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31 December 1969

MEMORANDUM ON THE SAFEGUARD SYSTEM

The subject of ballistic missile defense has been under intensive review by the Department of Defense during the past year. The subject has been considered specifically in relation to the FY 1971 budget, and the following conclusions and recommendations have been arrived at.

A. CONCLUSIONS AND RECOMMENDATIONS

Because the threat for which the Safeguard Program was designed has continued to develop during 1969, it is necessary to undertake the next step toward the full twelve site system in the FY 1971 budget period. The following recommendations are made:

1. Authorize the construction of two additional sites in FY 1971. These sites should be chosen to --

(b) Broaden the base for Minuteman defense.

(c) Begin to implement the defense against the SLBM threat.

Authorize engineering and site selection work for three additional sites.

Continue development of the Improved Spartan missile which will improve the area defense capability of the system.

Undertake R&D on smaller radars and missiles suitable for "hard-point" defense of Minuteman sites against the possibility of an even more severe threat to Minuteman survival than can be handled with the basic Safeguard system.

Plan the implementation of the full twelve site system in consideration of DOD budget constraints in FY 1971 and subsequent

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This next step is, in fact, urgent at this time to assure that the country can have the protection of the full twelve site system by 1978, if the threat continues to grow as is now indicated.

Specific program recommended:

1. Commenced deployment of the Whiteman and En-
gineer West and advanced preparation of three
mile south of its base at Fort Chino and

Plan the deployment of all twelve sites within NEA funding (exclusive of AEC costs) of \$1.5B in FY 71, \$2.0B in FY 72, and not more than \$2.3B in any subsequent year. (1969 dollars).

Add to the research and development program the development and evaluation of new defense components optimized for "hard-point" defense. These would be an improved Sprint and a smaller and cheaper radar and computer system which could be deployed in 1977 in larger numbers than the MSR to provide a higher level of defense of Minuteman and NCA if and as required. The complete development of this added capability is estimated to be \$750M (RDT&E) at the rate of about \$100M per year (not included in the NOA figures in the preceding paragraph).

Continue research and development on advanced concepts for ballistic missile defense, including consideration of the early mid-course intercept approach.

A discussion of the recommended deployment, together with the rationale for our choice follows.

B. SAFEGUARD OBJECTIVES

The ABM missions and the design of Safeguard (then called modified Sentinel) were proposed by the Department of Defense early in March 1969. President Nixon accepted the proposed plan and on March 14, 1969, announced the following defense objectives:

"Protection of our land-based retaliatory forces against a direct attack by the Soviet Union.

Defense of the American people against the kind of nuclear attack which Communist China is likely to be able to mount within the decade.

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- "Protection against the possibility of accidental attacks from any source."

He further elaborated.

- "We will provide for local defense of selected Minuteman missile sites and an area defense designed to protect our bomber bases and our command and control authorities."
- "By approving this system, it is possible to reduce U. S. fatalities to a minimum level in the event of a Chinese nuclear attack in the 1970's or in an accidental attack from any source."

The President also stated that "This program will be reviewed annually from the point of view of (a) technical developments, (b) the threat, and (c) the diplomatic context including any talks on arms limitation". He emphasized protection of our deterrent as the best preventive for war. Congressional approval was secured to proceed with an initial increment of two site complexes to be located in Minuteman fields near Grand Forks AFB and Malmstrom AFB. The purpose of this deployment was to check out the entire system under realistic conditions and work out the problems that inevitably arise in the deployment of any new major weapon system, as well as to provide protection for at least a limited portion of the Minuteman force. Phase 1 Spartan coverage (see Figure 1) forms part of the Phase 2 area defense.

C. THREAT

The specific threat as interpreted in February, 1969, was in brief:

1. There had been no known firings of CPR ICBM's. It was projected that the CPR could have operational ICBM's as early as 1972 with 10 to 25 operational by mid-1975.
2. Approximately 220 SS-9's and 800 SS-11's were known to be deployed or under construction. It was predicted that this force would continue to grow and that this, combined with the possibility of conversion within three years to MIRV's on the SS-9's and high accuracy for both, would give a total of some 1400 accurate RV's. If all of these were targeted against Minuteman, they could destroy over 900 of the 1000.

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3. It was known that 67 Yankee-class (Polaris type) ballistic missile submarines had been launched and that the evidence pointed to an increasing construction rate with a possible force of 55 Yankee-class boats by 1975. An on-station force of 15-20 would be capable of destroying up to 80% of our alert bomber force even with dispersed basing on 67 bases. Use of depressed trajectory SLBM's or the fractional orbital bombardment system (FOBS) will decrease the warning and decision time of our national command authorities from 15-30 minutes to as little as 5-6 minutes for SLBM attack and essentially no useful warning against FOBS.
4. Possibility of accidental launch from Soviet ICBM's and SLBM's.

Although the Soviet and CFR forces in China in February, 1969, did not pose a serious threat, the [redacted] present a severe threat by the mid-1970's.

