Food group	Food (Bq/kg) ([1])			
	Infant food ([2])	Dairy produce ([3])	Other food except minor food ([4])	Liquid food ([5])
Sum of isotopes of strontium, notably Sr-90	75	125	750	125
Sum of isotopes of iodine, notably I-131	150	500	2 000	500
Sum of alpha-emitting isotopes of plutonium and transplutonium elements, notably Pu-239 and Am-241	1	20	80	20
Sum of all other nuclides of half-life greater than 10 days, notably Cs-134 and Cs-137 ([6])	400	1 000	1 250	1 000

([1]) The level applicable to concentrated or dried products is calculated on the basis of the reconstituted product as ready for consumption. Member States may make recommendations concerning the diluting conditions in order to ensure that the maximum permitted levels laid down in this Regulation are observed.
([2]) Infant food is defined as food intended for the feeding of infants during the first 12 months of life which meets, in itself, the nutritional requirements of this category of persons and is put up for retail sale in packages which are clearly identified and labelled as such.
([3]) Dairy produce is defined as products falling within the following CN codes including, where appropriate, any adjustments which might subsequently be made to them: 0401 and 0402 (except 0402 29 11).
([4]) Minor food and the corresponding levels to be applied to them are set out in Annex II.
([5]) Liquid food is defined as products falling within heading 2009 and Chapter 22 of the Combined Nomenclature. Values are calculated taking into account consumption of tap-water and the same values could be applied to drinking water supplies at the discretion of competent authorities in Member States.
([6]) Carbon-14, tritium and potassium-40 are not included in this group.

食品と放射能 Q&A

消費者庁
Consumer Affairs Agency, Government of Japan

2018（平成30）年３月８日（第12版）

4 年齢や性別の違いによる食品の摂取量と放射性物質の健康に与える影響を考慮して食品中の放射性物質の限度値を割り出し、その中で最も厳しい限度値から、一般食品の基準値「100Bq（ベクレル）/kg」を決定しました（20ページ参照）。

5 なお、食品中の放射性物質に関する基準値は、一般的な食生活の中で、基準値上限の放射性物質を含む食品を食べ続けた場合でも、健康に影響を及ぼさない状況を想定して設定しています。流通している食品の放射性物質は基準値上限よりも少なくなっていますので、実際に食品から追加的に受ける放射線量はずっと小さい値となっています（50ページ参照）。

参考

■海外における食品中の放射性物質に関する指標（Bq/kg）

核種	日本	コーデックス	EU	米国
放射性セシウム	飲料水 10 牛乳 50 乳児用食品 50 一般食品 100	乳児用食品 1,000 一般食品 1,000	飲料水 1,000 乳製品 1,000 乳児用食品 400 一般食品 1,250	全ての食品 1,200
追加線量の上限設定値	1mSv	1mSv	1mSv	5mSv
放射性物質を含む食品の割合の仮定値	50%	10%	10%	30%

※ 基準値は、食品や飲料水から受ける線量を一定レベル以下にするためのものであり、安全と危険の境目ではありません。また、各国で食品の摂取量や放射性物質を含む食品の割合の仮定値等の影響を考慮してありますので、数値だけを比べることはできません。コーデックス、EUと日本は、食品からの追加線量の上限は同じ1mSv（ミリシーベルト）/年です。日本では放射性物質を含む食品の割合の仮定値を高く設定していること、年齢・性別毎の食品摂取量を考慮していること（20ページ参照）、放射性セシウム以外の核種の影響も考慮して放射性セシウムを代表として基準値を設定していること（22ページ参照）から、基準値の数値が海外と比べて小さくなっています。

線量限度

食品の規制値の比較

食品中の放射性物質に関する指標（Bq/kg）

核種	日本	コーデックス	EU	米国
放射性セシウム	牛乳 50 乳児用食品 50 一般食品 100	乳児用食品 1,000 一般食品 1,000	乳製品 1,000 乳児用食品 400 一般食品 1,250	全ての食品 1,200
追加線量の上限設定値	1mSv	1mSv	1mSv	5mSv
放射性物質を含む食品の割合の仮定値	50%	10%	10%	30%

※ コーデックス委員会は、消費者の健康の保護、食品の公正な貿易の確保等を目的として、1963年に国際連合食糧農業機関（FAO）及び世界保健機関（WHO）により設置された国際的な政府間機関であり、国際食品規格の策定を行っています。

※ 基準値は食品の摂取量や放射性物質を含む食品の割合の仮定値等の影響を考慮してありますので、数値だけを比べることはできません。

※ 飲料水の基準は、WHO放射性物質のガイダンスレベルを示し各国において参照されていること、各国の放射性物質の基準値は、想定する前提が異なるため、数値だけを比べることはできません。

出典：消費者庁「食品と放射能Q&A」

わが国では平成24年４月１日より、新たに食品中の放射性物質について「基準値」が設定されました。新しい基準値では食品を４項目に分類し、最も摂取頻度の高い「飲料水」については10ベクレル/kgと設定されました。

また、乳幼児の摂取量が多い「牛乳」は50ベクレル/kgに、さらに乳児の安全性確保の面から「乳児用食品」という新たな項目が設定され、牛乳と同じレベルの50ベクレル/kgとされました。それ以外の「一般食品」全てについては100ベクレル/kgという値が設定されました。

一般食品として全部を一括りにした背景には、個々人の食習慣の違いから来る追加被ばく線量の差を最小限にするという考えがありました。どんな食品を食べても、それらが基準値内であれば安全は確保できるという十分余裕を持った値として設定されました。

なお、各国の規制値が異なる理由は、規制値を設定する際に仮定した１年間の被ばく限度や、食品中の汚染率等が、それぞれの国等によって異なるためです（日本：被ばく限度は年間1ミリシーベルトまで。安全側に立ち一般食品は50%、牛乳・乳製品と乳児用食品は100%が汚染されていると仮定。コーデックス委員会：被ばく限度は年間1ミリシーベルトまで。食品中の10%が汚染されていると仮定）。

（関連ページ：下巻P43「平成24年４月からの基準値」）

本資料への収録日：平成25年３月31日
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