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TO : EUR: Mr. Kohler

DATE: January 16, 1960

FROM : SOV: J.M.McSweeney

1.3.9

SUBJECT: Coolidge Report Recommendations

Attached is a synopsis of the Coolidge Report prepared by S/AE.

I think you will find it well worth while to read the synopsis itself (20 pages) if not the back-up annexes.

I understand thatthis copy is the only copy being made available to EUR since it is felt that the material contained in it should be read only by those with a real need to know. If you would like, I shall be glad to see that the appropriate officers of EUR have an opportunity to see it after you have read it.

We have been unable to get you a copy of the Coolidge Report itself as the result of inhibiting White House injunction. If you are interested, perhaps your office could arrange to get the Secretary's copy for your perusal.

Mac Toon would be glad to brief you further if you wish.

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UNITED STATES WORKING GROUP ON DISARMAMENT
Washington, 1960

BP/2
January 18, 1960

Coolidge Report Recommendations on Arms Control Measures

This paper was drafted by Col. Tabor (DOD) and Mr. Komer (CIA). It was circulated on January 13, 1960, as TNT/2. A revision was circulated on January 14, 1960 as TNT/2/Rev. 1. These designations will no longer be used. This cover sheet should be placed on the paper bearing the number TNT/2/Rev 1. Hereafter the new number, BP/2 (Background Paper) should be used when referring to the paper.

Robert G. Sturgill
S/AE, Ext. 4164

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INT/2/Rev. 1
January 14, 1960

COOLIDGE REPORT RECOMMENDATIONS ON ARMS CONTROL MEASURES*

INDEX

* This synopsis of the Report of the Joint State Department-Defense Department Study on Disarmament contains only the Coolidge recommendations on arms control measures and the reasons therefor. For convenience, the arms control measures have been rearranged to present all arms control measures recommended for immediate negotiation in one section, and those arms control measures not recommended for negotiation at this time in a separate section.

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ANNEXES

COOLIDGE REPORT RECOMMENDATIONS ON ARMS CONTROL MEASURES

I. BACKGROUND OF ARMS CONTROL

A. The Need for Arms Controls

Until now, the pressure for arms control has been largely emotional and economic. Reduction in the risk of being subjected to the horrors of nuclear war has a world-wide human appeal. Relief from the financial burden of intensive arms competition also has a potent economic appeal. But now, in the age of nuclear missiles, no nation will be able to buy the degree of security which was possible in the past, no matter how much money it spends. Hence, sincere efforts should be made to reach arms control agreements which will limit the military capabilities of nations in a manner which is conducive to the security of the Free World and which does not jeopardize the security of others.

B. Basic Premise for Arms Control Negotiations

Sino-Soviet military capabilities, coupled with the Communist goal of world domination, constitute the major threat to the security of the Free World. And Sino-Soviet aggression since World War II, together with continued Soviet intransigence on arms control matters are fundamental causes of the level of tensions and armaments throughout the world.

It is possible that current Soviet propaganda efforts in favor of peace and disarmament may reflect the beginning of a fundamental change in their thinking which could lead to reduction of the Sino-Soviet military threat to the Free World. It would, however, be foolish to base our policy approach to arms control upon the assumption that this is the case for at least two reasons.

First, it is equally possible, and far more likely, that the current Soviet peace campaign is designed to lure the Free World into reducing or eliminating its military capability, so that the Soviet Union can pursue its repeatedly reaffirmed aim of world domination without fear of effective opposition. Until the Soviet Union has unmistakenly demonstrated sincerity by deeds as well as words, elementary prudence dictates that we strengthen our guard against Sino-Soviet aggression rather than relax it.

Second, even if the Soviet Union has honest motives in proposing disarmament measures, its leaders are tough realists. Should the posture of the Free World deteriorate relative to the Sino-Soviet posture during the extended negotiations which lie ahead, this would lower any real incentive which may exist for the Soviet Union to accept meaningful arms controls with effective safeguards.

