

Australian Radiation Protection and Nuclear Safety Amendment (2015 Measures No. 1) Regulation 2015

Select Legislative Instrument No. 73, 2015

I, General the Honourable Sir Peter Cosgrove AK MC (Ret’d), Governor‑General of the Commonwealth of Australia, acting with the advice of the Federal Executive Council, make the following regulation.

Dated 28 May 2015

Peter Cosgrove

Governor‑General

By His Excellency’s Command

Fiona Nash

Assistant Minister for Health

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1 Name

This is the *Australian Radiation Protection and Nuclear Safety Amendment (2015 Measures No. 1) Regulation 2015*.

2 Commencement

This instrument commences on 1 July 2015.

3 Authority

This instrument is made under the *Australian Radiation Protection and Nuclear Safety Act 1998.*

4 Schedules

Each instrument that is specified in a Schedule to this instrument is amended or repealed as set out in the applicable items in the Schedule concerned, and any other item in a Schedule to this instrument has effect according to its terms.

Schedule 1—Amendments

Part 1—Amendments of fees

Australian Radiation Protection and Nuclear Safety Regulations 1999

1 Amendments of listed provisions—Schedule 3A

The items of the table in Schedule 3A listed in the following table are amended as set out in the table.

| Amendments relating to facility licence application fees—nuclear installations | | | |
| --- | --- | --- | --- |
| Item | Table item | Omit | Substitute |
| 1 | Item 1 | 27 285 | 28 021 |
| 2 | Item 2 | 170 531 | 175 135 |
| 3 | Item 3 | 136 426 | 140 109 |
| 4 | Item 4 | 68 212 | 70 053 |
| 5 | Item 5 | 68 212 | 70 053 |
| 6 | Item 6 | 136 426 | 140 109 |
| 7 | Item 7 | 545 701 | 560 434 |
| 8 | Item 8 | 136 426 | 140 109 |
| 9 | Item 9 | 584 681 | 600 467 |
| 10 | Item 10 | 136 426 | 140 109 |
| 11 | Item 11 | 13 642 | 14 010 |
| 12 | Item 12 | 61 390 | 63 047 |
| 13 | Item 13 | 13 642 | 14 010 |
| 14 | Item 14 | 61 390 | 63 047 |
| 15 | Item 15 | 27 285 | 28 021 |
| 16 | Item 16 | 324 823 | 333 593 |
| 17 | Item 17 | 389 787 | 400 311 |
| 18 | Item 18 | 13 642 | 14 010 |
| 19 | Item 19 | 204 638 | 210 163 |
| 20 | Item 20 | 27 285 | 28 021 |
| 21 | Item 21 | 68 212 | 70 053 |
| 22 | Item 22 | 136 426 | 140 109 |
| 23 | Item 23 | 13 642 | 14 010 |
| 24 | Item 24 | 122 783 | 126 098 |
| 25 | Item 25 | 27 285 | 28 021 |

2 Amendments of listed provisions—Part 1 of Schedule 3B

The items of the table in Part 1 of Schedule 3B listed in the following table are amended as set out in the table.

| Amendments relating to facility licence application fees—prescribed radiation facilities (general) | | | |
| --- | --- | --- | --- |
| Item | Table item | Omit | Substitute |
| 1 | Item 1 | 12 278 | 12 609 |
| 2 | Item 2 | 12 278 | 12 609 |
| 3 | Item 3 | 12 278 | 12 609 |
| 4 | Item 4 | 12 278 | 12 609 |
| 5 | Item 5 | 12 278 | 12 609 |
| 6 | Item 6 | 12 278 | 12 609 |
| 7 | Item 7 | 24 557 | 25 220 |

3 Amendments of listed provisions—Part 2 of Schedule 3B

The items of the table in Part 2 of Schedule 3B listed in the following table are amended as set out in the table.

| Amendments relating to facility licence application fees—prescribed radiation facilities (other) | | | |
| --- | --- | --- | --- |
| Item | Table item | Omit | Substitute |
| 1 | Item 1 | 40 927 | 42 032 |
| 2 | Item 2 | 27 285 | 28 021 |
| 3 | Item 3 | 40 927 | 42 032 |
| 4 | Item 4 | 27 285 | 28 021 |

4 Amendments of listed provisions—Part 2 of Schedule 3C

The items of the table in Part 2 of Schedule 3C listed in the following table are amended as set out in the table.

| Amendments relating to source licence application fees—amount of fees | | | |
| --- | --- | --- | --- |
| Item | Table item | Omit | Substitute |
| 1 | Item 1 | 682 | 700 |
| 2 | Item 1 | 2 728 | 2 801 |
| 3 | Item 1 | 8 185 | 8 405 |
| 4 | Item 2 | 1 772 | 1 819 |
| 5 | Item 2 | 5 457 | 5 604 |
| 6 | Item 2 | 16 370 | 16 811 |
| 7 | Item 3 | 3 411 | 3 503 |
| 8 | Item 3 | 10 257 | 10 533 |
| 9 | Item 3 | 30 012 | 30 822 |

Part 2—Other amendments

Australian Radiation Protection and Nuclear Safety Regulations 1999

5 Regulation 3

Repeal the regulation, substitute:

3 Definitions

Note: A number of expressions used in these regulations are defined in the Act, including the following:

(a) controlled apparatus;

(b) controlled facility;

(c) controlled material;

(d) controlled person;

(e) deal with.

In these regulations:

***absorbed dose*** means the energy absorbed per unit mass by matter from ionizing radiation that impinges upon it.

Note: See Annex B to the *Recommendations for Limiting Exposure to Ionizing Radiation*.

***Act*** means the *Australian Radiation Protection and Nuclear Safety Act 1998*.

***action level*** means an intervention level applied to exposure to radiation.

***application fee***, for a licence, includes the ordinary costs of processing the application for the licence, but does not include any additional expenses that may be incurred by the CEO in respect of any peer review or consultancy that the CEO considers necessary for the purpose of deciding whether to issue the licence.

***committed effective dose*** means the effective dose that a person is committed to receive from an intake of radioactive material.

Note: See Annex B to the *Recommendations for Limiting Exposure to Ionizing Radiation*.

***Committee*** means the Radiation Health Committee or the Nuclear Safety Committee.

***Council*** means the Radiation Health and Safety Advisory Council created by section 19 of the Act.

***dose*** includes absorbed dose, equivalent dose or effective dose.

Note: See Annex B to the *Recommendations for Limiting Exposure to Ionizing Radiation*.

***effective dose*** means a measure of dose that takes into account both the type of radiation involved and the radiological sensitivities of the organs and tissues irradiated.

Note: See Annex B to the *Recommendations for Limiting Exposure to Ionizing Radiation*.

***equivalent dose*** means a measure of dose in organs and tissues that takes into account the type of radiation involved.

Note: See Annex B to the *Recommendations for Limiting Exposure to Ionizing Radiation*.

***excluded exposure***, for the definition of ***occupational exposure***, means the component of exposure which arises from natural background radiation, provided that:

(a) any relevant action level or levels for the workplace are not exceeded; and

(b) the CEO does not prohibit the exclusion of that component.

***exposure*** means the circumstance of being exposed to radiation.

***external exposure*** means exposure to radiation from a source outside the human body.

***holder***, of a licence, means the controlled person to whom the licence is issued.

***irradiator*** means a device that contains a controlled material that gives a controlled dose of radiation to any target material.

***medical exposure*** means:

(a) the exposure of a person to radiation received:

(i) as a patient undergoing medical diagnosis or therapy; or

(ii) as a volunteer in medical research; or

(b) non‑occupational exposure received as a consequence of assisting an exposed patient.

***National Standard for Limiting Occupational Exposure to Ionizing Radiation*** means the document of that title as republished by ARPANSA in 2002 in the single document titled *Recommendations for Limiting Exposure to Ionizing Radiation (1995) and National Standard for Limiting Occupational Exposure to Ionizing Radiation (Radiation Protection Series No. 1)*.

Note: The single document could in 2015 be viewed on ARPANSA’s website (http://www.arpansa.gov.au).

***occupational exposure*** means exposure of a person to radiation that:

(a) occurs in the course of the person’s work; and

(b) is not excluded exposure.

***public exposure*** means the exposure of a person to radiation that is neither occupational exposure nor medical exposure.

***Recommendations for Limiting Exposure to Ionizing Radiation*** means the document titled *Recommendations for Limiting Exposure to Ionizing Radiation (1995)*, as republished by ARPANSA in 2002 in the single document titled *Recommendations for Limiting Exposure to Ionizing Radiation (1995) and National Standard for Limiting Occupational Exposure to Ionizing Radiation (Radiation Protection Series No. 1)*.

Note: The single document could in 2015 be viewed on ARPANSA’s website (http://www.arpansa.gov.au).

***same location***, in relation to a controlled apparatus or controlled material: see subregulation 40D(3).

***sealed source*** means controlled material permanently contained in a capsule, or closely bound in a solid form, that is strong enough to be leak‑tight for:

(a) the intended use of the controlled material; and

(b) any foreseeable abnormal events likely to affect the controlled material.

***unsealed source*** means controlled material that is not a sealed source.

***waste package***, in relation to controlled material contained or to be contained in a nuclear waste storage facility or a nuclear waste disposal facility, means the waste form of the controlled material and its container as prepared for handling, transport, storage or disposal.

3A Parent nuclides and progeny nuclides included in secular equilibrium

(1) For these regulations, in determining the activity of a parent nuclide mentioned in an item in the table in clause 3 of Schedule 2, include the activity of any progeny nuclide mentioned in that item that is included in secular equilibrium with the parent nuclide.

Note: Parent nuclides are also marked a in the table in clause 2 of Schedule 2.

(2) Except for subregulation (1), the activity of a progeny nuclide mentioned in an item in the table in clause 3 of Schedule 2 is taken to be nil when included in secular equilibrium with a parent nuclide mentioned in that item.

6 Paragraph 4(2)(b)

Before “Schedule 1”, insert “the table in clause 1 of”.

7 Subregulation 4(3)

Omit “an apparatus is not a controlled apparatus”, substitute “an apparatus covered by subregulation (2) is not a controlled apparatus under that subregulation”.

8 Paragraph 4(3A)(a)

Omit “; and”, substitute “; or”.

9 Paragraph 6(1)(c)

After “1013 Bq”, insert “but not more than 1015 Bq”.

10 Paragraph 6(2)(a)

Omit “column 4 of Part 2”, substitute “an item in the table in clause 2”.

11 Paragraph 7(2)(b)

Omit “column 3 of Part 2”, substitute “an item in the table in clause 2”.

12 Paragraph 7(3)(a)

Omit “column 4 of Part 2”, substitute “an item in the table in clause 2”.

13 Paragraph 8(3)(b)

Omit “column 3 of Part 2”, substitute “an item in the table in clause 2”.

14 Paragraph 8(4)(a)

Omit “column 4 of Part 2”, substitute “an item in the table in clause 2”.

15 Paragraph 11(2)(a)

Omit “column 4 of Part 2”, substitute “an item in the table in clause 2”.

16 Subregulations 38(1) and (3)

Omit “Part 1”, substitute “an item in the table in clause 1”.

17 Paragraph 38(3)(b)

Omit “or 60; or”, substitute “or 60.”.

18 Paragraph 38(3)(c)

Repeal the paragraph.

19 Subregulation 38(5)

Omit “Part 1”, substitute “an item in the table in clause 1”.

