
Nuclear Weapons Databook

US - USSR/Russian Strategic Offensive Nuclear Forces 1945-1996

by

Robert S. Norris
and
Thomas B. Cochran

January 1997



Natural Resources Defense Council, Inc.

1200 New York Avenue, NW, Suite 400

Washington, DC 20005

Tel: 202-289-6868

FAX: 202-289-1060

Internet: RNorris@nrdc.org

TCochran@nrdc.org

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NATURAL RESOURCES DEFENSE COUNCIL, INC
1200 New York Avenue, N.W., Suite 400
Washington D.C. 20005

Voice: 202-289-6868 (main)
202-289-2369 (Norris)
202-289-2372 (Cochran)
FAX: 202-289-1060
Internet: RNorris@nrdc.org
TCochran@nrdc.org

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INTRODUCTION

A regular element of the debate about nuclear weapons and arms control is the presentation of data on the relative levels of US and USSR/Russian strategic forces, often in the form of tables or charts. Frequently, the data presented is unclear in terms of where it came from or what assumptions were used to construct it. Some tables present current "total" forces, others "on-line" forces, "alert" forces, "generated alert" forces, or "SALT and /or START accountable" forces. Each is important and more usable if detail about the sources and assumptions is provided. Historical tables compound the difficulties by not always being explicit about the time of the year (i.e., beginning Fiscal Year, beginning calendar year, or some other time).

There has long been a need for an accurate, comprehensive and consistent accounting of the growth and composition of US and Soviet /Russian strategic nuclear forces. Such an accounting can provide a context for policy decisions, allow for better assessments of current force levels and future trends, and enrich historical accounts of the nuclear age.

This Working Paper reflects a preliminary attempt to assemble accurate numbers through the tables and figures presented below.¹ Tables 1-8 depict US and USSR/Russian intercontinental ballistic missile forces, submarine-launched ballistic missile forces, and bomber forces, with the weapons they carried year-by-year from 1945 through 1996. In order to avoid any confusion in the presentation of the information Tables 3 through 8 have extensive footnotes which identify and clarify the assumptions which have been made. In addition, Figures 1 through 8 represent the data in a visual and comparative way. Supplementing the data about strategic forces are Tables 9, 10 and 11, and Figures 9-12 which present estimates of the total nuclear stockpiles (strategic and tactical) for both countries.²

The strategic tables and figures in this Working Paper depict strategic offensive "force levels," that is, "on-line" missile launchers as well as those in overhaul, repair, conversion, and

¹ Reader's additions and corrections are appreciated. An earlier version of this Working Paper was published in 1990.

² It should be underscored that there are many questions about the types and number of USSR/Russian tactical nuclear weapons.

modernization. They do not include non-operational test missiles or test launchers, or spare missiles (either maintenance spares or reloads). Bomber figures include US FB-111A medium bombers which, though are not accountable under the SALT treaties, were included in US strategic nuclear war plans. Soviet Backfire bombers are not included, because they were considered to have theater roles and are not included as strategic forces under the SALT or START treaties. US bomber figures do not include the several hundred SALT/START-accountable B-52 bombers which are not operational and in storage at Davis-Monthan Air Force Base, Arizona. The strategic tables do not depict strategic defensive forces, which are anti-ballistic missile systems, surface-to-air missiles, interceptor aircraft and air-to-air missiles. The strategic tables do not depict those weapons capable of striking the homelands of the US or USSR but are not included in strategic war plans or were the subject of SALT negotiations. These would include such weapons as sea-launched and ground launched cruise missiles, IRBMs, and aircraft weapons aboard aircraft carriers which were a part of strategic nuclear war plans in the 1950s and of several early Single Integrated Operational Plans (SIOP) in the 1960s.

It is important to distinguish between force levels and alert forces. Alert forces are those missiles that could, under normal conditions, be fired within a matter of minutes or in the case of bombers could be airborne within approximately fifteen minutes. During the Cold War the US kept its strategic forces at much higher states of alert than did the Soviet Union. For the US, alert forces comprised approximately two-thirds of on-line forces. These included virtually all on-line ICBMs, 60 percent of on-line strategic submarines and SLBMs, and 30 percent of the Primary Authorized Aircraft (PAA) bomber force. Prior to September 1991 US bomber weapons on alert constituted about 36 percent of the total weapons on alert, with 33 percent on strategic submarines and 31 percent on ICBMs. In the case of strategic submarines it is also important to distinguish between alert forces and modified alert forces. In the case of the 60-65 percent of the submarines that are at sea, about one-half of those constitute the alert force and could launch in a few minutes. The other half at sea are in a modified alert status, going to or coming from their designated areas, but still capable of launching missiles in a matter of hours.³

³ SASC, FY 1984 DOD, Part 5, p. 2504; Donald R. Cotter, "Peacetime Operations: Safety and Security," in Ashton Carter, John D. Steinbruner, Charles A. Zraket, eds., *Managing Nuclear Operations* (Washington, D.C.: The Brookings Institution, 1987), p. 25.

The Soviet/Russian strategic bomber force was not kept on alert. Instead, the Russians relied on the "generated alert" since they believed that there would be time to launch or disperse bombers. During the Cold War more than 80 percent of Soviet ICBMs were on alert,⁴ and could be fired within minutes.⁵ The Soviet Union kept only about 15 to 20 percent of its strategic submarines and SLBM force at sea at any given time. Another 15 to 20 percent of the alert SSBN force were at dockside with missiles capable of reaching targets in the U.S. from the Northern and Pacific Fleet bases. If time permitted a larger number of SSBNs could be flushed from their homeports. With the demise of the Soviet Union and severe budget problems the traditional levels maintained during the Cold War have sharply decreased.

As more strategic weapons were deployed through the 1980s, the corresponding number on alert went up. For example we estimate that by the end of 1989 approximately 7250 US strategic weapons were on alert, an increase of over 2100 since 1981. While the number of US ICBM warheads remained fairly constant it became a decreasing portion of the total forces on alert. Significant increases came in bomber weapons with 1600 air-launched cruise missiles (ALCMs) deployed on B-52G/H bombers. Soviet strategic forces increased significantly as ICBMs and SLBMs were MIRVed.

SOURCES OF INFORMATION

US government documents provided most of the data in this Working Paper, both for the US and the USSR/Russia. It should be noted that different US departments and agencies often disagree and, therefore, variations in their estimates occur. The reasons for this has to do with security classification, different counting standards, and inter-agency politics.

The data on the USSR/Russia is, obviously, more tentative. When there was a Soviet Union they traditionally provided virtually no information about their own military forces. This

⁴ Stephen M. Meyer, "Soviet Nuclear Operations," in Carter, et al., *Managing Nuclear Operations*, p. 494.

⁵ *Ibid.*, p. 495.

situation began to change somewhat with the openness (glasnost) policy of the Gorbachev era. It has, in fits and starts, continued in the new Russia but care and judgment must still be the rule in using any information.

Within the US government, there is not an empirical "truth" about the composition and characteristics of Soviet/Russian forces. The information divulged by the Department of Defense or the agencies of the intelligence community--the intelligence components of each of the military services, the National Security Agency, the CIA, the Department of Energy--reflect estimates of Soviet forces, and as such often reflect different biases or quality of information. By necessity we have had to make judgments about what appears to be the most accurate information.

The Department of Defense's *Annual Report to Congress* between 1967 and 1981 provided a continuing source of information comparing US and Soviet strategic forces. The Reagan Administration did not include the tables in its 1982 to 1989 *Annual Reports*. Nor did the Bush Administration in its four *Annual Reports* for 1990-1993 (Fiscal Years 1991-1994). The Clinton Administration has submitted three *Annual Reports* in 1994, 1995 and 1996 (Fiscal Years 1995-1997) but has not included any comparative information. The estimates from the earlier volumes about nuclear warheads in the bomber and missile forces of the two countries are presented below.

US-Soviet Strategic Force Warheads

DATE	<u>US</u>	<u>USSR</u>
1 Oct 1967	4500	1000
1 Sep 1968	4200	1100
1 Sep 1969	4200	1350
30 Dec 1970	4000	1800
1 Nov 1971	4700	2100
mid - 1972	5700	2500
mid - 1973	6784	2200
mid - 1974	7650	2500
mid - 1975	8500	2500
mid - 1976	8900	3500
30 Sep 1977	8400	3300
1 Jan 1978	9000	4000+

1 Jan 1979	9200	5000
1 Jan 1980	9200	6000
1 Jan 1981	9000	7000

Source: DOD *Annual Reports*, Fiscal Year 1969 through Fiscal Year 1982.

It is worth noting that the Department of Defense's estimates and those included in this Working Paper are often at variance. Without exception, DOD's estimates for both the US and the USSR are lower than those presented here. There are several reasons for this. The Department of Defense estimates of US and Soviet strategic forces are unclassified estimates. Classified estimates, most likely, have higher figures for both sides but are not divulged for the purported reason that they would compromise "sources and methods" of intelligence collection about the USSR or reveal features of US nuclear war plans that should not be made public.

For example, the *Annual Report's* numbers for the US do not reflect the true total of strategic nuclear forces available to the national command authorities. The Department of Defense estimate of the number of US bomber weapons is less than our estimate. In fact the true number of bomber weapons in the inventory exceeds our estimate. Bomber weapons, of many types, with different weights, sizes, and explosive yields, have been assigned in great numbers to the bomber force since the mid-1950s. Individual bombers can and do carry a great variety of different kinds and numbers of weapons. Their exact loadings are determined by their role in the execution of the war plan. The loading of the entire force is extraordinarily complex. To reveal the true number of weapons available to the bomber force, thus, would in the Department of Defense's opinion, reveal too much about the war plans.

For most of the Cold War the US bomber force was broken into two categories: the approximately thirty percent that were on alert, and the rest that were not on alert. Each alert bomber is estimated to have been loaded with an average of approximately 22 nuclear weapons. The logic was to put as many weapons in the air as fast as possible so they would not be destroyed on the ground. Another reason why our estimates are larger than the unclassified DOD estimates has to do with the design characteristics of nuclear bombs/warheads. The design of early nuclear and thermonuclear bombs was such that they could only be exploded at one yield. Beginning in the 1960s bombs were developed that provided "selectable" or variable

yields. Because there were many different targeting options in the war plans there was a "need" for many bombs per bomber. The normal military practice of planning for every contingency resulted in a large bomb stockpile requiring many different types of single yield bombs. The introduction of variable yield bombs allowed for targeting flexibility with fewer numbers of bombs.

Another reason why the estimates here are larger than unclassified DOD estimates has to do with "reserve" weapons, for bombers and possibly missiles. Reserve weapons would be for restrike operations. Bombers would return to recovery bases after dropping their initial loads, and theoretically would be loaded for another sortie. According to one report this secret plan goes by the code name "Operation Buggywhip."⁶ The US may even have contingency plans for strategic submarines to rendezvous with submarine tenders at prearranged places to reload missiles and warheads.

While the true number of weapons that exist to cover every contingency is larger than most estimates the actual number available at any given time is normally smaller. For example in the early 1960s, the US introduced a communications system, called the Emergency Rocket Communications System (ERCS), which placed a radio transmitter, rather than a nuclear warhead atop ten Minuteman II missiles. These missiles could be fired and used as emergency broadcast systems during a nuclear war to transmit launch orders to US forces. The ten ERCS missiles were deployed at Whiteman Air Force Base, Missouri. Our Table reflects ten fewer Minuteman II warheads than missiles.

On the other hand we have not reduced the numbers to reflect the true operational status of the forces. At any given time some percentage of US and Soviet ICBMs are undergoing maintenance, modifications or conversion and are not operational, i.e., off-line. The number may range from less than a dozen to several dozen at any one time. The real number available to launch is constantly changing and is less than the numbers reflected in the tables below. Similarly at any given time some number of US and Soviet/Russian strategic submarines are in

⁶ R. Jeffrey Smith, "START Treaty Will Impose First Numerical Limits on Warheads," *Washington Post*, 3 April 1990, p. A8.

overhaul or undergoing modifications or retrofitting which take them out of service for some period of time. When the US SSBN fleet numbered 25-30 normally about four or five submarines would be in this status. When the Soviet SSBN fleet numbered around 60 probably eight to ten submarines were non-operational at any given time.

Other unknown operational factors would give lesser warhead totals. Because we are not certain, (nor is the US intelligence community), of exactly how many warheads are carried on the Soviet MIRVed ICBM force we assume the number of warheads the missile could carry or use the SALT limits or START counting rules. It is unlikely that every Soviet/Russian ICBM carried the maximum number of reentry vehicles for which it was capable.

Soviet reserve warheads are another area of uncertainty. Some unknown number of reserve warheads and bombs undoubtedly existed for Soviet forces, as they did for US forces. The Soviet military did apparently practice and had some capability to reload ICBMs into cold launched silos,⁷ though the possibility of it doing so in the midst of a nuclear war seems low. The Department of Defense also says that Soviet, "Resupply systems are available to reload SSBNs [strategic missile launching submarines] in protected waters."⁸ It is unknown whether the Soviet Union had or Russia has any reload or restrike bombs for its strategic bombers.

⁷ "For their ICBM, LRINF, SRINF, SNF, SLBM, and air defense forces, the Soviets have stocked extra missiles, propellants and warheads throughout the USSR. Some ICBM silo launchers could be reloaded, and provision has been made for the decontamination of those launchers. Plans for the survival of necessary equipment and personnel have been developed and practiced;" *Soviet Military Power*, 1987, p. 28. Similar statements can be found in earlier editions: *Soviet Military Power*, 1984, p. 21; *Soviet Military Power*, 1985, p. 28; and *Soviet Military Power*, 1986, p. 24.

⁸ *Soviet Military Power*, 1987, p. 28. Missile Transport and Submarine Support Ships would probably be used. See Norman Polmar, *Guide to the Soviet Navy*, fourth edition (Annapolis, Maryland: Naval Institute Press, 1986) pp. 273-77, 293-97.

DEFINITIONS

Alert Forces: "On-line" strategic weapons which have a day-to-day readiness to launch within a short period of time (see also Generated Alert).

Bomber: Strategic airplane capable of long-range, intercontinental missions (designed for a tactical operating radius of over 2,500 nautical miles at design gross weight and design bomb load).

Force loadings: Those independently targetable weapons associated with the total operational ICBMs, SLBMs, and long-range bombers.

Generated Alert: Strategic weapons brought to a higher level of readiness than day-to-day alert forces.

Intercontinental Ballistic Missile (ICBM): Strategic missile with a range capability from about 3,000 to 8,000 nautical miles.

On-line: Those nuclear weapons which are operational, that is, not undergoing maintenance, modifications or conversions which remove them from the operational force for any period of time.

Strategic Nuclear Powered Ballistic Missile Submarine (SSBN): Fleet ballistic missile submarine capable of launching long-range missiles from either a submerged or surfaced conditions.

Strategic Offensive Forces: Bombers, Intercontinental Ballistic Missiles, and Submarine Launched Ballistic Missiles accountable under the SALT Agreements.

Submarine-launched Ballistic Missile (SLBM): Ballistic missile capable of being launched from fleet ballistic missile submarines.

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TABLE 11:

Stockpile figures for 1945-1961 and megatonnage for 1945-1994 are from Department of Energy, Openness Press Conference, Fact Sheets, 27 June 1994, pp. 171-173.

