

March 26, 1997

Lynn Newbill  
Ballistic Missile Defense Technology Information Center  
1755 Jefferson Davis Highway  
Suite 708  
Arlington VA 22202

Dear Mr. Newbill:

Thank you for your interest in receiving a copy of Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies.

Under the best of circumstances, I would be happy to send you a copy of this book. However, the Oxford University Press has made available to us only a limited quantity of books, most of which have already been promised to other individuals or organizations.

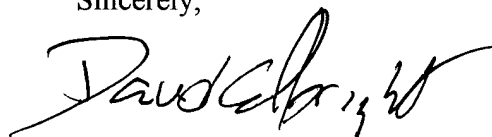
I regret, therefore, to inform you that I will not be able to send you a copy of the book. I have enclosed for your information copies of vugraphs that summarize the books main findings.

If you wish to purchase a book, they can be ordered at any major book retailer. You can also order books directly from the Oxford University Press by calling 1-800451-7556. The Stockholm International Peace Research Institute also has more information about this book, including ordering information, on its web page at <http://www.sipri.se/pubs/pressre/abbk2.html>. For your information, neither I, nor ISIS, nor the other authors or their organizations receive royalties from book sales.

Thank you again for your interest in our work. I am sorry that I could not fulfill your request. If you have any questions, please feel free to contact me at (202) 547-3633.

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Sincerely,



David Albright  
President

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Personal Author: Albright, D.; Berkhout, F.; Walker, W.

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Comments on Document: This book can be ordered directly from Oxford University Press, 1-800-451-7556.

Abstract: These vugraphs summarize the main findings of a three-year study, "Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies." According to the three nuclear experts who co-wrote the book, tons of weapons-grade plutonium and uranium produced over the last 50 years are inadequately monitored, risking misuse by rogue states and terrorists. The study concludes that there is too much nuclear material that's too easily obtainable. The authors urged President Clinton and Russian President Yeltsin to launch an international initiative to strengthen controls on weapons-grade plutonium and uranium.

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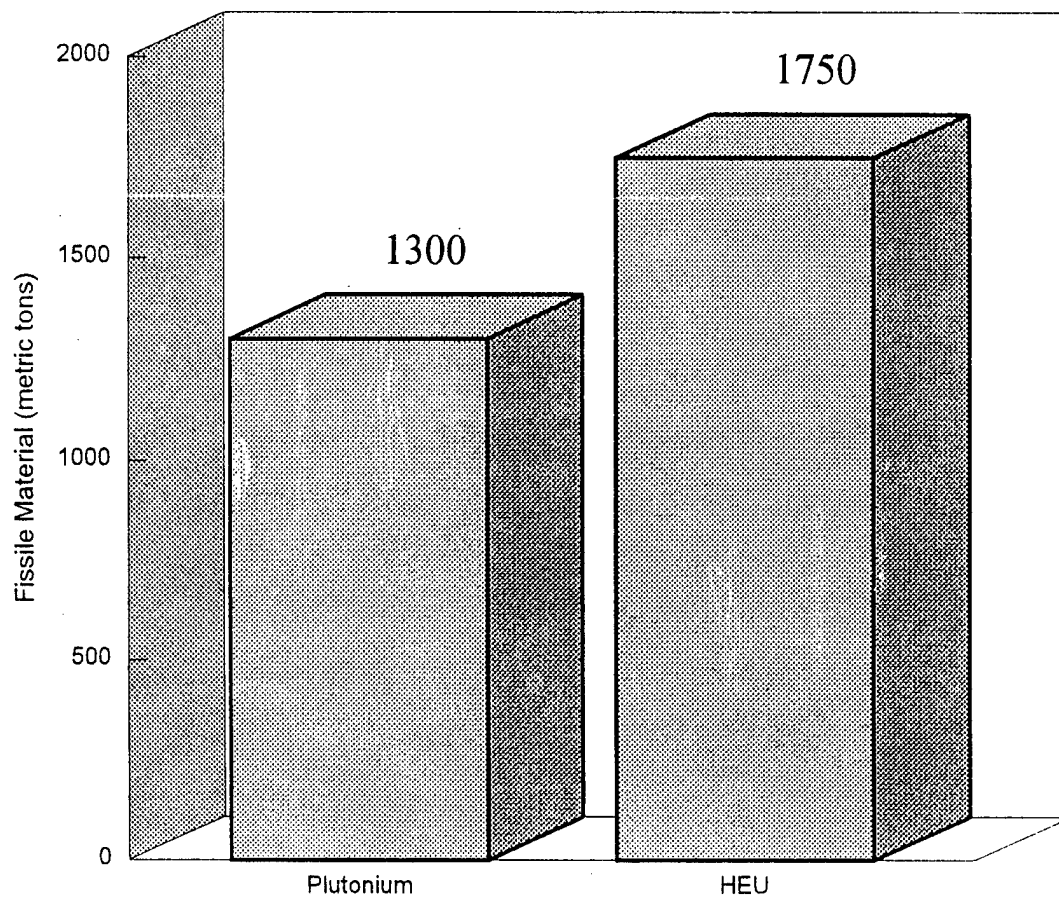
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# World-Wide Plutonium and HEU\* Estimates

