

NSC Memos to NSC/US Committee	Memos, UN Secretary's	Authority <u>ND 97950</u>
Box 15		By <u>TI</u> NARA Date <u>4/23/99</u>

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SUMMARY

One of the principal objectives of the United States in its Plowshare program is to develop the technology necessary to establish the feasibility and utility of underground nuclear explosions for excavation purposes.

The Limited Test Ban Treaty (LTBT) permits nuclear explosions underground, but only if such explosions do not "cause radioactive debris to be present" beyond the territorial limits of the country under whose jurisdiction or control the explosion is conducted. The Treaty does not differentiate between weapons tests and peaceful nuclear explosions.

Nuclear excavation explosions release some radioactive debris into the atmosphere. Some of this may be carried beyond territorial limits.

For the past six years there has been disagreement within the US Government as to the exact effect of the Treaty insofar as peaceful nuclear excavation explosions are concerned. An understanding of why this disagreement persists is necessary to an appreciation of how the development and utilization of peaceful nuclear excavation explosions might be pursued in a manner consistent with the LTBT.

Absence of Agreed Criteria.

The Treaty sets forth no criteria or objective standards for determining when radioactive debris is "present" beyond national borders. This imprecision of the Treaty has given rise to basic differences regarding the extent of the problem.

One View.

One view holds that, since the Treaty prohibits nuclear explosions that cause radioactive debris to be present

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Memos to NSC/US Committee	Secretary's	Authority <u>AWD 97950</u>
Box 15		by <u>TJ</u> Date <u>4/23/99</u>

~~CONFIDENTIAL~~

beyond territorial limits, an explosion from which radioactive debris is actually detected outside such limits in amounts and kinds sufficient to identify its origin would violate the Treaty. Moreover, since the Treaty clearly applies the same restriction to peaceful nuclear explosions as to weapons tests, those who hold this view maintain that peaceful nuclear excavation explosions which present a high probability of such extra-territorial detection and identification pose an unacceptable risk of supportable charges that we have deliberately violated this Treaty obligation. This position leads to an assertion of the most restrictive interpretation of the phrase "causes radioactive debris to be present", which is held to be consistent with the presumed reluctance of some States to let anyone else judge for them how much additional radioactivity they should be willing to accept.

Other View.

The other view maintains that the primary purpose of the Treaty was to limit weapons testing and therefore excavation explosions are not contrary to the purpose of the Treaty if their conduct does not impair the objective of limiting weapons tests. Only because of the inability to reach agreement with the Soviets on a mutually acceptable means for differentiating weapons tests from peaceful explosions were all peaceful explosions subjected to the same restrictions as weapons tests.

Proponents of this view hold that the principle of de minimis should be applied to the Treaty's prohibition on radioactive debris being "present" across national boundaries, since this can be related to the effort to put an end to contamination, and thus to elimination of the risk to health and safety caused by radioactive debris, rather than to the total abolition of such debris beyond territorial limits. This position then leads to a less restrictive interpretation of what constitutes radioactive debris being "present."

Issue.

The issue then focuses on what standard will be used

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Memos to NSC/US Committee	Memos, UN Secretary's	Authority <u>ND 97920</u>
Box 15		by: <u>TJ</u> Date <u>4/23/99</u>

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to determine when radioactivity is "present."^{1/} While those supporting a restrictive interpretation would admit to some minimal amount of radioactivity transiting a border without constituting a violation, they maintain that the standard should be based on detectability. Under that view, an explosion is prohibited if it causes radioactive debris to be "present" which can be detected and identified with that explosion.

Those supporting a less restrictive interpretation argue that a de minimis standard could be used for determining when radioactive debris is "present", based on an analogy to internationally accepted health guides for radioactivity exposure in industry, medicine, etc. These guides often establish levels of concentration which are so far below those having any health and safety significance as to be considered "not present."

Experience.

While neither view has been expressly adopted, the US has made ad hoc decisions to conduct five excavation experiments since the Treaty came into force in 1963 -- several in the knowledge that there was a finite probability that debris would cross the borders in such concentrations that it could be detected and identified with the test by routine monitoring. The predicted concentrations involved, however, were very small and well below the levels of reasonable concern about health and safety.

