第７８回原子力委員会
資料第２－　号

国際プルトニウム指針の公表について

平成９年１２月
科学技術庁

１．目的等

プルトニウム利用に係る基本的な原則を示すとともに、その透明性の向上のため、参加国が保有するプルトニウム（平和利用のプルトニウム及び軍事目的にとって不要となったプルトニウム）の量を毎年公表すること等を定めた国際的な指針を策定する。

２．経　緯

①1994年２月以来、本年９月まで13回の会合が開催され、指針について合意に達した。

②検討に参加した国は、米、露、英、仏、中、日、独、ベルギー、スイスの９ヶ国。他にIAEA、EUがオブザーバーとして参加。

３．指針のポイント

①核燃料サイクル等のプルトニウム利用計画を明らかにするとともに、各国の毎年末のプルトニウム保有量を共通の様式によって、施設区分（再処理施設、加工施設、原子炉施設等）ごとに公表する。

②各国がプルトニウムの利用を行ううえでの安全確保、核不拡散等についての基本的な原則を示す。

４．公表の手順

12月１日　IAEAに対し、指針を採択する旨の口上書（別紙１）を発出

12月５日　プルトニウム利用計画についてのステートメント（別紙２）及び1996年12月末現在のプルトニウム保有量（別紙３）をIAEAに提出

12月８日　IAEA理事会において、各国が指針を採択した旨を報告
指針、プルトニウム保有量等を公表

NOTE VERBALE

The Permanent Mission of Japan to the International Organizations in Vienna presents its compliments to the Director General of the International Atomic Energy Agency and has the honour to present information on the policies which the Government of Japan has decided to adopt in the management of plutonium as specified in the attached guidelines.

It is the continuing intention of the Government of Japan to ensure that holdings of plutonium under its jurisdiction, like those of other nuclear material, are managed safely and effectively in accordance with its international commitments and in ways which will reduce the risk of the proliferation of nuclear weapons and ensure the protection of workers, the general public and the environment. It also intends to publish regular information on the way in which it discharges these responsibilities.

The guidelines attached to this note set out the specific policies which the Government of Japan has decided to apply to the management of plutonium.

In the field of non-proliferation, these policies form part of the Government of Japan's continuing implementation of its obligations under the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), of its Safeguards Agreement with the Agency and of its other relevant commitments, and contribute to the achievement of the Principles and Objectives for Nuclear Non-Proliferation and Disarmament adopted at the NPT Review and Extension Conference in New York in May 1995.

The Government of Japan believes that the management of highly enriched uranium should be subject to similar guidelines and intends to consult with other like-minded Governments in order to explore the possibility of establishing such guidelines.

The Government of Japan expresses its hope that other States which separate, hold, process or use plutonium in their civil nuclear activities will adopt similar policies.

The Government of Japan requests the Director General of the International Atomic Energy Agency to circulate this note and its attachments, as well as any statements subsequently provided in accordance with the guidelines, to all Member States for their information.

The Permanent Mission of Japan avails itself of this opportunity to renew to the Director General of the International Atomic Energy Agency the assurances of its highest consideration.

1 December 1997
Vienna
To the Director General of the
International Atomic Energy Agency

GUIDELINES FOR THE MANAGEMENT OF PLUTONIUM

General[1]

1. Each State has an inalienable right to develop research, production and use of nuclear energy for peaceful purposes. This right is accompanied by sovereign responsibility for the use and management of all nuclear materials under its jurisdiction. Materials, however, which can be used for the manufacture of nuclear explosive components without transmutation or further enrichment are particularly sensitive and require special precautions. This paper sets out guidelines for the responsible management by Governments of plutonium in all peaceful nuclear activities. Although these guidelines do not apply to the management of plutonium contained in spent fuel[2] or of highly enriched uranium, the Government of Japan recognizes the sensitivity of these materials and the need to manage them with the same sense of responsibility as the plutonium covered by these guidelines.

2. Plutonium as referred to in the following guidelines means:-

- separated plutonium;
- plutonium contained in unirradiated mixed oxide fuel elements;
- plutonium contained in other unirradiated fabricated goods;
- plutonium in the course of manufacture or fabrication or contained in unirradiated goods in the course of manufacture or fabrication.