It follows

It follows that the basic premise of our approach to arms control must be to address the Soviet Union from a position in which our defense posture is strong and our capacity for effective political action is unimpeded. And this should be so whether we take the gloomy view of stressing the difficulties involved in arms control negotiations with the Soviet Union, or take the brighter view of emphasizing the possibilities of mutually useful agreements.

The conclusion seems inescapable that the Western Allies are not likely to achieve significant and beneficial results from arms control negotiations with the Soviet Union unless we negotiate from a position of strength, or until there is a fundamental change in the world situation.

We must press forward with measures to develop and preserve capabilities adequate to deter the outbreak of a general nuclear war until changed circumstances warrant reliance upon arms controls to do so.

With respect to limited wars it seems clear that, in addition to regional alliances and military aid programs designed to strengthen Free World forces in areas where such wars might occur, the United States must be able to aid its allies with conventional forces to a degree which will make its willingness to intervene effectively in limited wars credible both to its allies and to potential aggressors, whether or not its strategic nuclear weapons are used in such situations.

II. DISARMAMENT GOAL

A. Need for Disarmament Goal

Before turning to specific arms control measures, it seems important to determine the general direction in which we hope arms control measures will take us. We should state what we ultimately hope to attain by means of arms control in order to provide a basis for our own decisions and to make our aims and motives clear to others. Further, such a statement would place in perspective initial measures of arms control which might otherwise look insignificant.

A comprehensive, phased package of arms control measures is no substitute for an arms control objective. It founders on the multitude of the issues it raises. It is, under existing negotiating conditions, "biting off more than we can chew".

These considerations are of particular importance at the moment because of the revival by the Soviet Union of its long-standing proposal to eliminate nuclear weapons entirely, to which it has added a proposal to

eliminate

eliminate all standing military forces. The simplicity and sweep of these proposals require special effort on our part to place our own proposals for arms control in a setting of comparable breadth and simplicity.

The President of the United States and others have stated a simple and sweeping goal, namely, "world peace under law". Not only is this simple and sweeping, it is wholly consistent with the Western heritage -- the rule of law and not of men. It is, however, subject to the objection of being too broad to be meaningful.

Accordingly, it is recommended that, while adopting the goal of "world peace under law", we should spell out its main elements, as we conceive them.

B. Recommended Disarmament Goal

The United States should favor arms control measures which tend toward establishing world peace under law, namely, a world in which:

1. Build-Up of International Law Enforcement Capability:- There shall be universally recognized rules of international law, which, if followed, will prevent all nations from initiating armed conflict with (or from aiding civil disturbances within) other nations, backed by adequate jurisdiction in a world court and by effective means of enforcement.

2. Reduction of National Military Capabilities:- Through safeguarded international agreements, national military establishments shall have been reduced to the point where no single nation or group of nations can effectively oppose enforcement of international law, and no weapons of mass destruction shall be within the control of any nation.

Progress toward the goal should be made as fast, but only as fast, as the security of the Free World permits, in the light of the military capability of our probable enemies, our commitments to our allies, unsettled political problems, technological considerations and the like. The test in each case should be to adopt only those arms control measures which are compatible with the goal and which involve less risk to the security of the Free World than not adopting them.

III. ARMS CONTROL MEASURES FOR IMMEDIATE NEGOTIATION

A. A Few Relatively Simple Measures of Two Types

Our goal calls for two types of action, one building up international capability and the other limiting national capabilities. At the outset we should confine ourselves to relatively few and simple matters; we should

see if

see if we cannot for the first time actually accomplish something through easily understandable first steps toward the easing of cold-war tensions and the attainment of our ultimate goal while avoiding proposals which would affect the basic power balance at this stage. Specifically:

1. Our long-range goal should act as a magnifying glass and focus heat on a few reasonable initial measures. If no real progress can be made on such measures, it will reveal to us and to the world that the present peace offensive of the Soviet Union is no more than propaganda.

2. Concentrating on a few points at the outset tends to confine negotiations to limits within which there is less scope for the distracting diversions at which the Soviet Union is so adept.