After the last of these five experiments, the Soviet Union transmitted an aide-memoire on January 21, 1969 which

^{1/} Ever-present but variable background radioactivity at any given location, unrelated to current excavation explosions, complicates the problem of measuring the radioactive debris attributable to a particular explosion. It should also be noted that increasingly sensitive techniques make it possible for a number of countries to detect and identify the presence of minimal amounts of radioactive debris -- far below the levels which could be considered significant from a health standpoint.

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claimed a violation of the Treaty on the basis that they had detected radioactive debris attributable to that experiment. (Because of special circumstances involved in that experiment, such as the announced presence of unusual isotopes, it is conceivable that debris could have been detected by the Soviets and reasonably attributed to our experiment.)

We have also privately reported to the USSR, on several occasions, that we had collected radioactive debris, outside their territory, from specific Soviet explosions and have requested explanations.

Neither Party has ever admitted to a violation of the Limited Test Ban Treaty nor explained in an international forum its conduct under the Treaty. Thus, there has not evolved an agreed interpretation as to what concentration of radioactive debris constitutes a violation. Within the United States there are divergent views. We do not know how the phrase is understood by other governments.

It is against this background that any study of the question of reconciling the development and utilization of peaceful nuclear excavation explosions with the Limited Test Ban Treaty begins.

Questions.

A study of the problem of reconciling the US nuclear excavation program with the Limited Test Ban Treaty requires the answer to several questions:

1. When will it be necessary or desirable to obtain relief from the restrictions of the Limited Test Ban Treaty on peaceful nuclear excavation explosions?
 2. What form of relief from these restrictions is necessary?
 3. How should the US seek to obtain such relief?
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Memos to NSC/US Committee	Memos. UN Secretary's	Authority <u>ND 9772</u>
Box 15		By: <u>TJ</u> Date <u>4/23/89</u>

The resolution of these questions involves complicated international negotiation and extensive, delicate diplomatic preparation.

When?

The question of timing can more logically be addressed in terms of the stages of development and application of the technology than by chronological dates. The stage at which the US will require relief from the restrictions of the Limited Test Ban Treaty can be considered in two phases. First, there is the relief, if any, that may be necessary to complete the developmental program, which is designed to establish the feasibility of nuclear excavation in general and for a sea-level, transisthmian Atlantic-Pacific canal in particular. Four additional experiments, the minimal program for the latter purpose, are required over the next two years or so. Second, there is the relief that would be required to utilize fully the nuclear excavation technology developed, as in the construction of a transisthmian canal. The extent of relief required in either case is not known. It will depend upon a) agreement as to what concentrations at national borders can be accepted as consistent with the LTBT and b) forecasts as to the concentrations that will probably be produced by contemplated excavation explosions. Current AEC studies of the technical aspects of this problem should provide a basis for judgment as to optimum timing.

What?

Any possible course of action to obtain relief must be judged against three basic criteria. What is its effect on the objectives and the integrity of the Limited Test Ban Treaty? How does it take into account international attitudes toward the Limited Test Ban Treaty and peaceful nuclear explosions? And, how does it affect the ability to develop and exploit peaceful nuclear excavation technology?

Any solution must provide assurance that the opportunities for weapons development and weapons effects experiments will not be increased beyond those now permitted. Since the

Memo
to NSC/US
Committee
Box 15

Authority NND 97720
By: T.J. HARR Date 4/23/99

operation of the Treaty to date has prevented some substantial additions to the worldwide burden of radioactive debris, any solution to the peaceful nuclear excavation problem will be examined closely by many in light of its effect on the environmental contamination objective of the Treaty.

How?

In working out an internationally accepted accommodation, the US can expect to encounter several important international attitudes: a reluctance to amend the Limited Test Ban Treaty; a desire to link this issue with progress on a Comprehensive Test Ban Treaty (CTB); and, the likelihood that an effort will be made to link any resolution of the issue with an elaboration of the procedures for implementing peaceful nuclear explosion services foreseen under Article V of the Non-Proliferation Treaty.