20 Paragraph 38(5)(b)

Omit “or 60; or”, substitute “or 60.”.

21 Paragraph 38(5)(c)

Repeal the paragraph.

22 Paragraph 38(6)(a)

Omit “Part 1”, substitute “an item in the table in clause 1”.

23 Paragraph 39(2)(a)

Omit “Part 1”, substitute “the table in clause 1”.

24 Paragraph 39(3)(a)

Omit “Part 2”, substitute “the table in clause 2”.

25 Subregulation 40B(1)

Omit “column 2 of an item in”, substitute “an item in the table in clause 1 of”.

26 Subregulation 40B(2)

Repeal the subregulation, substitute:

(2) The amount of the application fee for the licence is the amount mentioned in the item.

27 Subregulation 40C(1)

Omit “column 2 of an item in Part 1”, substitute “an item in the table in clause 1”.

28 Subregulation 40C(2)

Before “application fee”, insert “amount of the”.

29 Paragraph 40C(2)(a)

Omit “, the fee mentioned in column 3 of the relevant item in Part 1 of Schedule 3B”, substitute “and subregulation (3), the amount mentioned in the item mentioned in subregulation (1)”.

30 Paragraph 40C(2)(b)

Omit “column 2 of an item in Part 2 of Schedule 3B—the fee mentioned in column 3 of that item”, substitute “an item in the table in clause 2 of Schedule 3B (the ***clause 2*** ***item***)—the amount mentioned in the clause 2 item”.

31 Subregulation 40C(3)

Omit “the application fee for the licence is the sum of the application fees for each thing authorised to be done by the licence”, substitute “the amount of the application fee for the licence is the sum of the amounts of the application fees that would have been applicable under subregulation (2) if applications for separate licences had been made for each of those things”.

32 Subregulation 40D(1)

Omit “column 2 of an item in Group 1, 2 or 3 of Part 1”, substitute “an item in a Group in the table in clause 1”.

33 Subregulation 40D(2)

Omit “application fee”, substitute “amount of the application fee for the licence”.

34 Subparagraph 40D(2)(a)(i)

Omit “fee mentioned in column 3 of the provision in Part 2”, substitute “amount mentioned in the item in the table in clause 2”.

35 Subparagraph 40D(2)(a)(ii)

Omit “fees mentioned in column 3 of the provisions in Part 2”, substitute “amounts mentioned in the items in the table in clause 2”.

36 Paragraph 40D(2)(b)

Omit “fees mentioned in column 3 of the provisions in Part 2”, substitute “amounts mentioned in the items in the table in clause 2”.

37 Subregulation 48(2)

After “accordance with”, insert “the following (as existing on 1 July 2015)”.

38 Paragraphs 48(2)(a), (b) and (c)

Omit “and”.

39 Paragraph 48(2)(d)

Repeal the paragraph, substitute:

(d) the *Code for the Safe Transport of Radioactive Material (2014) (Radiation Protection Series C‑2)*.

Note: These documents could in 2015 be viewed on ARPANSA’s website (http://www.arpansa.gov.au).

40 Subregulation 48(3)

Omit “following Codes of Practice”, substitute “following (as existing on 1 July 2015)”.

41 At the end of paragraph 48(3)(a)

Add “*(1985)*, published by the National Health and Medical Research Council”.

42 At the end of paragraph 48(3)(b)

Add “*(1992)*, published by the National Health and Medical Research Council”.

43 Paragraph 48(3)(c)

Repeal the paragraph, substitute:

(c) the *Code for the Safe Transport of Radioactive Material (2014) (Radiation Protection Series C‑2)*;

44 At the end of subregulation 48(3)

Add:

Note: These codes could in 2015 be viewed on ARPANSA’s website (http://www.arpansa.gov.au).

45 Regulations 49, 50 and 51

Repeal the regulations, substitute:

49 Managing safety

(1) The holder of a facility licence must take all reasonably practicable steps to manage the safety of the facility, including:

(a) having in place plans and arrangements of the kind mentioned in item 4 of the table in clause 1 of Schedule 3; and

(b) ensuring that such plans and arrangements are implemented to the extent reasonably practicable.

(2) The holder of a source licence must take all reasonably practicable steps to manage the safety of the source, including:

(a) having in place plans and arrangements of the kind mentioned in item 4 of the table in clause 2 of Schedule 3; and

(b) ensuring that such plans and arrangements are implemented to the extent reasonably practicable.

50 Reviewing and updating plans and arrangements for managing safety

(1) The holder of a licence must, at least once every 3 years, review and update the plans and arrangements mentioned in regulation 49 in relation to the licence.

(2) The holder of a licence must keep and maintain records of any changes made to the plans and arrangements.

(3) Subregulation (1) does not apply to the extent that the licence makes other arrangements for a matter mentioned in that subregulation.

51 CEO approval for certain changes

The holder of a licence must seek the CEO’s prior approval to do either of the following things if it will have significant implications for safety:

(a) change the details in the application for the licence;

(b) modify the source or facility mentioned in the licence.

46 Subregulation 52(1)

Omit “make a relevant change”, substitute “do a thing mentioned in paragraph 51(a) or (b)”.

47 Subregulation 52(2)

Repeal the subregulation, substitute:

(2) The holder of a licence must, within 3 months after doing a thing as mentioned in subregulation (1), tell the CEO about the thing.

48 Subregulation 52(3)

Omit “the subregulations”, substitute “that subregulation”.

49 Subregulation 53(1)

Omit “must only”, substitute “may only”.

50 After subregulation 53(1)

Insert:

(1A) The holder of a licence may only transfer controlled apparatus or controlled materials to another person (the ***transferee***):

(a) with the approval of the CEO; or

(b) if both of the following apply:

(i) the transferee is the holder of a facility licence or a source licence;

(ii) the transferee’s licence authorises the transferee to receive the controlled apparatus or controlled materials.

51 Subregulation 53(2)

Repeal the subregulation, substitute:

(2) If the holder of a licence (the ***transferor***) transfers controlled apparatus or controlled materials to another person (the ***transferee***) under paragraph (1A)(b), the transferor must, within 7 days of the transfer, tell the CEO:

(a) that the transfer has happened; and

(b) the name of the transferee; and

(c) the number of the licence held by the transferee; and

(d) the location of the controlled apparatus or controlled materials after the transfer.

52 Subregulation 53(3)

Omit “or body”.

53 Subregulation 53(4)

After “(1),”, insert “(1A),”.

54 Part 5 (heading)

Repeal the heading, substitute:

Part 5—Practices and procedures to be followed

55 Subregulations 58(1) and (2)

Repeal the subregulations, substitute:

(1) The holder of a facility licence for a controlled facility must ensure that the doses to which a person is exposed, inside or in connection with the facility, do not exceed the effective dose limits mentioned in regulation 59, and the equivalent dose limits mentioned in regulation 62.

56 Subregulation 58(4)

Repeal the subregulation, substitute:

(4) The holder of a licence must ensure that radiation protection and safety of the following relating to the licence are optimised in order to achieve the outcome mentioned in subregulation (4A):

(a) controlled material;

(b) controlled apparatus (other than apparatus prescribed by these regulations that produce harmful non‑ionizing radiation when energised);

(c) a controlled facility.

(4A) For subregulation (4), the outcome is that the following are as low as reasonably achievable after taking into account economic and societal factors:

(a) the magnitude of individual doses;

(b) the number of people who are exposed;

(c) the likelihood of incurring exposures to radiation.

57 At the end of regulation 60

Add:

(3) For subregulation (1), a ***relevant period*** is:

(a) for a controlled person—5 years; or

(b) for a member of the public—1 year.

58 Regulation 61

After “mentioned in”, insert “the table in clause 1 of”.

59 Subregulation 62(1)

Repeal the subregulation, substitute:

(1) For occupational exposure, the equivalent dose limit to the lens of the eye is 20 mSv annually, averaged over 5 consecutive calendar years.

(1A) However, the equivalent dose to the lens of the eye for a person subject to occupational exposure must not, in a year, be greater than 50 mSv.

(1B) The equivalent dose to the lens of the eye for a person subject to public exposure must not, in a year, be greater than 15 mSv.

60 Division 5.3 (heading)

Repeal the heading, substitute:

Division 5.3—Practices and procedures

61 Regulation 62A (heading)

Repeal the heading, substitute:

62A Practices and procedures

62 Subregulations 62A(1) and (2)

Omit “codes of practice”, substitute “codes”.

63 Subregulation 62A(2)

After “follows”, insert “(as existing on 1 July 2015)”.

64 Paragraph 62A(2)(c)

Repeal the paragraph, substitute:

(c) the *Code for the Safe Transport of Radioactive Material (2014) (Radiation Protection Series C‑2)*.

Note: These codes could in 2015 be viewed on ARPANSA’s website (http://www.arpansa.gov.au).

65 Schedule 1 (before the table)

Insert:

1 Exposure limits for non‑ionizing radiation

The following table sets out exposure limits for non‑ionizing radiation.

66 Schedule 1 (table item 1)

Repeal the item, substitute:

| Exposure limits for non‑ionizing radiation | |
| --- | --- |
| Item | Exposure limits |
| 1 | The exposure limits mentioned in the *Interim guidelines on limits of exposure to 50/60 Hz electric and magnetic fields (1989)*, National Health and Medical Research Council, Radiation Health Series No. 30, as in force when these regulations commence. |

67 At the end of Schedule 1

Add:

Note: The documents mentioned in items 1, 3 and 6 of the table could in 2015 be viewed on ARPANSA’s website (http://www.arpansa.gov.au).

68 Schedule 2 (note to Schedule heading)

After “regulations”, insert “3A,”.

69 Part 1 of Schedule 2 (heading)

Repeal the heading, substitute:

Part 1—Exempt dealings

70 Part 1 of Schedule 2 (after the heading)

Insert:

1 Exempt dealings

The following table sets out dealings that are exempt dealings.

71 Part 1 of Schedule 2 (table, headings)

Repeal the headings, substitute:

| Exempt dealings | |
| --- | --- |
| Item | Description of dealing |

72 Part 1 of Schedule 2 (table item 1, column headed “Description of dealing”, paragraph (a))

Omit “concentration for the material mentioned in column 3 of Part 2”, substitute “activity concentration value for the material set out in an item in the table in clause 2”.

73 Part 1 of Schedule 2 (table item 1, column headed “Description of dealing”, paragraph (b))

Omit “of less than the activity in column 4 of Part 2”, substitute “less than the activity value for the material set out in that item”.

74 Part 1 of Schedule 2 (table item 2, column headed “Description of dealing”, paragraph (a))

Omit “activity for the material in column 4 of Part 2”, substitute “activity value for the material set out in an item in the table in clause 2”.

75 Part 1 of Schedule 2 (table item 2, column headed “Description of dealing”, paragraph (b))

Omit “activity concentration for the material in column 3 of Part 2”, substitute “activity concentration value for the material set out in that item”.

76 Part 1 of Schedule 2 (table item 4, column headed “Description of dealing”, paragraph (c))

Omit “*Code of Practice for the Safe Transport of Radioactive Material (2008) (Radiation Protection Series No. 2)*”, substitute “*Code for the Safe Transport of Radioactive Material (2014) (Radiation Protection Series C‑2)*”.

77 Part 1 of Schedule 2 (table item 7, column headed “Description of dealing”, paragraph (a))

Repeal the paragraph.

