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DEPARTMENT OF PHYSICS

BERKELEY, CALIFORNIA 94720

September 22, 1982

Honorable Caspar W. Weinberger
The Secretary of Defense
Washington, D.C. 20301

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Authority: EO 13526
Chief, Records & Declass Div, WHS
Date: MAY 20 2019

Dear Cap:

Since you asked that any difficulties or likely challenges to the effectiveness of CSB deployment be brought out clearly before a decision is made, I write this personal letter of comment as a supplement to the report of the Task Force on MX/CSB basing which you have or will shortly receive. I believe there are issues in our report whose understanding is critical enough that they warrant being looked at from various viewpoints.

First, let me note again what seem to me the primary advantages of CSB deployment. These are:

- (1) Presently known Soviet weapons are not well adapted to attacking a CSB system. This is not true of an MX/MPS type of deployment nor of more widely separated silos such as Minute Man, which are rather vulnerable to these same weapons.
- (2) CSB, being a compact system, allows efficient BMD so that even a small BMD deployment of 100 defensive missiles can be rather effective.
- (3) Also because of its compactness, CSB uses less land than would MX/MPS. (It has no particular advantage of this type when compared with deployment in MM silos.)

(A disadvantage of the system as planned compared with MX/MPS or MM deployment is its greater susceptibility to pin-down.)

CSB's virtues are reflected in our first conclusion:

"When employing their present RVs without extensive modification, the Soviets could not have confidence in attacks against the M-X in CSB providing the desired system hardness can be achieved. The same statement cannot be made concerning an M-X deployment in MM silos."

Now for the precautions. A critical problem is noted in the caution "providing the desired system hardness can be achieved." The system hardness planned when the Task Force initiated work last summer, [REDACTED]

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often referred to, is not adequate and the proposed hardness has been increased by a large factor to characteristics whose achievement is uncertain. Our Task Force says it is "probably feasible," but this is without any clear limits of time scale or cost.

OSD 3.3(b)(2)(4)(8)

Herein lie troublesome possibilities -- for our missing the hardness goal, for important delays in full deployment due to difficulties in reaching this goal, and/or important cost overruns. Before a final decision is made, an intensive effort on design of silos and as careful analysis of such designs as is practical would be important.

The most serious problem of all for the CSB deployment as I see it is that the Soviets may have appropriately modified their weapons for effective attack on it almost as soon as it is fully deployed, and from there on we could be simply in a quantitative race with no cost advantage. Note that our second conclusion says

"With appropriate effort the Soviets can threaten CSB. New RVs would need to be designed for an effective attack. Such new systems could be deployed by 1990."

The root of the problem is that the technical difficulty for the Soviets to make appropriate modifications in their weapons seems less (and so also do costs) than ours in deploying a properly designed CSB. Everyone apparently agrees that at least they are not greater. Hence the Air Force scenario, according to which the IOC for the U.S. CSB system would be four years from now, in late 1986, but the IOC for appropriately modified Soviet weapons would be about eight years from now, in 1990 or 1991, is at best quite uncertain and may be unlikely. The Task Force says carefully that the Soviet responsive weapons for attack on CSB "could be deployed by 1990," and also that "Soviet responsive threats to undefended CSB could begin soon after CSB deployment."

Some of us have been over the information and reasoning of the intelligence community on which the Air Force scenario is based with a bit of care, and I must express substantial unease about its realism. Our own chance of making the 1986 date is particularly difficult because of the importance of achieving, by then or shortly thereafter, the extreme system hardness which is hoped for. So far as the Soviet rapidity in adapting weapons is concerned, they have relatively straight-forward tasks to do involving no critical technological uncertainties, and whether they have such weapons deployed in 5 years or the predicted 8-10 years will probably depend on their sense of its importance. Furthermore, their time scale for deployment is under their control, not ours.

Office of the Secretary of Defense
Chief, RDD, ESD, WHS

Date: 20 NOV 2019 Authority: EO 13526 + 5 U.S.C. 8532

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Disagreement over these time scales is based not so much on technical grounds as on the more general ones of Soviet will, practices, etc. Hence a generalist who looks carefully at this question can probably form a reasonable view of it. Your own good judgement is needed on this point. The Air Force's estimates will not be easy to defend if challenged.