There is the strong likelihood that these issues will all interact, with the CTB issue being foremost. Sweden, India and others can be expected to make achievement of a CTB or other new obligations the price of agreement.

The attitudes of the USSR and the UK as the two other Original Parties are important, but unclear. In a Vienna meeting of technical experts earlier this year the Soviets indicated reservations about the wisdom of seeking to amend the Limited Test Ban Treaty and informally suggested another approach. The UK is not interested in performing nuclear excavations and has manifested some concern about opening up the LTBT. Their ultimate attitude is difficult to forecast.

The accomplishments of the US Plowshare program and the extensive information available have increased international knowledge of and interest in the potential of peaceful nuclear explosions including nuclear excavation. A number of foreign projects have been suggested. Article V of the Non-Proliferation Treaty provides that non-nuclear-weapon Parties to the Treaty will be able to obtain the potential benefits from any peaceful applications of nuclear explosions. This has highlighted the potential of peaceful

Memos to NSC/US Committee	Memos, UN Secretary's	Authority <u>NO. 9172</u>
Box 15		By: <u>TJ</u> Date <u>4/23/99</u>

~~CONFIDENTIAL~~

nuclear explosions and has heightened the expectations of the non-nuclear weapons States for these benefits. The considerable international interest in peaceful nuclear explosions should help provide a favorable climate for efforts to resolve the problems associated with the Limited Test Ban Treaty.

Fundamental to most interim and long-term means of handling nuclear excavations under the LTBT is a need for objective criteria against which the proposed experiment or project could be evaluated. The AEC is currently studying: (1) Criteria that may be used in applying the de minimis principle to the phrase "causes radioactive debris to be present"; and (2) the possible adaptations of existing radiological health and safety guides to develop relevant operating guides for nuclear excavation.

These studies will take from three to six months. It will not be known until the completion of the current studies whether objective criteria can be established; and, if so, what effect such criteria would have on the problems identified in this study.

Possible Courses of Action.

While we lack sufficient technical data and political information at this point to make a conclusive assessment of the most advisable courses of action which the US should follow to reconcile the Limited Test Ban Treaty with the development and utilization of nuclear excavation technology, some general observations can be made.

Amendment of the Treaty, if attainable, would be the ideal long-term solution to permit full development and utilization of peaceful nuclear excavation technology. An examination of the substantive features of the amendment the US would prefer highlights the complex negotiations that would be entailed in achieving an amendment. Many elements and permutations of elements must be considered in formulating an amendment dealing with peaceful nuclear excavation explosions. The principal elements include: the explosions to which the amendment would apply; the

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Memos to NSC/US Commit
Box 15
Memos, UN Secretary's
AUTHORITY NND 917200
BY: T. J. MARR Date 4/23/99

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procedures which would be followed with respect to the international community; and the functions and authority of the international body through which certain of the procedures might be implemented.

Interpretation of the Treaty was found to be less comprehensive and definitive than an amendment, but might be useful as an interim or evolutionary step in attaining a long-range solution. It is recognized that interpretations of the Treaty run the risk of not being accepted by some Parties and of legal challenge. Interpretation would, however, have the advantage of not opening up the Treaty to amendment and thus would reduce some of the political obstacles foreseen in attaining an amendment and a number of the negotiating complexities involved in formulating an amendment. It could probably not provide sufficient latitude to conduct projects such as nuclear excavation of a sea-level Atlantic-Pacific transisthmian canal or harbors near national borders, and thus would not provide a general solution of the problem. Various forms of interpretation were considered, as well as a number of techniques that might be used to achieve their acceptance. For example, the phrase, "causes radioactive debris to be present" outside territorial limits, could be interpreted on the basis of criteria for de minimis quantities of radioactive debris.

Consideration was also given to obtaining some indication of international consent by obtaining a favorable resolution by an appropriate international organization endorsing the conduct of peaceful nuclear excavation explosions.

Interin Measures.