78 Part 1 of Schedule 2 (at the end of the cell at table item 7, column headed “Description of dealing”)

Add:

; (h) an electron capture detector or similar device used in gas chromatography containing:

(i) a nickel‑63 sealed source with activity not more than 750 MBq; or

(ii) a tritium source with activity not more than 20 GBq;

(i) lighting products that include krypton‑85.

79 Part 1 of Schedule 2 (at the end of the table)

Add:

|  |  |
| --- | --- |
| 9 | The dealing involves a sealed radioactive source used for teaching the characteristics and properties of radiation or radiation sources, and the sealed source contains one or more of the following:  (a) Cobalt‑60 with an activity not greater than 200 kBq;  (b) Strontium‑90 with an activity not greater than 80 kBq;  (c) Caesium‑137 with an activity not greater than 200 kBq;  (d) Radium‑226 with an activity not greater than 20 kBq;  (e) Americium‑241 with an activity not greater than 40 kBq. |
| 10 | The dealing involves a geological sample that:  (a) contains radioactive material that emits radiation at a level not exceeding 5 micrograys an hour, measured at a distance of 10 cm from its surface; and  (b) is being used as a sample in teaching or for display as a geological specimen. |

80 At the end of Part 1 of Schedule 2

Add:

Note: The code mentioned in item 4 of the table could in 2015 be viewed on ARPANSA’s website (http://www.arpansa.gov.au).

81 Parts 2, 3 and 4 of Schedule 2

Repeal the Parts, substitute:

Part 2—Activity concentration values and activity values for nuclides

2 Activity concentration values and activity values for nuclides

The following table sets out activity concentration values and activity values for nuclides.

Note 1: The activity of a progeny nuclide included in secular equilibrium with a parent nuclide is dealt with in regulation 3A. Parent nuclides and progeny nuclides are set out in the table in clause 3, and parent nuclides are also marked a in the following table.

Note 2: A nuclide marked m or m’ in the following table indicates a metastable state of the nuclide, with the metastable state m’ indicating a state of higher energy than the metastable state m.