We have no evidence that China has begun testing an ICBM. However, should a vehicle become available for testing within the next few months, IOC could be achieved by late 1972 or early 1973. It is more likely, however, that IOC will be later, perhaps by as much as two or three years. If the earliest possible IOC were achieved, the number of operational launchers might fall somewhere between 10 and 25 in 1975. In the more likely event that IOC is later, achievement of a force this size would slip accordingly.

Soviet build up of SS-9's and SS-11's has continued at least as rapidly as predicted. The number of SS-9's deployed or believed to be under construction is now between 270 and 282. The corresponding number of SS-11's ranges from 820 to 900. In addition, testing of multiples on the SS-9 has continued though we have not detected sufficient variability in the impact pattern to verify an independent targeting capability. SS-11 testing has intensified and recent testing indicates the strong possibility that the SS-11's may achieve accuracy by the mid-70's which would permit them to be effective against Minuteman silos as well as Safeguard radars.

Production of Yankee-class boats has continued during 1969. At present 16-24 Yankee-class boats are believed to be either operational or under construction. Of these, 9 are believed to

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be operational with 2 of the 9 deployed. A second shipyard is known to be producing these submarines, which boosts last year's estimated construction rate of 4-8 annually to 6-8 annually.

~~that the threat against which Safeguard was configured last year has continued to grow.~~ Clearly, to implement Phase 1 only would not be adequate, and we therefore recommend proceeding with the first step of Phase 2 deployment.

D. PROPOSED DEPLOYMENT

1. Description. The proposed deployment continues progress toward the full 12-site Phase 2 Safeguard system (Figure 2), including the Sprints added for Minuteman defense and the Perimeter Acquisition Radar (PAR) additional seaward coverage needed for defense of our strategic bomber force against the Soviet SLBM's. This deployment continues progress toward the objectives set forth by the President. Funding (NOA) and schedules for this alternative are based on constraining NOA to approximately \$1.5B for FY 71 and \$2.0B for FY 72 with no constraints thereafter. (NOA funding rate is not expected to exceed \$2.3B in any year.) These funding constraints cause the system completion date to slip from October 1976 to October 1977. However, without funding constraints, peak NOA would be \$2.7B in FY 72 and peak expenditure would be \$2.2B in FY 73 (all figures are 1969 dollars).

Under these constraints, we must commit in FY 71 the deployment of two more sites -- Whiteman (in the Minuteman fields near St. Louis) and the Northwest site. In addition, we should undertake advanced preparation of three more sites -- Northeast, Washington, D. C., and Michigan/Ohio.

The full 12-site deployment could be installed by October 1977. It provides area defense of the entire United States against a Chinese or other Nth country attack and of most of the strategic bomber bases against attack by depressed trajectory SLBM's. Against the Chinese, the system would be able to absorb about 100 warheads. Against the SLBM attack, the system could blunt the leading edge of the attack on the bomber fields and absorb about 20 to 30 warheads per Safeguard site. This should provide about 10 or more additional minutes for the protected alert bombers to escape to safety.

The Minuteman defense level increases as the four sites in the Minuteman fields become operational. The first two sites constitute Phase 1 with a total of 60 Spartans and 58 Sprints and will be installed by late 1974. The third site, Whiteman, will be installed by July 1975, and the fourth site, Warren,

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by April 1977. These four sites with a total of 120 Spartans and 264 Sprints provide a capability which depends on the level of threat against the Minuteman force. For the lower threat level of 1000 to 1400 arriving Soviet R-V's, 200 to 300 Minuteman would be expected to survive. For higher threat levels, say 2000 arriving RV's, the Safeguard Phase 2 deployment would be overwhelmed, but would still absorb some 300 to 400 RV's which would otherwise be useable against our cities.

In addition, we plan to add to the research and development program the development and evaluation of new defense components optimized for hard-point defense (e.g. Minuteman, National Command Authorities). These new components would be an improved Sprint, and a smaller and cheaper radar and computer system which could be deployed by 1977 in larger numbers than the MSR to provide a higher level of defense of Minuteman and the NCA as required. The complete development and evaluation cost of the new components is estimated to be about \$750M (RDT&E funds, not included below) of which about \$100M would be obligated in FY 71.)

We will, of course, continue exploration of alternative concepts which might lead to even more effective defense against ballistic missiles.

2. Deployment and Schedule. Deployment cost and schedule are shown below. The NOA and expenditures are in 1969 dollars with no allowance for inflation. The schedule shows equipment readiness dates on which equipments will be installed and operable and the site turned over to military control. Following these dates, there will be a period of about six months of continuing checkout, training, and acceptance testing during which there will be a limited operational capability. Schedules are based on the assumption that public or political problems in site selection or acquisition will not cause delays.

(a) Schedule (Equipment Readiness Dates)

<u>Apr 74</u>	<u>Oct 74</u>	<u>Jul 75</u>	<u>Jul 76</u>	<u>Oct 76</u>	<u>Jan 77</u>	<u>Apr 77</u>	<u>Jul 77</u>	<u>Oct 77</u>
GF	Malm	Whit	NW	NE	DC	War	Tex	C. Cal.
						M/O	S. Cal	Fla/Ga

(b) DOD Costs

AEC costs of approximately \$1.2 billion (exclusive of Improved

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Spartan, for which development costs have not yet been estimated) are not included.