In the absence of a general long-term reconciliation of full development and utilization of nuclear excavation explosions with the Limited Test Ban Treaty or during the period when such an objective is being pursued, it was recognized that the US would wish to continue to develop and, if feasible, to exploit nuclear excavation technology without appearing to disregard its Treaty obligations. A spectrum of alternative courses can be considered for this

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Memo to NSC/US Committee	Memo: UN Secretary's	Authority <u>NND 97920</u> by <u>IJ</u> NSA Date <u>4/23/99</u>
Box 15		

~~CONFIDENTIAL~~

purpose, beginning with the current practice under NSDM 18' of an ad hoc subjective review of each proposed underground nuclear explosion. Additionally, objective criteria could be developed and adopted within the Government to determine in the light of the LTBT whether a proposed nuclear excavation explosion should or should not be carried out. Depending upon the criteria established, it might be possible to conduct a substantial portion of the experiments necessary for the development of nuclear excavation technology.

A factor to be considered in adopting an interim course of action is its relationship to possible approaches to achieve a general long-term reconciliation. A possible enhancement of or interference with success in achieving general long-term reconciliation through various courses of action will require examination. Once a long-term approach is selected, it may be possible to design a specific interim approach which will enhance the success of the long-term solution.

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PA/HO Department of State
E.O. 12958, as amended
August 6, 2007

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DEPARTMENT OF STATE

INTERNATIONAL SCIENTIFIC AND TECHNOLOGICAL AFFAIRS

NSC/USC memo

RR-NSSM-25

August 22, 1969

MICROFILMED
BY S/S

~~SECRET - RESTRICTED DATA (Removed)~~

Memorandum for the Under Secretary

12886

Through: S/S

From: SCI - Herman Pollack

Subject: Peaceful Nuclear Explosions and the Limited Test Ban Treaty

Your memorandum of June 12, 1969 requested a study of the implications of the Limited Test Ban Treaty on the "Plowshare" program for peaceful application of nuclear explosives.

Representatives of the Department of State, the Arms Control and Disarmament Agency, the Atomic Energy Commission and the Department of Defense have participated in this study. Within the Department, contributions have been made by the Legal Adviser's office, the Political/Military staff in Under Secretary Johnson's office, the Bureau of International Organization Affairs, and the Bureau of European Affairs, as well as the staff of International Scientific and Technological Affairs. Our report is attached at Tab C. SCI, with the participation of ACDA and AEC, has also prepared a Summary (Tab A) and Conclusions (Tab B) for your convenience in reviewing the report.

For the sake of brevity we have not repeated in this report the full recital of potential advantages and disadvantages for all aspects of the problem, since this

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When separated from Appendix A (S) and Appendix B (Secret - Restricted Data)

Memos to NSC/US Committee	Memos, UN Secretary's	Authority <u>NND 979501</u>
Box 15		By: <u>TJ MARK</u> Date <u>4/23/99</u>

would have involved covering much of the same ground which was treated in our March 22, 1969 report on the proposed Cape Keraudren nuclear harbor excavation in Australia (NSSM 25). The present report addresses itself to the most realistic options available for consideration as well as new factors which have emerged since the Cape Keraudren study.

In this study we have borne in mind not only the limitations of the Limited Test Ban Treaty, but also the desirability of proceeding with the development of this technology in order to meet the expectations under Article V of the Non-Proliferation Treaty.

While some differences in viewpoint still exist regarding the restrictions of the Limited Test Ban Treaty, the attached report endeavors to present the significant considerations without prejudice. The participants in this study are in general agreement on the Conclusions expressed in Tab B, although divergent views regarding presentation and emphasis still remain. Even in the absence of unanimity, it has been gratifying to observe the extent to which the agencies and offices concerned have been willing to accommodate their different views on this traditionally controversial subject.

Annex II, an illustrative draft Protocol, will be transmitted as soon as the various Agencies have completed their review of the draft text.