| Activity concentration values and activity values for nuclides | | | |
| --- | --- | --- | --- |
| Item | Nuclide | Activity concentration value (Bq/g) | Activity value (Bq) |
| 1 | H‑3 | 1 x 106 | 1 x 109 |
| 2 | Be‑7 | 1 x 103 | 1 x 107 |
| 3 | Be‑10 | 1 x 104 | 1 x 106 |
| 4 | C‑11 | 1 x 101 | 1 x 106 |
| 5 | C‑14 | 1 x 104 | 1 x 107 |
| 6 | Ne‑13 | 1 x 102 | 1 x 109 |
| 7 | Ne‑19 | 1 x 102 | 1 x 109 |
| 8 | O‑15 | 1 x 102 | 1 x 109 |
| 9 | F‑18 | 1 x 101 | 1 x 106 |
| 10 | Na‑22 | 1 x 101 | 1 x 106 |
| 11 | Na‑24 | 1 x 101 | 1 x 105 |
| 12 | Mg‑28 | 1 x 101 | 1 x 105 |
| 13 | Al‑26 | 1 x 101 | 1 x 105 |
| 14 | Si‑31 | 1 x 103 | 1 x 106 |
| 15 | Si‑32 | 1 x 103 | 1 x 106 |
| 16 | P‑32 | 1 x 103 | 1 x 105 |
| 17 | P‑33 | 1 x 105 | 1 x 108 |
| 18 | S‑35 | 1 x 105 | 1 x 108 |
| 19 | Cl‑36 | 1 x 104 | 1 x 106 |
| 20 | Cl‑38 | 1 x 101 | 1 x 105 |
| 21 | Cl‑39 | 1 x 101 | 1 x 105 |
| 22 | Ar‑37 | 1 x 106 | 1 x 108 |
| 23 | Ar‑39 | 1 x 107 | 1 x 104 |
| 24 | Ar‑41 | 1 x 102 | 1 x 109 |
| 25 | K‑40 | 1 x 102 | 1 x 106 |
| 26 | K‑42 | 1 x 102 | 1 x 106 |
| 27 | K‑43 | 1 x 101 | 1 x 106 |
| 28 | K‑44 | 1 x 101 | 1 x 105 |
| 29 | K‑45 | 1 x 101 | 1 x 105 |
| 30 | Ca‑41 | 1 x 105 | 1 x 107 |
| 31 | Ca‑45 | 1 x 104 | 1 x 107 |
| 32 | Ca‑47 | 1 x 101 | 1 x 106 |
| 33 | Sc‑43 | 1 x 101 | 1 x 106 |
| 34 | Sc‑44 | 1 x 101 | 1 x 105 |
| 35 | Sc‑45 | 1 x 102 | 1 x 107 |
| 36 | Sc‑46 | 1 x 101 | 1 x 106 |
| 37 | Sc‑47 | 1 x 102 | 1 x 106 |
| 38 | Sc‑48 | 1 x 101 | 1 x 105 |
| 39 | Sc‑49 | 1 x 103 | 1 x 105 |
| 40 | Ti‑44 | 1 x 101 | 1 x 105 |
| 41 | Ti‑45 | 1 x 101 | 1 x 106 |
| 42 | V‑47 | 1 x 101 | 1 x 105 |
| 43 | V‑48 | 1 x 101 | 1 x 105 |
| 44 | V‑49 | 1 x 104 | 1 x 107 |
| 45 | Cr‑48 | 1 x 102 | 1 x 106 |
| 46 | Cr‑49 | 1 x 101 | 1 x 106 |
| 47 | Cr‑51 | 1 x 103 | 1 x 107 |
| 48 | Mn‑51 | 1 x 101 | 1 x 105 |
| 49 | Mn‑52 | 1 x 101 | 1 x 105 |
| 50 | Mn‑52m | 1 x 101 | 1 x 105 |
| 51 | Mn‑53 | 1 x 104 | 1 x 109 |
| 52 | Mn‑54 | 1 x 101 | 1 x 106 |
| 53 | Mn‑56 | 1 x 101 | 1 x 105 |
| 54 | Fe‑52 | 1 x 101 | 1 x 106 |
| 55 | Fe‑55 | 1 x 104 | 1 x 106 |
| 56 | Fe‑59 | 1 x 101 | 1 x 106 |
| 57 | Fe‑60 | 1 x 102 | 1 x 105 |
| 58 | Co‑55 | 1 x 101 | 1 x 106 |
| 59 | Co‑56 | 1 x 101 | 1 x 105 |
| 60 | Co‑57 | 1 x 102 | 1 x 106 |
| 61 | Co‑58 | 1 x 101 | 1 x 106 |
| 62 | Co‑58m | 1 x 104 | 1 x 107 |
| 63 | Co‑60 | 1 x 101 | 1 x 105 |
| 64 | Co‑60m | 1 x 103 | 1 x 106 |
| 65 | Co‑61 | 1 x 102 | 1 x 106 |
| 66 | Co‑62m | 1 x 101 | 1 x 105 |
| 67 | Ni‑56 | 1 x 101 | 1 x 106 |
| 68 | Ni‑57 | 1 x 101 | 1 x 106 |
| 69 | Ni‑59 | 1 x 104 | 1 x 108 |
| 70 | Ni‑63 | 1 x 105 | 1 x 108 |
| 71 | Ni‑65 | 1 x 101 | 1 x 106 |
| 72 | Ni‑66 | 1 x 104 | 1 x 107 |
| 73 | Cu‑60 | 1 x 101 | 1 x 105 |
| 74 | Cu‑61 | 1 x 101 | 1 x 106 |
| 75 | Cu‑64 | 1 x 102 | 1 x 106 |
| 76 | Cu‑67 | 1 x 102 | 1 x 106 |
| 77 | Zn‑62 | 1 x 102 | 1 x 106 |
| 78 | Zn‑63 | 1 x 101 | 1 x 105 |
| 79 | Zn‑65 | 1 x 101 | 1 x 106 |
| 80 | Zn‑69 | 1 x 104 | 1 x 106 |
| 81 | Zn‑69m | 1 x 102 | 1 x 106 |
| 82 | Zn‑71m | 1 x 101 | 1 x 106 |
| 83 | Zn‑72 | 1 x 102 | 1 x 106 |
| 84 | Ga‑65 | 1 x 101 | 1 x 105 |
| 85 | Ga‑66 | 1 x 101 | 1 x 105 |
| 86 | Ga‑67 | 1 x 102 | 1 x 106 |
| 87 | Ga‑68 | 1 x 101 | 1 x 105 |
| 88 | Ga‑70 | 1 x 102 | 1 x 106 |
| 89 | Ga‑72 | 1 x 101 | 1 x 105 |
| 90 | Ga‑73 | 1 x 102 | 1 x 106 |
| 91 | Ge‑66 | 1 x 101 | 1 x 106 |
| 92 | Ge‑67 | 1 x 101 | 1 x 105 |
| 93 | Ge‑68a | 1 x 101 | 1 x 105 |
| 94 | Ge‑69 | 1 x 101 | 1 x 106 |
| 95 | Ge‑71 | 1 x 104 | 1 x 108 |
| 96 | Ge‑75 | 1 x 103 | 1 x 106 |
| 97 | Ge‑77 | 1 x 101 | 1 x 105 |
| 98 | Ge‑78 | 1 x 102 | 1 x 106 |
| 99 | As‑69 | 1 x 101 | 1 x 105 |
| 100 | As‑70 | 1 x 101 | 1 x 105 |
| 101 | As‑71 | 1 x 101 | 1 x 106 |
| 102 | As‑72 | 1 x 101 | 1 x 105 |
| 103 | As‑73 | 1 x 103 | 1 x 107 |
| 104 | As‑74 | 1 x 101 | 1 x 106 |
| 105 | As‑76 | 1 x 102 | 1 x 105 |
| 106 | As‑77 | 1 x 103 | 1 x 106 |
| 107 | As‑78 | 1 x 101 | 1 x 105 |
| 108 | Se‑70 | 1 x 101 | 1 x 106 |
| 109 | Se‑73 | 1 x 101 | 1 x 106 |
| 110 | Se‑73m | 1 x 102 | 1 x 106 |
| 111 | Se‑75 | 1 x 102 | 1 x 106 |
| 112 | Se‑79 | 1 x 104 | 1 x 107 |
| 113 | Se‑81 | 1 x 103 | 1 x 106 |
| 114 | Se‑81m | 1 x 103 | 1 x 107 |
| 115 | Se‑83 | 1 x 101 | 1 x 105 |
| 116 | Br‑74 | 1 x 101 | 1 x 105 |
| 117 | Br‑74m | 1 x 101 | 1 x 105 |
| 118 | Br‑75 | 1 x 101 | 1 x 106 |
| 119 | Br‑76 | 1 x 101 | 1 x 105 |
| 120 | Br‑77 | 1 x 102 | 1 x 106 |
| 121 | Br‑80 | 1 x 102 | 1 x 105 |
| 122 | Br‑80m | 1 x 103 | 1 x 107 |
| 123 | Br‑82 | 1 x 101 | 1 x 106 |
| 124 | Br‑83 | 1 x 103 | 1 x 106 |
| 125 | Br‑84 | 1 x 101 | 1 x 105 |
| 126 | Kr‑74 | 1 x 102 | 1 x 109 |
| 127 | Kr‑76 | 1 x 102 | 1 x 109 |
| 128 | Kr‑77 | 1 x 102 | 1 x 109 |
| 129 | Kr‑79 | 1 x 103 | 1 x 105 |
| 130 | Kr‑81 | 1 x 104 | 1 x 107 |
| 131 | Kr‑81m | 1 x 103 | 1 x 1010 |
| 132 | Kr‑83m | 1 x 105 | 1 x 1012 |
| 133 | Kr‑85 | 1 x 105 | 1 x 104 |
| 134 | Kr‑85m | 1 x 103 | 1 x 1010 |
| 135 | Kr‑87 | 1 x 102 | 1 x 109 |
| 136 | Kr‑88 | 1 x 102 | 1 x 109 |
| 137 | Rb‑79 | 1 x 101 | 1 x 105 |
| 138 | Rb‑81 | 1 x 101 | 1 x 106 |
| 139 | Rb‑81m | 1 x 103 | 1 x 107 |
| 140 | Rb‑82m | 1 x 101 | 1 x 106 |
| 141 | Rb‑83a | 1 x 102 | 1 x 106 |
| 142 | Rb‑84 | 1 x 101 | 1 x 106 |
| 143 | Rb‑86 | 1 x 102 | 1 x 105 |
| 144 | Rb‑87 | 1 x 103 | 1 x 107 |
| 145 | Rb‑88 | 1 x 102 | 1 x 105 |
| 146 | Rb‑89 | 1 x 102 | 1 x 105 |
| 147 | Sr‑80 | 1 x 103 | 1 x 107 |
| 148 | Sr‑81 | 1 x 101 | 1 x 105 |
| 149 | Sr‑82a | 1 x 101 | 1 x 105 |
| 150 | Sr‑83 | 1 x 101 | 1 x 106 |
| 151 | Sr‑85 | 1 x 102 | 1 x 106 |
| 152 | Sr‑85m | 1 x 102 | 1 x 107 |
| 153 | Sr‑87m | 1 x 102 | 1 x 106 |
| 154 | Sr‑89 | 1 x 103 | 1 x 106 |
| 155 | Sr‑90a | 1 x 102 | 1 x 104 |
| 156 | Sr‑91 | 1 x 101 | 1 x 105 |
| 157 | Sr‑92 | 1 x 101 | 1 x 106 |
| 158 | Y‑86 | 1 x 101 | 1 x 105 |
| 159 | Y‑86m | 1 x 102 | 1 x 107 |
| 160 | Y‑87a | 1 x 101 | 1 x 106 |
| 161 | Y‑88 | 1 x 101 | 1 x 106 |
| 162 | Y‑90 | 1 x 103 | 1 x 105 |
| 163 | Y‑90m | 1 x 101 | 1 x 106 |
| 164 | Y‑91 | 1 x 103 | 1 x 106 |
| 165 | Y‑91m | 1 x 102 | 1 x 106 |
| 166 | Y‑92 | 1 x 102 | 1 x 105 |
| 167 | Y‑93 | 1 x 102 | 1 x 105 |
| 168 | Y‑94 | 1 x 101 | 1 x 105 |
| 169 | Y‑95 | 1 x 101 | 1 x 105 |
| 170 | Zr‑86 | 1 x 102 | 1 x 107 |
| 171 | Zr‑88 | 1 x 102 | 1 x 106 |
| 172 | Zr‑89 | 1 x 101 | 1 x 106 |
| 173 | Zr‑93a | 1 x 103 | 1 x 107 |
| 174 | Zr‑95 | 1 x 101 | 1 x 106 |
| 175 | Zr‑97a | 1 x 101 | 1 x 105 |
| 176 | Nb‑88 | 1 x 101 | 1 x 105 |
| 177 | Nb‑89 | 1 x 101 | 1 x 105 |
| 178 | Nb‑89m | 1 x 101 | 1 x 105 |
| 179 | Nb‑90 | 1 x 101 | 1 x 105 |
| 180 | Nb‑93m | 1 x 104 | 1 x 107 |
| 181 | Nb‑94 | 1 x 101 | 1 x 106 |
| 182 | Nb‑95 | 1 x 101 | 1 x 106 |
| 183 | Nb‑95m | 1 x 102 | 1 x 107 |
| 184 | Nb‑96 | 1 x 101 | 1 x 105 |
| 185 | Nb‑97 | 1 x 101 | 1 x 106 |
| 186 | Nb‑98 | 1 x 101 | 1 x 105 |
| 187 | Mo‑90 | 1 x 101 | 1 x 106 |
| 188 | Mo‑93 | 1 x 103 | 1 x 108 |
| 189 | Mo‑93m | 1 x 101 | 1 x 106 |
| 190 | Mo‑99 | 1 x 102 | 1 x 106 |
| 191 | Mo‑101 | 1 x 101 | 1 x 106 |
| 192 | Tc‑93 | 1 x 101 | 1 x 106 |
| 193 | Tc‑93m | 1 x 101 | 1 x 106 |
| 194 | Tc‑94 | 1 x 101 | 1 x 106 |
| 195 | Tc‑94m | 1 x 101 | 1 x 105 |
| 196 | Tc‑95 | 1 x 101 | 1 x 106 |
| 197 | Tc‑95m | 1 x 101 | 1 x 106 |
| 198 | Tc‑96 | 1 x 101 | 1 x 106 |
| 199 | Tc‑96m | 1 x 103 | 1 x 107 |