central estimates for the end of 1996 in metric tons

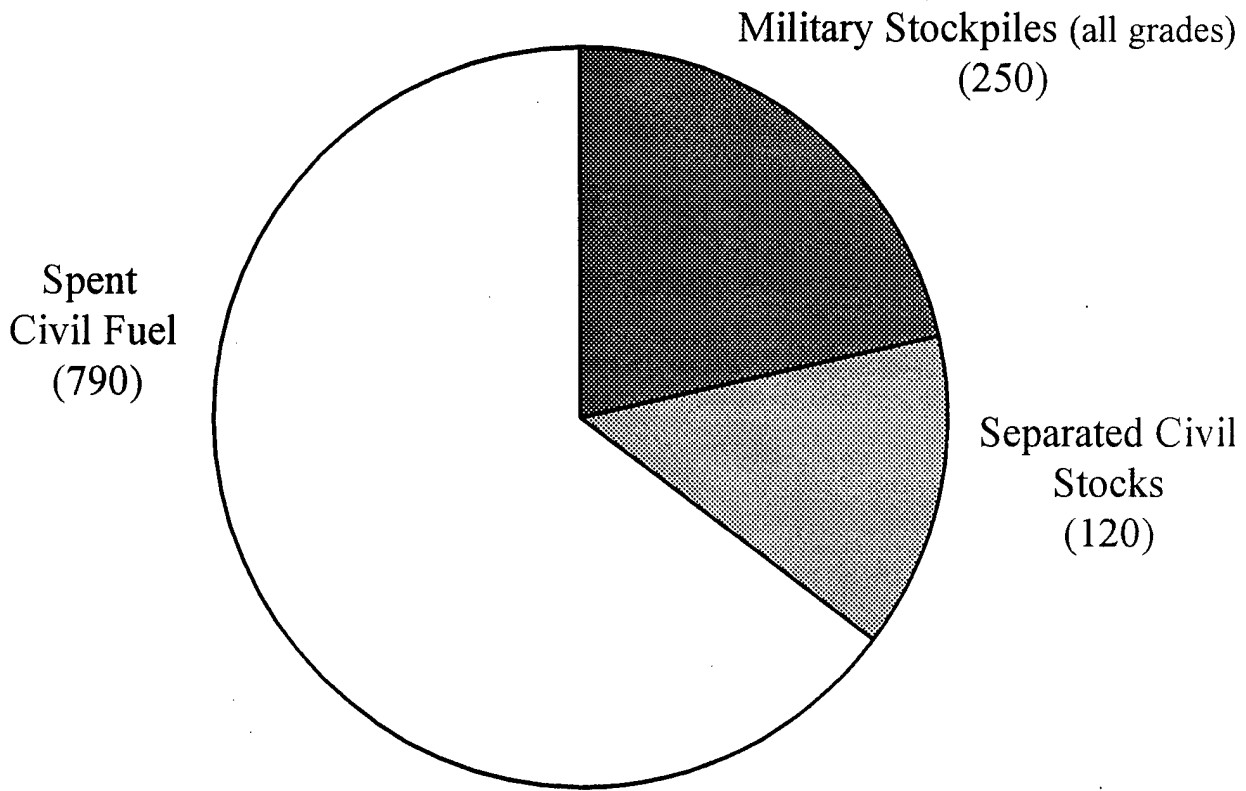


\* HEU refers to Weapon Grade Uranium-Equivalent

Source: Albright, Berkhout and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.