Table 1
U.S. Strategic Offensive Force Loadings, 1945-1996

End Year	ICBMs		SLBMs		Bombers		Total	
	Launchers	Warheads	Launchers	Warheads	Launchers	Warheads	Launchers	Warheads
1945					15	6	15	6
1946					125	11	125	11
1947					270	32	270	32
1948					473	100	473	100
1949					447	200	447	200
1950					462	330	462	330
1951					569	500	569	500
1952					660	720	660	720
1953					720	878	720	878
1954					1,035	1,418	1,035	1,418
1955					1,260	1,755	1,260	1,755
1956					1,470	2,123	1,470	2,123
1957					1,605	2,460	1,605	2,460
1958					1,620	2,610	1,620	2,610
1959	6	6			1,545	2,490	1,551	2,496
1960	12	12	32	32	1,515	3,083	1,559	3,127
1961	57	57	80	80	1,395	3,016	1,532	3,153
1962	203	203	144	144	1,306	3,104	1,653	3,451
1963	597	597	160	160	1,055	3,293	1,812	4,050
1964	907	907	320	384	785	3,427	2,012	4,718
1965	854	854	384	736	650	3,465	1,888	5,055
1966	1,004	1,004	560	1,264	575	3,476	2,139	5,744
1967	1,054	1,044	656	1,552	558	3,630	2,268	6,226
1968	1,054	1,044	656	1,552	481	3,521	2,191	6,117
1969	1,054	1,044	656	1,552	399	3,286	2,109	5,882
1970	1,054	1,244	656	1,552	390	3,339	2,100	6,135
1971	1,054	1,444	656	2,464	377	3,232	2,087	7,140
1972	1,054	1,644	656	3,120	457	3,845	2,167	8,609
1973	1,054	1,844	656	4,112	423	3,776	2,133	9,732
1974	1,054	1,944	656	4,432	396	3,819	2,106	10,195
1975	1,054	2,144	656	4,544	396	3,978	2,106	10,666
1976	1,054	2,144	656	5,104	382	3,850	2,092	11,098
1977	1,054	2,144	656	5,216	382	3,834	2,092	11,194
1978	1,054	2,144	656	5,440	376	3,767	2,086	11,351
1979	1,054	2,144	656	5,376	376	3,568	2,086	11,088
1980	1,054	2,144	592	5,056	376	3,568	2,022	10,768
1981	1,054	2,144	512	4,752	376	3,568	1,942	10,464
1982	1,049	2,139	520	4,768	328	3,384	1,897	10,291
1983	1,040	2,130	544	4,960	297	3,520	1,881	10,610
1984	1,030	2,120	592	5,344	297	3,844	1,919	11,308
1985	1,020	2,110	600	5,376	297	4,104	1,917	11,590
1986	1,005	2,165	616	5,440	312	4,709	1,933	12,314
1987	1,000	2,300	640	5,632	361	5,753	2,001	13,685
1988	1,000	2,440	608	5,312	318	5,328	1,926	13,080
1989	1,000	2,440	592	5,152	311	5,188	1,903	12,780
1990	1,000	2,440	608	5,216	267	4,648	1,875	12,304
1991	550	2,000	480	3,456	209	3,844	1,239	9,300
1992	550	2,000	488	3,456	158	2,824	1,196	8,280
1993	550	2,000	336	2,688	159	2,840	1,045	7,528
1994	580	2,090	360	2,880	157	2,808	1,097	7,778
1995	575	2,075	384	3,072	122	2,176	1,081	7,323
1996	575	2,075	408	3,264	102	1,808	1,085	7,147

Table 2
USSR/Russian Strategic Offensive Force Loadings, 1956-1996

End Year	ICBMs		SLBMs		Bombers		Total	
	Launchers	Warheads	Launchers	Warheads	Launchers	Warheads	Launchers	Warheads
1956					40	120	40	120
1957					53	152	53	152
1958			6	6	85	250	91	256
1959			33	33	105	310	138	343
1960	2	2	30	30	121	354	153	386
1961	10	10	57	57	133	382	200	449
1962	36	36	72	69	138	392	246	497
1963	99	99	72	69	150	440	321	608
1964	191	191	72	69	173	522	436	782
1965	281	281	75	72	163	532	519	885
1966	416	416	78	75	159	546	653	1,037
1967	818	818	87	72	159	576	1,064	1,466
1968	1,017	1,017	138	120	159	576	1,314	1,713
1969	1,274	1,274	221	194	157	568	1,652	2,036
1970	1,472	1,472	317	287	157	568	1,946	2,327
1971	1,519	1,539	407	362	157	568	2,083	2,469
1972	1,504	1,524	503	458	157	568	2,164	2,550
1973	1,462	1,557	595	556	157	568	2,214	2,681
1974	1,367	1,587	679	688	157	568	2,203	2,843
1975	1,469	2,169	771	828	157	568	2,397	3,565
1976	1,483	2,483	849	954	157	568	2,489	4,005
1977	1,333	2,703	972	1,247	157	568	2,462	4,518
1978	1,251	3,491	1,002	1,458	157	568	2,410	5,517
1979	1,395	4,603	993	1,529	157	568	2,545	6,700
1980	1,338	5,362	990	1,558	157	568	2,485	7,488
1981	1,368	5,692	1,038	1,882	157	568	2,563	8,142
1982	1,398	6,282	990	1,866	157	568	2,545	8,716
1983	1,368	6,660	978	1,854	167	728	2,513	9,242
1984	1,353	6,795	982	2,038	160	720	2,495	9,553
1985	1,371	6,813	980	2,264	160	920	2,511	9,997
1986	1,370	6,812	948	2,280	160	1,120	2,478	10,212
1987	1,418	6,872	962	2,506	155	1,250	2,535	10,628
1988	1,390	6,930	963	2,706	170	1,440	2,523	11,076
1989	1,378	7,030	949	2,938	161	1,572	2,488	11,540
1990	1,378	6,938	908	2,900	128	1,414	2,414	11,252
1991	1,006	6,106	832	2,792	100	1,266	1,938	10,164
1992	950	5,725	628	2,492	112	1,392	1,690	9,609
1993	898	5,156	520	2,384	113	1,398	1,531	8,938
1994	818	4,314	456	2,320	113	1,398	1,387	8,032
1995	771	3,709	440	2,272	113	1,398	1,324	7,379
1996	755	3,589	440	2,272	113	1,398	1,308	7,259

Table 3
U.S. ICBM Forces, 1959-1996

	End-																		
	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977
ICBM Launchers																			
ATLAS D [1]	6	12	30	30	30	0													
ATLAS E [2]			27	27	27	27	0												
ATLAS F [3]				72	72	72	0												
TITAN I [4]				54	54	54	0												
TITAN II [5]					54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
MINUTEMAN I [6]				20	360	700	800	800	800	800	500	400	300	200	100	50	0		
MINUTEMAN II [7]								150	200	200	500	500	500	500	500	500	450	450	450
MINUTEMAN III [8]												100	200	300	400	450	550	550	550
MX (PEACEKEEPER) [9]																			
TOTAL	6	12	57	203	597	907	854	1004	1054	1054	1054	1054	1054	1054	1054	1054	1054	1054	1054
ICBM Warheads																			
W49 (ATLAS D) [10]	6	12	30	30	30	0													
W38 (ATLAS E) [11]			27	27	27	27	0												
W38 (ATLAS F)				72	72	72	0												
W38 (TITAN I)				54	54	54	0												
W53 (TITAN II) [12]					54	54	54	54	54	54	54	54	54	54	54	54	54	54	54
W59 (MM I) [13]				20	150	150	150	150	150	150	150	150	150	150	100	50	0		
W56 (MM I) [14]					210	550	650	650	650	650	350	250	150	50					
W56 (MM II) [15]								150	190	190	490	490	490	490	490	490	440	440	440
W62 (MM III) [16]												300	600	900	1200	1350	1650	1650	1650
W78 (MM III) [17]																			
W87 (MX) [18]																			
TOTAL	6	12	57	203	597	907	854	1004	1044	1044	1044	1244	1444	1644	1844	1944	2144	2144	2144

Table 3
U.S. ICBM Forces, 1959-1996

	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
ICBM Launchers																			
ATLAS D [1]																			
ATLAS E [2]																			
ATLAS F [3]																			
TITAN I [4]																			
TITAN II [5]	54	54	54	54	49	40	30	20	5	0									
MINUTEMAN I [6]																			
MINUTEMAN II [7]	450	450	450	450	450	450	450	450	450	450	450	450	450	0					
MINUTEMAN III [8]	550	550	550	550	550	550	550	550	540	520	500	500	500	500	500	500	530	525	525
MX (PEACEKEEPER) [9]									10	30	50	50	50	50	50	50	50	50	50
TOTAL	1054	1054	1054	1054	1049	1040	1030	1020	1005	1000	1000	1000	1000	550	550	550	580	575	575
ICBM Warheads																			
W49 (ATLAS D) [10]																			
W38 (ATLAS E) [11]																			
W38 (ATLAS F)																			
W38 (TITAN I)																			
W53 (TITAN II) [12]	54	54	54	54	49	40	30	20	5	0									
W59 (MM I) [13]																			
W56 (MM I) [14]																			
W58 (MM II) [15]	440	440	440	440	440	440	440	440	440	440	440	440	440	0					
W62 (MM III) [16]	1650	1650	1410	1080	795	750	750	750	720	660	600	600	600	600	600	600	600	600	600
W78 (MM III) [17]			240	570	855	900	900	900	900	900	900	900	900	900	900	900	990	975	975
W87 (MX) [18]									100	300	500	500	500	500	500	500	500	500	500
TOTAL	2144	2144	2144	2144	2139	2130	2120	2110	2165	2300	2440	2440	2440	2000	2000	2000	2090	2075	2075

TABLE 3
U.S. ICBM Forces, 1959-1996

1. The first Atlas D ICBM was placed on alert at Vandenberg Air Force Base (AFB), CA on 31 October 1959. The first Atlas Ds were taken off alert at Vandenberg beginning on 1 May 1964, the last was removed from alert on 1 October 1964. At full strength there were six Atlas D ICBMs at Vandenberg, 15 at F.E. Warren AFB, WY and nine at Offutt AFB, NE.

2. Three nine missile squadrons of Atlas E ICBMs were accepted by SAC in 1961 at Fairchild AFB, WA (operational 3 October 1961); Forbes AFB, KS; and F.E. Warren AFB, WY (operational 7 March 1961). The first Atlas E was taken off alert on 4 January 1965 and the last was removed from alert on 31 March 1965.

3. Six 12 missile Atlas F ICBM squadrons became operational between 9 September and 20 December 1962 at Schilling AFB, KS; Lincoln AFB, NE; Altus AFB, OK; Dyess AFB, TX; Walker AFB, NM; Plattsburgh AFB, NY. The first Atlas F was removed from alert on 1 December 1964 and the last on 12 April 1965.

4. On 20 April and 10 May 1962 the first two Titan I ICBM squadrons (9 missiles each, both at Lowry AFB, CO) became operational. Four more nine missile squadrons became operational at Ellsworth AFB, SD; Beale AFB, CA; Mountain Home AFB, ID; and lastly on 28 September 1962 at Larson AFB, WA. The first Titan I was taken off alert on 4 January 1965 and the last on 1 April 1965.

5. Six nine missile squadrons of Titan II ICBMs were deployed equally at Davis-Monthan AFB, AZ; McConnell AFB, KS; and Little Rock AFB, AK between 8 June and 31 December 1963. Accidents occurred at silos at Rock, KS on 24 August 1978 and Damascus, AK on 19 September 1980. The missiles were not returned to operational service. The first of the remaining 52 Titan IIs was deactivated at Davis Monthan in early 1982. Every 45-60 days a Titan II was deactivated with the last accomplished on 5 May 1987.

6. The first Minuteman missile went on alert on 27 October 1962 during the Cuban Missile Crisis. A total of nine were on alert on 30 October and the first two flights of Minuteman I ICBMs (20 missiles) were operational on 11 December 1962 at Malmstrom AFB, MT. Eventually there were 150 Minuteman IA ICBMs at Malmstrom and 650 Minuteman IB ICBMs at Ellsworth AFB, SD; Minot AFB, ND; Whiteman AFB, MO; and F.E. Warren AFB, WY. The last Minuteman IA was removed from alert on 15 January 1969 at Malmstrom.

7. The first Minuteman II ICBMs went on alert in January 1966. The first three Minuteman II ICBM squadrons became operational between 2 April and 22 November 1966. On 21 April 1967 SAC reached the level of 1000 operational Minuteman I and II ICBMs. On 27 September 1991 President Bush announced that the Minuteman IIs would be taken off alert. The stand down was completed the following day.

8. The first Minuteman IIIs went on alert 19 August 1970 at Minot AFB, ND. On 29 December 1970 the first squadron of Minuteman III ICBMs became operational at Minot AFB. By 12 July 1975 the Minuteman ICBM force consisted of 450 Minuteman IIs and 550 Minuteman IIIs.

9. On 22 December 1986 the first ten MX missiles became operational at F.E. Warren AFB, WY, replacing Minuteman III ICBMs. On 30 December 1988 the 50 MX ICBMs reached full operational capability.

10. Single Mk-1 reentry vehicle. The W49 (1.4 Mt) nuclear warhead entered Phase 5 (First Production Unit, or FPU) in September 1958, the date the first warhead was produced by the Atomic Energy Commission.

11. The single Mk-2 reentry vehicle was used on the Atlas E and F and Titan I ICBMs. The W38 (3-4 Mt) nuclear warhead entered Phase 5 (FPU) in May 1961, the date the first warhead was produced by the Atomic Energy Commission.

12. Single Mk-6 reentry vehicle. The W53 (9 Mt) nuclear warhead entered Phase 5 (FPU) in December 1962, the date the first warhead was produced by the Atomic Energy Commission.

13. Single Mk-5 reentry vehicle on the Minuteman IA. The W59 (1 Mt) nuclear warhead entered Phase 5 (FPU) in June 1962, the date the first warhead was produced by the Atomic Energy Commission.

14. The Minuteman IB used a single warhead Mk-11 reentry vehicle. The W56 (1.2 Mt) nuclear warhead entered Phase 5 (FPU) in March 1963, the date the first warhead was produced by the Atomic Energy Commission.

15. Single Mk-11C reentry vehicle. On 10 October 1967 the first Emergency Rocket Communications System (ERCS) was installed on ten Minuteman II ICBMs at Whiteman AFB, Missouri. ERCS, an emergency communications transmitter placed on the missile instead of a nuclear warhead, is still deployed on ten Minuteman II ICBMs at Whiteman.

16. Up to three warheads on the Mk-12 MIRV. The W62 (170 kt) nuclear warhead entered Phase 5 (FPU) in March 1970, the date the first warhead was produced by the Atomic Energy Commission.

17. Up to three warheads on the MK-12A MIRV. The W78 (335 kt) nuclear warhead entered Phase 5 (FPU) in August 1979, the date the first warhead was produced by the Department of Energy. Between December 1979 and February 1983 300 Minuteman III ICBMs were retrofitted with Mk-12A reentry vehicles with the W78 warhead.

18. Up to ten warheads on the MK-21 MIRV. The W87-0 (300 kt) nuclear warhead entered Phase 5 (FPU) in April 1986, the date the first warhead was produced by the Department of Energy.

Table 4
USSR/Russian ICBM Forces, 1960-1996

	End-												
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972
ICBM Launchers [1]													
SS-6 Sapwood	2	4	4	4	4	4	4	4	0				
SS-7 Saddler [2]		6	32	90	170	197	197	197	197	197	197	190	190
SS-8 Sasin [3]				5	17	23	23	23	23	23	23	19	19
SS-9 Scarp M1								10	20	40	50	50	50
SS-9 Scarp M2							10	70	115	130	170	200	200
SS-9 Scarp M3									3	5	10	20	20
SS-9 Scarp M4												10	10
SS-11 Sego M1						57	182	514	659	859	982	990	955
SS 11 Sego M2 & M3													
SS-13 Savage [4]										20	40	40	60
SS-17 Spanker M1[5]													
SS-17 Spanker M2													
SS-17 Spanker M3													
SS-18 Satan M1 & M3 [6]													
SS-18 Satan M2													
SS-18 Satan M4 & M5													
SS-19 Stiletto M1 [7]													
SS-19 Stiletto M2													
SS-19 Stiletto M3													
SS-24 Scalpel M1 [8]													
SS-24 Scalpel M2													
SS-25 Sickle [9]													
TOTAL	2	10	36	99	191	281	416	818	1,017	1,274	1,472	1,519	1,504
ICBM Warheads													
SS-6	2	4	4	4	4	4	4	4	0				
SS-7		6	32	90	170	197	197	197	197	197	197	190	190
SS-8				5	17	23	23	23	23	23	23	19	19
SS-9 M1 [10]								10	20	40	50	50	50
SS-9 M2							10	70	115	130	170	200	200
SS-9 M3									3	5	10	20	20
SS-9 M4												10	10
SS-11 M1 [11]						57	182	514	659	859	982	990	955
SS-11 M2 & M3													
SS-13										20	40	40	60
SS-17 M1 [12]													
SS-17 M2													
SS-17 M3													
SS-18 M1 & M3 [13]													
SS-18 M2													
SS-18 M4													
SS-19 M1 [14]													
SS-19 M2													
SS-19 M3													
SS-24 M1													
SS-24 M2													
SS-25													
TOTAL (MRV=1)	2	10	36	99	191	281	416	818	1,017	1,274	1,472	1,519	1,504
TOTAL (MRV=3)	2	10	36	99	191	281	416	818	1,017	1,274	1,472	1,539	1,524

Table 4
USSR/Russian ICBM Forces, 1960-1996

	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985
ICBM Launchers [1]													
SS-6 Sapwood													
SS-7 Saddler [2]	190	190	190	138	78	0							
SS-8 Sasin [3]	19	19	19	19	9	0							
SS-9 Scarp M1	50	50	50	40	20	0							
SS-9 Scarp M2	208	208	200	190	140	65	55	0					
SS-9 Scarp M3	20	20	20	20	20	20	20	0					
SS-9 Scarp M4	10	10	10	10	10	0							
SS-11 Sego M1	830	610	490	430	330	230	220	160	130	130	100	55	28
SS-11 Sego M2 & M3	75	200	350	420	420	420	420	420	420	420	420	420	420
SS-13 Savage [4]	60	60	60	60	60	60	60	60	60	60	60	60	60
SS-17 Spanker M1[5]			10	20	50	80	120	130	130	30	0		
SS-17 Spanker M2						20	20	20	20	10	0		
SS-17 Spanker M3										110	150	150	150
SS-18 Satan M1 & M3 [6]			10	36	36	36	36	26	26	16	0		
SS-18 Satan M2					40	140	154	162	162	92	0		
SS-18 Satan M4 & M5							50	120	120	200	308	308	308
SS-19 Stiletto M1 [7]			60	100	100	120	180	180	180	80	0		
SS-19 Stiletto M2					20	60	60	40	40	10	0		
SS-19 Stiletto M3								20	80	240	330	360	360
SS-24 Scalpel M1 [8]													
SS-24 Scalpel M2													
SS-25 Sickle [9]													45
TOTAL	1,462	1,367	1,469	1,483	1,333	1,251	1,395	1,338	1,368	1,398	1,368	1,353	1,371
ICBM Warheads													
SS-6													
SS-7	190	190	190	138	78	0							
SS-8	19	19	19	19	9	0							
SS-9 M1 [10]	50	50	50	40	20	0							
SS-9 M2	208	208	200	190	140	65	55	0					
SS-9 M3	20	20	20	20	20	20	20	0					
SS-9 M4	10	10	10	10	10	0							
SS-11 M1 [11]	830	610	490	430	330	230	220	160	130	130	100	55	28
SS-11 M2 & M3	75	200	350	420	420	420	420	420	420	420	420	420	420
SS-13	60	60	60	60	60	60	60	60	60	60	60	60	60
SS-17 M1 [12]			40	80	200	320	480	520	520	120	0		
SS-17 M2						20	20	20	20	10	0		
SS-17 M3										440	600	600	600
SS-18 M1 & M3 [13]			10	36	36	36	36	26	26	16	0		
SS-18 M2					320	1,120	1,232	1,296	1,296	736	0		
SS-18 M4							500	1,200	1,200	2,000	3,080	3,080	3,080
SS-19 M1 [14]			360	600	600	720	1,080	1,080	1,080	480	0		
SS-19 M2					20	60	60	40	40	10	0		
SS-19 M3								120	480	1,440	1,980	2,160	2,160
SS-24 M1													
SS-24 M2													
SS-25													45
TOTAL (MRV=1)	1,462	1,367	1,799	2,043	2,263	3,071	4,183	4,942	5,272	5,862	6,240	6,375	6,393
TOTAL (MRV=3)	1,557	1,587	2,169	2,483	2,703	3,491	4,603	5,362	5,692	6,282	6,660	6,795	6,813