| 200 | Tc‑97 | 1 x 103 | 1 x 108 |
| 201 | Tc‑97m | 1 x 103 | 1 x 107 |
| 202 | Tc‑98 | 1 x 101 | 1 x 106 |
| 203 | Tc‑99 | 1 x 104 | 1 x 107 |
| 204 | Tc‑99m | 1 x 102 | 1 x 107 |
| 205 | Tc‑101 | 1 x 102 | 1 x 106 |
| 206 | Tc‑104 | 1 x 101 | 1 x 105 |
| 207 | Ru‑94 | 1 x 102 | 1 x 106 |
| 208 | Ru‑97 | 1 x 102 | 1 x 107 |
| 209 | Ru‑103 | 1 x 102 | 1 x 106 |
| 210 | Ru‑105 | 1 x 101 | 1 x 106 |
| 211 | Ru‑106a | 1 x 102 | 1 x 105 |
| 212 | Rh‑99 | 1 x 101 | 1 x 106 |
| 213 | Rh‑99m | 1 x 101 | 1 x 106 |
| 214 | Rh‑100 | 1 x 101 | 1 x 106 |
| 215 | Rh‑101 | 1 x 102 | 1 x 107 |
| 216 | Rh‑101m | 1 x 102 | 1 x 107 |
| 217 | Rh‑102 | 1 x 101 | 1 x 106 |
| 218 | Rh‑102m | 1 x 102 | 1 x 106 |
| 219 | Rh‑103m | 1 x 104 | 1 x 108 |
| 220 | Rh‑105 | 1 x 102 | 1 x 107 |
| 221 | Rh‑106m | 1 x 101 | 1 x 105 |
| 222 | Rh‑107 | 1 x 102 | 1 x 106 |
| 223 | Pd‑100 | 1 x 102 | 1 x 107 |
| 224 | Pd‑101 | 1 x 102 | 1 x 106 |
| 225 | Pd‑103 | 1 x 103 | 1 x 108 |
| 226 | Pd‑107 | 1 x 105 | 1 x 108 |
| 227 | Pd‑109 | 1 x 103 | 1 x 106 |
| 228 | Ag‑102 | 1 x 101 | 1 x 105 |
| 229 | Ag‑103 | 1 x 101 | 1 x 106 |
| 230 | Ag‑104 | 1 x 101 | 1 x 106 |
| 231 | Ag‑104m | 1 x 101 | 1 x 106 |
| 232 | Ag‑105 | 1 x 102 | 1 x 106 |
| 233 | Ag‑106 | 1 x 101 | 1 x 106 |
| 234 | Ag‑106m | 1 x 101 | 1 x 106 |
| 235 | Ag‑108ma | 1 x 101 | 1 x 106 |
| 236 | Ag‑110m | 1 x 101 | 1 x 106 |
| 237 | Ag‑111 | 1 x 103 | 1 x 106 |
| 238 | Ag‑112 | 1 x 101 | 1 x 105 |
| 239 | Ag‑115 | 1 x 101 | 1 x 105 |
| 240 | Cd‑104 | 1 x 102 | 1 x 107 |
| 241 | Cd‑107 | 1 x 103 | 1 x 107 |
| 242 | Cd‑109 | 1 x 104 | 1 x 106 |
| 243 | Cd‑113 | 1 x 103 | 1 x 106 |
| 244 | Cd‑113m | 1 x 103 | 1 x 106 |
| 245 | Cd‑115 | 1 x 102 | 1 x 106 |
| 246 | Cd‑115m | 1 x 103 | 1 x 106 |
| 247 | Cd‑117 | 1 x 101 | 1 x 106 |
| 248 | Cd‑117m | 1 x 101 | 1 x 106 |
| 249 | In‑109 | 1 x 101 | 1 x 106 |
| 250 | In‑110 | 1 x 101 | 1 x 106 |
| 251 | In‑110m | 1 x 101 | 1 x 105 |
| 252 | In‑111 | 1 x 102 | 1 x 106 |
| 253 | In‑112 | 1 x 102 | 1 x 106 |
| 254 | In‑113m | 1 x 102 | 1 x 106 |
| 255 | In‑114 | 1 x 103 | 1 x 105 |
| 256 | In‑114m | 1 x 102 | 1 x 106 |
| 257 | In‑115 | 1 x 103 | 1 x 105 |
| 258 | In‑115m | 1 x 102 | 1 x 106 |
| 259 | In‑116m | 1 x 101 | 1 x 105 |
| 260 | In‑117 | 1 x 101 | 1 x 106 |
| 261 | In‑117m | 1 x 102 | 1 x 106 |
| 262 | In‑119m | 1 x 102 | 1 x 105 |
| 263 | Sn‑110 | 1 x 102 | 1 x 107 |
| 264 | Sn‑111 | 1 x 102 | 1 x 106 |
| 265 | Sn‑113 | 1 x 103 | 1 x 107 |
| 266 | Sn‑117m | 1 x 102 | 1 x 106 |
| 267 | Sn‑119m | 1 x 103 | 1 x 107 |
| 268 | Sn‑121 | 1 x 105 | 1 x 107 |
| 269 | Sn‑121ma | 1 x 103 | 1 x 107 |
| 270 | Sn‑123 | 1 x 103 | 1 x 106 |
| 271 | Sn‑123m | 1 x 102 | 1 x 106 |
| 272 | Sn‑125 | 1 x 102 | 1 x 105 |
| 273 | Sn‑126a | 1 x 101 | 1 x 105 |
| 274 | Sn‑127 | 1 x 101 | 1 x 106 |
| 275 | Sn‑128 | 1 x 101 | 1 x 106 |
| 276 | Sb‑115 | 1 x 101 | 1 x 106 |
| 277 | Sb‑116 | 1 x 101 | 1 x 106 |
| 278 | Sb‑116m | 1 x 101 | 1 x 105 |
| 279 | Sb‑117 | 1 x 102 | 1 x 107 |
| 280 | Sb‑118m | 1 x 101 | 1 x 106 |
| 281 | Sb‑119 | 1 x 103 | 1 x 107 |
| 282 | Sb‑120 | 1 x 102 | 1 x 106 |
| 283 | Sb‑120m | 1 x 101 | 1 x 106 |
| 284 | Sb‑122 | 1 x 102 | 1 x 104 |
| 285 | Sb‑124 | 1 x 101 | 1 x 106 |
| 286 | Sb‑124m | 1 x 102 | 1 x 106 |
| 287 | Sb‑125 | 1 x 102 | 1 x 106 |
| 288 | Sb‑126 | 1 x 101 | 1 x 105 |
| 289 | Sb‑126m | 1 x 101 | 1 x 105 |
| 290 | Sb‑127 | 1 x 101 | 1 x 106 |
| 291 | Sb‑128 | 1 x 101 | 1 x 105 |
| 292 | Sb‑128m | 1 x 101 | 1 x 105 |
| 293 | Sb‑129 | 1 x 101 | 1 x 106 |
| 294 | Sb‑130 | 1 x 101 | 1 x 105 |
| 295 | Sb‑131 | 1 x 101 | 1 x 106 |
| 296 | Te‑116 | 1 x 102 | 1 x 107 |
| 297 | Te‑121 | 1 x 101 | 1 x 106 |
| 298 | Te‑121m | 1 x 102 | 1 x 106 |
| 299 | Te‑123 | 1 x 103 | 1 x 106 |
| 300 | Te‑123m | 1 x 102 | 1 x 107 |
| 301 | Te‑125m | 1 x 103 | 1 x 107 |
| 302 | Te‑127 | 1 x 103 | 1 x 106 |
| 303 | Te‑127m | 1 x 103 | 1 x 107 |
| 304 | Te‑129 | 1 x 102 | 1 x 106 |
| 305 | Te‑129m | 1 x 103 | 1 x 106 |
| 306 | Te‑131 | 1 x 102 | 1 x 105 |
| 307 | Te‑131m | 1 x 101 | 1 x 106 |
| 308 | Te‑132 | 1 x 102 | 1 x 107 |
| 309 | Te‑133 | 1 x 101 | 1 x 105 |
| 310 | Te‑133m | 1 x 101 | 1 x 105 |
| 311 | Te‑134 | 1 x 101 | 1 x 106 |
| 312 | I‑120 | 1 x 101 | 1 x 105 |
| 313 | I‑120m | 1 x 101 | 1 x 105 |
| 314 | I‑121 | 1 x 102 | 1 x 106 |
| 315 | I‑123 | 1 x 102 | 1 x 107 |
| 316 | I‑124 | 1 x 101 | 1 x 106 |
| 317 | I‑125 | 1 x 103 | 1 x 106 |
| 318 | I‑126 | 1 x 102 | 1 x 106 |
| 319 | I‑128 | 1 x 102 | 1 x 105 |
| 320 | I‑129 | 1 x 102 | 1 x 105 |
| 321 | I‑130 | 1 x 101 | 1 x 106 |
| 322 | I‑131 | 1 x 102 | 1 x 106 |
| 323 | I‑132 | 1 x 101 | 1 x 105 |
| 324 | I‑132m | 1 x 102 | 1 x 106 |
| 325 | I‑133 | 1 x 101 | 1 x 106 |
| 326 | I‑134 | 1 x 101 | 1 x 105 |
| 327 | I‑135 | 1 x 101 | 1 x 106 |
| 328 | Xe‑120 | 1 x 102 | 1 x 109 |
| 329 | Xe‑121 | 1 x 102 | 1 x 109 |
| 330 | Xe‑122a | 1 x 102 | 1 x 109 |
| 331 | Xe‑123 | 1 x 102 | 1 x 109 |
| 332 | Xe‑125 | 1 x 103 | 1 x 109 |
| 333 | Xe‑127 | 1 x 103 | 1 x 105 |
| 334 | Xe‑129m | 1 x 103 | 1 x 104 |
| 335 | Xe‑131m | 1 x 104 | 1 x 104 |
| 336 | Xe‑133m | 1 x 103 | 1 x 104 |
| 337 | Xe‑133 | 1 x 103 | 1 x 104 |
| 338 | Xe‑135 | 1 x 103 | 1 x 1010 |
| 339 | Xe‑135m | 1 x 102 | 1 x 109 |
| 340 | Xe‑138 | 1 x 102 | 1 x 109 |
| 341 | Cs‑125 | 1 x 101 | 1 x 104 |
| 342 | Cs‑127 | 1 x 102 | 1 x 105 |
| 343 | Cs‑129 | 1 x 102 | 1 x 105 |
| 344 | Cs‑130 | 1 x 102 | 1 x 106 |
| 345 | Cs‑131 | 1 x 103 | 1 x 106 |
| 346 | Cs‑132 | 1 x 101 | 1 x 105 |
| 347 | Cs‑134m | 1 x 103 | 1 x 105 |
| 348 | Cs‑134 | 1 x 101 | 1 x 104 |
| 349 | Cs‑135 | 1 x 104 | 1 x 107 |
| 350 | Cs‑135m | 1 x 101 | 1 x 106 |
| 351 | Cs‑136 | 1 x 101 | 1 x 105 |
| 352 | Cs‑137a | 1 x 101 | 1 x 104 |
| 353 | Cs‑138 | 1 x 101 | 1 x 104 |
| 354 | Ba‑126 | 1 x 102 | 1 x 107 |
| 355 | Ba‑128 | 1 x 102 | 1 x 107 |
| 356 | Ba‑131 | 1 x 102 | 1 x 106 |
| 357 | Ba‑131m | 1 x 102 | 1 x 107 |
| 358 | Ba‑133 | 1 x 102 | 1 x 106 |
| 359 | Ba‑133m | 1 x 102 | 1 x 106 |
| 360 | Ba‑135m | 1 x 102 | 1 x 106 |
| 361 | Ba‑137m | 1 x 101 | 1 x 106 |
| 362 | Ba‑139 | 1 x 102 | 1 x 105 |
| 363 | Ba‑140a | 1 x 101 | 1 x 105 |
| 364 | Ba‑141 | 1 x 102 | 1 x 105 |
| 365 | Ba‑142 | 1 x 102 | 1 x 106 |
| 366 | La‑131 | 1 x 101 | 1 x 106 |
| 367 | La‑132 | 1 x 101 | 1 x 106 |
| 368 | La‑135 | 1 x 103 | 1 x 107 |
| 369 | La‑137 | 1 x 103 | 1 x 107 |
| 370 | La‑138 | 1 x 101 | 1 x 106 |
| 371 | La‑140 | 1 x 101 | 1 x 105 |
| 372 | La‑141 | 1 x 102 | 1 x 105 |
| 373 | La‑142 | 1 x 101 | 1 x 105 |
| 374 | La‑143 | 1 x 102 | 1 x 105 |
| 375 | Ce‑134 | 1 x 103 | 1 x 107 |
| 376 | Ce‑135 | 1 x 101 | 1 x 106 |
| 377 | Ce‑137 | 1 x 103 | 1 x 107 |
| 378 | Ce‑137m | 1 x 103 | 1 x 106 |
| 379 | Ce‑139 | 1 x 102 | 1 x 106 |
| 380 | Ce‑141 | 1 x 102 | 1 x 107 |
| 381 | Ce‑143 | 1 x 102 | 1 x 106 |
| 382 | Ce‑144a | 1 x 102 | 1 x 105 |
| 383 | Pr‑136 | 1 x 101 | 1 x 105 |
| 384 | Pr‑137 | 1 x 102 | 1 x 106 |
| 385 | Pr‑138m | 1 x 101 | 1 x 106 |
| 386 | Pr‑139 | 1 x 102 | 1 x 107 |
| 387 | Pr‑142 | 1 x 102 | 1 x 105 |
| 388 | Pr‑142m | 1 x 107 | 1 x 109 |
| 389 | Pr‑143 | 1 x 104 | 1 x 106 |
| 390 | Pr‑144 | 1 x 102 | 1 x 105 |
| 391 | Pr‑145 | 1 x 103 | 1 x 105 |
| 392 | Pr‑147 | 1 x 101 | 1 x 105 |
| 393 | Nd‑136 | 1 x 102 | 1 x 106 |
| 394 | Nd‑138 | 1 x 103 | 1 x 107 |