# World Inventory of Plutonium

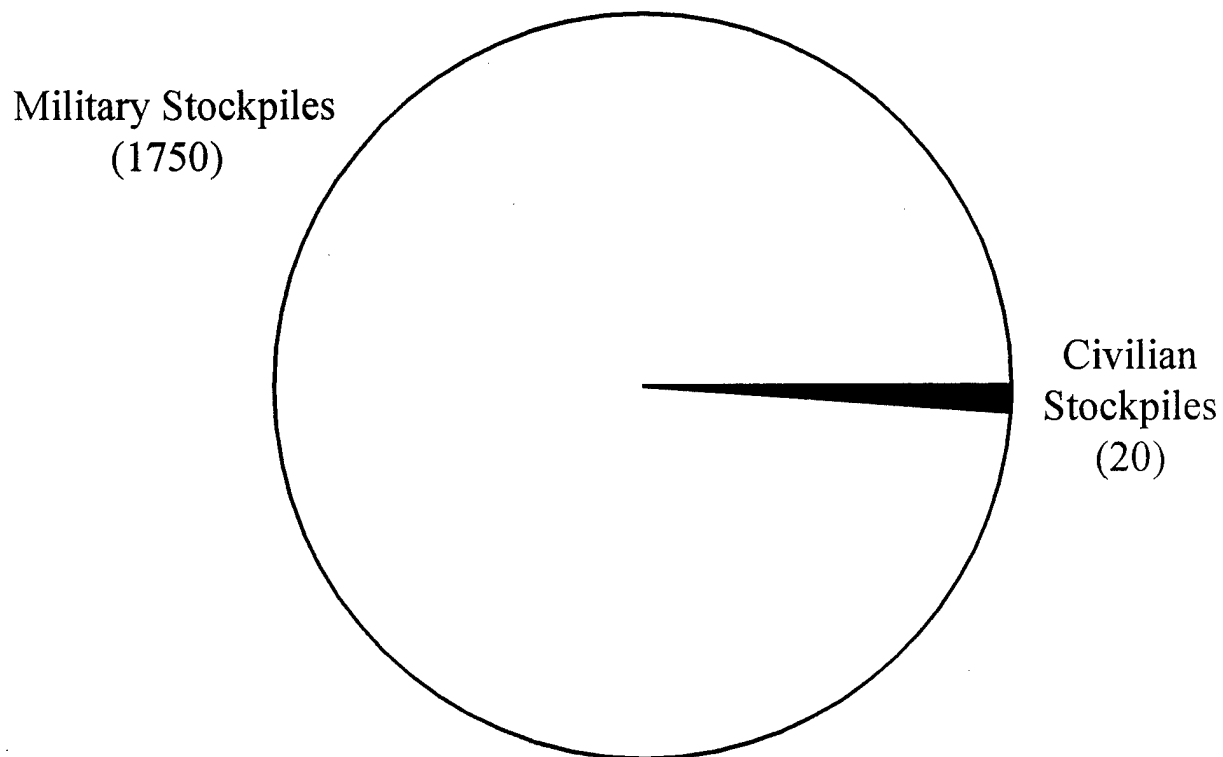
central estimates for the end of 1994 in metric tons



Source: Albright, Berkhout, and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.