3. Concentration can be facilitated by the selection of measures which are not dependent on each other. They should not have the inter-connection which many arms control measures have -- for example, the connection force levels and armaments have with each other and with military budgets.

4. By endeavoring to achieve a few limited objectives which, compared with many other measures, may be more easily verified, we might achieve agreement on verification procedures which could be helpful in later more important measures.

B. Initial Measures to Increase International Capability Recommended for Immediate Negotiation

The thought behind the following recommended measures designed to increase international capability is to build on what we have, namely, the United Nations, rather than to attempt a great leap forward by seeking a drastic revision of the United Nations Charter or by creating a new organization. The initial steps proposed below represent very modest progress toward the ultimate goal of peace under international law, backed by adequate jurisdiction in a world court and by effective means of enforcement. But they appear to be as far as we can go at the moment.

In this area we do not face the recurrent Soviet objection to inspection teams as "espionage"; however, there are at least as formidable difficulties in the way. One is that to attain our ultimate disarmament goal will require either drastic changes in the United Nations Charter or a new world organization. Nevertheless, there is still scope under the present Charter for considerable progress before the question of making drastic changes must be faced. It seems well worthwhile to attempt to exhaust that scope, before deciding whether to advocate a drastic change.

1. Development and Codification of International Law:- There is ample room for progress under the United Nations Charter as it exists today.

Article 13 calls for the development and codification of international law. Little progress on that score has been made to date, because efforts have been largely confined to codifying rules which are generally recognized as presently constituting "international law". Little or no effort has been devoted to the development of rules which, if adopted by member nations, would restrain actions leading to armed conflict. Specifically, progress has bogged down on the definition of "aggression". It would seem that this obstacle might be overcome by defining most, if not all, of the specific acts which together or singly constitute aggression, without attempting to define the conclusion represented by the word "aggression". Domestic law generally does this by defining numerous acts which together or singly constitute a "breach of the peace", without formulating a definition of "breach of the peace".

However that may be, it seems well worthwhile to revive and intensify the effort to develop and codify international law. This appears of sufficient importance not only to entrust the task to the highest legal talent member nations can produce, but also to provide adequate staff assistance and to devise mechanics to ensure that progress is periodically checked and validated by diplomatic conferences.

It should be noted that a valuable by-product of such an endeavor would be to increase the area of common understanding between nations, which would tend to lessen tensions and perhaps provide a broad basis for real international cooperation.

Accordingly, the United States should introduce in the United Nations General Assembly a resolution which will establish a new organ composed of outstanding jurists who would be required to devote full time to their duties, would be cleared for appointment by high courts, law schools, and academies, as provided in Article 6 of the Statute of the International Court of Justice, would be well-compensated and well-staffed, and would be charged with the following duties:

a. To codify existing principles of international law, giving priority to those principles which will make armed conflict between nations, and aiding civil disturbances within another nation, less likely.

b. To prepare rules not presently within the scope of international law but which, if adopted by member nations, would make armed conflict between nations, and aiding civil disturbances within another nation, less likely.

c. To submit the results of their work from time to time to the international diplomatic conferences described below.

d. To recommend

d. To recommend the establishment of periodic diplomatic conferences of representatives of member nations to review the work of the new organ.

e. To recommend procedures whereby the results of the work of the new organ will have the force of treaty provisions.

2. Increase the Jurisdiction and Prestige of the World Court:- Again there appears to be considerable scope within the present United Nations Charter for progress. To date the International Court of Justice has had far too few cases for it to become the important instrument for the peaceful settlement of international disputes which the Charter envisages. This is not only because, as noted above, little progress has been made in developing or codifying international law, but because its jurisdiction under paragraph 2 of Article 36 of the Court's Statute to pass upon the four important matters there enumerated is not firm. The so-called "Connally Amendment", which reserves to the United States the right to decide when a dispute involves domestic matters, set a precedent beclouding the United States declaration conferring jurisdiction on the Court which many other nations have followed.