| 395 | Nd‑139 | 1 x 102 | 1 x 106 |
| 396 | Nd‑139m | 1 x 101 | 1 x 106 |
| 397 | Nd‑141 | 1 x 102 | 1 x 107 |
| 398 | Nd‑147 | 1 x 102 | 1 x 106 |
| 399 | Nd‑149 | 1 x 102 | 1 x 106 |
| 400 | Nd‑151 | 1 x 101 | 1 x 105 |
| 401 | Pm‑141 | 1 x 101 | 1 x 105 |
| 402 | Pm‑143 | 1 x 102 | 1 x 106 |
| 403 | Pm‑144 | 1 x 101 | 1 x 106 |
| 404 | Pm‑145 | 1 x 103 | 1 x 107 |
| 405 | Pm‑146 | 1 x 101 | 1 x 106 |
| 406 | Pm‑147 | 1 x 104 | 1 x 107 |
| 407 | Pm‑148 | 1 x 101 | 1 x 105 |
| 408 | Pm‑148m | 1 x 101 | 1 x 106 |
| 409 | Pm‑149 | 1 x 103 | 1 x 106 |
| 410 | Pm‑150 | 1 x 101 | 1 x 105 |
| 411 | Pm‑151 | 1 x 102 | 1 x 106 |
| 412 | Sm‑141 | 1 x 101 | 1 x 105 |
| 413 | Sm‑141m | 1 x 101 | 1 x 106 |
| 414 | Sm‑142 | 1 x 102 | 1 x 107 |
| 415 | Sm‑145 | 1 x 102 | 1 x 107 |
| 416 | Sm‑146 | 1 x 101 | 1 x 105 |
| 417 | Sm‑147 | 1 x 101 | 1 x 104 |
| 418 | Sm‑151 | 1 x 104 | 1 x 108 |
| 419 | Sm‑153 | 1 x 102 | 1 x 106 |
| 420 | Sm‑155 | 1 x 102 | 1 x 106 |
| 421 | Sm‑156 | 1 x 102 | 1 x 106 |
| 422 | Eu‑145 | 1 x 101 | 1 x 106 |
| 423 | Eu‑146 | 1 x 101 | 1 x 106 |
| 424 | Eu‑147 | 1 x 102 | 1 x 106 |
| 425 | Eu‑148 | 1 x 101 | 1 x 106 |
| 426 | Eu‑149 | 1 x 102 | 1 x 107 |
| 427 | Eu‑150 | 1 x 101 | 1 x 106 |
| 428 | Eu‑150m | 1 x 103 | 1 x 106 |
| 429 | Eu‑152 | 1 x 101 | 1 x 106 |
| 430 | Eu‑152m | 1 x 102 | 1 x 106 |
| 431 | Eu‑154 | 1 x 101 | 1 x 106 |
| 432 | Eu‑155 | 1 x 102 | 1 x 107 |
| 433 | Eu‑156 | 1 x 101 | 1 x 106 |
| 434 | Eu‑157 | 1 x 102 | 1 x 106 |
| 435 | Eu‑158 | 1 x 101 | 1 x 105 |
| 436 | Gd‑145 | 1 x 101 | 1 x 105 |
| 437 | Gd‑146a | 1 x 101 | 1 x 106 |
| 438 | Gd‑147 | 1 x 101 | 1 x 106 |
| 439 | Gd‑148 | 1 x 101 | 1 x 104 |
| 440 | Gd‑149 | 1 x 102 | 1 x 106 |
| 441 | Gd‑151 | 1 x 102 | 1 x 107 |
| 442 | Gd‑152 | 1 x 101 | 1 x 104 |
| 443 | Gd‑153 | 1 x 102 | 1 x 107 |
| 444 | Gd‑159 | 1 x 103 | 1 x 106 |
| 445 | Tb‑147 | 1 x 101 | 1 x 106 |
| 446 | Tb‑149 | 1 x 101 | 1 x 106 |
| 447 | Tb‑150 | 1 x 101 | 1 x 106 |
| 448 | Tb‑151 | 1 x 101 | 1 x 106 |
| 449 | Tb‑153 | 1 x 102 | 1 x 107 |
| 450 | Tb‑154 | 1 x 101 | 1 x 106 |
| 451 | Tb‑155 | 1 x 102 | 1 x 107 |
| 452 | Tb‑156 | 1 x 101 | 1 x 106 |
| 453 | Tb‑156 (24.4 h) | 1 x 103 | 1 x 107 |
| 454 | Tb‑156m’ (5 h) | 1 x 104 | 1 x 107 |
| 455 | Tb‑157 | 1 x 104 | 1 x 107 |
| 456 | Tb‑158 | 1 x 101 | 1 x 106 |
| 457 | Tb‑160 | 1 x 101 | 1 x 106 |
| 458 | Tb‑161 | 1 x 103 | 1 x 106 |
| 459 | Dy‑155 | 1 x 101 | 1 x 106 |
| 460 | Dy‑157 | 1 x 102 | 1 x 106 |
| 461 | Dy‑159 | 1 x 103 | 1 x 107 |
| 462 | Dy‑165 | 1 x 103 | 1 x 106 |
| 463 | Dy‑166 | 1 x 103 | 1 x 106 |
| 464 | Ho‑155 | 1 x 102 | 1 x 106 |
| 465 | Ho‑157 | 1 x 102 | 1 x 106 |
| 466 | Ho‑159 | 1 x 102 | 1 x 106 |
| 467 | Ho‑161 | 1 x 102 | 1 x 107 |
| 468 | Ho‑162 | 1 x 102 | 1 x 107 |
| 469 | Ho‑162m | 1 x 101 | 1 x 106 |
| 470 | Ho‑164 | 1 x 103 | 1 x 106 |
| 471 | Ho‑164m | 1 x 103 | 1 x 107 |
| 472 | Ho‑166 | 1 x 103 | 1 x 105 |
| 473 | Ho‑166m | 1 x 101 | 1 x 106 |
| 474 | Ho‑167 | 1 x 102 | 1 x 106 |
| 475 | Er‑161 | 1 x 101 | 1 x 106 |
| 476 | Er‑165 | 1 x 103 | 1 x 107 |
| 477 | Er‑169 | 1 x 104 | 1 x 107 |
| 478 | Er‑171 | 1 x 102 | 1 x 106 |
| 479 | Er‑172 | 1 x 102 | 1 x 106 |
| 480 | Tm‑162 | 1 x 101 | 1 x 106 |
| 481 | Tm‑166 | 1 x 101 | 1 x 106 |
| 482 | Tm‑167 | 1 x 102 | 1 x 106 |
| 483 | Tm‑170 | 1 x 103 | 1 x 106 |
| 484 | Tm‑171 | 1 x 104 | 1 x 108 |
| 485 | Tm‑172 | 1 x 102 | 1 x 106 |
| 486 | Tm‑173 | 1 x 102 | 1 x 106 |
| 487 | Tm‑175 | 1 x 101 | 1 x 106 |
| 488 | Yb‑162 | 1 x 102 | 1 x 107 |
| 489 | Yb‑166 | 1 x 102 | 1 x 107 |
| 490 | Yb‑167 | 1 x 102 | 1 x 106 |
| 491 | Yb‑169 | 1 x 102 | 1 x 107 |
| 492 | Yb‑175 | 1 x 103 | 1 x 107 |
| 493 | Yb‑177 | 1 x 102 | 1 x 106 |
| 494 | Yb‑178 | 1 x 103 | 1 x 106 |
| 495 | Lu‑169 | 1 x 101 | 1 x 106 |
| 496 | Lu‑170 | 1 x 101 | 1 x 106 |
| 497 | Lu‑171 | 1 x 101 | 1 x 106 |
| 498 | Lu‑172 | 1 x 101 | 1 x 106 |
| 499 | Lu‑173 | 1 x 102 | 1 x 107 |
| 500 | Lu‑174 | 1 x 102 | 1 x 107 |
| 501 | Lu‑174m | 1 x 102 | 1 x 107 |
| 502 | Lu‑176 | 1 x 102 | 1 x 106 |
| 503 | Lu‑176m | 1 x 103 | 1 x 106 |
| 504 | Lu‑177 | 1 x 103 | 1 x 107 |
| 505 | Lu‑177m | 1 x 101 | 1 x 106 |
| 506 | Lu‑178 | 1 x 102 | 1 x 105 |
| 507 | Lu‑178m | 1 x 101 | 1 x 105 |
| 508 | Lu‑179 | 1 x 103 | 1 x 106 |
| 509 | Hf‑170 | 1 x 102 | 1 x 106 |
| 510 | Hf‑172a | 1 x 101 | 1 x 106 |
| 511 | Hf‑173 | 1 x 102 | 1 x 106 |
| 512 | Hf‑175 | 1 x 102 | 1 x 106 |
| 513 | Hf‑177m | 1 x 101 | 1 x 105 |
| 514 | Hf‑178m | 1 x 101 | 1 x 106 |
| 515 | Hf‑179m | 1 x 101 | 1 x 106 |
| 516 | Hf‑180m | 1 x 101 | 1 x 106 |
| 517 | Hf‑181 | 1 x 101 | 1 x 106 |
| 518 | Hf‑182 | 1 x 102 | 1 x 106 |
| 519 | Hf‑182m | 1 x 101 | 1 x 106 |
| 520 | Hf‑183 | 1 x 101 | 1 x 106 |
| 521 | Hf‑184 | 1 x 102 | 1 x 106 |
| 522 | Ta‑172 | 1 x 101 | 1 x 106 |
| 523 | Ta‑173 | 1 x 101 | 1 x 106 |
| 524 | Ta‑174 | 1 x 101 | 1 x 106 |
| 525 | Ta‑175 | 1 x 101 | 1 x 106 |
| 526 | Ta‑176 | 1 x 101 | 1 x 106 |
| 527 | Ta‑177 | 1 x 102 | 1 x 107 |
| 528 | Ta‑178 | 1 x 101 | 1 x 106 |
| 529 | Ta‑179 | 1 x 103 | 1 x 107 |
| 530 | Ta‑180 | 1 x 101 | 1 x 106 |
| 531 | Ta‑180m | 1 x 103 | 1 x 107 |
| 532 | Ta‑182 | 1 x 101 | 1 x 104 |
| 533 | Ta‑182m | 1 x 102 | 1 x 106 |
| 534 | Ta‑183 | 1 x 102 | 1 x 106 |
| 535 | Ta‑184 | 1 x 101 | 1 x 106 |
| 536 | Ta‑185 | 1 x 102 | 1 x 105 |
| 537 | Ta‑186 | 1 x 101 | 1 x 105 |
| 538 | W‑176 | 1 x 102 | 1 x 106 |
| 539 | W‑177 | 1 x 101 | 1 x 106 |
| 540 | W‑178a | 1 x 101 | 1 x 106 |
| 541 | W‑179 | 1 x 102 | 1 x 107 |
| 542 | W‑181 | 1 x 103 | 1 x 107 |
| 543 | W‑185 | 1 x 104 | 1 x 107 |
| 544 | W‑187 | 1 x 102 | 1 x 106 |
| 545 | W‑188a | 1 x 102 | 1 x 105 |
| 546 | Re‑177 | 1 x 101 | 1 x 106 |
| 547 | Re‑178 | 1 x 101 | 1 x 106 |
| 548 | Re‑181 | 1 x 101 | 1 x 106 |
| 549 | Re‑182 | 1 x 101 | 1 x 106 |
| 550 | Re‑182m | 1 x 101 | 1 x 106 |
| 551 | Re‑184 | 1 x 101 | 1 x 106 |
| 552 | Re‑184m | 1 x 102 | 1 x 106 |
| 553 | Re‑186 | 1 x 103 | 1 x 106 |
| 554 | Re‑186m | 1 x 103 | 1 x 107 |
| 555 | Re‑187 | 1 x 106 | 1 x 109 |
| 556 | Re‑188 | 1 x 102 | 1 x 105 |
| 557 | Re‑188m | 1 x 102 | 1 x 107 |
| 558 | Re‑189a | 1 x 102 | 1 x 106 |
| 559 | Os‑180 | 1 x 102 | 1 x 107 |
| 560 | Os‑181 | 1 x 101 | 1 x 106 |
| 561 | Os‑182 | 1 x 102 | 1 x 106 |
| 562 | Os‑185 | 1 x 101 | 1 x 106 |
| 563 | Os‑189m | 1 x 104 | 1 x 107 |
| 564 | Os‑191 | 1 x 102 | 1 x 107 |
| 565 | Os‑191m | 1 x 103 | 1 x 107 |
| 566 | Os‑193 | 1 x 102 | 1 x 106 |
| 567 | Os‑194a | 1 x 102 | 1 x 105 |
| 568 | Ir‑182 | 1 x 101 | 1 x 105 |
| 569 | Ir‑184 | 1 x 101 | 1 x 106 |
| 570 | Ir‑185 | 1 x 101 | 1 x 106 |
| 571 | Ir‑186 | 1 x 101 | 1 x 106 |
| 572 | Ir‑186m | 1 x 101 | 1 x 106 |
| 573 | Ir‑187 | 1 x 102 | 1 x 106 |
| 574 | Ir‑188 | 1 x 101 | 1 x 106 |
| 575 | Ir‑189a | 1 x 102 | 1 x 107 |
| 576 | Ir‑190 | 1 x 101 | 1 x 106 |
| 577 | Ir‑190m (3.1 h) | 1 x 101 | 1 x 106 |
| 578 | Ir‑190m’ (1.2 h) | 1 x 104 | 1 x 107 |
| 579 | Ir‑192 | 1 x 101 | 1 x 104 |
| 580 | Ir‑192m | 1 x 102 | 1 x 107 |
| 581 | Ir‑193m | 1 x 104 | 1 x 107 |
| 582 | Ir‑194 | 1 x 102 | 1 x 105 |
| 583 | Ir‑194m | 1 x 101 | 1 x 106 |
| 584 | Ir‑195 | 1 x 102 | 1 x 106 |
| 585 | Ir‑195m | 1 x 102 | 1 x 106 |
| 586 | Pt‑186 | 1 x 101 | 1 x 106 |
| 587 | Pt‑188a | 1 x 101 | 1 x 106 |
| 588 | Pt‑189 | 1 x 102 | 1 x 106 |