3. These guidelines apply to the management of all plutonium in all peaceful nuclear activities, and to other plutonium after it has been designated by the Government concerned as no longer required for defence purposes.

4. Notwithstanding the above, these guidelines do not apply to:-

---

1. These guidelines should be read in conjunction with the Note Verbale, dated 1 December 1997, communicating them to the Director General of the International Atomic Energy Agency (IAEA).

2. Except for the publication of estimated amounts of plutonium contained in spent civil fuel which is envisaged in paragraph 14(iii) below.

i. plutonium with an isotopic concentration of plutonium 238 exceeding 80%;

ii. plutonium used in gram quantities or as a sensing component in instruments;

iii. plutonium which has been exempted from safeguards by the International Atomic Energy Agency (IAEA) under the procedures set out in paragraph 37 of INFCIRC 153 and the corresponding paragraph of the Safeguards Agreement between the IAEA and the Government of Japan;

iv. plutonium on which IAEA safeguards have been terminated under the procedures set out in paragraphs 11, 13 and 35 of INFCIRC 153 and the corresponding paragraph of the Safeguards Agreement between the IAEA and the Government of Japan.

Non-Proliferation and International Safeguards

5. Plutonium will continue to be handled in accordance with the Government of Japan's obligations under the Treaty on the Non-Proliferation of Nuclear Weapons, its Safeguards Agreement with the IAEA, and its other nuclear non-proliferation commitments.

Responsible Handling

6. Plutonium will continue to be handled in accordance with current internationally recognised standards for radiological protection[3] and nuclear safety[4], as accepted by the Government of Japan, and its other relevant international commitments[5], at all stages of production, separation, processing, fabrication, use, transport, storage and disposal.

Physical Protection

7. In applying measures for the physical protection of plutonium in use, storage or transport (including international transport), the Government of Japan will apply as

---

3. Notably the IAEA's Basic Standards of Radiological Protection, and the standards derived from them.

4. Notably the IAEA's Fundamentals of Nuclear Safety and the standards derived from them, as well as the regulations of the IAEA and those of the IMO and other international organisations for the safe transport of nuclear materials.

5. For example, the International Convention on Nuclear Safety and various international conventions dealing with the safe transport of nuclear materials etc.

appropriate the requirements of the Convention on the Physical Protection of Nuclear Material and the note on "Levels of Physical Protection" attached to this paper as Annex A, taking account of the recommendations on the Physical Protection of Nuclear Material published by the IAEA as INFCIRC 225, Rev.3.

8. Until they are used (including use for research or development) or disposed of, holdings of separated plutonium in excess of 15 grams will only be stored at reprocessing plants, at fabricating plants, or at sites authorised by the Government of Japan for that purpose. In authorising storage sites, the Government of Japan will bear in mind the desirability on security grounds of limiting the number of sites where such material is held.

Nuclear Material Accountancy and Control

9. Plutonium will be subject to an effective system of nuclear material accountancy and control, based on a system of material balance areas[6]. Such a system will require the keeping for each material balance area of accounting records of regular physical inventories[6] and the measurement results used in determining them, of all inventory changes[6], in such detail as to permit the book inventory[6] to be determined at any time, and of any adjustments[6] and corrections made in respect of physical inventories and book inventories. It will also make provision for:-

(a) a measurement system for the determination of the quantities of plutonium received, produced, shipped, lost, or otherwise removed from inventory and the quantities on inventory. This system will either conform to the latest international standards or be equivalent in quality to such standards;

(b) the evaluation of the precision and the accuracy of measurements and the estimation of measurement uncertainty;

(c) procedures for identifying, reviewing and evaluating differences in shipper/receiver measurements;

(d) procedures for taking a physical inventory[6];

---

6. This term has the same definition as in paragraphs 98-116 of IAEA Document INFCIRC 153 ("The Structure and Content of Agreements between the Agency and States required in connection with the Treaty on the Non-Proliferation of Nuclear Weapons").