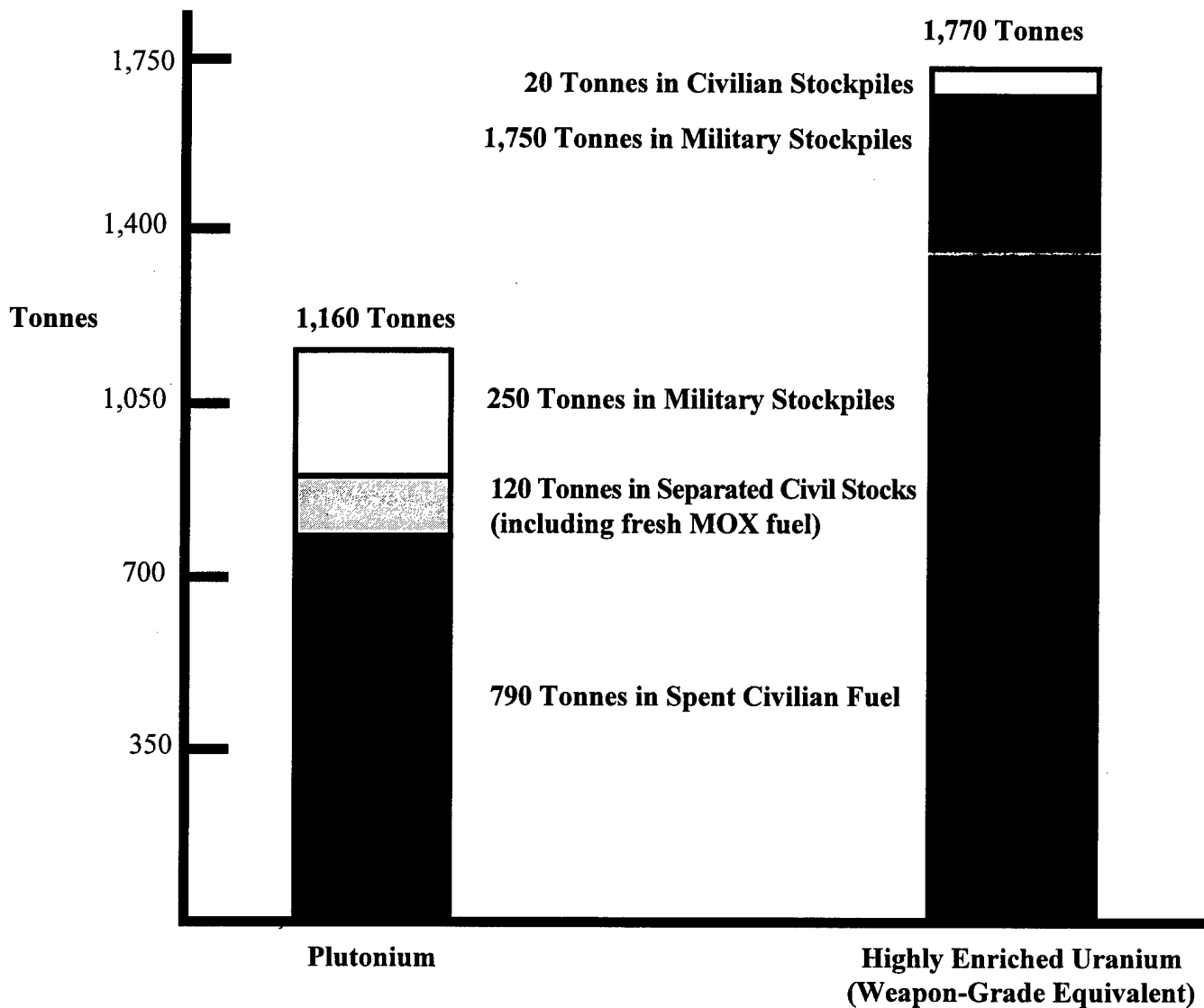
# World Inventory of Weapon Grade Uranium-Equivalent

central estimates for the end of 1994 in metric tons



Source: Albright, Berkhout, and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.