| 589 | Pt‑191 | 1 x 102 | 1 x 106 |
| 590 | Pt‑193 | 1 x 104 | 1 x 107 |
| 591 | Pt‑193m | 1 x 103 | 1 x 107 |
| 592 | Pt‑195m | 1 x 102 | 1 x 106 |
| 593 | Pt‑197 | 1 x 103 | 1 x 106 |
| 594 | Pt‑197m | 1 x 102 | 1 x 106 |
| 595 | Pt‑199 | 1 x 102 | 1 x 106 |
| 596 | Pt‑200 | 1 x 102 | 1 x 106 |
| 597 | Au‑193 | 1 x 102 | 1 x 107 |
| 598 | Au‑194 | 1 x 101 | 1 x 106 |
| 599 | Au‑195 | 1 x 102 | 1 x 107 |
| 600 | Au‑198 | 1 x 102 | 1 x 106 |
| 601 | Au‑198m | 1 x 101 | 1 x 106 |
| 602 | Au‑199 | 1 x 102 | 1 x 106 |
| 603 | Au‑200 | 1 x 102 | 1 x 105 |
| 604 | Au‑200m | 1 x 101 | 1 x 106 |
| 605 | Au‑201 | 1 x 102 | 1 x 106 |
| 606 | Hg‑193 | 1 x 102 | 1 x 106 |
| 607 | Hg‑193m | 1 x 101 | 1 x 106 |
| 608 | Hg‑194a | 1 x 101 | 1 x 106 |
| 609 | Hg‑195 | 1 x 102 | 1 x 106 |
| 610 | Hg‑195ma | 1 x 102 | 1 x 106 |
| 611 | Hg‑197 | 1 x 102 | 1 x 107 |
| 612 | Hg‑197m | 1 x 102 | 1 x 106 |
| 613 | Hg‑199m | 1 x 102 | 1 x 106 |
| 614 | Hg‑203 | 1 x 102 | 1 x 105 |
| 615 | Tl‑194 | 1 x 101 | 1 x 106 |
| 616 | Tl‑194m | 1 x 101 | 1 x 106 |
| 617 | Tl‑195 | 1 x 101 | 1 x 106 |
| 618 | Tl‑197 | 1 x 102 | 1 x 106 |
| 619 | Tl‑198 | 1 x 101 | 1 x 106 |
| 620 | Tl‑198m | 1 x 101 | 1 x 106 |
| 621 | Tl‑199 | 1 x 102 | 1 x 106 |
| 622 | Tl‑200 | 1 x 101 | 1 x 106 |
| 623 | Tl‑201 | 1 x 102 | 1 x 106 |
| 624 | Tl‑202 | 1 x 102 | 1 x 106 |
| 625 | Tl‑204 | 1 x 104 | 1 x 104 |
| 626 | Pb‑195m | 1 x 101 | 1 x 106 |
| 627 | Pb‑198 | 1 x 102 | 1 x 106 |
| 628 | Pb‑199 | 1 x 101 | 1 x 106 |
| 629 | Pb‑200 | 1 x 102 | 1 x 106 |
| 630 | Pb‑201 | 1 x 101 | 1 x 106 |
| 631 | Pb‑202 | 1 x 103 | 1 x 106 |
| 632 | Pb‑202m | 1 x 101 | 1 x 106 |
| 633 | Pb‑203 | 1 x 102 | 1 x 106 |
| 634 | Pb‑205 | 1 x 104 | 1 x 107 |
| 635 | Pb‑209 | 1 x 105 | 1 x 106 |
| 636 | Pb‑210a | 1 x 101 | 1 x 104 |
| 637 | Pb‑211 | 1 x 102 | 1 x 106 |
| 638 | Pb‑212a | 1 x 101 | 1 x 105 |
| 639 | Pb‑214 | 1 x 102 | 1 x 106 |
| 640 | Bi‑200 | 1 x 101 | 1 x 106 |
| 641 | Bi‑201 | 1 x 101 | 1 x 106 |
| 642 | Bi‑202 | 1 x 101 | 1 x 106 |
| 643 | Bi‑203 | 1 x 101 | 1 x 106 |
| 644 | Bi‑205 | 1 x 101 | 1 x 106 |
| 645 | Bi‑206 | 1 x 101 | 1 x 105 |
| 646 | Bi‑207 | 1 x 101 | 1 x 106 |
| 647 | Bi‑210 | 1 x 103 | 1 x 106 |
| 648 | Bi‑210ma | 1 x 101 | 1 x 105 |
| 649 | Bi‑212a | 1 x 101 | 1 x 105 |
| 650 | Bi‑213 | 1 x 102 | 1 x 106 |
| 651 | Bi‑214 | 1 x 101 | 1 x 105 |
| 652 | Po‑203 | 1 x 101 | 1 x 106 |
| 653 | Po‑205 | 1 x 101 | 1 x 106 |
| 654 | Po‑206 | 1 x 101 | 1 x 106 |
| 655 | Po‑207 | 1 x 101 | 1 x 106 |
| 656 | Po‑208 | 1 x 101 | 1 x 104 |
| 657 | Po‑209 | 1 x 101 | 1 x 104 |
| 658 | Po‑210 | 1 x 101 | 1 x 104 |
| 659 | At‑207 | 1 x 101 | 1 x 106 |
| 660 | At‑211 | 1 x 103 | 1 x 107 |
| 661 | Fr‑222 | 1 x 103 | 1 x 105 |
| 662 | Fr‑223 | 1 x 102 | 1 x 106 |
| 663 | Rn‑220a | 1 x 104 | 1 x 107 |
| 664 | Rn‑222a | 1 x 101 | 1 x 108 |
| 665 | Ra‑223a | 1 x 102 | 1 x 105 |
| 666 | Ra‑224a | 1 x 101 | 1 x 105 |
| 667 | Ra‑225 | 1 x 102 | 1 x 105 |
| 668 | Ra‑226a | 1 x 101 | 1 x 104 |
| 669 | Ra‑227 | 1 x 102 | 1 x 106 |
| 670 | Ra‑228a | 1 x 101 | 1 x 105 |
| 671 | Ac‑224 | 1 x 102 | 1 x 106 |
| 672 | Ac‑225a | 1 x 101 | 1 x 104 |
| 673 | Ac‑226 | 1 x 102 | 1 x 105 |
| 674 | Ac‑227a | 1 x 10‑1 | 1 x 103 |
| 675 | Ac‑228 | 1 x 101 | 1 x 106 |
| 676 | Th‑226a | 1 x 103 | 1 x 107 |
| 677 | Th‑227 | 1 x 101 | 1 x 104 |
| 678 | Th‑228a | 1 x 100 | 1 x 104 |
| 679 | Th‑229a | 1 x 100 | 1 x 103 |
| 680 | Th‑230 | 1 x 100 | 1 x 104 |
| 681 | Th‑231 | 1 x 103 | 1 x 107 |
| 682 | Th‑232 | 1 x 101 | 1 x 104 |
| 683 | Th‑nata | 1 x 100 | 1 x 103 |
| 684 | Th‑234a | 1 x 103 | 1 x 105 |
| 685 | Pa‑227 | 1 x 101 | 1 x 106 |
| 686 | Pa228 | 1 x 101 | 1 x 106 |
| 687 | Pa‑230 | 1 x 101 | 1 x 106 |
| 688 | Pa‑231 | 1 x 100 | 1 x 103 |
| 689 | Pa‑232 | 1 x 101 | 1 x 106 |
| 690 | Pa‑233 | 1 x 102 | 1 x 107 |
| 691 | Pa‑234 | 1 x 101 | 1 x 106 |
| 692 | U‑230a | 1 x 101 | 1 x 105 |
| 693 | U‑231 | 1 x 102 | 1 x 107 |
| 694 | U‑232a | 1 x 100 | 1 x 103 |
| 695 | U‑233 | 1 x 101 | 1 x 104 |
| 696 | U‑234 | 1 x 101 | 1 x 104 |
| 697 | U‑235a | 1 x 101 | 1 x 104 |
| 698 | U‑236 | 1 x 101 | 1 x 104 |
| 699 | U‑237 | 1 x 102 | 1 x 106 |
| 700 | U‑238a | 1 x 101 | 1 x 104 |
| 701 | U‑nata | 1 x 100 | 1 x 103 |
| 702 | U‑239 | 1 x 102 | 1 x 106 |
| 703 | U‑240 | 1 x 103 | 1 x 107 |
| 704 | U‑240a | 1 x 101 | 1 x 106 |
| 705 | Np‑232 | 1 x 101 | 1 x 106 |
| 706 | Np‑233 | 1 x 102 | 1 x 107 |
| 707 | Np‑234 | 1 x 101 | 1 x 106 |
| 708 | Np‑235 | 1 x 103 | 1 x 107 |
| 709 | Np‑236 | 1 x 102 | 1 x 105 |
| 710 | Np‑236m | 1 x 103 | 1 x 107 |
| 711 | Np‑237a | 1 x 100 | 1 x 103 |
| 712 | Np‑238 | 1 x 102 | 1 x 106 |
| 713 | Np‑239 | 1 x 102 | 1 x 107 |
| 714 | Np‑240 | 1 x 101 | 1 x 106 |
| 715 | Pu‑234 | 1 x 102 | 1 x 107 |
| 716 | Pu‑235 | 1 x 102 | 1 x 107 |
| 717 | Pu‑236 | 1 x 101 | 1 x 104 |
| 718 | Pu‑237 | 1 x 103 | 1 x 107 |
| 719 | Pu‑238 | 1 x 100 | 1 x 104 |
| 720 | Pu‑239 | 1 x 100 | 1 x 104 |
| 721 | Pu‑240 | 1 x 100 | 1 x 103 |
| 722 | Pu‑241 | 1 x 102 | 1 x 105 |
| 723 | Pu‑242 | 1 x 100 | 1 x 104 |
| 724 | Pu‑243 | 1 x 103 | 1 x 107 |
| 725 | Pu‑244 | 1 x 100 | 1 x 104 |
| 726 | Pu‑245 | 1 x 102 | 1 x 106 |
| 727 | Pu‑246 | 1 x 102 | 1 x 106 |
| 728 | Am‑237 | 1 x 102 | 1 x 106 |
| 729 | Am‑238 | 1 x 101 | 1 x 106 |
| 730 | Am‑239 | 1 x 102 | 1 x 106 |
| 731 | Am‑240 | 1 x 101 | 1 x 106 |
| 732 | Am‑241 | 1 x 100 | 1 x 104 |
| 733 | Am‑242 | 1 x 103 | 1 x 106 |
| 734 | Am‑242ma | 1 x 100 | 1 x 104 |
| 735 | Am‑243a | 1 x 100 | 1 x 103 |
| 736 | Am‑244 | 1 x 101 | 1 x 106 |
| 737 | Am‑244m | 1 x 104 | 1 x 107 |
| 738 | Am‑245 | 1 x 103 | 1 x 106 |
| 739 | Am‑246 | 1 x 101 | 1 x 105 |
| 740 | Am‑246m | 1 x 101 | 1 x 106 |
| 741 | Cm‑238 | 1 x 102 | 1 x 107 |
| 742 | Cm‑240 | 1 x 102 | 1 x 105 |
| 743 | Cm‑241 | 1 x 102 | 1 x 106 |
| 744 | Cm‑242 | 1 x 102 | 1 x 105 |
| 745 | Cm‑243 | 1 x 100 | 1 x 104 |
| 746 | Cm‑244 | 1 x 101 | 1 x 104 |
| 747 | Cm‑245 | 1 x 100 | 1 x 103 |
| 748 | Cm‑246 | 1 x 100 | 1 x 103 |
| 749 | Cm‑247 | 1 x 100 | 1 x 104 |
| 750 | Cm‑248 | 1 x 100 | 1 x 103 |
| 751 | Cm‑249 | 1 x 103 | 1 x 106 |
| 752 | Cm‑250 | 1 x 10‑1 | 1 x 103 |
| 753 | Bk‑245 | 1 x 102 | 1 x 106 |
| 754 | Bk‑246 | 1 x 101 | 1 x 106 |
| 755 | Bk‑247 | 1 x 100 | 1 x 104 |
| 756 | Bk‑249 | 1 x 103 | 1 x 106 |
| 757 | Bk‑250 | 1 x 101 | 1 x 106 |
| 758 | Cf‑244 | 1 x 104 | 1 x 107 |
| 759 | Cf‑246 | 1 x 103 | 1 x 106 |
| 760 | Cf‑248 | 1 x 101 | 1 x 104 |
| 761 | Cf‑249 | 1 x 100 | 1 x 103 |
| 762 | Cf‑250 | 1 x 101 | 1 x 104 |
| 763 | Cf‑251 | 1 x 100 | 1 x 103 |
| 764 | Cf‑252 | 1 x 101 | 1 x 104 |
| 765 | Cf‑253 | 1 x 102 | 1 x 105 |
| 766 | Cf‑254 | 1 x 100 | 1 x 103 |
| 767 | Es‑250 | 1 x 102 | 1 x 106 |
| 768 | Es‑251 | 1 x 102 | 1 x 107 |
| 769 | Es‑253 | 1 x 102 | 1 x 105 |
| 770 | Es‑254 | 1 x 101 | 1 x 104 |
| 771 | Es‑254m | 1 x 102 | 1 x 106 |
| 772 | Fm‑252 | 1 x 103 | 1 x 106 |
| 773 | Fm‑253 | 1 x 102 | 1 x 106 |
| 774 | Fm‑254 | 1 x 104 | 1 x 107 |
| 775 | Fm‑255 | 1 x 103 | 1 x 106 |
| 776 | Fm‑257 | 1 x 101 | 1 x 105 |
| 777 | Md‑257 | 1 x 102 | 1 x 107 |
| 778 | Md‑258 | 1 x 102 | 1 x 105 |
| 779 | An alpha‑emitting nuclide not mentioned in another item | 1 x 100 | 1 x 103 |
| 780 | A nuclide that is not alpha‑emitting and not mentioned in another item | 1 x 101 | 1 x 104 |