As the Soviets develop suitable weapons to attack CSB, we can initiate BMD deployment as a growth option if this is planned from the beginning, as is recommended by the Task Force. This could lead a little later to a race between increasing deployment of silos and BMD on our part versus multiplication and refinement of RVs on the Soviet part. The Air Force plan envisages such a stage, but has it occurring after the predicted time delay between their IOC and our IOC of about 4 years, a delay which, as I note above, may be much shorter. According to the Air Force scenario, the U.S. wins the race. I believe that with luck CSB may give us a kind of head start, but relative advantages once a quantitative race gets underway have not been studied. I see no reason the relative costs or technical possibilities would be in our favor. One can hope for useful arms control by then, but the future interaction between such a system and arms control arrangements is not easily predictable.

There are large uncertainties in what the unprecedented nuclear environment would be like during an attack on MX/CSB including fratricidal effects, effects on C³I, etc. This could substantially modify present expectations of the defense environment. For example, there may be enormously high winds due to certain cooperative effects of many bursts. I'm sure some critics will point out such possibilities and predict dire results. To me, these uncertainties do not represent our most serious problems since if the Soviets do not know much more than we, uncertainties will face the attacker as well as the defender and can contribute to deterrence as well as make defence uncertain. There is only a modest chance that without further nuclear tests in the atmosphere theoretical knowledge alone can be developed which would significantly change the Task Force's conclusions on these matters.

In considering the continuing problems of protecting any fixed target, including CSB, the question of appropriate alternatives immediately arises. While my views on this are shifting somewhat and much can be said, I have no qualitatively new suggestions. The new aspect which needs particular consideration in reaching a decision on funding CSB is how the value of a prompt response with good accuracy which M-X can give as soon as the late 1980's compares with that of other use of the resources and with potential damage to the U.S. position if developments do not go well, e.g. if we do not credibly achieve the required hardness, if its achievement is late or, most importantly, if Soviet responses which put this extensive new system in jeopardy are significantly more rapid than present official estimates.

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If you wish more detail or discussion on any question related to MX/CSB, I will be pleased to be of any help I can. No doubt, so will every other member of our Task Force.

Very best wishes in the critical and fine job you are doing.

Sincerely,

Ch. H. Townes

Charles H. Townes

CHT:jgb

cc: R. DeLauer ✓

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REPORT OF THE DEFENSE SCIENCE BOARD

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Authority: EO 13526

Chief, Records & Declass Div, WNS

Date:

MAY 20 2019

TASK FORCE ON M-X CSB DEPLOYMENT

EXECUTIVE SUMMARY

The Task Force examined the technical aspects of the Closely Spaced Basing (CSB) concept and their bearing on the survivability and strategic utility of the system, at the time CSB is to be first deployed and later, both with and without Ballistic Missile Defense (BMD) and deceptive basing.

CONCLUSIONS

1. When employing their present RVs without extensive modification, the Soviets could not have confidence in attacks against the M-X in CSB providing the desired system hardness can be achieved. The same statement cannot be made concerning an M-X deployment in MM silos.
2. With appropriate effort the Soviets can threaten CSB. New RVs would need to be designed for an effective attack. Such new systems could be deployed by 1990.
3. The growth option for CSB offered by BMD further increases the difficulty and uncertainties of an attack on CSB. A combination of CSB, BMD with 100 interceptors, and 3-to-1 deceptive basing of M-X can significantly increase the price to

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the Soviets of an effective attack, perhaps approaching the equivalent of their entire current SS-18 booster inventory. This combination does not ensure that a significant fraction of the M-X force can be launched if the Soviets are willing to pay such a price.

4. The CSB concept is in an early stage of development. Consequently cost, time, and effectiveness estimates are still not firm as this report is being written. In particular, several of the key parameters of the concept are still changing.

DISCUSSION

ISSUES:

In considering the response to its charge the Task Force focused its attention on the following issues: the effectiveness of M-X/CSB against current or somewhat improved Soviet systems and the effectiveness of M-X/CSB against new Soviet weapons designed to attack M-X/CSB. The Task Force discusses below both issues for CSB systems with and without BMD and deceptive basing, and also the ability of the Soviets to respond in a timely way.

The CSB Concept: Fratricide, Hardness and Soviet Response

1. The very hard silos² planned for CSB prevent multiple kills at the close spacing which exploits fratricide effects. Fratricide, the lethal effects of one Soviet detonation on other

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