## CENTRAL ESTIMATES OF WORLD-WIDE PLUTONIUM AND HIGHLY ENRICHED URANIUM (HEU) INVENTORIES

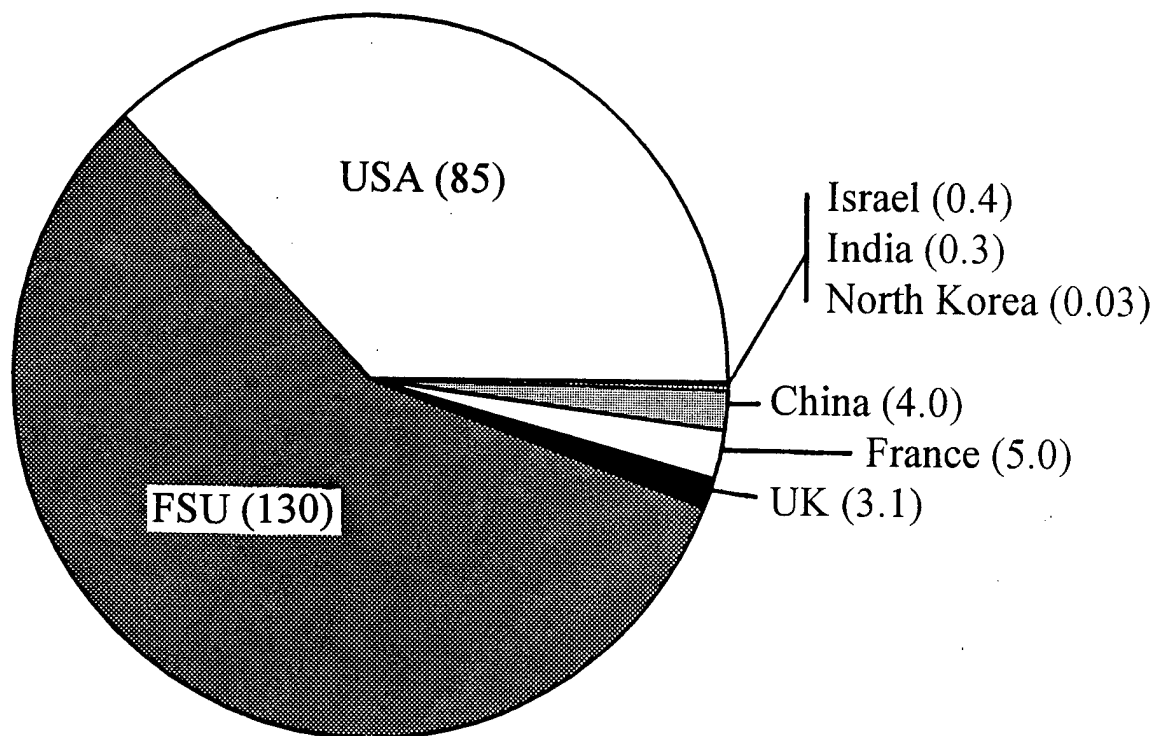


- Notes:**
- (1) Estimates as of 31 December 1994.
  - (2) The uncertainty of the central estimate for plutonium is about 10 percent and the uncertainty for the central estimate of HEU is about 25 percent.
  - (3) The HEU estimate represents a simplification to ease comparison between countries and to take account of a lack of information on Russian stocks. Actual quantities of HEU are slightly higher. For example, the U.S. weapons, reserve, and excess inventory is about 750 tonnes of HEU, which corresponds to about 645 tonnes of weapon-grade uranium equivalent. Information about Russia allows only an estimate of weapon-grade uranium equivalent.
  - (4) One tonne is equal to 1,000 kilograms, or 2,200 pounds. Therefore the total plutonium inventory is 2,420,000 pounds, and the total HEU inventory is 3,828,000 pounds.

**Source:** Albright, Berkhout and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.

# Weapon-Grade Plutonium in Nuclear Weapon and Threshold States

central estimates for the end of 1994 in metric tons



Source: Albright, Berkhout, and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.