Table 4
USSR/Russian ICBM Forces, 1960-1996

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
ICBM Launchers [1]											
SS-6 Sapwood											
SS-7 Saddler [2]											
SS-8 Sasin [3]											
SS-9 Scarp M1											
SS-9 Scarp M2											
SS-9 Scarp M3											
SS-9 Scarp M4											
SS-11 Sego M1	0										
SS-11 Sego M2 & M3	420	420	370	360	310	0					
SS-13 Savage [4]	60	60	60	60	30	0					
SS-17 Spanker M1[5]											
SS-17 Spanker M2											
SS-17 Spanker M3	150	139	120	100	50	0					
SS-18 Satan M1 & M3 [6]											
SS-18 Satan M2											
SS-18 Satan M4 & M5	308	308	308	308	308	308	308	290	248	186	180
SS-19 Stiletto M1 [7]											
SS-19 Stiletto M2											
SS-19 Stiletto M3	360	360	350	300	300	300	235	200	170	170	160
SS-24 Scalpel M1 [8]		5	12	24	36	36	36	36	36	36	36
SS-24 Scalpel M2			20	56	56	56	56	36	10	10	10
SS-25 Sickle [9]	72	126	150	170	288	306	315	336	354	369	369
TOTAL	1,370	1,418	1,390	1,378	1,378	1,006	950	898	818	771	755
ICBM Warheads											
SS-6											
SS-7											
SS-8											
SS-9 M1 [10]											
SS-9 M2											
SS-9 M3											
SS-9 M4											
SS-11 M1 [11]	0										
SS-11 M2 & M3	420	420	370	360	310	0					
SS-13	60	60	60	60	30	0					
SS-17 M1 [12]											
SS-17 M2											
SS-17 M3	600	556	480	400	200	0					
SS-18 M1 & M3 [13]											
SS-18 M2											
SS-18 M4	3,080	3,080	3,080	3,080	3,080	3,080	3,080	2,900	2,480	1,860	1,800
SS-19 M1 [14]											
SS-19 M2											
SS-19 M3	2,160	2,160	2,100	1,800	1,800	1,800	1,410	1,200	1,020	1,020	960
SS-24 M1		50	120	240	360	360	360	360	360	360	360
SS-24 M2			200	560	560	560	560	360	100	100	100
SS-25	72	126	150	170	288	306	315	336	354	369	369
TOTAL (MRV=1)	6,392	6,452	6,560	6,670	6,628	6,106	5,725	5,156	4,314	3,709	3,589
TOTAL (MRV=3)	6,812	6,872	6,930	7,030	6,938	6,106	5,725	5,156	4,314	3,709	3,589

TABLE 4
USSR/Russian ICBM Forces, 1960-1996

1. The initial operational capability (IOC) dates vary in different U.S. government sources.
2. At maximum deployment in 1965 there were a total of 197 SS-7s with 128 at soft sites and 69 at hard sites. Some phase out of both began in 1971.
3. Soft site deployment began in November 1963 with hard site deployment beginning in April 1964. At maximum deployment in 1965 there were a total of 23 SS-8s with 14 at soft sites and 9 at hard sites.
4. All 60 SS-13s were deployed at Yoshkar Ola.
5. The 150 SS-17s replaced the SS-11s and were deployed at Kostromo and Yedrovo.
6. At full deployment the 308 SS-18s were deployed at Aleysk (30), Dombarosvki (64), Kartaly (46), and Uzhur (64) in Russia, and Derzhavinsk (52) and Zhangiz-Tobe (52) in Kazakhstan.
7. At full deployment the 360 SS-19s were deployed at Tatischevo (120) and Kozelsk (60) in Russia and Khmelnski (90) and Pervomaysk (90) in Ukraine.
8. The first few rail-based SS-24 Mod 1s were deployed at Kostromo in December 1987. The first regiment of silo-based SS-24 Mod 2s were operational at Pervomaysk, Ukraine in August 1988, replacing SS-19s. Eventually there would be 46 SS-24 Mod 2s at Pervomaysk, 10 SS-24 Mod 2s at Tatischevo and 12 SS-24 Mod 1s each at Kostromo, Bershet and Krasnoyarsk. Deactivation of the 46 SS-24s in the Ukraine occurred in stages with 20 removed from alert by the end of 1993 and the balance a year later.
9. As of mid-1996 351 SS-25s were deployed at ten bases in Russia: Kansk, Nizhniy Tagil, Novosibirsk, Yurya (45 each); Irkutsk, Teykovo, Yoshkar Ola, Banual (36 each); 18 at Drovyanay and 9 at Vypolzovo. The last SS-25s from Belarus and their warheads were redeployed back to Russia by the end of November 1996.
10. The Mod 1 (12-18 MT) is a single RV. The Mod 2 (18-25 MT) is a single RV. The Mod 3 (2 to 3.5 MT) is the Fractional Orbital Bombardment System (FOBS). The Mod 4 (2 to 3.5 MT) carried up to three warheads on multiple reentry vehicle (MRV). The MRV was a precursor to the MIRV, where the warheads could not be independently targetable. Because the area in which the warheads can be targeted is limited many tables count the multiple RVs as one warhead. For purposes of estimating warhead production they should be counted separately.
11. Single reentry vehicle. Mod 1 retired first to compensate for SS-25. All retired by end of 1987. Mod 2 used penetration aids. Mod 3 carried up to three warheads on MRV. Assumes half Mod 2 and half Mod 3 during phaseout.
12. Up to four MIRV warheads on Mods 1 and 3 and a single RV on Mod 2
13. Single reentry vehicle on Mods 1 and 3. Up to eight MIRV warheads on Mod 2.

Up to ten MIRV warheads on Mod 4.

14. Up to six MIRV warheads on Mods 1 and 3. Single reentry vehicle on Mod 2.

15. Up to ten MIRV warheads.

16. Single reentry vehicle.

Table 5
U.S. Ballistic Missile Submarine Forces, 1960-1996

	End-																			
	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	
SSBNs																				
Polaris [1]	2	5	9	10	20	24	35	41	41	41	41	34	29	21	19	18	13	12	10	
Poseidon [2]												7	12	20	22	23	28	29	31	
Trident [3]																				
TOTAL	2	5	9	10	20	24	35	41	41	41	41	41	41	41	41	41	41	41	41	
SLBM Launchers																				
Polaris A1 [4]	32	80	80	80	80	0														
Polaris A2 [5]			64	80	208	208	208	208	208	208	208	144	96	48	0					
Polaris A3 [6]					32	176	352	448	448	448	448	400	368	288	304	288	208	192	160	
Poseidon with C3 [7]												112	192	320	352	368	448	464	496	
Poseidon with C4 [8]																				
Trident with C4 [9]																				
Trident with D5 [10]																				
TOTAL	32	80	144	160	320	384	560	656	656	656	656	656	656	656	658	656	656	656	656	
SLBM Warheads																				
W47Y1 (A-1) [11]	32	80	80	80	80	0														
W47Y1 (A-2) [11]			64	64	64	64	32	0												
W47Y2 (A-2) [11]				16	144	144	176	208	208	208	208	144	96	48	0					
W56 (A-3) [12]					32	176	352	448	448	448	448	400	368	288	304	288	208	192	160	
W68 (C-3) [13]												1120	1920	3200	3520	3680	4480	4640	4960	
W76 (C-4) [14]																				
W76 (D-5)																				
W88 (D-5) [15]																				
TOTAL (MRV=1)	32	80	144	160	320	384	560	656	656	656	656	1664	2384	3536	3824	3968	4688	4832	5120	
TOTAL (MRV=3)	32	80	144	160	384	736	1264	1552	1552	1552	1552	2464	3120	4112	4432	4544	5104	5216	5440	

Table 5
U.S. Ballistic Missile Submarine Forces, 1960-1996

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
SSBNs																		
Polaris [1]	10	6	1	0														
Poseidon [2]	31	31	31	31	31	31	30	28	28	26	25	23	12	11	0			
Trident [3]				1	2	4	5	7	8	8	8	10	12	13	14	15	16	17
TOTAL	41	37	32	32	33	35	35	35	36	34	33	33	24	24	14	15	16	17
SLBM Launchers																		
Polaris A1 [4]																		
Polaris A2 [5]																		
Polaris A3 [6]	160	96	16	0														
Poseidon with C3 [7]	464	400	368	304	304	304	288	256	256	224	208	176	0					
Poseidon with C4 [8]	32	96	128	192	192	192	192	192	192	192	192	192	192	176	0			
Trident with C4 [9]				24	48	96	120	168	192	192	192	192	192	192	192	192	192	192
Trident with D5 [10]												48	96	120	144	168	192	216
TOTAL	656	592	512	520	544	592	600	616	640	608	592	608	480	488	336	360	384	408
SLBM Warheads																		
W47Y1 (A-1) [11]																		
W47Y1 (A-2) [11]																		
W47Y2 (A-2) [11]																		
W58 (A-3) [12]	160	96	16	0														
W68 (C-3) [13]	4640	4000	3680	3040	3040	3040	2880	2560	2560	2240	2080	1760	0					
W76 (C-4) [14]	256	768	1024	1728	1920	2304	2496	2880	3072	3072	3072	3072	2688	2496	1536	1536	1536	1536
W76 (D-5)													384	576	768	960	1152	1344
W88 (D-5) [15]												384	384	384	384	384	384	384
TOTAL (MRV=1)	5056	4864	4720	4768	4960	5344	5376	5440	5632	5312	5152	5216	3456	3456	2688	2880	3072	3264
TOTAL (MRV=3)	5376	5056	4752	4768	4960	5344	5376	5440	5632	5312	5152	5216	3456	3456	2688	2880	3072	3264

TABLE 5
U.S. Ballistic Missile Submarine Forces, 1960-1996

1. USS George Washington (SSBN 598) first deployed with Polaris A-1 SLBMs on 15 November 1960.

2. USS James Madison (SSBN 627) first deployed with Poseidon C-3 SLBMs on 31 March 1971. On 10 June 1985, the White House announced that the US would dismantle a ballistic missile submarine to remain within the SALT II ceiling on MIRVed missiles. The USS Sam Rayburn (SSBN 635) was subsequently deactivated on 16 September 1985. It was converted to a moored training ship to train personnel in the Naval Nuclear Propulsion Program. The first training class began in early 1990. On 27 May 1986, the White House announced that the US would dismantle two more SSBNs. These were the USS Nathan Hale (SSBN 623) and the USS Nathaniel Greene (SSBN 636), retired on 3 November 1986 and 16 December 1986. The FY 1988 DOD Authorization Act specified that no money be authorized to overhaul USS Andrew Jackson (SSBN 619). It was retired on 1 April 1988. The USS John Adams (SSBN 620) was deactivated on 1 October 1989 and the USS James Monroe (SSBN 622) on 14 October 1989. As a result of President Bush's September 27, 1991 announcement all remaining SSBNs that carried Poseidon SLBMs were taken off alert. The other twelve SSBNs that carried the Trident C-4 SLBM were retired by the end of 1993.

3. USS Ohio (SSBN 726) first deployed with Trident I C-4 SLBMs on 1 October 1982.

4. The Polaris A-1 was on active duty from 15 November 1960 to 14 October 1965.

5. The Polaris A-2 was on active duty from 26 June 1962 to 9 June 1974.

6. The Polaris A-3 was on active duty from 28 September 1964 to 25 February 1982.

7. On 31 March 1971 the USS James Madison (SSBN 627) deployed for patrol with 16 Poseidon C-3 missiles. The Poseidon SLBM would eventually be deployed on 31 SSBNs, after which 12 were retrofitted with Trident I SLBMs and deployed between October 1979 and June 1983. As a result of President Bush's September 27, 1991 announcement all remaining SSBNs that carried Poseidon SLBMs were taken off alert.

8. On 20 October 1979, the USS Francis Scott Key (SSBN 657) deployed with Trident I C-4 SLBMs. The twelfth and last Lafayette/Franklin class SSBN to be retrofitted with Trident I C-4s, the USS Casimir Pulaski (SSBN 633) deployed on 3 June 1983. By the end of 1993 the 12 SSBNs that carried the Trident I SLBM were retired.

9. On 11 November 1981 the USS Ohio (SSBN 726) the first Trident submarine deployed with Trident I SLBMs. A total of eight Ohio-class SSBNs, based in the Pacific at Bangor WA, would deploy with Trident I SLBMs between 1981 and 1986.

10. On 29 March 1982 the USS Tennessee (SSBN 734) went on its first patrol with Trident II SLBMs.

11. Single Mk-1 (Navy) reentry vehicle. The W47 Y1 (600 kt) nuclear warhead entered Phase 6 (Quantity Production Unit in June 1960, the date the first warhead was produced by the Atomic Energy

Commission. The Mk-1 (Navy) was also on the Polaris A-2 with the W47 Y1 warhead and the W47 Y2 (1.2 Mt) warhead.

12. Up to three W58 (200 kt) warheads on the Mk-2 (Navy) multiple reentry vehicle (MRV). The W58 nuclear warhead entered Phase 6 (Quantity Production Unit in March 1964, the date the first warhead was produced by the Atomic Energy Commission. The MRV was a precursor to the MIRV, where the warheads could not be independently targetable. Because the area in which the warheads can be targeted is limited many tables count the multiple RVs as one warhead. For purposes of estimating warhead production they should be counted separately.

13. Up to ten W68 (40-50 kt) warheads on the Mk-3 MIRV. The maximum number of reentry vehicles that have been flight-tested on the Poseidon C-3 SLBM is 14. Loadings per missile prior to withdrawal of ten Polaris SSBNs probably averaged nine warheads; see testimony by Paul H. Nitze, Senate Armed Services Committee, SALT Hearings, Part 3, p. 897. After withdrawal Poseidon SLBMs were selectively uploaded: see House Armed Service Committee (HASC), FY 1982 DOD, Part 3, p. 156; House Appropriations Committee, FY 1982 DOD, Part 7, p.544; HASC, FY 1983 DOD, Part 4, p. 118. The W68 nuclear warhead entered Phase 5 (FPU) in May 1970, the date the first warhead was produced by the Atomic Energy Commission.

14. Up to eight W76 (100 kt) warheads on the Mk-4 MIRV. The maximum number of reentry vehicles that have been flight tested for the Trident I C-4 SLBM is seven. The figure of seven reentry vehicles for the Trident I C-4 is based on the maximum number of reentry vehicles actually released during flight-tests of the missile as of 1 May 1979. If simulated releases of reentry vehicles had been counted as flight-tests of reentry vehicles, as is the case for simulations occurring after 1 May 1979, the figure for the Trident I C-4 would have been eight, which is the largest number of reentry vehicles for which the missile is designed and with which it will be deployed; see Annex to Letter from Secretary of State Cyrus Vance to the President Transmitting the SALT Treaty, June 21, 1979 in ACDA, *Documents on Disarmament* 1979, p. 263. The nuclear warhead entered Phase 5 (FPU) in June 1978, the date the first warhead was produced by the Department of Energy.

15. Up to eight W88 (475 kt) warheads in a Mk-5 MIRV. The nuclear warhead entered Phase 5 (FPU) in September 1988 and Phase 6 in June 1989. Only some 400 warheads were manufactured before Rocky Flats and the rest of the production complex ceased operation at the end of 1989 and the beginning of 1990.