	<u>FY 71</u>	<u>FY 72</u>	<u>FY 73</u>	<u>FY 74</u>	<u>Total</u>
VNOA	\$1.5	\$2.0	\$2.2	\$1.6	\$11.7
Expenditure	.93	1.3	1.8	1.9	11.7

(c) Sites requiring authorization in full in FY 71 would be Whiteman and Northwest with advanced preparations required for Northeast, D. C., and Michigan/Ohio.

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E. PROS AND CONS

1. Pro:

(a) Continues progress toward the announced objectives of the Safeguard program.

(b) Would continue the momentum of deployment and retain the production/construction base.

(c) While running some risk, this proposal comes as close to coming within the estimated Soviet and Communist Chinese threats as funding constraints permit.

(d) Provides a defense that will mean either the survival of 200 to 300 Minuteman or the absorption of 300 to 400 Soviet warheads otherwise useable against our cities, and complements other Minuteman survivability options such as new defense components, super hardening, or mobility.

(e) Is wholly consistent with the arguments based on the Soviet and Chinese threats used in recent Congressional debate.

(f) The modified R&D program is expected to provide more economical defense of Minuteman against the heavier threats which might develop, and thus lessen objections such as those raised in Congressional debate.

(g) The fact that the U. S. will be entering substantive Strategic Arms Limitation Talks with the Soviets in 1970 ought not to lead to modifications of the Safeguard program at this time. The reasons are three: First, because a part of the threat -- the Chinese ICBM threat -- is not under Soviet control;

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Second, because a number of plausible outcomes of SALT would not lead to such a reduction in the potential Soviet threat that the requirements for Safeguard were substantially altered; Third, because it is important to effective conduct of the SALT negotiations that the U.S. make clear its plans for Safeguard and the threats to which they are responsive in order that the threat reductions (or other means of satisfying Safeguard requirements) which would be needed to make reductions in Safeguard acceptable are also clear.

An agreement which limits Soviet ICBM's to the number operational or under construction now or at any future date still threatens the survivability of undefended Minutemen unacceptably, because SS-9's may be upgraded with MRV deployment or SS-11's can be upgraded with accuracy improvements. There is serious question whether these ~~potential upgrading~~ will be prevented by agreement because of the difficulties of verifications and the expressed Soviet reluctance to consider "qualitative" limitations.

The proposed program does not preclude modification of the deployment or the expenditures if warranted by progress of SALT.

2. Con:

Would increase our NOA requirement in FY 71 from \$1060M to about \$1500M, exclusive of \$100M in FY 71 for RDT&E on improved Minuteman defense components.

Implies a commitment to the full 12-site system.

Will lead to debate about the need for further deployment and possible adverse effects on SALT.

(d) Opponents will certainly claim that Safeguard deployment is another step in the arms race.

(e) A claim that Soviets will just exhaust Minuteman defense and kill all Minuteman. Could also lead to the further claim that land-based ICBM's are obsolescent and unnecessary.

(f) A claim that the Chinese will use a kind of pen aid that will defeat Safeguard.

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F. RESPONSE TO THREATS BEYOND SAFEGUARD DESIGN LEVEL

The two serious technical arguments against the system are Soviet ICBM force expansion to the point where they simply overwhelm the system and the advancement of Chinese technology to the point where area defense becomes very difficult.

If the Soviets continue to expand their ICBM forces and, in addition, deploy large MIRV (silo killers) and upgrade the accuracy of SS-11's, they could achieve an attack level which exceeds the design goals of the presently proposed deployment. In this event, the U.S. would have to take additional measures to insure survivability of its land-based deterrent. We would have a number of options open to us. One option would be to deploy more of the same Safeguard components (MSR's and Sprints), perhaps by diverting them from area defense sites. This is a reasonably quick and well understood solution. If time permitted, we would prefer to deploy the new less expensive and more effective hard-point defenses, the development of which we are starting. Since these defense options include hard-point defense of only a fraction of the Minuteman force, they are compatible with and complement other means of improving Minuteman survivability. Specifically, rebasing part of the Minuteman force in super hardened silos and/or rebasing part on mobile transporter-launchers are under study now.

The Chinese, because of their limited economy and lack of the very expensive, sophisticated range instrumentation needed to develop penetration aids, are not expected to be able to deploy penetration aids like our Mk 1a or "Antelope" system for many years after they deploy simple ICBM's. When they do begin to deploy sophisticated penetration aids we will find ourselves in a technology (rather than force level) race, which we should be able to win. Our advanced ballistic missile defense research program now includes the kind of work needed to counter the later Chinese threat. For example, we are investigating the use of long wavelength infra red (LWIR) optical sensors for both surveillance and long-range ABM interceptor homing. The LWIR sensors can detect a reentry vehicle in the presence of chaff because chaff does not resemble a reentry vehicle at infra red wavelengths.

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