(e) procedures for the evaluation of accumulations of unmeasured inventory and unmeasured losses;

(f) a system of records and reports showing, for each material balance area, the inventory of plutonium and the changes in that inventory including receipts into and transfers out of the material balance area; and

(g) provisions to ensure that the accounting procedures and arrangements are being operated correctly.

Provision will also be made for the regular verification of accountancy records.

International Transfers

10. Before authorising transfers of plutonium for peaceful purposes to any non-nuclear weapon State, exceeding 50 grams to one recipient[7] country in any period of 12 months, the Government of Japan will require formal assurances from the Government of the recipient State that:-

i. the plutonium will be used exclusively for peaceful purposes and will not be put to any use which would result in any nuclear explosive device;

ii. the plutonium will be subject to IAEA Safeguards under an agreement whose duration corresponds at least to the actual use of the plutonium in the recipient State and which provides that the rights and obligations of the parties continue to apply in connection with that plutonium and any special fissionable material produced, processed or used in connection with it until the Agency has terminated safeguards on them in accordance with its normal procedures;

iii. the plutonium will be placed under effective physical protection in accordance with the requirements of paragraph 7 of these guidelines in order to prevent unauthorised use and handling. Responsibilities for the transport of the plutonium will be clearly defined in accordance with the requirements of the Convention on the Physical Protection of Nuclear Material;

iv. the plutonium will not be further transferred to a third country without the prior consent of the Government of Japan. Any such further transfers are to be subject to the requirements of this paragraph and of paragraphs 11 and 12 below.

---

7 The "recipient" country or State is the country or State in which the intended recipient (importer) belongs; the "recipient Government" is the government of that country or State. The "supplier" Government is the Government responsible for authorising the export; the "supplier country" or "supplier State" is the country or State governed by the "supplier Government".

11. In addition, before any shipment of separated plutonium exceeding 50 grams to one recipient country in any period of 12 months is undertaken, the Government of Japan will require the provision by the intended recipient of a certificate stating, besides the quantity, the approximate date of delivery, the final destination and end-use, and the timetable foreseen for utilisation. The recipient Government will confirm the correctness of this information.

12. Any such proposed shipment of separated plutonium will be discussed between the supplying and recipient Governments in the light of their non-proliferation commitments, the information published by the recipient Government on its holdings of separated plutonium and its strategy for plutonium use, the intended recipient's certificate of end-use, and other relevant circumstances.

Policies for the Management of Plutonium

13. The Government of Japan is committed to management of plutonium in ways which are consistent with its national decisions on the nuclear fuel cycle and which will ensure the peaceful use or the safe and permanent disposal of plutonium. The formulation of that strategy will take into account: the need to avoid contributing to the risks of nuclear proliferation, especially during any period of storage before the plutonium is either irradiated as fuel in a reactor or permanently disposed of; the need to protect the environment, workers and the public; the resource value of the material, the costs and benefits involved and budgetary requirements; and the importance of balancing supply and demand, including demand for reasonable working stocks for nuclear operations, as soon as practical.

Publication of Information

14. With a view to increasing the transparency and public understanding of the management of plutonium, the Government of Japan will therefore publish:-

i. occasional brief statements explaining its national strategy for nuclear power and the nuclear fuel cycle and, against that background, its general plans for managing national holdings of plutonium; and

ii. an annual statement, in the format set out at Annex B, of its holdings of all plutonium subject to these guidelines; and

iii. an annual statement, in the format set out in Annex C, of its estimate of the plutonium contained in its holdings of spent civil reactor fuel.

15. The Government of Japan is willing to exchange experience in implementing these guidelines with other governments who implement similar guidelines and, as appropriate, to cooperate with them in seeking solutions to any practical problems which may emerge. It will be ready to join with them in reviewing these guidelines in the light of experience with their application and changing circumstances at an agreed time not less than five years after the date on which these guidelines are notified to the Director General of the Agency.

1 December 1997

ANNEX A

LEVELS OF PHYSICAL PROTECTION

1. The purpose of physical protection of nuclear materials is to prevent unauthorised use and handling of these materials. This note records consensus among Governments who have adopted the Guidelines on the Management of Plutonium on the levels of protection to be ensured in relation to the amount of plutonium, and equipment and facilities containing it, taking account of international recommendations.