Table 6
USSR/Russian Ballistic Missile Submarine Forces, 1958-1996

	End-												
	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
SSB/SSBNs													
Golf I SSB	2	4	10	19	22	22	22	22	22	18	16	15	14
Golf II					1	1	1	1	1	5	6	7	8
Golf III													
Golf IV													
Golf V													
Hotel I/II SSBN		7	0	0	1	1	1	2	3	6	8	7	7
Hotel III												1	1
Yankee I SSBN											3	8	14
Yankee II													
Delta I SSBN													
Delta II													
Delta III													
Delta IV													
Typhoon SSBN													
TOTAL	2	11	10	19	24	24	24	25	26	29	33	38	44
SLBM Launchers [1]													
Golf I [2]	6	12	30	57	66	66	66	66	66	54	48	45	42
Golf II [3]					3	3	3	3	3	15	18	21	24
Golf III [4]													
Golf IV [5]													
Golf V [6]													
Hotel I/II [7]		21	0	0	3	3	3	6	9	18	24	21	21
Hotel III [8]												6	6
Yankee I [9]											48	128	224
Yankee II [10]													
Delta I [11]													
Delta II [12]													
Delta III [13]													
Delta IV [14]													
Typhoon [15]													
TOTAL	6	33	30	57	72	72	72	75	78	87	138	221	317
SLBM Warheads													
SS-N-4	6	33	30	57	66	66	66	66	66	54	48	45	42
SS-N-5 Sark					6	6	6	9	12	33	42	42	45
SS-N-6 Serb [16]											48	128	224
SS-N-8 Sawfly													
SS-N-17 Snipe													
SS-N-18 Stingray [17]													
SS-N-20 Sturgeon [18]													
SS-N-23 Skiff [19]													
TOTAL STRATEGIC (MRV=1)	6	33	30	57	69	69	69	72	75	72	120	194	287
TOTAL STRATEGIC (MRV=2) [20]	6	33	30	57	69	69	69	72	75	72	120	194	287
TOTAL WARHEADS	6	33	30	57	72	72	72	75	78	87	138	215	311

Table 6
USSR/Russian Ballistic Missile Submarine Forces, 1958-1996

	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983
SSB/SSBNs													
Golf I SSB	7	7	7	7	7	5	4	3	1	0			
Golf II	13	13	13	13	13	13	13	13	13	13	13	13	13
Golf III							1	1	1	1	1	1	1
Golf IV						1	1	1	1	1	0		
Golf V								1	1	1	1	1	1
Hotel I/II SSBN	7	7	7	7	7	7	7	7	6	6	6	6	2
Hotel III	1	1	1	1	1	1	1	1	1	1	1	1	1
Yankee I SSBN	20	26	30	32	33	34	33	31	30	29	28	24	24
Yankee II							1	1	1	1	1	1	1
Delta I SSBN			1	4	9	13	18	18	18	18	18	18	18
Delta II			1	2	3	4	4	4	4	4	4	4	4
Delta III							4	8	9	10	13	14	14
Delta IV													
Typhoon SSBN											1	1	1
TOTAL	48	54	60	66	73	78	87	89	86	85	87	84	80
SLBM Launchers [1]													
Golf I [2]	21	21	21	21	21	15	12	9	3	0			
Golf II [3]	39	39	39	39	39	39	39	39	39	39	39	39	39
Golf III [4]							6	6	6	6	6	6	6
Golf IV [5]						4	4	4	4	4	0		
Golf V [6]								1	1	1	1	1	1
Hotel I/II [7]	21	21	21	21	21	21	21	21	18	18	18	18	6
Hotel III [8]	6	6	6	6	6	6	6	6	6	6	6	6	6
Yankee I [9]	320	416	480	512	528	544	528	496	480	464	448	384	384
Yankee II [10]							12	12	12	12	12	12	12
Delta I [11]			12	48	108	156	216	216	216	216	216	216	216
Delta II [12]			16	32	48	64	64	64	64	64	64	64	64
Delta III [13]							64	128	144	160	208	224	224
Delta IV [14]													
Typhoon [15]											20	20	20
TOTAL	407	503	595	679	771	849	972	1,002	993	990	1,038	990	978
SLBM Warheads													
SS-N-4	21	21	21	21	21	15	12	9	3	0			
SS-N-5 Sark	60	60	60	60	60	60	60	60	57	57	57	57	45
SS-N-6 Serb [16]	320	416	480	512	528	548	532	500	484	468	448	384	384
SS-N-8 Sawfly			34	86	162	226	286	292	292	292	292	292	292
SS-N-17 Snipe							12	12	12	12	12	12	12
SS-N-18 Stingray [17]							192	384	432	480	624	672	672
SS-N-20 Sturgeon [18]											200	200	200
SS-N-23 Skiff [19]													
TOTAL STRATEGIC (MRV=1)	362	458	556	640	732	810	1,055	1,218	1,241	1,270	1,594	1,578	1,566
TOTAL STRATEGIC (MRV=2) [20]	362	458	556	688	828	954	1,247	1,458	1,529	1,558	1,882	1,866	1,854
TOTAL WARHEADS	401	497	595	727	867	993	1,286	1,497	1,568	1,597	1,921	1,905	1,893

Table 6
USSR/Russian Ballistic Missile Submarine Forces, 1958-1996

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
SSB/SSBNs													
Golf I SSB													
Golf II	13	13	13	13	12	6	0						
Golf III	1	1	1	0									
Golf IV													
Golf V	1	1	1	1	1	1	0						
Hotel I/II SSBN	2	0											
Hotel III	1	1	1	1	1	1	0						
Yankee I SSBN	23	21	18	17	15	12	11	6	0				
Yankee II	1	1	1	1	1	1	1	0					
Delta I SSBN	18	18	18	18	18	18	18	18	9	0			
Delta II	4	4	4	4	4	4	4	4	4	4	0		
Delta III	14	14	14	14	14	14	14	14	14	14	14	13	13
Delta IV		1	2	3	4	6	6	7	7	7	7	7	7
Typhoon SSBN	2	3	3	4	5	6	6	6	6	6	6	6	6
TOTAL	80	78	76	76	75	69	60	55	40	31	27	26	26
SLBM Launchers [1]													
Golf I [2]													
Golf II [3]	39	39	39	39	36	18	0						
Golf III [4]	6	6	6	0									
Golf IV [5]													
Golf V [6]	1	1	1	1	1	1	0						
Hotel I/II [7]	6	0											
Hotel III [8]	6	6	6	6	6	6	0						
Yankee I [9]	368	336	288	272	240	192	176	96	0				
Yankee II [10]	12	12	12	12	12	12	12	0					
Delta I [11]	216	216	216	216	216	216	216	216	108	0			
Delta II [12]	64	64	64	64	64	64	64	64	64	64	0		
Delta III [13]	224	224	224	224	224	224	224	224	224	224	224	208	208
Delta IV [14]		16	32	48	64	96	96	112	112	112	112	112	112
Typhoon [15]	40	60	60	80	100	120	120	120	120	120	120	120	120
TOTAL	982	980	948	962	963	949	908	832	628	520	456	440	440
SLBM Warheads													
SS-N-4													
SS-N-5 Sark	45	39	39	39	36	18	0						
SS-N-6 Serb [16]	368	336	288	272	240	192	176	96	0				
SS-N-8 Sawfly	292	292	292	286	286	286	280	280	172	64	0		
SS-N-17 Snipe	12	12	12	12	12	12	12	0					
SS-N-18 Stingray [17]	672	672	672	672	672	672	672	672	672	672	672	624	624
SS-N-20 Sturgeon [18]	400	600	600	800	1,000	1,200	1,200	1,200	1,200	1,200	1,200	1,200	1,200
SS-N-23 Skiff [19]		64	128	192	256	384	384	448	448	448	448	448	448
TOTAL STRATEGIC (MRV=1)	1,750	1,976	1,992	2,234	2,466	2,746	2,724	2,696	2,492	2,384	2,320	2,272	2,272
TOTAL STRATEGIC (MRV=2) [20]	2,038	2,264	2,280	2,506	2,706	2,938	2,900	2,792	2,492	2,384	2,320	2,272	2,272
TOTAL WARHEADS	2,077	2,303	2,319	2,545	2,742	2,956	2,900	2,792	2,492	2,384	2,320	2,272	2,272

TABLE 6
USSR/Russian Ballistic Missile Submarine Forces, 1958-1996

1. The initial operational capability (IOC) dates vary in different U.S. government documents.
2. Carries 3 SS-N-4 SLBMs.
3. Carries 3 SS-N-5 SLBMs. These boats were originally Golf Is with SS-N-4 SLBMs.
4. Carries 6 SS-N-8 SLBMs. This was a one-of-a-kind conversion from Golf I with SS-N-4 SLBMs to carry the SS-N-8 SLBMs for test purposes.
5. Carries 4 SS-N-6 SLBMs. This is a test platform for the SS-N-6.
6. Carries 1 SS-N-20 SLBM. This is a test platform for the SS-N-20.
7. Carries 3 SS-N-5 SLBMs. It is unclear whether the seven Hotel Is (each carrying three SS-N-4) were actually operational. There were originally nine Hotels Is, one was converted to a Hotel III and one sank. They were removed from service in 1960-61 while being converted to HOTEL II so as to carry three SS-N-5. In addition one new Hotel II was built as well.
8. Carries 6 SS-N-8 SLBMs. This boat was originally a Hotel II, and was converted as a test platform for the SS-N-8 SLBM.
9. Carries 16 SS-N-6 SLBMs.
10. Carries 12 SS-N-17 SLBMs.
11. Carries 12 SS-N-8 SLBMs.
12. Carries 16 SS-N-8 SLBMs. The Delta II is a lengthened version of the Delta I submarine.
13. Carries 16 SS-N-18 SLBMs.
14. Carries 16 SS-N-23 SLBMs.
15. Carries 20 SS-N-20 SLBMs.
16. Some missiles have two warheads on multiple reentry vehicle (MRV). The MRV was a precursor to the MIRV, where the warheads could not be independently targetable. Because the area in which the warheads can be targeted is limited many tables count the multiple RVs as one warhead. For purposes of estimating warhead production they should be counted separately.
17. The SS-N-18 Mod 1 carries up to three warheads on multiple independently retargetable reentry vehicles (MIRV); the SS-N-18 Mod 2 carries a single reentry vehicle; the SS-N-18 Mod 3 carries up to seven warheads on MIRV. Counting assumption is three warheads.
18. Carries up to 10 warheads on multiple independently targetable reentry vehicle (MIRV).

19. Carries up to four warheads on multiple independently targetable reentry vehicles (MIRV).

20. Assumes the SS-N-6 Mod 3 with two warheads on multiple reentry vehicle (MRV) introduced in 1974 and gradually put on 18 Yankee I submarines.

Table 7
U.S. Strategic Bomber Forces, 1945-1996

	End-																
	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	1955	1956	1957	1958	1959	1960	1961
Bombers (Total Inventory) [1]																	
B-29 Superfortress	15	148	319	488	390	288	340	417	110	0							
B-36 Peacemaker				35	36	38	98	154	185	209	338	247	127	22	0		
B-50 Superfortress				35	99	196	219	224	138	90	0						
B-47 Stratojet							12	62	329	795	1,085	1,306	1,285	1,367	1,365	1,178	889
B-58 Hustler																19	68
B-52 Stratofortress											18	97	243	380	468	538	571
FB-111A																	
B-1B Lancer																	
B-2 Spirit																	
TOTAL	15	148	319	556	525	520	669	857	762	1,094	1,442	1,650	1,655	1,769	1,854	1,735	1,528
Bombers (PAA) [2]																	
B-29 Superfortress [3]	15	125	270	420	330	230	290	360	90	0							
B-36 Peacemaker [4]				18	18	36	60	100	180	180	270	210	120	0			
B-50 Superfortress [5]				35	99	196	219	200	135	90	0						
B-47 Stratojet [6]									315	765	990	1,215	1,260	1,260	1,200	1,085	855
B-58 Hustler [7]																	40
B-52 Stratofortress [8]												45	225	360	345	450	500
FB-111A [9]																	
B-1B Lancer [10]																	
B-2 Spirit [11]																	
TOTAL	15	125	270	473	447	462	569	660	720	1,035	1,260	1,470	1,605	1,620	1,545	1,515	1,395
Bomber Weapons (Force Loadings) [12]																	
Bombs [13]	6	11	32	100	200	330	500	720	878	1,418	1,755	2,123	2,460	2,610	2,490	3,083	2,973
Hounddog (AGM-28B) [14]																	43
SRAM (AGM-69A) [15]																	
ALCM (AGM-86B) [16]																	
ACM (AGM-129A) [17]																	
TOTAL	6	11	32	100	200	330	500	720	878	1,418	1,755	2,123	2,460	2,610	2,490	3,083	3,016
Bomber Weapons (Total Inventory)																	
Bombs	6	11	32	110	235	369	549	800	1,000	1,500	2,200	3,000	4,200	5,700	7,000	6,900	6,500
Hounddog (AGM-28B)																54	230
SRAM (AGM-69A)																	
ALCM (AGM-86B)																	
ACM (AGM-129A)																	
TOTAL	6	11	32	110	235	369	549	800	1,000	1,500	2,200	3,000	4,200	5,700	7,000	6,954	6,730

Table 7
U.S. Strategic Bomber Forces, 1945-1996

	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978
Bombers (Total Inventory) [1]																	
B-29 Superfortress																	
B-36 Peacemaker																	
B-50 Superfortress																	
B-47 Stratojet	880	613	391	114	0												
B-58 Hustler	78	86	94	93	83	81	78	41	0								
B-52 Stratofortress	639	636	626	600	591	588	579	505	459	412	402	422	422	420	419	417	344
FB-111A								3	42	30	60	71	72	69	68	66	68
B-1B Lancer																	
B-2 Spirit																	
TOTAL	1,595	1,335	1,111	807	674	669	655	549	501	442	462	493	494	489	487	483	410
Bombers (PAA) [2]																	
B-29 Superfortress [3]																	
B-36 Peacemaker [4]																	
B-50 Superfortress [5]																	
B-47 Stratojet [6]	675	450	180	45	0												
B-58 Hustler [7]	78	80	80	80	80	78	78	39	0								
B-52 Stratofortress [8]	555	525	525	525	495	480	405	360	360	347	397	357	330	330	316	316	316
FB-111A [9]								0	30	30	60	66	66	66	66	66	60
B-1B Lancer [10]																	
B-2 Spirit [11]																	
TOTAL	1,306	1,055	785	650	575	558	481	399	390	377	457	423	396	396	382	382	376
Bomber Weapons (Force Loadings) [12]																	
Bombs [13]	2,920	2,855	2,953	3,013	3,043	3,192	3,139	3,036	3,060	2,956	3,398	3,005	2,656	2,576	2,464	2,464	2,428
Hounddog (AGM-28B) [14]	184	438	474	453	434	438	382	250	279	278	272	270	263	262	246	230	199
SRAM (AGM-69A) [15]											175	500	900	1,140	1,140	1,140	1,140
ALCM (AGM-86B) [16]																	
ACM (AGM-129A) [17]																	
TOTAL	3,104	3,293	3,427	3,465	3,476	3,630	3,521	3,286	3,339	3,232	3,845	3,778	3,819	3,978	3,850	3,834	3,767
Bomber Weapons (Total Inventory)																	
Bombs	6,300	5,710	5,905	6,025	6,085	6,384	6,278	6,072	6,120	5,912	6,795	6,011	5,312	5,152	4,928	4,928	4,856
Hounddog (AGM-28B)	547	593	566	542	548	477	312	349	345	340	338	329	327	308	288	249	0
SRAM (AGM-69A)											227	651	1,149	1,451	1,431	1,415	1,408
ALCM (AGM-86B)																	
ACM (AGM-129A)																	
TOTAL	6,847	6,303	6,471	6,567	6,633	6,861	6,590	6,421	6,465	6,252	7,360	6,991	6,788	6,911	6,647	6,592	6,264

Table 7
U.S. Strategic Bomber Forces, 1945-1996

	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Bombers (Total Inventory) [1]																		
B-29 Superfortress																		
B-36 Peacemaker																		
B-50 Superfortress																		
B-47 Stratojet																		
B-58 Hustler																		
B-52 Stratofortress	343	343	344	300	263	263	263	263	263	193	193	193	191	95	95	94	76	71
FB-111A	65	63	62	62	61	60	60	60	60	59	58	58	0					
B-1B Lancer								18	76	97	97	96	96	95	95	95	95	95
B-2 Spirit															1	5	8	13
TOTAL	408	406	406	362	324	323	323	341	399	349	348	347	287	190	191	194	179	178
Bombers (PAA) [2]																		
B-29 Superfortress [3]																		
B-36 Peacemaker [4]																		
B-50 Superfortress [5]																		
B-47 Stratojet [6]																		
B-58 Hustler [7]																		
B-52 Stratofortress [8]	316	316	316	272	241	241	241	241	241	180	173	154	125	74	74	74	56	44
FB-111A [9]	60	60	60	56	56	56	56	56	56	48	48	24	0					
B-1B Lancer [10]								15	64	90	90	89	84	84	84	80	80	48
B-2 Spirit [11]															1	3	6	10
TOTAL	376	376	376	328	297	297	297	312	361	318	311	267	209	158	159	167	122	102
Bomber Weapons (Force Loadings) [12]																		
Bombs [13]	2,428	2,428	2,428	2,052	1,804	1,804	1,804	2,044	2,999	2,574	2,488	1,948	2,244	1,424	1,440	1,408	1,136	1,008
Hounddog (AGM-28B) [14]	0																	
SRAM (AGM-69A) [15]	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,140	1,100	1,100	0					
ALCM (AGM-86B) [16]			0	192	576	900	1,160	1,525	1,614	1,614	1,600	1,600	1,600	1,100	1,000	1,000	640	400
ACM (AGM-129A) [17]														300	400	400	400	400
TOTAL	3,568	3,568	3,568	3,384	3,520	3,844	4,104	4,709	6,753	6,328	6,188	4,648	3,844	2,824	2,840	2,808	2,176	1,808
Bomber Weapons (Total Inventory)																		
Bombs	4,856	4,856	4,856	4,200	3,600	3,600	3,600	3,600	3,600	3,600	3,000	2,400	1,800	1,550	1,550	1,550	1,550	1,500
Hounddog (AGM-28B)																		
SRAM (AGM-69A)	1,396	1,383	1,374	1,332	1,327	1,309	1,309	1,309	1,309	1,309	1,250	1,250	0					
ALCM (AGM-86B)			14	288	736	1,209	1,271	1,584	1,715	1,715	1,715	1,680	1,600	1,500	1,400	1,400	1,400	1,400
ACM (AGM-129A)														460	460	460	460	460
TOTAL	6,252	6,239	6,244	5,820	5,663	6,118	6,180	6,493	6,624	6,624	6,966	6,330	3,400	3,510	3,410	3,410	3,410	3,360

TABLE 7

U.S. Strategic Bomber Forces, 1945-1996

1. Includes the total number of bombers in the Strategic Air Command active inventory ("assigned resources," not bombers in inactive storage) as of the end of the year (December).

2. Primary Authorized Aircraft (PAA). Previously the term Unit Equipment (UE) was used. More recently the term Primary Mission Aircraft is used. All of the terms specify the number of aircraft assigned to operational units in combat ready condition. The difference between inventory and PAA are those planes used for training and those in maintenance.

3. Not all B-29 Boeing bombers were modified to carry nuclear weapons. On 31 December 1946 there were 23 nuclear modified B-29 bombers; on 1 March 1947 there were 35; on 1 December 1948 there were 38; in mid-January 1949 there were 66; and on 1 January 1950 there were 95. See David Alan Rosenberg, "U.S. Nuclear Stockpile, 1945 to 1950," *Bulletin of the Atomic Scientists*, May 1982, p. 30. The Strategic Air Command was established on 21 March 1946 as a combat command of the Army Air Forces. On 18 September 1947 the Department of the Air Force was created as a military service and SAC was reorganized and realigned.