## Nuclear Weapons' States Inventories of HEU, after losses and draw-downs

Figures are central estimates as of 31 Dec 1994, in metric tons

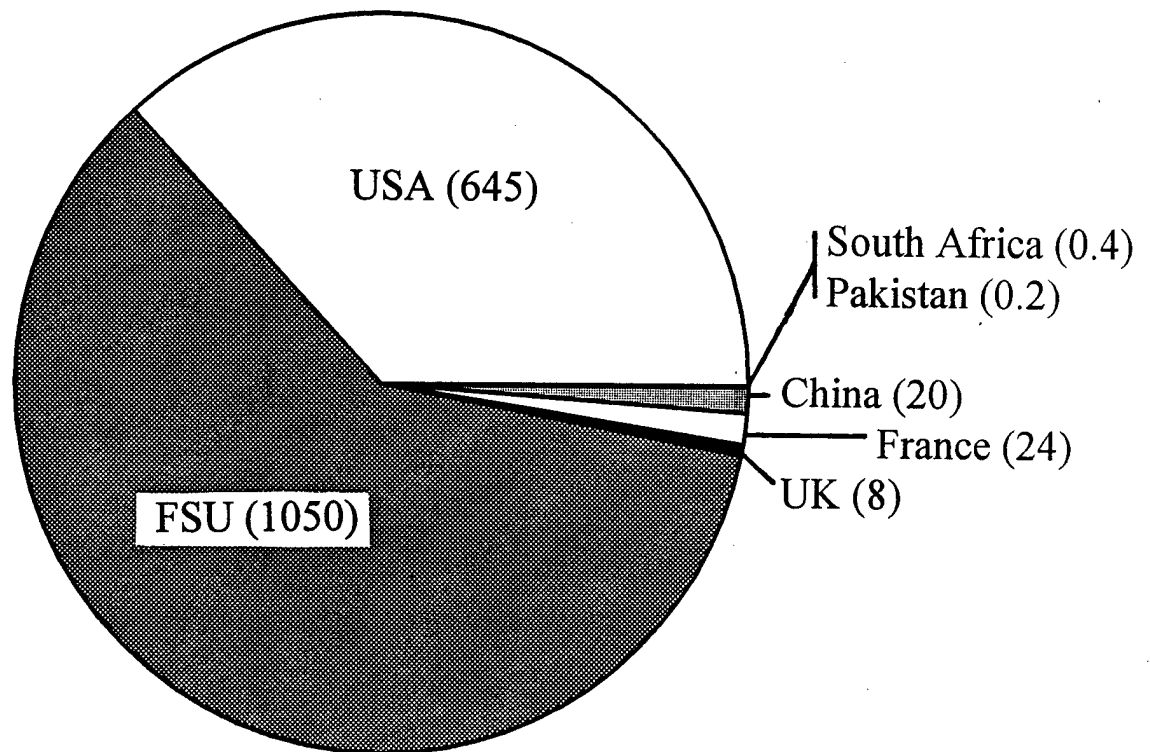
|               | Weapon-grade Equivalent | 80% <sup>235</sup> U-Equivalent |
|---------------|-------------------------|---------------------------------|
| <b>FSU</b>    | <b>1050 ± 30%</b>       | <b>1220</b>                     |
| <b>USA</b>    | <b>645 ± 10%</b>        | <b>750</b>                      |
| <b>France</b> | <b>24 ± 20%</b>         | <b>28</b>                       |
| <b>China</b>  | <b>20 ± 25%</b>         | <b>23</b>                       |
| <b>UK</b>     | <b>8 ± 25%</b>          | <b>9</b>                        |

Source: Albright, Berkhout and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.



# Weapon Grade Uranium-Equivalent in Nuclear Weapon and Threshold States

central estimates for the end of 1994 in metric tons



Source: Albright, Berkhout, and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.

## Nuclear weapon states' and threshold states' military inventories of weapon-grade plutonium and highly-enriched uranium, after losses and draw downs.

Figures are central estimates as of 31 Dec. 1994, in metric tons (without uncertainty bands).

|                                | Plutonium | HEU                       |
|--------------------------------|-----------|---------------------------|
| <i>Nuclear weapon states</i>   |           |                           |
|                                |           | (weapon grade equivalent) |
| USA                            | 85        | 645                       |
| FSU                            | 130       | 1,050                     |
| UK                             | 3.1       | 8                         |
| France                         | 5.0       | 24                        |
| China                          | 4.0       | 20                        |
| <i>Subtotal (rounded)</i>      | 225       | 1750                      |
| <i>Threshold states</i>        |           |                           |
| Israel <i>de facto</i>         | 0.44      | --                        |
| India <i>de facto</i>          | 0.30      | --                        |
| Pakistan <i>de facto</i>       | --        | 0.2                       |
| North Korea <i>frozen</i>      | 0.03      | --                        |
| South Africa <i>dismantled</i> | --        | 0.4 (> 80%)               |
| <i>Subtotal</i>                | 0.77      | 0.6                       |

Source: Albright, Berkhout and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.