Attachments:

- Tab A - Summary
- Tab B - Conclusions
- Tab C - Report - Peaceful Nuclear Explosions and the Limited Test Ban Treaty (with Secret and Restricted Data Attachments)

(For distribution see page 3)

Hemos to NSC/US Committee	Hemos: UN Secretary's	Authority NND 97950
Box 15		By: T.J. MARK Date 4/23/99

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- cc: J - Ambassador Johnson*
C - Ambassador Pederson*
IO - Mr. DePalma
EUR - Mr. Hillenbrand
ARA - Mr. Meyer
EA - Mr. Green
L - Mr. Stevenson
J/PM - Mr. Spiers*
J/PM - Mr. Lehmann
IO/OES - Mr. Boudreau
L - Mr. Stein
EUR/SOV - Mr. MacCracken
AEC - Mr. Labowitz
ACDA - Mr. Van Doren
- Mr. Gleysteen
- Mr. Aaron
- Col. Long
DOD - Mr. Bartholomew
- Cmdr. Angleman

* Including Appendix D (Secret-Restricted Data),
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CONCLUSIONS

A. Long Term Solution

1. Modification of the Limited Test Ban Treaty will be required to permit the full development and utilization of peaceful nuclear excavation explosions. An amendment of the Treaty appears to be the best long-term solution of the problem if attainable.

2. A long-term solution is likely to require several years of considerable effort to achieve. If an appropriate course of action is followed in the interim there need be no compelling programmatic or political reasons for the United States to propose any long-term solution for some time.

3. Nevertheless the US should proceed to develop its preferred long-term solution, and its technical rationale, into as concrete a form as possible. This would allow pursuit of such a course when necessary, and would also permit the long-term solution to be taken into account in determining appropriate interim action and conduct under the Treaty.

4. Before forming a definitive decision on the long-term solution, we shall need to:

a. Reach agreement within the US Government as to what levels of radioactivity at national borders can be accepted as consistent with our undertaking in the Limited Test Ban Treaty not to carry out underground nuclear explosions that cause radioactive debris to be present beyond such borders. In this connection, AEC should complete its study of criteria that might be used in applying the de minimis principle to the phrase "causes radioactive debris to be present."

b. Consider the results of the current AEC study on the possible adaptation of existing radiological health and safety guides to develop relevant operating guides

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Memo to NSC/US Committee	Memo, UN Secretary's	Authority <u>ND 4772</u>
Box 15		By <u>II</u> NSA Date <u>4/23/99</u>

for nuclear excavation. If such guides are found useful, they will need to be developed in detail and to be considered by an appropriate international technical forum.

c. Attain an adequate understanding of Soviet attitudes on two key points: the concept of a world-wide ceiling on radioactivity in the atmosphere which they suggested in April 1969; and their attitude towards various possible modifications of the LTBT, especially in view of an indicated reluctance to amend the Treaty. It would be desirable at an appropriate time to hold further exploratory talks on these points following appropriate allied consultations, although no effort should be made to reach agreement with the USSR at this time on LTBT issues.

d. Obtain more precise information than is now available concerning the views of other countries in order to assess the prospects of attaining international acceptance of a modification of the LTBT. Continuing international pressures for a comprehensive test ban are likely to complicate the process. The complex of political attitudes likely to attend an effort to amend the Treaty, and the complicated negotiations that can be foreseen, suggest that it would be prudent for the US to take international interest into account in the timing and tactics of negotiation. The question of restrictions of the LTBT will undoubtedly be brought to the fore in connection with the formulation of procedures for Article V of the Non-Proliferation Treaty. We should exploit the interest of other countries in obtaining the benefits of peaceful nuclear explosion services to help achieve international recognition and acceptance of the need to modify the Treaty.

B. Interim Measures

5. Until a long-term solution is available, the US should adopt an interim course of action for continuing the

Memos to NSC/US Commit Box 15
Memos to UN Secretary's

Authority NND 97920
By: J. MARK Date 4/23/99

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development of excavation technology. This can be considered in several stages:

a. Because of the present lack of objective criteria, peaceful nuclear excavation experiments during FY 1970 should continue to be handled on an ad hoc basis pursuant to NSDM 18. (Preliminary analysis indicates that the first of the two explosions being planned for the period November, 1969-March, 1970 may involve somewhat higher concentrations of radioactive debris at ground level near our borders than those experienced in the last test, Project SCHOONER. However, the maximum concentrations which might occur are estimated to be about the same as the maximum predictions for SCHOONER at the time it was approved.)

b. Once the necessary data become available from current AEC studies it should be possible to determine if they provide a suitable and acceptable basis for a de minimis interpretation of the Treaty for the remainder of the developmental stages of the program.

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