4. Not all of the 385 Convair B-36 bombers that the Air Force accepted were modified to carry nuclear weapons. On 1 December 1948 there were four nuclear modified B-36 bombers; by mid-January 1949 there were 17; and by 1 January 1950 there were 34. Effective 1 October 1955, SAC's four heavy Strategic Reconnaissance Wings were redesignated heavy Bombardment Wings in recognition of the conversion of the RB-36 from a reconnaissance airplane to a bomber.

5. Not all of the 370 Boeing B-50 bombers that the Air Force bought were modified to carry nuclear weapons. On 1 December 1948 there were 18 nuclear modified B-50 bombers; by mid-January 1949 there were 38; and by 1 January 1950 there were 96. The B-50 was basically a B-29 that was to be a stopgap to be used until an aircraft more suitable for atomic weapon delivery became available. On 1 July 1950 there were a total of 264 nuclear modified B-29, B-36 and B-50 bombers. SAC's five wings of atomic-capable B-50s began to exchange their aircraft for new B-47s at the end of 1953. Those wings were the 509th (Walker AFB, NM), 43rd (Davis-Monthan AFB, AZ), 2^d (Hunter AFB, GA), 93rd Castle, AFB, CA), and 97th (Biggs, AFB, TX), all activated in July and August 1948.

6. The Air Force accepted a total of 2,041 Boeing B-47s. The B and E versions had a maximum bomb load of 25,000 lb. Beginning with the 90th B-47B the Air Force had a requirement that it carry two types of fission bombs. The first B-47 configured to carry thermonuclear weapons was delivered in January 1955. By the end of April 1956 over 1,100 B-47s could handle the new thermonuclear bombs. SAC's last two B-47s went to storage on 11 February 1966.

7. The first full wing of 36 General Dynamics B-58As achieved initial operational capability in May 1961. This was with the 43rd Bomb Wing at Carswell AFB, TX. A second Bomb Wing, the 305th at Bunker Hill AFB, IN had its full allocation a year later. In December 1965, Secretary of Defense Robert McNamara directed phaseout of the entire B-58 force by the end of June 1970. It was actually completed on 16 January 1970.

8. In June 1955 the Air Force took delivery of the first B-52. By October 1962 when the last B-52H was delivered to SAC Boeing had built a total of 744 bombers in models A-H, plus two prototypes.

As of the end of 1996 all but 71 B-52Hs have been retired. The Air Force estimates that these planes will be structurally sound until about 2030, sixty eight years after entering service.

9. There were two wings of FB-111A aircraft, the 509th Bomb Wing at Pease AFB, NH which was fully combat ready in October 1971 and the 380th Strategic Aerospace Wing at Plattsburgh AFB, NY which was combat ready in 1972. A total of 76 FB-111As were accepted by the Air Force. On 10 July 1991 the SAC turned over its last FB-111A to the Tactical Air Command; 35 were redesignated F-111G, the rest were retired or sent to museums

10. One hundred B-1B bombers were purchased. Four have crashed, the most recent of which was on 30 November 1992 and one is considered a ground trainer, not part of Strategic Command's operational inventory. Under START II B-1Bs will no longer be counted as nuclear weapon carriers. Their transition to a conventional role is almost complete. By the end of 1997 the B-1 will be out of the SIOP altogether.

11. The first B-2 was delivered to the 509th Bombardment Wing on 17 December 1993. The 21st and last bomber will be delivered in 2000. The first 16 B-2s initially will only carry the B83 bomb. Eventually all of the planes will be able to carry both B61 and B83 bombs.

12. There is no easy or accurate method for estimating the actual number of weapons the bomber forces carry. How each bomber is loaded is determined by its Single Integrated Operational Plan (SIOP) mission. The SIOP is the central nuclear war plan of the U.S. It is developed by the Joint Strategic Target Planning Staff at the Strategic Air Command in Omaha, Nebraska. It is incredibly complex once matching over 10,000 nuclear warheads with their targets taking into account factors of reliability, timing, target hardness, collateral damage, etc. The U.S. bomber's role in the overall plan must be integrated with ballistic missile salvos from SSBNs and land based forces in the U.S. and Europe. When bombers were on alert at each SAC base those in the northern parts of the U.S. had the least distance to fly over the north pole and would have been the first to reach the Soviet Union. Therefore it is likely that those bombers had a full complement of SRAMs intended for defense suppression and making corridors through which following bombers would fly. The counting assumptions for bomber loadings of nuclear weapons are as follows:

- a) 1946-1948: Actual number of bombs in the stockpile as of June 30; Rosenberg.
- b) 1949-1950: Rosenberg reports 240 mechanical assemblies as of June 30, 1949 and "at least 292" nuclear components and 688 mechanical assemblies as of 30 June 1950. We assume that there were 200 bombs by the end of 1949 and 400 by the end of 1950.
- c) 1951-1952: Prior to the deployment of the B-47 bomber, the assumption is that there is a sufficient number of bombs for each PAA aircraft.
- d) 1953-1955: B-29, B-36 and B-50 bombers continue to carry one bomb per aircraft. The assumption for the B-47 bomber from 1953 to 1965 is that there were an average of 1.5 bombs per aircraft; based on Department of Defense, OSD, "Memorandum for the President, Recommended FY 1965-FY 1969 Strategic Retaliatory Forces," 6 December 1963, p. 1-2 (partially declassified).
- e) 1956-1959: B-36 and B-47 bombers carry one and 1.5 bombs, respectively (see above). B-52 average loading is two bombs per bomber.

f) 1960: With the introduction of the versatile B28 bomb in quantity the B-52 bomber force loading goes up to 3.3 bombs per plane; see Department of Defense, OSD, "Memorandum for the President, Recommended FY 1965-FY 1969 Strategic Retaliatory Forces," 6 December 1963, p.1-2 (partially declassified).

g) 1961-1962: The B-58 bomber carries one bomb until 1964. B-47 and B-52 bomber force loadings continue as above.

h) 1963: The average bomb force loading per B-52 bomber increases to four.

i) 1964-1969: The B-58 is modified to carry four bombs. B-52 bomber force loadings gradually increase from 4.5 to 8 bombs per plane. The average bomb loadings are assumed to be: 4.5 in 1964, 5 in 1965, 5.5 in 1966, 6 in 1967, 7 in 1968, and 8 in 1969.

j) 1970-1971: The average bomb loadings for the B-52 and FB-111A bombers are eight and six respectively.

k) 1972-1986: Twenty FB-111A bombers carry six SRAMs each and no bombs. The remaining FB-111A bombers carry six bombs each. The remaining SRAMs are carried on B-52 bombers. B-52 bombers loaded with SRAMs carry 12 SRAMs and four bombs. The remaining B-52 bombers carry an average of eight bombs. B-1B bombers beginning in 1986 carry eight bombs.

13. Strategic bombers have carried a wide variety of types of bombs. The first generation were heavy, and then lighter weight fission bombs. The entry date is when the first warhead was produced and the exit date is when the last one was retired. Military service dates will differ. These included:

Bomb	Weight (lb)	Yield (kt)	Entry-Exit
Mark 4	10,800	1-31	03/49-05/53
Mark 6	8,500	8-160	07/51-01/61
Mark 5	3,100	11-47	05/52-01/63
Mark 7	1,650	8-60	08/52-06/67

These were followed by large thermonuclear bombs: (Yield in Megatons)

B15	7,000	1.70-3.75	04/55-04/65
B17/24	42,000	10-15	10/54-10/57
B21	17,000	4-5	12/55-11/57
B36	17,500	9-10	04/56-01/62
B39	6,650	3.75	02/57-11/66
B41	10,000	10	09/60-07/76
B53	8,850	9	08/62 -to date

Finally there were lighter-weight, smaller-diameter, lower-yield bombs:

B28	2,000	up to 1.45 Mt	08/58-04/92
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B43	2,100	up to 1.0 Mt	04/61-04/91
B61	700	100-500 kt	01/68- to date
B83	2,400	1.2 Mt	09/83- to date

14 Eighty percent of the total inventory of nuclear armed Hound Dog (AGM-28B) air-to-surface missiles are force loadings.

15 Counting assumptions for nuclear-armed Short Range Attack Missiles (SRAM) (AGM-69A). The total number of operational SRAMs is 1140 from 1975-1986; HAC, FY 1982 DOD, Part 2, p. 101. The SRAM inventory peaked in 1975 at 1471. During the 1972-74 period, SRAM operational missiles were assumed to be the same ratio of operational/total inventory as in 1975. The SRAM was retired for safety reasons at the end of 1991.

16. Counting assumptions for nuclear armed Air-Launched Cruise Missiles (ALCM) (AGM-86B). The number of ALCMs is assumed to be 12 per modified and deployed B-52G/H bomber. A few hundred ALCMs were converted to conventional versions and some were used in the Gulf War. With the retirement of B-52Gs and a portion of the B-52Hs several hundred ALCMs are being placed in a "hedge" and/or reserve status.

17. Advanced Cruise Missiles supplement and replace ALCMs

Table 8
USSR/Russian Strategic Bomber Forces, 1956-1996

	End-	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969
	Bombers (PAA) [1]														
TU-95 Bear A		20	30	45	55	65	75	80	80	85	60	45	30	30	30
TU-95 Bear B/C									12	30	45	60	75	75	75
TU-95 Bear G															
TU-95 Bear H6															
TU-95 Bear H16															
MYA-4 Bison		20	23	40	50	56	58	58	58	58	58	54	54	54	52
TU-160 Blackjack															
TOTAL		40	53	85	105	121	133	138	150	173	163	159	159	159	157
Bomber Weapons (Force Loadings) [2]															
TU-95 Bear A [3]		40	60	90	110	130	150	160	160	170	120	90	60	60	60
TU-95 Bear B/C [4]									48	120	180	240	300	300	300
TU-95 Bear G [5]															
TU-95 Bear H6															
TU-95 Bear H16 [6]															
MYA-4 Bison [7]		80	92	160	200	224	232	232	232	232	232	216	216	216	208
TU-160 Blackjack [8]															
TOTAL		120	152	250	310	354	382	392	440	522	532	546	576	576	568

Table 8
USSR/Russian Strategic Bomber Forces, 1956-1996

	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
Bombers (PAA) [1]													
TU-95 Bear A	30	30	30	30	20	0							
TU-95 Bear B/C	65	55	45	30	30	20	0						
TU-95 Bear G	10	20	30	40	45	45	30	0					
TU-95 Bear H6				5	15	25	27	27	30	31	31	31	31
TU-95 Bear H16	10	25	40	50	50	55	55	57	57	57	57	57	57
MYA-4 Bison	45	30	15	0									
TU-160 Blackjack					10	16	16	16	25	25	25	25	25
TOTAL	160	160	160	155	170	161	128	100	112	113	113	113	113
Bomber Weapons (Force Loadings) [2]													
TU-95 Bear A [3]	60	60	60	60	40	0							
TU-95 Bear B/C [4]	260	220	180	120	120	80	0						
TU-95 Bear G [5]	60	120	180	240	270	270	180	0					
TU-95 Bear H6				30	90	150	162	162	180	186	186	186	186
TU-95 Bear H16 [6]	160	400	640	800	800	880	880	912	912	912	912	912	912
MYA-4 Bison [7]	180	120	60	0									
TU-160 Blackjack [8]					120	192	192	192	300	300	300	300	300
TOTAL	720	920	1,120	1,250	1,440	1,572	1,414	1,266	1,392	1,398	1,398	1,398	1,398

TABLE 8
USSR/Russian Strategic Bomber Forces, 1956-1996

1. The number of bombers is assumed to be the equivalent of U.S. Primary Authorized Aircraft (PAA). This does not include aircraft in storage or inactive aircraft.
2. Force loadings from 1956-1959 are authors estimates of bombs available for combat; from 1960-1996, the force loadings are authors estimates based on the counting rules below.
3. Bear A bombers carry two bombs each, and no air-to-surface missiles.
4. Bear B/C bombers carry four bombs or a single AS-3 air-to-surface missile.
5. Bear G bombers carry four bombs and two AS-4 air-to-surface missiles per plane. Bear B/C bombers were converted to Bear G models, but after 1989 no longer had a strategic offensive role.
6. In 1984, newly produced Bear H bombers began to be deployed. The Bear H6 carries 6 AS-15A air-launched cruise missiles or 6 bombs. The Bear H16 carries 16 AS-15A ALCMs or 16 bombs.
7. Bison bombers carried four bomber weapons each.
8. Blackjack bombers carry 12 AS-15B ALCMs or 12 AS-16 SRAMs or 12 bombs.

Table 9
U.S. Nuclear Warheads, 1945-1996

End Year	Strategic Warheads				Non-Strategic Warheads	Stockpiled Warheads	Awaiting Dism'tlem't	Intact Warheads
	ICBM	SLBM	Bombers	Total				
1945			6	6	0	6		
1946			11	11	0	11		
1947			32	32	0	32		
1948			110	110	0	110	?	?
1949			235	235	0	235	?	?
1950			369	369	0	369	?	?
1951			549	549	91	640	?	?
1952			800	800	205	1,005	?	?
1953			1,000	1,000	436	1,436	?	?
1954			1,500	1,500	563	2,063	?	?
1955			2,200	2,200	857	3,057	?	?
1956			3,000	3,000	1,618	4,618	?	?
1957			4,200	4,200	2,244	6,444	?	?
1958			5,700	5,700	4,122	9,822	?	?
1959	6		7,000	7,006	8,462	15,468	?	?
1960	13	34	6,954	7,000	13,433	20,434	?	?
1961	60	84	6,730	6,874	17,299	24,173	?	?
1962	213	151	6,847	7,211	20,397	27,609	?	?
1963	627	168	6,303	7,098	22,710	29,808	?	?
1964	952	403	6,471	7,827	23,481	31,308	?	?
1965	897	773	6,567	8,237	23,899	32,135	?	?
1966	1,054	1,327	6,633	9,014	23,179	32,193	?	?
1967	1,096	1,630	6,861	9,587	21,824	31,411	?	?
1968	1,096	1,630	6,590	9,316	20,136	29,452	?	?
1969	1,096	1,630	6,421	9,147	18,316	27,463	?	?
1970	1,306	1,630	6,465	9,401	17,091	26,492	?	?
1971	1,516	2,587	6,252	10,355	16,247	26,602	?	?
1972	1,726	3,276	7,360	12,363	15,111	27,474	?	?
1973	1,936	4,318	6,991	13,244	15,205	28,449	?	?
1974	2,041	4,654	6,788	13,483	14,815	28,298	?	?
1975	2,251	4,771	6,911	13,933	13,302	27,235	?	?
1976	2,251	5,359	6,647	14,257	11,941	26,199	?	?
1977	2,251	5,477	6,592	14,320	11,022	25,342	?	?
1978	2,251	5,712	6,264	14,227	10,197	24,424	?	?
1979	2,251	5,645	6,252	14,148	9,993	24,141	?	?
1980	2,251	5,309	6,239	13,799	10,117	23,916	?	?
1981	2,251	4,990	6,244	13,485	9,706	23,191	?	?
1982	2,246	5,006	5,820	13,072	10,019	23,091	?	?
1983	2,237	5,208	5,663	13,108	10,234	23,341	?	?
1984	2,226	5,611	6,118	13,955	9,666	23,621	?	?
1985	2,216	5,645	6,180	14,040	9,470	23,510	?	?
1986	2,273	5,712	6,493	14,478	8,932	23,410	?	?
1987	2,415	5,914	6,624	14,953	8,519	23,472	?	?
1988	2,562	5,578	6,624	14,764	8,232	22,995	241	23,236
1989	2,562	5,410	5,965	13,937	8,249	22,186	642	22,827
1990	2,562	5,480	5,330	13,372	7,657	21,029	752	21,781
1991	2,200	5,480	3,400	11,080	6,712	17,792	2,330	20,121
1992	2,200	3,630	3,510	9,340	3,739	13,079	5,261	18,340
1993	2,200	3,630	3,410	9,240	1,802	11,042	5,789	16,831
1994	2,200	3,630	3,410	9,240	1,300	10,540	4,916	15,456
1995	2,180	3,630	3,410	9,220	1,255	10,475	3,635	14,111
1996	2,180	3,630	3,360	9,170	1,225	10,395	2,542	12,937