# Threshold States' Nuclear Weapons Status

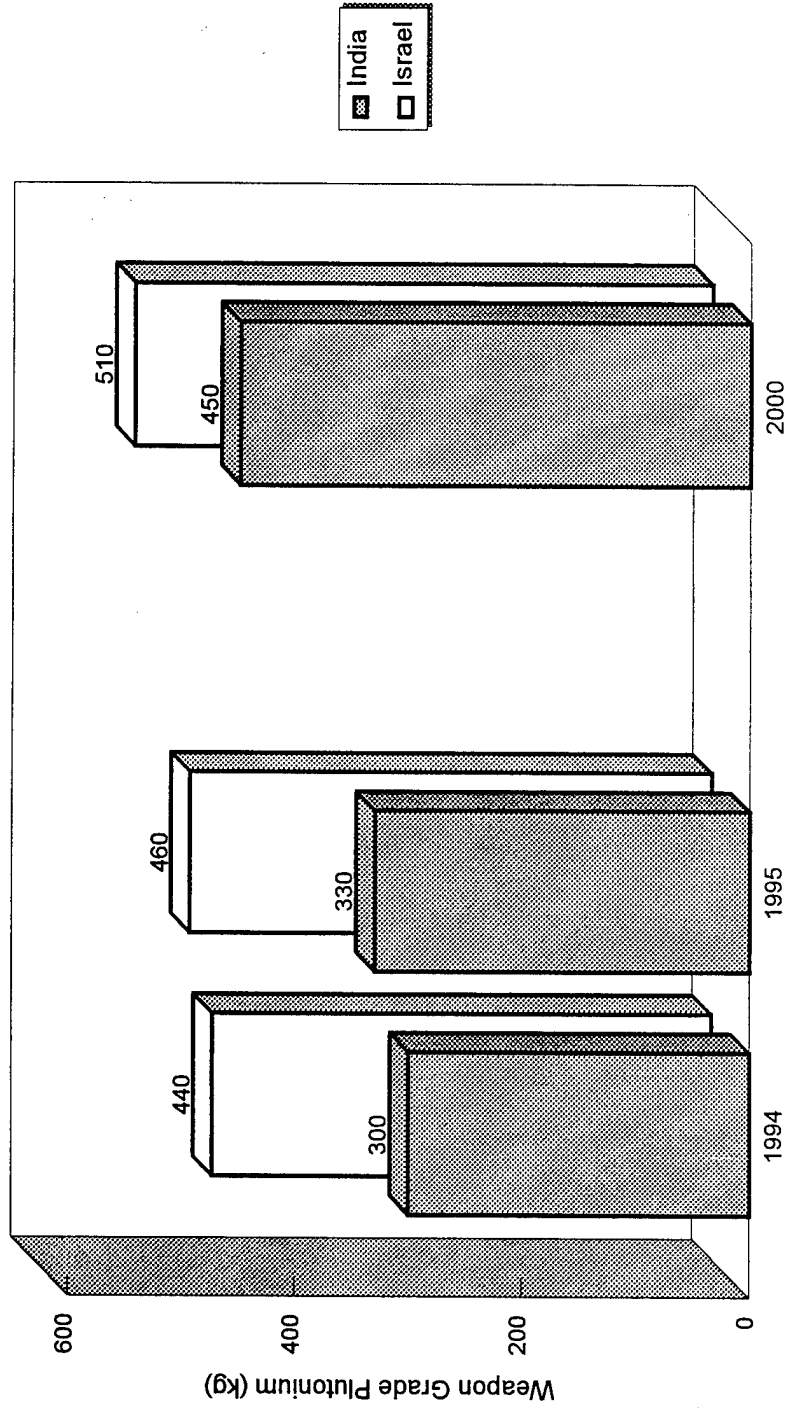
Figures are for the end of 1994, in kilograms.