Accordingly, it is recommended that the "Connally Amendment" should be repealed. International agreements should be sought for unqualified declarations under paragraph 2 of Article 36 of the Statute of the International Court of Justice. The member of the Court appointed by each nation should at all times be of outstanding judicial ability.

3. Measures Toward Effective Enforcement of International Law:- It seems clear that if there could be created a small, mobile, well-equipped force, under effective United Nations control, it would be of real help in the prevention of limited war and armed aggression.

It is equally clear, however, that no such force is presently practicable. Not only is the Soviet Union opposed, but so are a substantial number of other nations, principally for fear of their forces becoming involved in a struggle between the major powers.

The best that can be expected in the near future is that some members of the United Nations will continue to supply small armed forces on an ad hoc basis under the Uniting for Peace Resolution which by-passes the Security Council when the Council fails to act. Incidentally, it should be noted that small ad hoc forces have the great advantage over standing forces in being selected from nations not involved in the particular dispute.

This is a discouraging outlook for establishing effective enforcement of international law. Nevertheless, impressive results have been

accomplished

accomplished by United Nations observer teams and by United Nations semi-military forces charged with policing borders and the like. It therefore seems worthwhile to endeavor to formalize the procedures by which such groups are brought into being, and to add to them a mediation function. If successful, this might well provide a cadre for more extensive arrangements and establish a basis of confidence which would permit further progress.

Accordingly, it is recommended that the United States should introduce in the General Assembly a resolution requesting the Disarmament Commission to develop measures, for adoption by the General Assembly, which would establish a corps of observers nominated by member nations from which the Secretary General, when authorized by the Security Council or the General Assembly, would appoint teams charged with any one or more of the following functions, subject to the consent of one or both of the parties involved, as at present: (1) to determine and report the facts involved in any situation involving an actual or threatened breach of international peace; (2) to recommend measures to terminate or avoid such hostilities; (3) to act as mediators to settle such disputes; (4) to supervise the cessation of such hostilities or the measures adopted to avoid them; and (5) to assist in the administration of disputed territories.

C. Initial Measures to Limit National Military Capabilities

1. Completion of Current Negotiations to Cease Nuclear Weapons Testing:- Our hand is already set to the plow in the current negotiations for an agreement to cease all nuclear weapons tests. If that were not so, much could be said for excluding from an agreement a prohibition of underground tests which does not appear to be enforceable; for this reason among others, it is recommended that if our commitments in these negotiations permit, the agreement should not include underground tests.

Irrespective of what the agreement should cover, the negotiations should be pressed to a conclusion, for the success or failure of these negotiations will be an important omen as to the possibility of progress on other matters.

2. European Zone of Inspection Against Surprise Ground Attack:- As a measure against surprise ground attack, there should be continuous disclosure and verification by the United States, the United Kingdom, France, and the Soviet Union, of the size, composition, and locations of their forces in an area to be described in terms of terrain features and which encompasses most of the territory of the Low Countries, Germany, Denmark, Poland, Czechoslovakia, and Hungary.

This proposal is suggested for immediate negotiation because:

a. It would

a. It would lessen the possibility of surprise ground attack in Europe and would thus aid NATO in its primary mission of defending against a Soviet ground attack in Europe.

b. The zone is relatively small and should serve as a valuable laboratory in which to develop inspection techniques.

c. If the information disclosed by the Soviet Union on its forces in the zone is found to be reliable, it would engender a degree of mutual confidence. If it is proved unreliable, we would be warned against agreeing to more serious steps.

d. The proposal is in the same general field as the first of the five "partial" measures Khrushchev has proposed, and so indicates we have not wholly ignored his proposals.

e. The zone does not include Soviet territory proper, and so stands a better chance of being acceptable to the Soviet Union, even though it is less desirable from our point of view.

f. Under the proposal the zone is not neutralized, nor denuclearized, nor is West Germany prevented from building up its twelve divisions, nor is it required to withdraw from NATO, nor are force levels affected.

g. While force levels are unaffected, nevertheless, if the inspection provides the anticipated increase in the security of NATO forces, a thinning out of non-indigenous forces in the zone should become practicable from a military point of view. At that time, therefore, the Western Allies might be in a position to jointly propose to the Soviet Union some reciprocal thinning out.