Table 10
USSR/Russian Nuclear Warheads, 1949-1996

End Year	Strategic Warheads				Non-Strategic	Stockpiled Warheads	Awaiting Dism'tem't	Intact Warheads
	ICBM	SLBM	Bombers	Total				
1949					1	1	?	?
1950					5	5	?	?
1951					25	25	?	?
1952					50	50	?	?
1953					120	120	?	?
1954					150	150	?	?
1955					200	200	?	?
1956			126	126	300	426	?	?
1957			160	160	500	660	?	?
1958		6	263	269	600	869	?	?
1959		35	326	360	700	1,060	?	?
1960	2	32	372	405	1,200	1,605	?	?
1961	11	60	401	471	2,000	2,471	?	?
1962	38	72	412	522	2,800	3,322	?	?
1963	104	72	462	638	3,600	4,238	?	?
1964	201	72	548	821	4,400	5,221	?	?
1965	295	76	559	929	5,200	6,129	?	?
1966	437	79	573	1,089	6,000	7,089	?	?
1967	859	76	605	1,539	6,800	8,339	?	?
1968	1,068	126	605	1,799	7,600	9,399	?	?
1969	1,338	204	596	2,138	8,400	10,538	?	?
1970	1,546	301	596	2,443	9,200	11,643	?	?
1971	1,616	380	596	2,592	10,500	13,092	?	?
1972	1,600	481	596	2,678	11,800	14,478	?	?
1973	1,635	584	596	2,815	13,100	15,915	?	?
1974	1,666	722	596	2,985	14,400	17,385	?	?
1975	2,277	869	596	3,743	15,700	19,443	?	?
1976	2,607	1,002	596	4,205	17,000	21,205	?	?
1977	2,838	1,309	596	4,744	18,300	23,044	?	?
1978	3,666	1,531	596	5,793	19,600	25,393	?	?
1979	4,833	1,805	596	7,035	20,900	27,935	?	?
1980	5,630	1,636	596	7,862	22,200	30,062	?	?
1981	5,977	1,976	596	8,549	23,500	32,049	?	?
1982	6,596	1,959	596	9,152	24,800	33,952	?	?
1983	6,993	1,947	764	9,704	26,100	35,804	?	?
1984	7,135	2,140	756	10,031	27,400	37,431	?	?
1985	7,154	2,377	966	10,497	28,700	39,197	?	?
1986	7,153	2,394	1,176	10,723	30,000	40,723	4,277	45,000
1987	7,216	2,631	1,313	11,159	27,700	38,859	4,141	43,000
1988	7,277	2,841	1,512	11,630	25,700	37,330	3,670	41,000
1989	7,382	3,085	1,651	12,117	23,700	35,817	3,183	39,000
1990	7,285	3,045	1,485	11,815	21,700	33,515	3,485	37,000
1991	6,411	2,932	1,329	10,672	18,933	29,606	5,394	35,000
1992	6,011	2,617	1,462	10,089	16,167	26,256	6,744	33,000
1993	5,414	2,503	1,468	9,385	13,400	22,785	8,215	31,000
1994	4,530	2,436	1,468	8,434	10,633	19,067	9,933	29,000
1995	3,894	2,386	1,468	7,748	7,867	15,615	11,385	27,000
1996	3,768	2,386	1,468	7,622	5,100	12,722	12,278	25,000

Table 11
U.S. Nuclear Warheads and Megatonage by Fiscal Year, FY 1945-FY 1996

End-FY	Stockpile	Yield (Mt)
1945	2	0
1946	9	0
1947	13	0
1948	50	1
1949	170	4
1950	299	10
1951	438	35
1952	841	50
1953	1,169	73
1954	1,703	339
1955	2,422	2,880
1956	3,692	9,189
1957	5,543	17,546
1958	7,345	17,304
1959	12,298	19,055
1960	18,638	20,491
1961	22,229	10,948
1962	26,117	12,825
1963	29,100	15,977
1964	30,516	16,944
1965	32,099	15,153
1966	32,171	14,037
1967	32,215	12,786
1968	30,607	11,838
1969	28,296	11,714
1970	26,629	9,695
1971	26,355	8,584
1972	26,849	8,532
1973	28,099	8,452
1974	28,799	8,425
1975	27,797	7,368
1976	26,393	5,936
1977	25,616	5,845
1978	24,518	5,721
1979	24,141	5,696
1980	24,141	5,619
1981	23,241	5,383
1982	23,041	5,359
1983	23,241	5,232
1984	23,641	5,192
1985	23,560	5,217
1986	23,360	5,415
1987	23,560	4,882
1988	23,206	4,790
1989	22,363	4,743
1990	21,654	4,519
1991	19,154	3,796
1992	13,704	3,168
1993	11,204	2,647
1994	10,554	2,375
1995	10,496	2,362
1996	10,413	2,331

Figure 1
U.S. - USSR/Russian Total Strategic Launchers (Force Loadings), 1945-1996

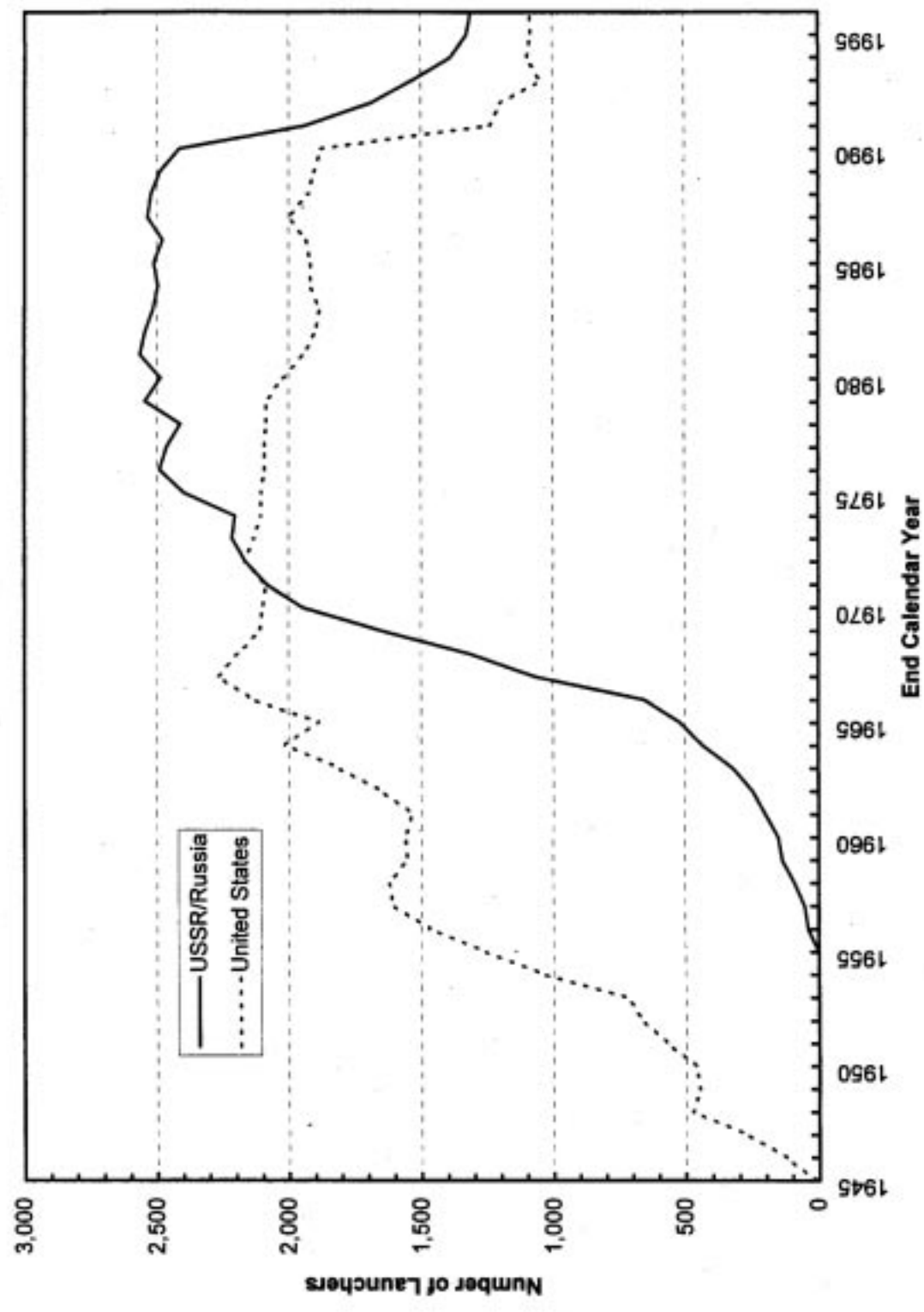


Figure 2
U.S. - USSR/Russian Total Strategic Warheads (Force Loadings), 1945-1996