|                                      | Plutonium<br>(kg) | Weapon-Grade Uranium<br>(kg) | # of Nuclear Weapons<br>(rough estimate) |
|--------------------------------------|-------------------|------------------------------|------------------------------------------|
| Israel                               | 440 ± 25%         | --                           | 60-110                                   |
| India                                | 300 ± 30%         | --                           | 20-25                                    |
| Pakistan                             | --                | 210 ± 25%                    | 5-10                                     |
| North Korea - frozen                 | 30 ± 20%          | --                           | 1-2(?)                                   |
| South Africa -<br>weapons dismantled | --                | 400 (>80%)                   | 7                                        |

Source: Albright, Berkhout and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.

# India and Israel 1994 to 2000

Central Estimates of Weapon-Grade Plutonium Stocks



Source: Albright, Berkhout and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.

## Threshold States' Inventories of Weapon-Grade Plutonium and Weapon-Grade Uranium

Figures of mass are central estimates in kilograms on 31 December 1994, 31 December 1995 and by 2000.

| Country         | By end of 1994 |            | By end of 1995 |            | By 2000       |       |
|-----------------|----------------|------------|----------------|------------|---------------|-------|
|                 | WGPu           | WGU        | WGPu           | WGU        | WGPu          | WGU   |
| <b>Israel</b>   | 440            | --a        | 460            | --a        | 510           | --a   |
| <b>India</b>    | 300            | Negligible | 330            | Negligible | 450           | ?     |
| <b>Pakistan</b> | Negligible     | 210        | Negligible     | 210        | kg quantities | 210 b |

a Public Information provides no indication of whether Israel has an enrichment capability or a stock of HEU

b Pakistan is assumed to continue its moratorium on HEU production

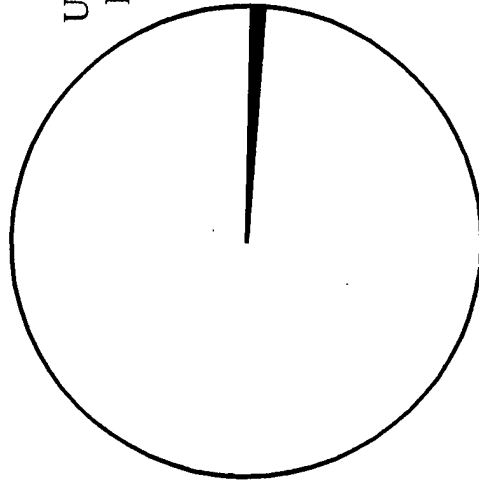
Source: Albright, Berkhout and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.

# World Inventory of Fissile Materials safeguarded and unsafeguarded stocks

central estimates for the end of 1993 in metric tons

## HEU

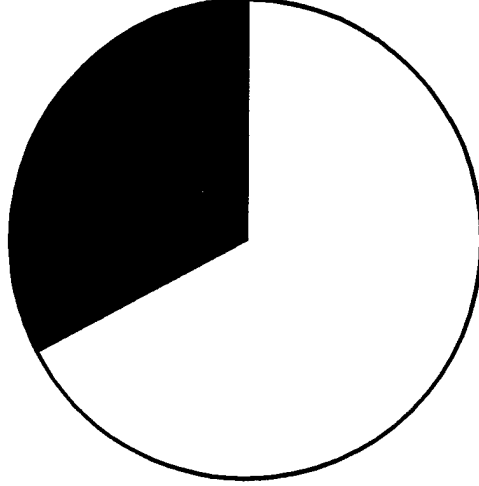
(weapon grade uranium-equivalent)



Unsafeguarded  
(1760)

Under IAEA or  
EURATOM Safeguards  
(<15)

## Plutonium



Unsafeguarded  
(780)

Under IAEA safeguards  
(380)

Source: Albright, Berkhout, and Walker. Plutonium and Highly Enriched Uranium 1996: World Inventories, Capabilities and Policies, SIPRI and Oxford University Press, 1997.