The area should be defined in terms of terrain features insofar as practicable, rather than national boundaries, in an effort to avoid suggesting Western acceptance of either the existing division of Germany or the Soviet-imposed post-World War II boundaries of Poland and Czechoslovakia. (See Annex A.)

Restricting the application of the measure to the military forces of the United States, the United Kingdom, France and the Soviet Union within the area should make it easier to avoid negotiation with the Pankow regime in East Germany.

Verification should be accomplished by joint Four-Power inspection teams -- backed by aerial inspection and radar.

If it should develop that adding zones in other parts of the world would make this proposal more generally acceptable, there would be no objection to doing so, provided the other zones make sense by themselves. The main purpose of aiding NATO's mission, however, should not be obscured.

3. Prohibition

3. Prohibition of Vehicles Capable of Mass Destruction from Being Placed in Orbit or Stationed in Outer Space:- The principal reason for suggesting this measure at the outset is a simple one. Twice in the past, an opportunity to control revolutionary weapons at a time when they were controllable has been missed. The first was when we had a monopoly on atomic weapons and the Soviet Union refused the "Baruch Plan". The second was when the development of ICBM's was in its infancy, and no agreement was reached to halt further development. Now we may have an opportunity to prevent space vehicles from becoming weapons of mass destruction. We should not "miss the boat" a third time. It is highly important to forestall the extension of a nuclear arms race into outer space.

It is to be noted that the proposal is confined to space vehicles carrying weapons of mass destruction. It does not include communications or reconnaissance vehicles. These will be extremely important to our security. Also, they are expected to provide many types of information for verification of arms control agreements. Our ability to use them must not be compromised, in spite of the probable opposition of the Soviet Union to their use.

The essential first step is to obtain early agreement on the prohibition of the launching of mass destruction weapons designed to sustain themselves in space. This would not include ballistic missiles since they do not sustain themselves in space. This could be achieved through an agreement that no weapons of mass destruction would be placed in orbit or projected into sustained space flight; disclosure by registration of flight plans of all orbital and sustained space flights more than 100 kilometers (62.5 miles) above the earth's surface; verification of orbital and sustained space flights through international inspection of payloads prior to launching; and inspection for undisclosed orbital vehicles and monitoring of sustained space flights above 100 kilometers through a space surveillance and tracking system.

A specific height above the earth is suggested so as to avoid running into unsettled questions of law and fact, such as the definition of "space", the limitation of national sovereignty in the areas above national terrestrial boundaries, and the use of national air space and outer space for peaceful purposes. The figure of 100 kilometers (62.5 miles) falls between the theoretical upper limit of continuous flight of winged aircraft based on aerodynamic force (perhaps as high as 55 miles) and the lower theoretical limit at which an object can remain in even a short-lived orbit (about 70 miles).

In the interest of speed, and because only two nations are now capable of launching sustained space flight and orbital vehicles, it is probably desirable that the initial agreement be negotiated bilaterally between the United States and the Soviet Union as a subcommittee of the

Ten Power Conference. The agreement should provide that other nations might join and if, subsequent to its execution, any nation engaged in a space program failed to join, the parties to the agreement might withdraw.

The questions of law and fact which in the past have plagued consideration of space matters should be set apart from arms control negotiations. They might in due course be referred to either the United Nations or to some other international body for resolution.

D. Other Measures to Limit National Military Capabilities Which Could Be Presently Negotiated

The following measures also could be negotiated now without danger to the security of the Free World:

1. Measures to Lessen the Likelihood of Accidental or Unintentional War:- In the missile age the defender may receive little or no warning of an impending attack. Hence the time available for deciding to launch a retaliatory attack is dangerously reduced and, once launched, missiles cannot be recalled in the same manner as bombers. Under these circumstances, there is danger of war starting by an accidental nuclear explosion or by the isolated act of an irresponsible individual or by some other ambiguous event.