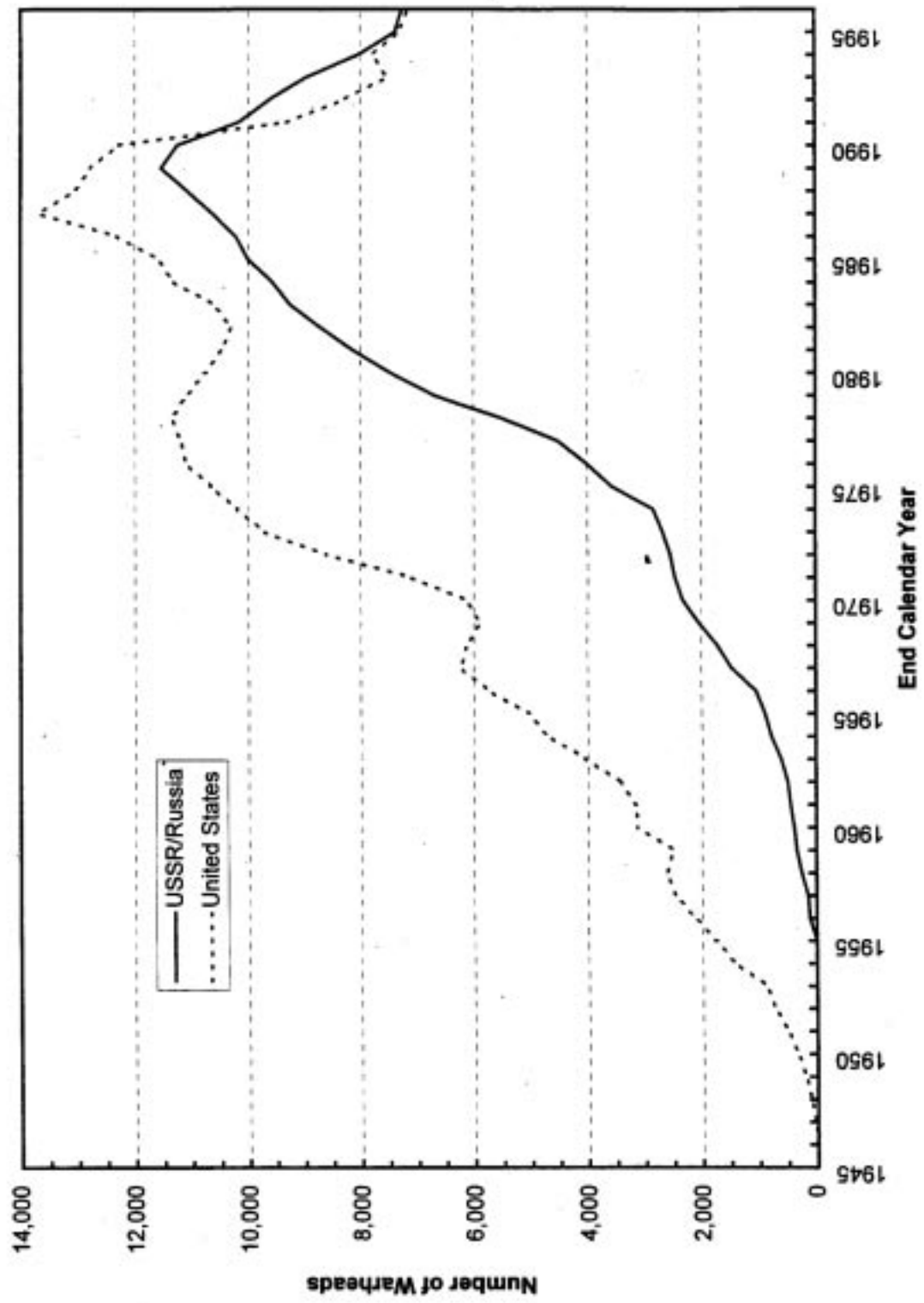


Figure 3
U.S. - USSR/Russian ICBM Launchers, 1959-1996

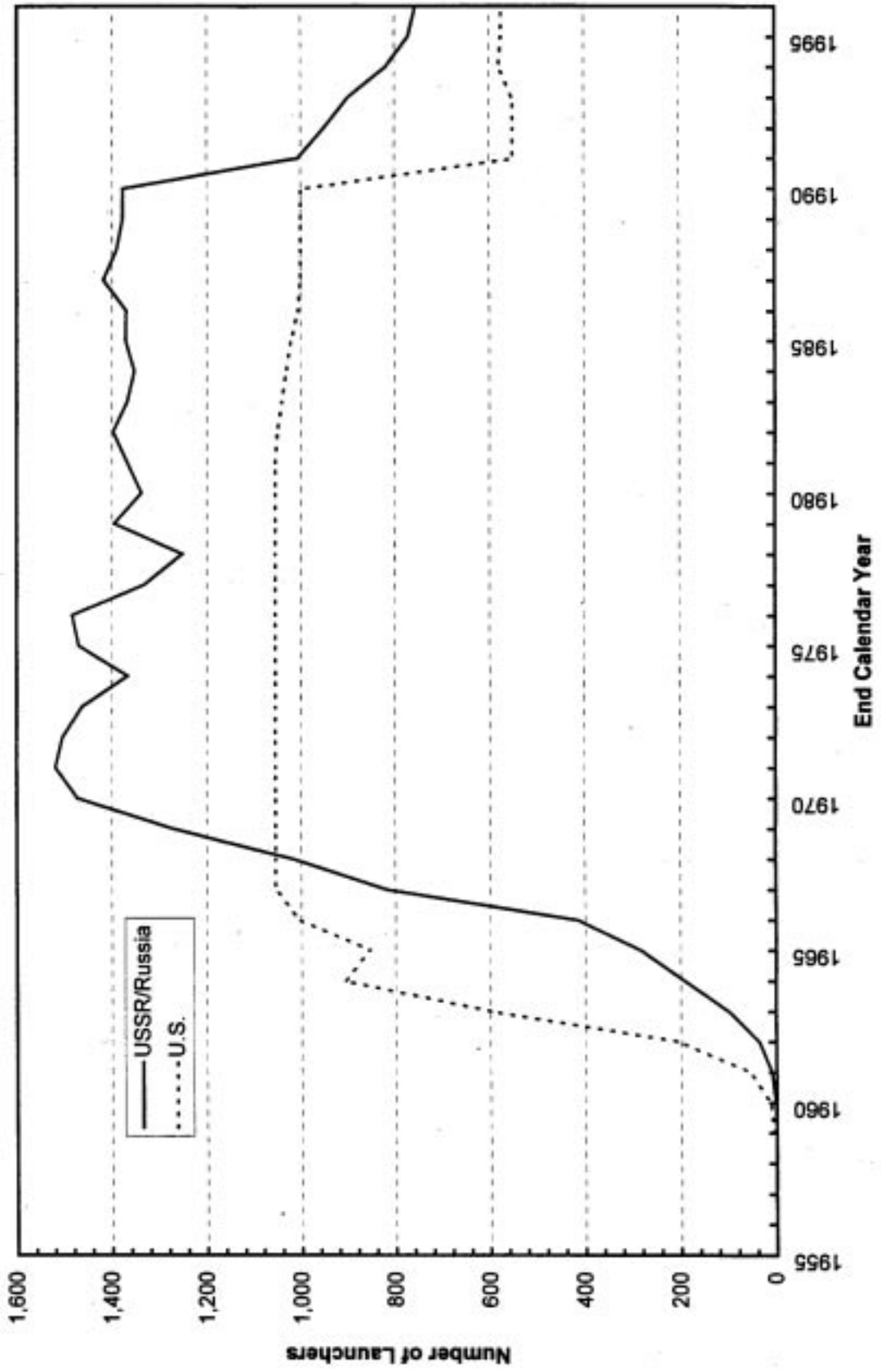


Figure 4
U.S. - USSR/Russian ICBM Warheads (Force Loadings), 1959-1996

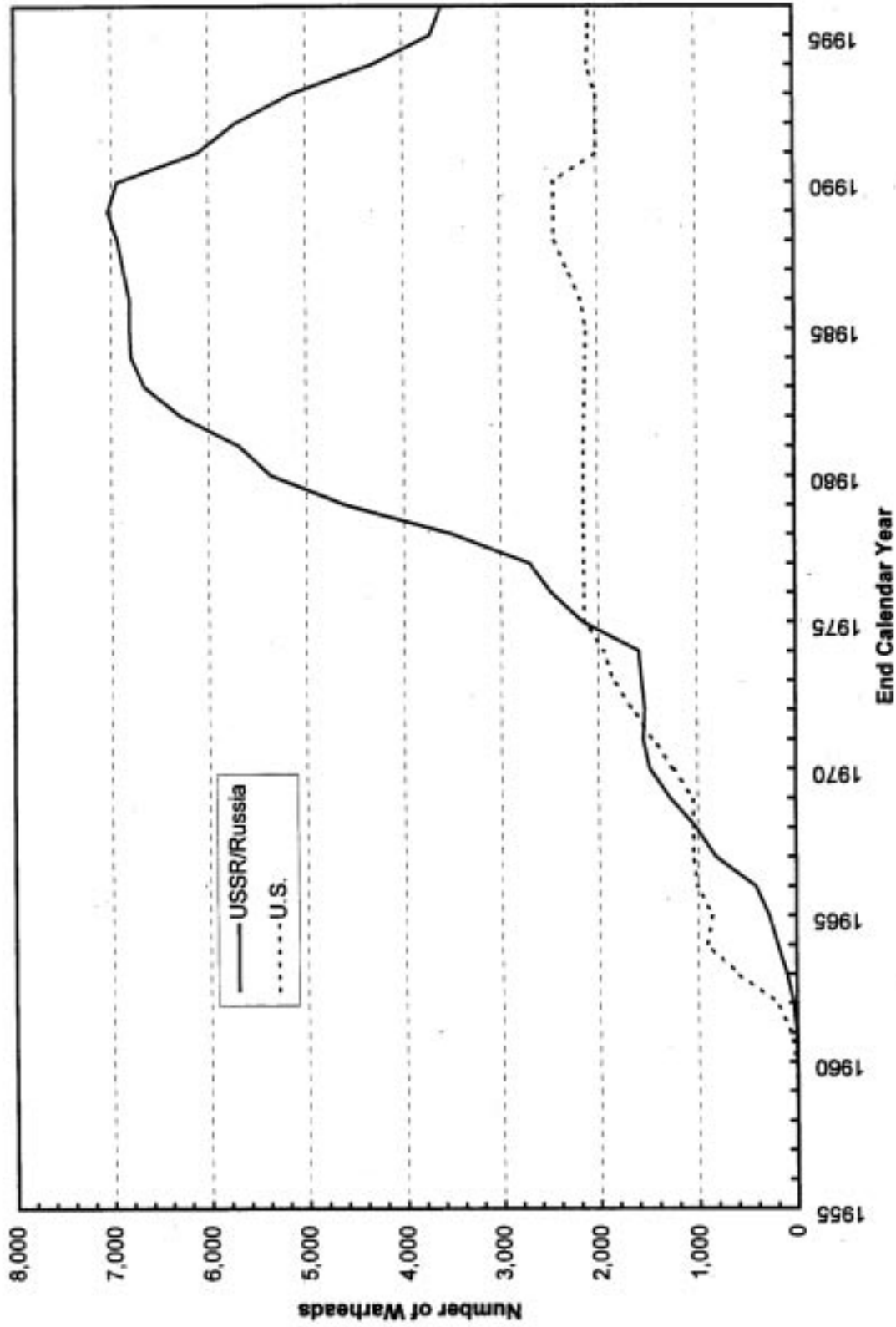


Figure 5
U.S. - USSR/Russian SLBM Launchers, 1958-1996

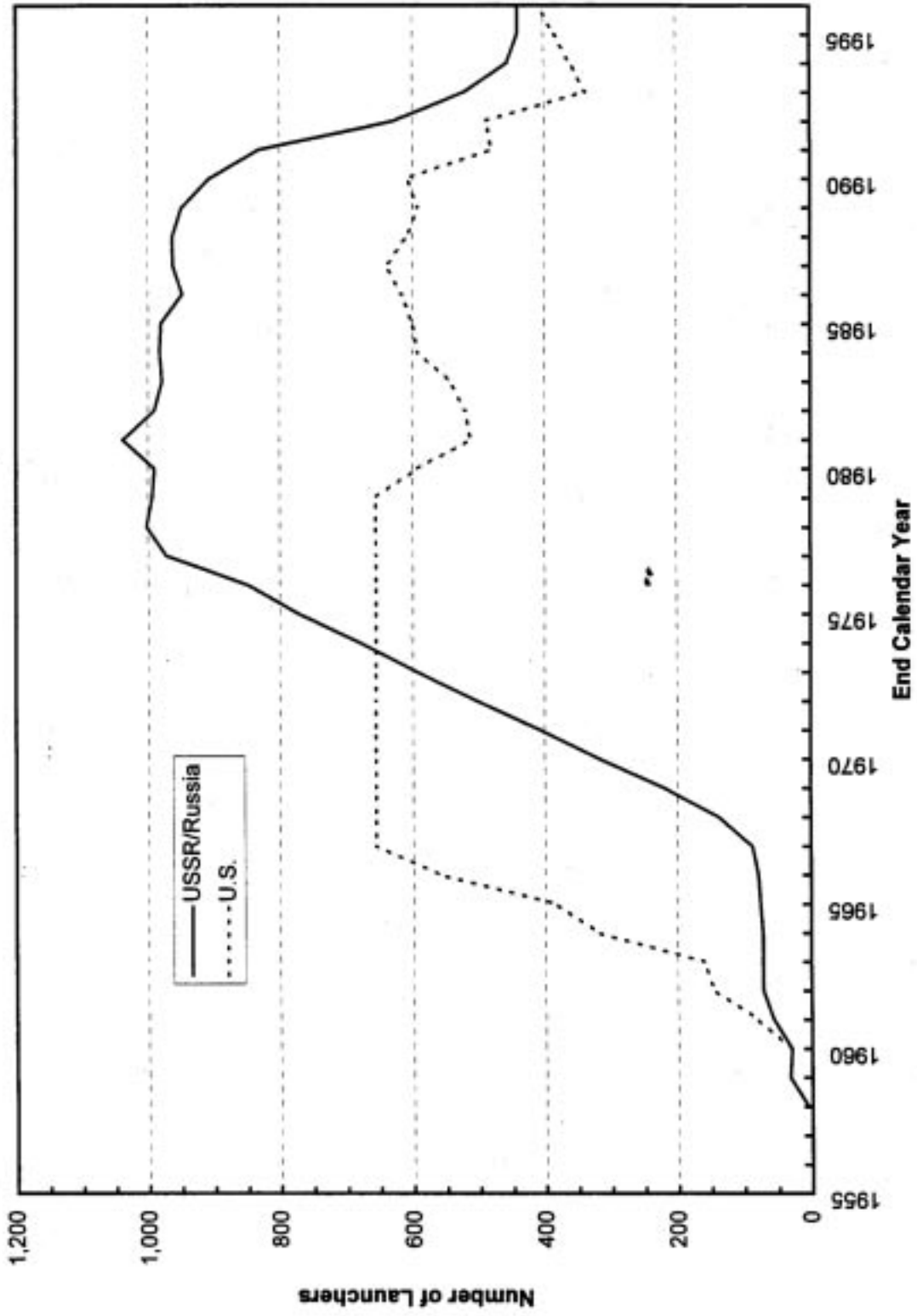


Figure 6
U.S. - USSR/Russian SLBM Warheads (Force Loadings), 1958-1996

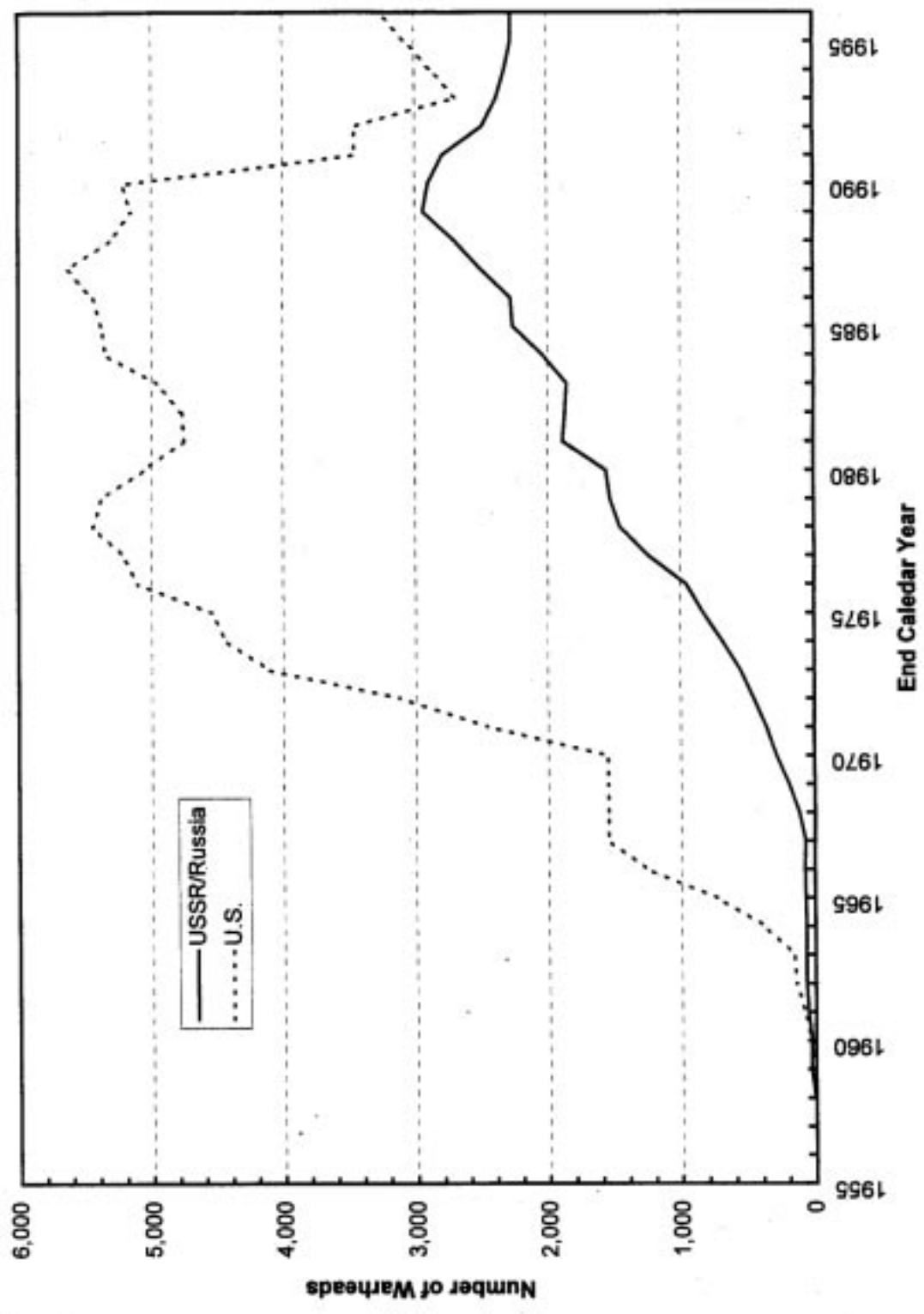


Figure 7
U.S. - USSR/Russian Strategic Bombers, 1945-1996

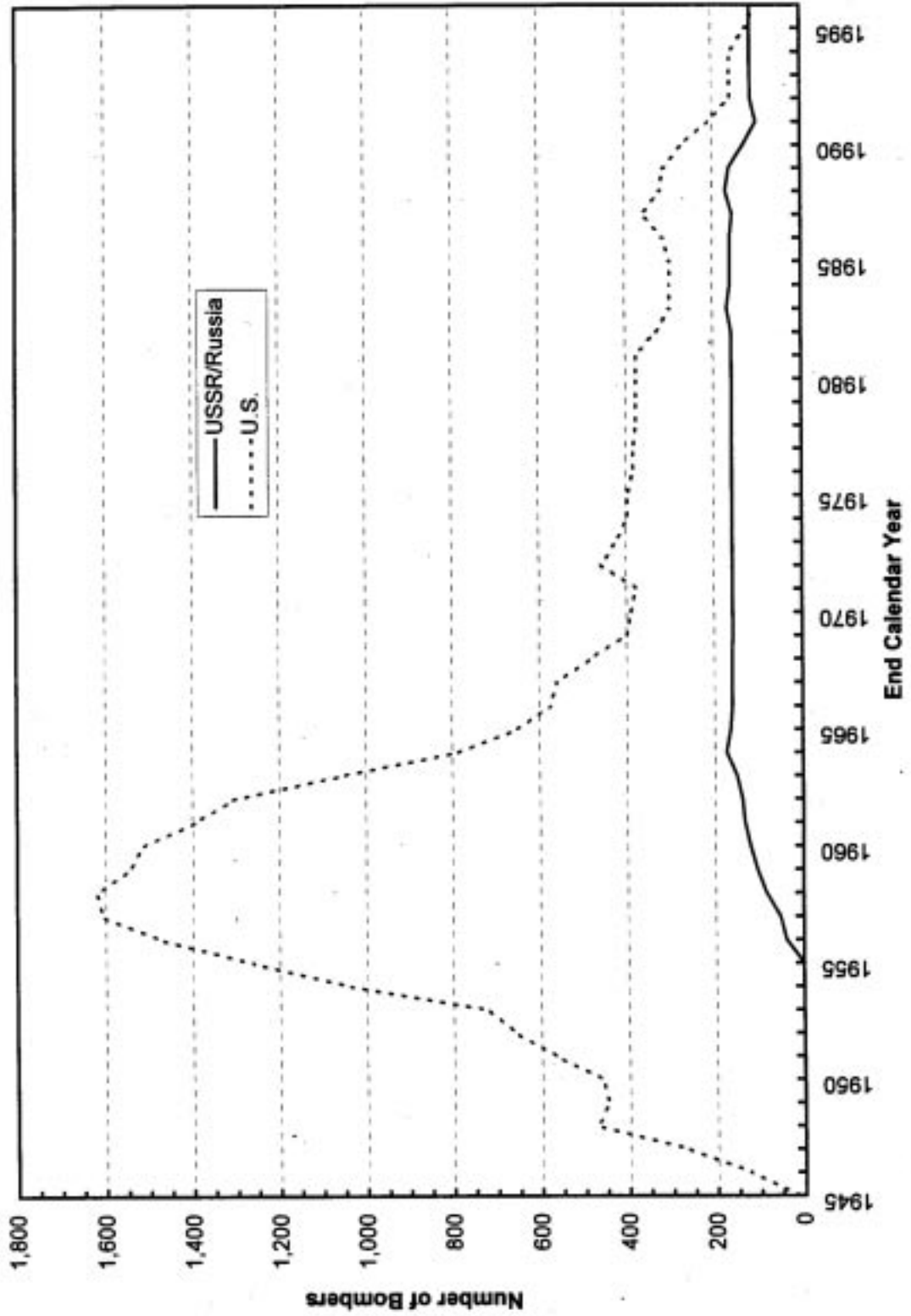


Figure 8
U.S. - USSR/Russian Strategic Bomber Weapons, 1945-1996

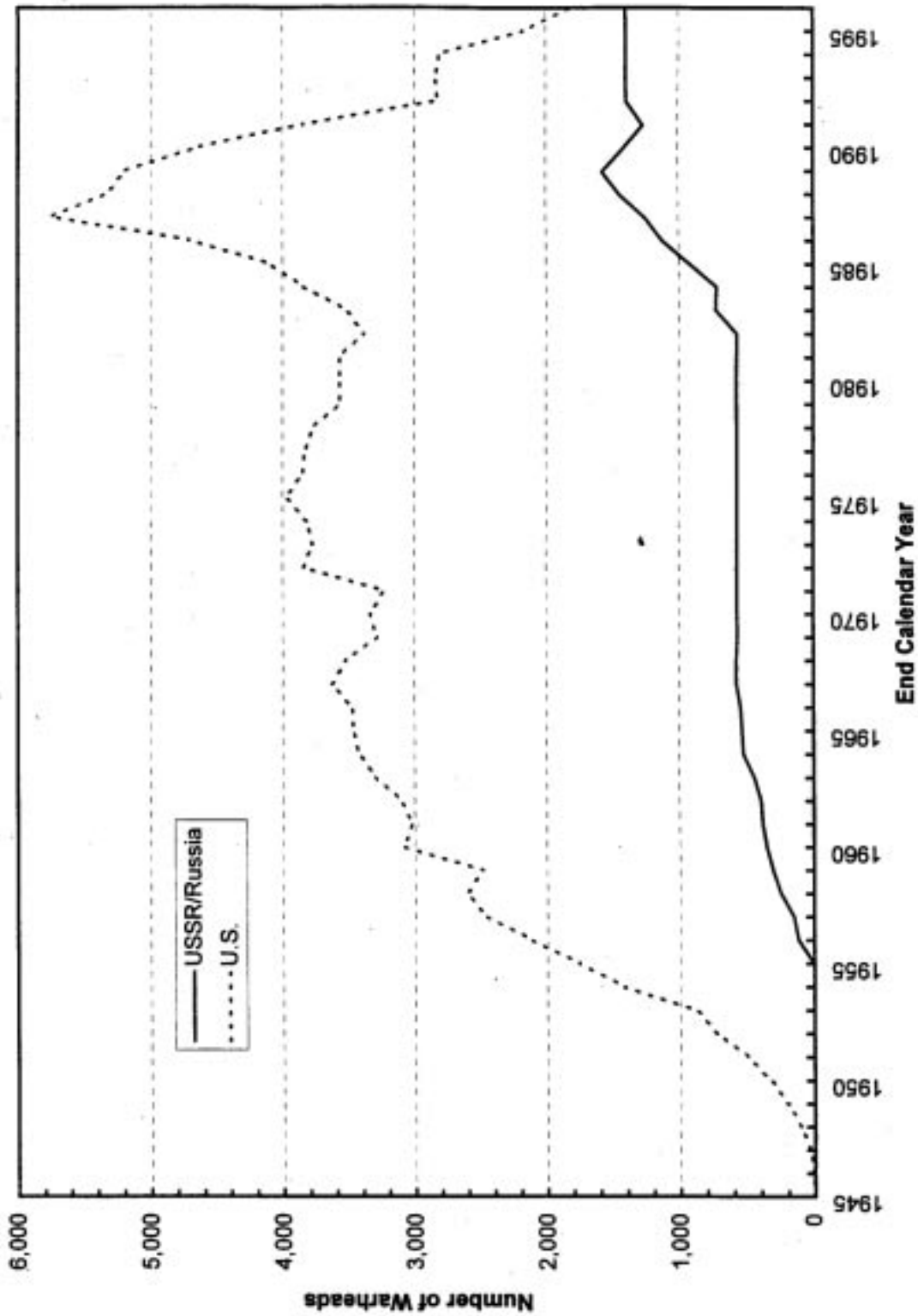


Figure 9
U.S. Nuclear Stockpile, 1945-1996

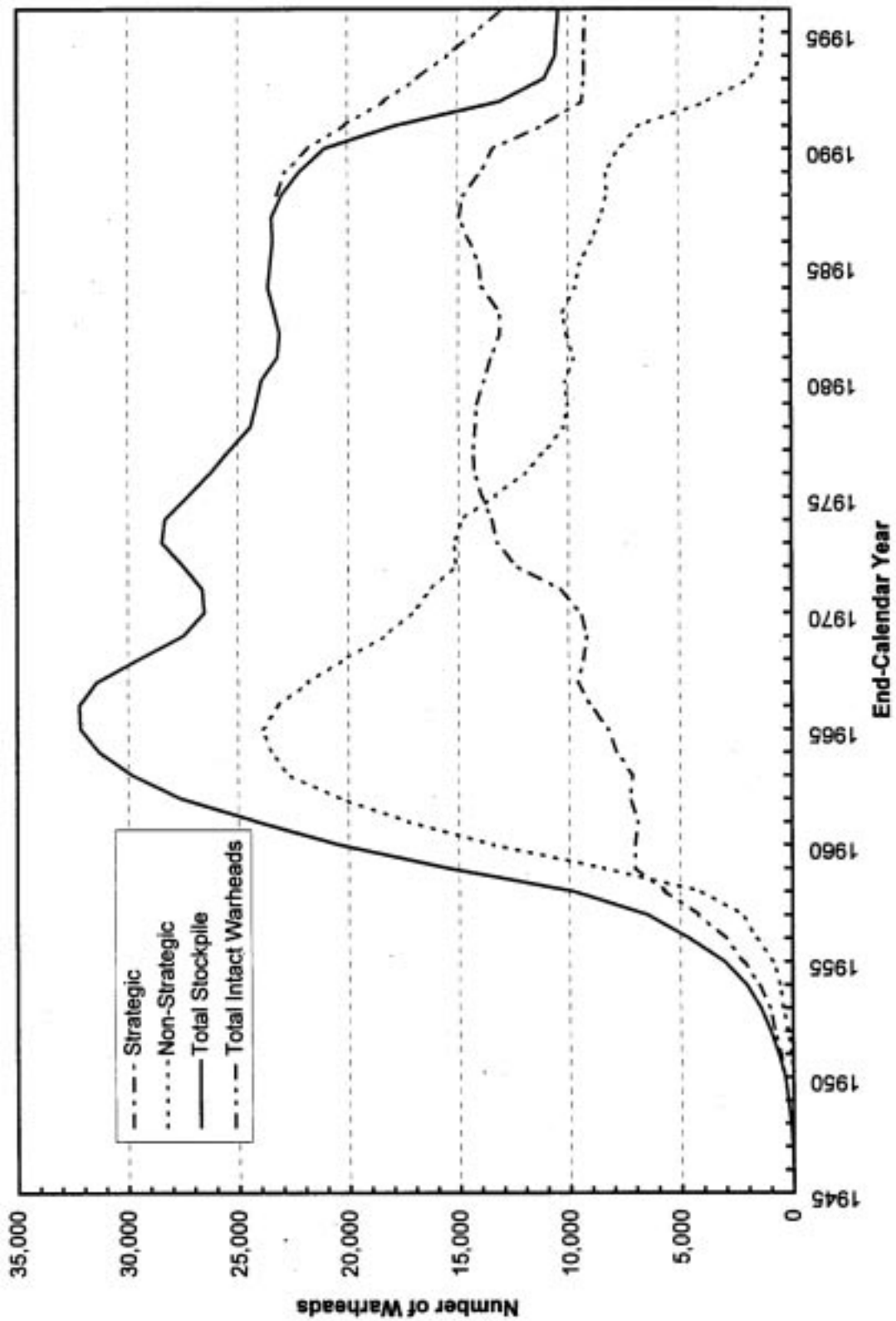


Figure 10
USSR/Russian Nuclear Stockpile, 1949-1996

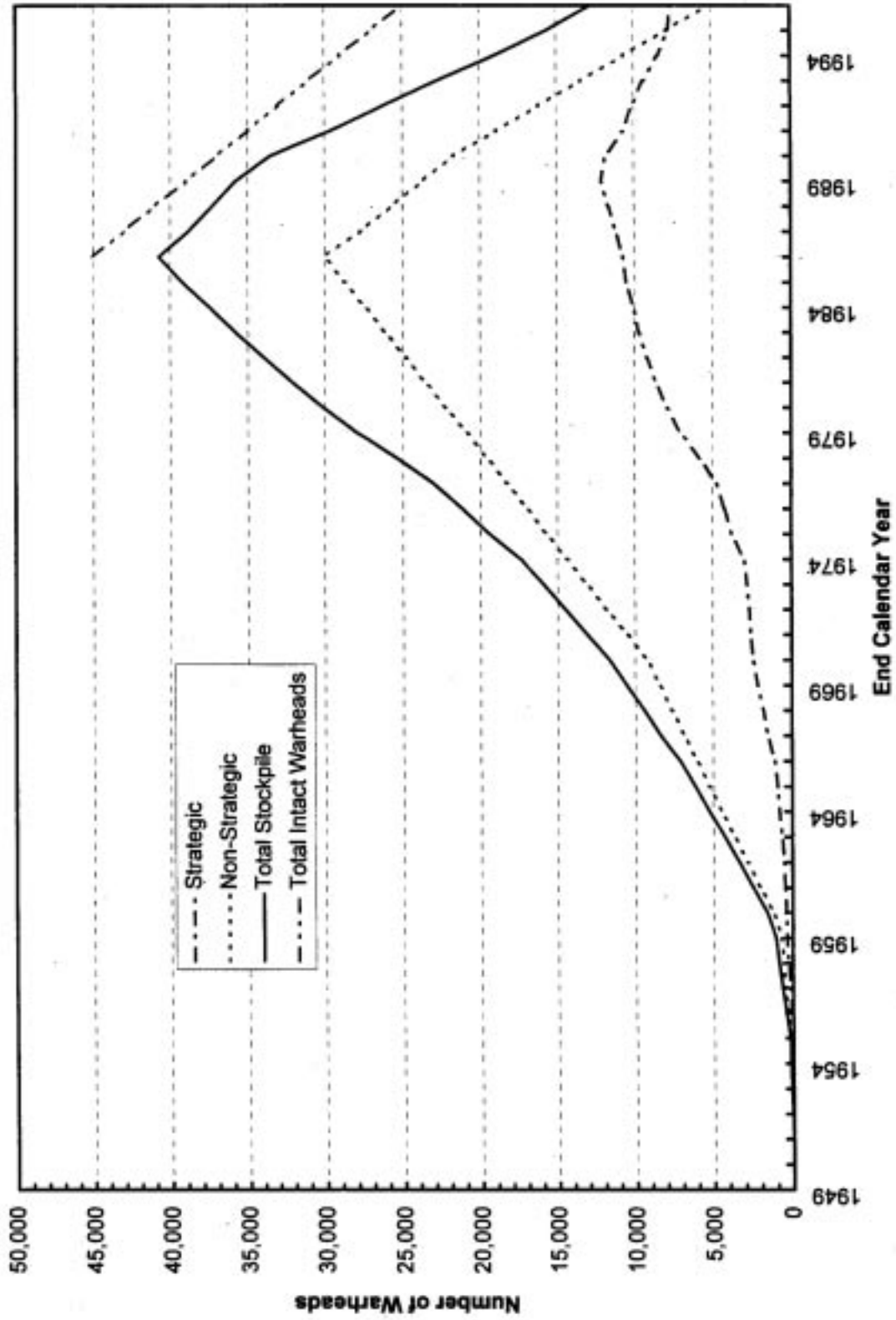


Figure 11
U.S. - USSR/Russian Nuclear Stockpile, 1945-1996

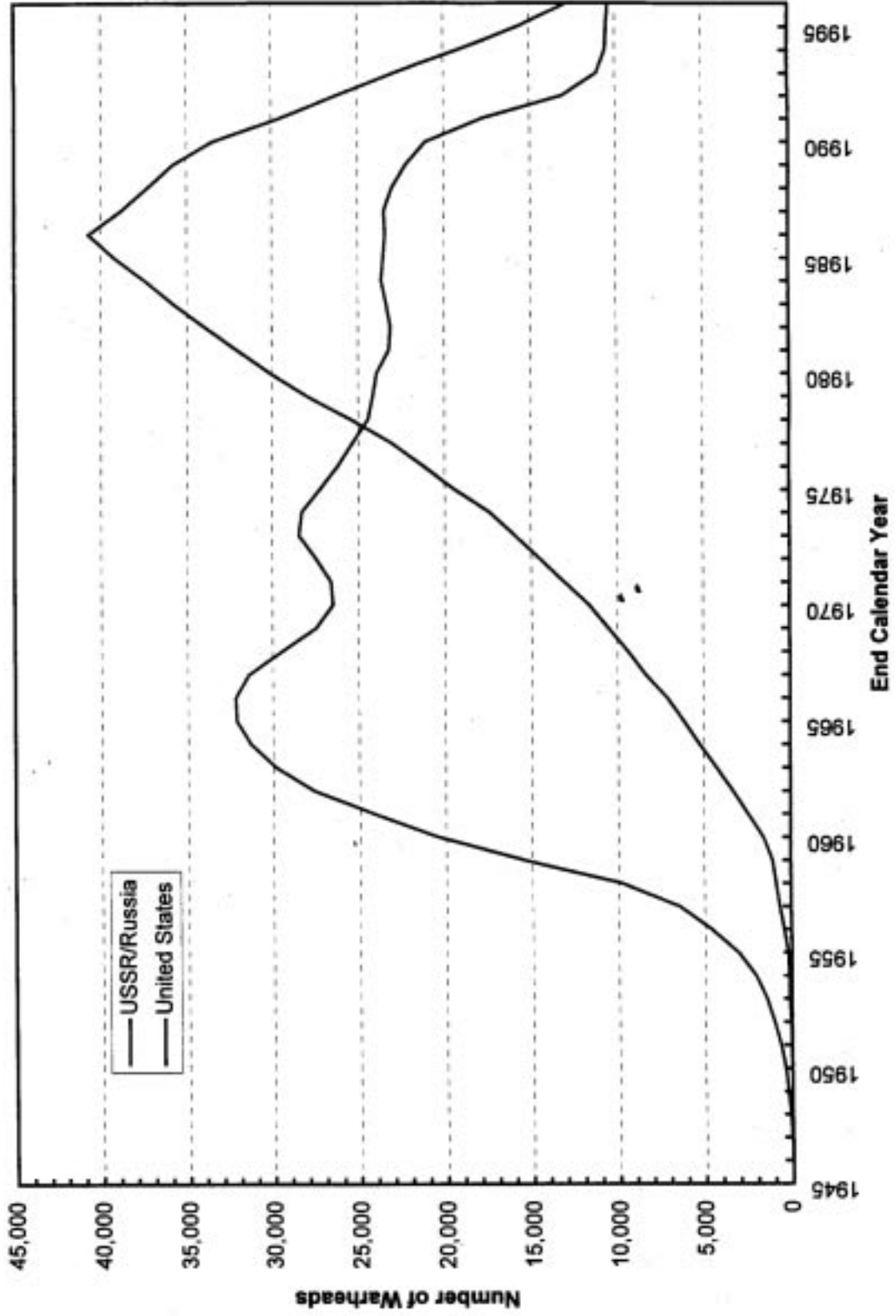
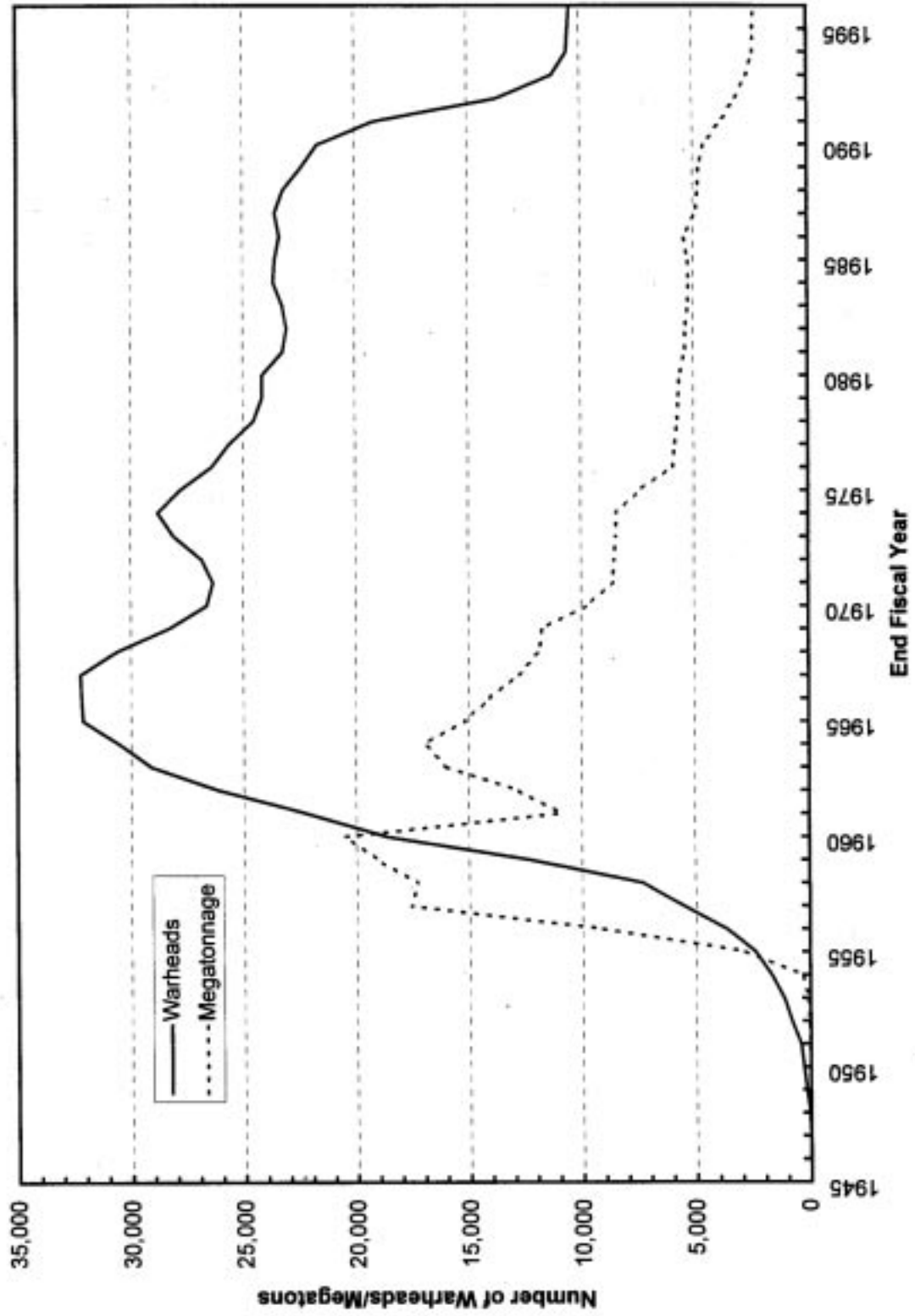


Figure 12
U.S. Nuclear Warheads and Megatonnage by Fiscal Year



ABOUT THE AUTHORS

DR. ROBERT STANDISH NORRIS

Dr. Robert S. Norris is Senior Staff Analyst with the Natural Resources Defense Council and Director of the Nuclear Weapons Databook Project. His principal areas of expertise include writing and research in the areas of nuclear weapons research and production, arms control, and nuclear weapons testing. He is co-editor of NRDC's *Nuclear Weapons Databook* series and is a co-author of *U.S. Nuclear Warhead Production*, Vol. II (1987); *U.S. Nuclear Warhead Facility Profiles*, Vol. III (1987); *Soviet Nuclear Weapons*, Vol. IV (1989); and *British, French and Chinese Nuclear Weapons*, Vol. V (1994). His most recent book is, *Making the Russian Bomb: From Stalin to Yeltsin* (1995). He has co-authored chapters and provided tables on nuclear weapons in the 1985-1996 annual editions of the *SIPRI Yearbook*. He has written articles for *Arms Control Today* and *Security Dialogue*, and co-authors the "NRDC Nuclear Notebook" column for each issue of *The Bulletin of the Atomic Scientists*. He is co-author (with Dr. Cochran) of the article on "Nuclear Weapons" in the 1990 printing of *The New Encyclopedia Britannica* (15th edition, Volume 29, pp. 575-580).