2. Implementation of measures of physical protection in each country is the responsibility of the Government of that country. Where the international transfer of plutonium is involved, the levels of physical protection on which these measures are to be based should be the subject of an agreement between supplier and recipient Governments. In this context these requirements should apply to transfers to all States.

3. The document INFCIRC/225 of the International Atomic Energy Agency entitled "The Physical Protection of Nuclear Material" and similar documents which from time to time are prepared by international groups of experts and updated as appropriate to reflect changes in the state of the art and state of knowledge with regard to physical protection of nuclear material are a useful basis for guiding States in designing a system of physical protection measures and procedures.

4. The categorisation of nuclear material presented below, as it may be up-dated from time to time by consensus among States implementing these guidelines, is to serve as the agreed basis for designating specific levels of physical protection in relation to different amounts of plutonium.

5. The levels of physical protection to be ensured in the use, storage and transport of plutonium will, as a minimum, include protection characteristics according to the amount involved as follows:-

a) where the amount of plutonium is more than 15 grams but less than 500 grams:-

- use and storage within an area to which access is controlled;

- transport under special precautions including prior arrangements among sender, recipient and carrier, and, in case of international transport, prior agreement between entities subject to the jurisdiction and regulation of supplier and recipient Governments respectively, specifying time, place and procedures for transferring transport responsibility;

b) where the amount of plutonium is more than 500 grams but less than 2 kilograms:-

- use and storage within a protected area to which access is controlled, ie an area under constant surveillance by guards or electronic devices, surrounded by a physical barrier with a limited number of points of entry under appropriate control, or any area with an equivalent level of physical protection;

- transport under special precautions including prior arrangements among sender, recipient and carrier, and, in case of international transport, prior agreement between entities subject to the jurisdiction and regulation of supplier and recipient Governments respectively, specifying time, place and procedures for transferring transport responsibility;

c) where the amount of plutonium is 2 kilograms or more:-

- protection with highly reliable systems against unauthorised use as follows:

- use and storage within a highly protected area, ie a protected area, as defined in (b) above to which, in addition, access is restricted to persons whose trustworthiness has been determined, and which is under surveillance by guards who are in close communication with appropriate response forces. Specific measures taken in this context should have as their objective the detection and prevention of any assault, unauthorised access or unauthorised removal of material;

- transport under the precautions for transport as identified in (a) and (b) above and, in addition, under constant surveillance by escorts and under conditions which assure close communication with appropriate response forces.

6. In the case of an international transfer, the supplier, together with the recipient, should take the steps necessary to confirm that the agencies or authorities having national responsibility for ensuring that prescribed levels of physical protection are adequately met and for coordinating recovery and response operations in the event of unauthorised handling or use of plutonium are in touch with one another. These national agencies should consult and cooperate as appropriate to secure the safe completion of the transfer.

ANNEX B

ANNUAL FIGURES FOR HOLDINGS OF CIVIL UNIRRADIATED PLUTONIUM

National Totals as of 31 Dec. 199..

	(Previous year's figures in brackets) Rounded to 100kg plutonium with quantities less than 50kg reported as such
1. Unirradiated separated plutonium in product stores at reprocessing plants.	___ (___)
2. Unirradiated separated plutonium in the course of manufacture or fabrication and plutonium contained in unirradiated semi-fabricated or unfinished products at fuel or other fabricating plants or elsewhere.	___ (___)
3. Plutonium contained in unirradiated MOX fuel or other fabricated products at reactor sites or elsewhere.	___ (___)
4. Unirradiated separated plutonium held elsewhere.	___ (___)

Note:

(i) Plutonium included in lines 1-4 above belonging to foreign bodies.	___ (___)
(ii) Plutonium in any of the forms in lines 1-4 above held in locations in other countries and therefore not included above.	___ (___)

(iii) Plutonium included in lines 1-4 above which is in international shipment prior to its arrival in the recipient State.	____	(____)

ANNEX C

ESTIMATED AMOUNTS OF PLUTONIUM CONTAINED IN SPENT CIVIL REACTOR FUEL

National Totals as of 31 Dec. 199..