Part 3—Parent nuclides and progeny nuclides

3 Parent nuclides and progeny nuclides

The following table sets out progeny nuclides for parent nuclides included in secular equilibrium.

Note 1: The activity of a progeny nuclide included in secular equilibrium with a parent nuclide is dealt with in regulation 3A.

Note 2: Parent nuclides are also marked a in the table in clause 2.

| Parent nuclides and progeny nuclides | | |
| --- | --- | --- |
| Item | Parent nuclide | Progeny nuclide |
| 1 | Ge‑68 | Ga‑68 |
| 2 | Rb‑83 | Kr‑83m |
| 3 | Sr‑82 | Rb‑82 |
| 4 | Sr‑90 | Y‑90 |
| 5 | Y‑87 | Sr‑87m |
| 6 | Zr‑93 | Nb‑93m |
| 7 | Zr‑97 | Nb‑97 |
| 8 | Ru‑106 | Rh‑106 |
| 9 | Ag‑108m | Ag‑108 |
| 10 | Sn‑121m | Sn‑121 (0.776) |
| 11 | Sn‑126 | Sb‑126m |
| 12 | Xe‑122 | I‑122 |
| 13 | Cs‑137 | Ba‑137m |
| 14 | Ba‑140 | La‑140 |
| 15 | Ce‑144 | Pr‑144 |
| 16 | Gd‑146 | Eu‑146 |
| 17 | Hf‑172 | Lu‑172 |
| 18 | W‑178 | Ta‑178 |
| 19 | W‑188 | Re‑188 |
| 20 | Re‑189 | Os‑189m (0.241) |
| 21 | Os‑194 | Ir‑194 |
| 22 | Ir‑189 | Os‑189m |
| 23 | Pt‑188 | Ir‑188 |
| 24 | Hg‑194 | Au‑194 |
| 25 | Hg‑195m | Hg‑195 (0.542) |
| 26 | Pb‑210 | Bi‑210  Po‑210 |
| 27 | Pb‑212 | Bi‑212  Tl‑208 (0.36)  Po‑212 (0.64) |
| 28 | Bi‑210m | Tl‑206 |
| 29 | Bi‑212 | Tl‑208 (0.36)  Po‑212 (0.64) |
| 30 | Rn‑220 | Po‑216 |
| 31 | Rn‑222 | Po‑218  Pb‑214  Bi‑214  Po‑214 |
| 32 | Ra‑223 | Rn‑219  Po‑215  Pb‑211  Bi‑211  Tl‑207 |
| 33 | Ra‑224 | Rn‑220  Po‑216  Pb‑212  Bi‑212  Tl‑208 (0.36)  Po‑212 (0.64) |
| 34 | Ra‑226 | Rn‑222  Po‑218  Pb‑214  Bi‑214  Po‑214  Pb‑210  Bi‑210  Po‑210 |
| 35 | Ra‑228 | Ac‑228 |
| 36 | Ac‑225 | Fr‑221  At‑217  Bi‑213  Po‑213 (0.978)  Tl‑209 (0.0216)  Pb‑209 (0.978) |
| 37 | Ac‑227 | Fr‑223 (0.0138) |
| 38 | Th‑226 | Ra‑222  Rn‑218  Po‑214 |
| 39 | Th‑228 | Ra‑224  Rn‑220  Po‑216  Pb‑212  Bi‑212  Tl‑208 (0.36)  Po‑212 (0.64) |
| 40 | Th‑229 | Ra‑225  Ac‑225  Fr‑221  At‑217  Bi‑213  Po‑213  Pb‑209 |
| 41 | Th‑nat | Ra‑228  Ac‑228  Th‑228  Ra‑224  Rn‑220  Po‑216  Pb‑212  Bi‑212  Tl‑208 (0.36)  Po‑212 (0.64) |
| 42 | Th‑234 | Pa‑234m |
| 43 | U‑230 | Th‑226  Ra‑222  Rn‑218  Po‑214 |
| 44 | U‑232 | Th‑228  Ra‑224  Rn‑220  Po‑216  Pb‑212  Bi‑212  Tl‑208 (0.36)  Po‑212 (0.64) |
| 45 | U‑235 | Th‑231 |
| 46 | U‑238 | Th‑234  Pa‑234m |
| 47 | U‑nat | Th‑234  Pa‑234m  U‑234  Th‑230  Ra‑226  Rn‑222  Po‑218  Pb‑214  Bi‑214  Po‑214  Pb‑210  Bi‑210  Po‑210 |
| 48 | U‑240 | Np‑240m |
| 49 | Np‑237 | Pa‑233 |
| 50 | Am‑242m | Am‑242 |
| 51 | Am‑243 | Np‑239 |

82 Part 1 of Schedule 3 (after the heading)

Insert:

1 Facility licence—information and documents that may be requested by CEO

The following table sets out information and documents that the CEO may ask an applicant for a facility licence to give.

83 Part 1 of Schedule 3 (table, headings)

Omit:

| Item | Information |
| --- | --- |

substitute:

| Facility licence—information and documents that may be requested by CEO | |
| --- | --- |
| Item | Information and documents |

84 Part 1 of Schedule 3 (at the end of the cell at table item 4, column headed “Information”)

Add:

; (g) the environment protection plan for the controlled facility.

85 Part 2 of Schedule 3 (after the heading)

Insert:

2 Source licence—information and documents that may be requested by CEO

The following table sets out information and documents that the CEO may ask an applicant for a source licence to give.

86 Part 2 of Schedule 3 (table, headings)

Repeal the headings, substitute:

| Source licence—information and documents that may be requested by CEO | |
| --- | --- |
| Item | Information and documents |

87 Schedule 3A (before the table)

Insert:

1 Facility licence application fees—nuclear installations

The following table sets out the amount of the application fee for a facility licence that authorises a person to do a thing mentioned in an item in the table in relation to a controlled facility that is a nuclear installation.

88 Schedule 3A (table, headings)

Repeal the headings, substitute:

| Facility licence application fees—nuclear installations | | |
| --- | --- | --- |
| Item | Thing authorised to be done by licence | Amount ($) |

89 Part 1 of Schedule 3B (after the heading)

Insert:

1 Facility licence application fees—prescribed radiation facilities (general)

The following table sets out the amount of the application fee for a facility licence that authorises a person to do a thing in relation to a controlled facility that is a prescribed radiation facility of a kind mentioned in an item in the table (except if the thing is mentioned in an item in the table in clause 2).

90 Part 1 of Schedule 3B (table, headings)

Repeal the headings, substitute:

| Facility licence application fees—prescribed radiation facilities (general) | | |
| --- | --- | --- |
| Item | Kind of prescribed radiation facility | Amount ($) |

91 Part 1 of Schedule 3B (note)

Omit “the application fee for the licence is the sum of the application fees for each thing authorised to be done by the licence”, substitute “the amount of the application fee for the licence is the sum of the amounts of the application fees that would have been applicable if applications for separate licences had been made for each of those things”.

92 Part 2 of Schedule 3B (after the heading)

Insert:

2 Facility licence application fees—prescribed radiation facilities (other)

The following table sets out the amount of the application fee for a facility licence that authorises a person to do a thing mentioned in an item in the table in relation to a prescribed radiation facility.

93 Part 2 of Schedule 3B (table, headings)

Repeal the headings, substitute:

| Facility licence application fees—prescribed radiation facilities (other) | | |
| --- | --- | --- |
| Item | Thing authorised to be done by licence | Amount ($) |

94 Part 1 of Schedule 3C (after the heading)

Insert:

1 Source licence application fees—kinds of controlled apparatus or controlled material

The following table sets out kinds of controlled apparatus and controlled materials for the purpose of determining the amount of an application fee for a source licence.

95 Part 1 of Schedule 3C (table, headings)

Omit:

| Item | Controlled apparatus or controlled material |
| --- | --- |

substitute:

| Source licence application fees—kinds of controlled apparatus or controlled material | |
| --- | --- |
| Item | Controlled apparatus or controlled material |

96 Part 1 of Schedule 3C (table items 6, 7, 8, 30, 31, 42 and 43)

Omit “the amount mentioned in column 4 of Part 2 of Schedule 2 for that kind of nuclide”, substitute “the activity value for that nuclide set out in an item in the table in clause 2 of Schedule 2”.

97 Part 1 of Schedule 3C (note)

Omit “The dictionary in these Regulations”, substitute “Regulation 3”.

98 Part 2 of Schedule 3C (after the heading)

Insert:

2 Source licence application fees—amount of fees

The following table sets out amounts for the purpose of determining the amount of an application fee for a source licence.

Note: The amount of an application fee for a source licence is based on:

(a) the number of controlled apparatus or controlled materials in the same location to be dealt with under the application; and

(b) the Group in the table in clause 1 that covers the controlled apparatus or controlled materials.

99 Part 2 of Schedule 3C (table, headings)

Repeal the headings, substitute:

| Source licence application fees—amount of fees | | |
| --- | --- | --- |
| Item | Number of controlled apparatus or controlled materials in the same location to be dealt with under application | Amount ($) |