Dr. Norris received his Ph.D. in Political Science from New York University in 1976, and taught at New York University, Miami University in Oxford, Ohio, Miami University, Luxembourg, and American University. He was a senior research analyst for the Center for Defense Information before coming to the Natural Resources Defense Council in September 1984.

DR. THOMAS B. COCHRAN

Dr. Thomas B. Cochran is a Senior Scientist and Director of the Nuclear Program at the Natural Resources Defense Council. He initiated a series of joint nuclear weapons verification projects with the Soviet Academy of Sciences. These include the Nuclear Test Ban Verification Project, which demonstrated the feasibility of utilizing seismic monitoring to verify a low-threshold test ban, and the Black Sea Experiment, which examined the utility of passive radiation detectors for verifying limits on sea-launched cruise missiles. He has served as a consultant to numerous government and non-government agencies on energy, nuclear nonproliferation and nuclear reactor matters.

Dr. Cochran is the author of *The Liquid Metal Fast Breeder Reactor: An Environmental and Economic Critique* (Washington, DC: Resources for the Future, 1974); and co-editor/author of the *Nuclear Weapons Databook*, Volume I: *U.S. Nuclear Forces and Capabilities* (Cambridge, MA: Ballinger Press, 1984); Volume II: *U.S. Nuclear Warhead Production* (1987); Volume III: *U.S. Nuclear Warhead Facility Profiles* (1987); and Volume IV: *Soviet Nuclear Weapons* (1989). He co-authored most recently *Making the Russian Bomb: From Stalin to Yeltsin* (1995). He is co-author (with Dr. Norris) of the article on "Nuclear Weapons" in the 1990 printing of *The New Encyclopedia Britannica* (15th edition, Volume 29, pp. 575-580). In addition, he has published numerous articles and working papers, including those in *SIPRI Yearbook* chapters, *Arms Control Today*, and the *Bulletin of the Atomic Scientists*.

Dr. Cochran received his Ph.D. in Physics from Vanderbilt University in 1967. He was assistant Professor of Physics at the Naval Postgraduate School, Monterey, California, from 1969 to 1971, and from 1971 to 1973, he was a Senior Research Associate at Resources for the Future. Dr. Cochran has been with NRDC since 1973. He is the recipient of the American Physical Society's Szilard Award and the Federation of American Scientists' Public Service Award, both in 1987. As a consequence of his work, NRDC received the 1989 Scientific Freedom and Responsibility Award by the American Association for the Advancement of Science.

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