	(Previous year's figures in brackets) Rounded to 1000kg plutonium with quantities less than 500kg reported as such
1. Plutonium contained in spent fuel at civil reactor sites.	___ (___)
2. Plutonium contained in spent fuel at reprocessing plants.	___ (___)
3. Plutonium contained in spent fuel held elsewhere.	___ (___)

Note:

i) The treatment of material sent for direct disposal will need further consideration when specific plants for direct disposal have taken concrete form.

ii) Definitions:

- Line 1: covers estimated amounts of plutonium contained in fuel discharged from civil reactors;
- Line 2: covers estimated amounts of plutonium contained in fuel received at reprocessing plants but not yet reprocessed.

我が国のプルトニウム利用計画について

１９９７年１２月

１．核燃料サイクルとプルトニウム利用

（１）核燃料サイクルの推進

我が国は、ウラン資源の有効利用による将来にわたるエネルギーの安定供給の確保、放射性廃棄物による環境への負荷の低減などの観点から、使用済燃料を再処理し、回収されたプルトニウムなどを有効利用する「核燃料サイクル」を原子力政策の基本としており、そのための技術開発を着実に進めている。

1997年１月、原子力委員会は、軽水炉でのプルトニウム利用（プルサーマル）、使用済燃料の管理等、当面の核燃料サイクルの具体的な施策についての決定を行い、同年２月には、これを政府として確認する閣議了解がなされた。

（２）使用済燃料の再処理

我が国は、使用済燃料の再処理について、現在、動力炉・核燃料開発事業団東海再処理工場（処理能力0.7トンU／日。1997年3月のアスファルト固化処理施設の事故により停止中。）にて行うほか、英国核燃料会社（ＢＮＦＬ）及び仏国核燃料会社（ＣＯＧＥＭＡ）への再処理委託契約により実施している。

また、日本原燃株式会社は、我が国初の商業用再処理工場として、青森県六ケ所村に年間再処理能力800トンUの再処理工場の建設を進めており、2003年1月に操業を開始する計画である。

（３）プルサーマル

ウラン資源の有効利用となり、現時点で最も確実なプルトニウムの利用方法であるプルサーマルについては、今後数十年にわたり我が国のプルトニウム利用の柱となるものと考えられている。原子力発電所を有する全ての電気事業者の共通の課題として位置づけられており、電気事業者においては、1999年から東京電力株式会社福島第一原子力発電所３号機及び関西電力株式会社高浜発電所４号機において、2000年から東京電力株式会社柏崎刈羽３号機及び関西電力株式会社高浜発電所３号機において開始し、2010年までには合計16～18基で実施する計画としている（このうち、2006年運転開始予定の電源開発株式会社大間原子力発電所については、全炉心MOX燃料のABWRとする計画である）。政府においては、地元での説明会、フォーラムの開催等積極的な取組を通じて、プルサーマルの実施に対する地元及び国民の理解を得る努力を行っている。

（4）高速増殖炉

高速増殖炉については、原型炉「もんじゅ」を建設し、発電プラントとしての性能確認等を行ってきたところ、1995年に２次冷却系ナトリウム漏えい事故が発生し、現在、運転を停止し安全総点検中。また、本事故を踏まえ、高速増殖炉開発の在り方について、原子力委員会の下の高速増殖炉懇談会において幅広く検討が行われた。

その結果取りまとめられた同懇談会の報告書においては、将来の非化石エネルギー源の一つの有力な選択肢として、高速増殖炉の実用化の可能性を追求するために、柔軟な計画の下に、高速増殖炉の研究開発を進めることが妥当とされた。さらに、高速増殖炉の実用化にあたっては、実用化時期を含めた開発計画について、安全性と経済性を追求しつつ、将来のエネルギー状況を見ながら、柔軟に対応していくことが必要とされている。

今後は、同報告書を踏まえて定められた原子力委員会の方針に沿って、「もんじゅ」を含む高速増殖炉の研究開発を進めることとしている。

２．核燃料サイクル計画の透明性の向上

（1）平和利用の堅持と透明性向上のための取組

我が国は、原子力基本法に基づき、厳に平和目的に限り原子力開発利用を推進してきており、核燃料サイクルを推進するに当たっては、核拡散に係る国際的な疑念を生じないよう核物質管理に厳重を期すことはもとより、我が国において計画遂行に必要な量以上のプルトニウム、すなわち、余剰プルトニウムを持たないとの原則を堅持しつつ、プルトニウム利用計画の透明性の確保に努めている。

また、国際的には、核兵器の不拡散に関する条約（NPT）に加入し、これを厳守するとともに、包括的核実験禁止条約（CTBT）については、1997年7月に批准している。

（2）IAEA保障措置の適用

我が国は、NPTに基づき、IAEAとの間で保障措置協定を締結し、国内原子力活動に係る全ての核物質についてIAEAのフルスコープ保障措置を受け入れている。同時に、国自らも、核原料物質、核燃料物質及び原子炉の規制に関する法律により、国内保障措置制度を運用している。具体的には、原子力事業者等に対し、計量管理規定の認可を受けることを義務付け、核燃料物質在庫変動報告等の各種計量管理に関する報告書を国に提出することを義務付けるとともに、その内容について国の査察官及びIAEA査察官の査察により検認を受けている。これらにより、我が国の原子力活動が平和目的に限り行われていることが確認されている。

また、IAEA保障措置の強化・効率化に向けた取組みについても、重要な課題と認識しており、できる限り早期の実施に向けて最善の努力を行うこととしている。

（3）プルトニウム需給見通しの作成

余剰のプルトニウムを持たないとの原則の下で、我が国の核燃料サイクル計画が、これに沿ったものとなっていることを内外に明らかにするため、長期的な2010年頃までのプルトニウム需給見通しを、関連する計画の進捗状況を踏まえつつ、適時に作成し公表してきている。

（4）分離プルトニウム管理状況の公表

我が国は、1994年から関係国に先駆けて分離プルトニウムの管理状況、すなわち施設の区分ごとに存在するプルトニウム量を原子力白書を通じて公表し、透明性の向上を図っている。

別紙3

ANNEX B

民生未照射プルトニウムの年次保有量

国内総計

1996年12月31日現在
(前年量は括弧内に示す)
100 kgPu単位に丸めた量
50kg未満の場合は
そのように報告

[kgPu]

1. 再処理工場製品貯蔵庫中の未照射分離プルトニウム	600	( )
2. 燃料加工又はその他製造工場又はその他の場所での製造又は加工中未照射分離プルトニウム及び未照射半加工又は未完成製品に含まれるプルトニウム	3100	( )
3. 原子炉又はその他の場所での未照射MOX燃料又はその他加工製品に含まれるプルトニウム	900	( )
4. その他の場所で保管される未照射分離プルトニウム	400	( )

注記

(i) 上記1-4のプルトニウムのうち所有権が他国であるもの	0	( )
(ii) 上記1-4のいずれかの形態のプルトニウムであって他国に存在し、上記1-4には含まれないもの	15100	( )
(iii) 上記1-4のプルトニウムのうち国際輸送中で受取国へ到着前のもの	0	( )

使用済民生原子炉燃料に含まれるプルトニウム推定量

国内総計

1996年12月31日現在
(前年量は括弧内に示す)
1000 kgPu単位に丸めた量
500kg未満の場合は
そのように報告

[kgPu]

1. 民生原子炉における使用済燃料に含まれるプルトニウム	48000	( )
2. 再処理工場における使用済燃料に含まれるプルトニウム	1000	( )
3. その他の場所で保有される使用済燃料に含まれるプルトニウム	500 kgPu未満	( )

注記

i) 直接処分計画が具体化した時、直接処分の行われる物質の取扱いについてはさらなる検討が必要。

ii) 定義

—1： 民生原子炉から取り出された燃料に含まれるプルトニウムの推定量

—2： 再処理工場で受け入れた燃料の内、未だ再処理されていない燃料に含まれるプルトニウムの推定量