It is not clear what form the means should take. Hence, prior to discussions with the Soviet Union, it is hardly profitable to do more than suggest a possibility for joint exploration. This might consist of stationing in the capital of each country high ranking officers with direct communications to their own capital who could personally verify promptly the circumstances connected with an ambiguous incident which might mistakenly be regarded as a hostile act. In such case, the host country should be most anxious to aid these officers to verify the true character of the incident, so the problems faced by ordinary foreign inspectors in the Soviet Union would not arise.

The ultimate might be a "purple telephone" directly connecting the Heads of Governments.

The idea here suggested would be particularly important in times of heightened tension. Obviously, the time to establish the mechanics is before tension arises. It is possible that other nations would wish to participate; there is no objection to this provided that the number is kept small so that the mechanics do not become too cumbersome to be effective.

2. Preparatory Steps for Limiting Force Levels:- It clearly would be advantageous to the Free World to bring about a reduction in Sino-Soviet

conventional

conventional military capabilities through a reduction in their force levels. The United States has already unilaterally reduced its own forces to 2.5 million, but in the present state of the world it appears unsound for the United States to reduce its force level further. This is not so much because the Soviet level is over 4 million as it is because of the unsolved political problems, particularly their impact on us through our commitments to other nations, and because of the menace of Red China.

Nevertheless, if the Soviet Union would first come down to 2.5 million, it should be possible to agree to modest further reciprocal reductions. It seems apparent, however, that for us to propose to the Soviet Union that it come down to 2.5 million, while we remain stationary, is too one-sided. The best we can do is to say to the Soviet Union that if it will come down to 2.5 million, and that is verified, we will be willing to discuss some further reduction.

If the Soviet Union indicates interest in that proposition, it is not too soon to begin to study mechanics for the verification of force levels. Presumably those mechanics would include furnishing the United Nations with inventories of force levels (and perhaps conventional arms), and the development of the technique of effective inspection by an international inspection organ. It is a complicated matter, even though it involves but a small part of what total disarmament would involve.

We should make clear that we are not interested in talking force levels until the Soviet Union comes down to a verified 2.5 million; even then our idea of reciprocal reductions in force levels is that they should be very modest unless other nations, especially Red China, also reduce. However, there seems no harm in attempting presently to develop plans for verification and for the creation of an international inspection organ.

E. Summary of Measures Recommended for Immediate Negotiation

1. Recommended Initial Measures Designed to Increase International Capability:-

a. Propose action by the United Nations to intensify the effort to develop and codify international law.

b. Repeal the so-called "Connally Amendment", and seek multilateral agreements giving the International Court of Justice the full jurisdiction set forth in paragraph 2 of Article 36 of its Statute.

c. Propose action by the United Nations to improve the procedures governing the creation of a United Nations "presence" in areas where disputes exist.

2. Recommended

2. Recommended Initial Measures Designed to Limit National Military Capabilities:-

a. Endeavor to complete the current negotiations on the prohibition of nuclear weapons tests insofar as adherence to such a prohibition proves verifiable.

b. Propose at the Ten Power Conference a European zone of inspection against surprise ground attack, in aid of NATO's mission.

c. Propose at the Ten Power Conference a prohibition of vehicles capable of mass destruction from being placed in orbit or stationed in outer space.

IV. MEASURES WHICH SHOULD NOT BE PRESENTLY NEGOTIATED

A. Limitation on Conventional Arms

What has been said above (III.D.2., page 10) about force levels applies to conventional armaments. The two go hand-in-hand. While theoretically a limitation on weapons is more effective than a limitation on men, because an unarmed man is not much of a menace, yet the only sensible method of limiting conventional arms appears to be to tie the number of permitted weapons to the number of permitted military personnel. Therefore, limitation of conventional arms should wait until a limit on force levels is agreed upon. (The possibility of depositing arms in depots is considered separately below.)

B. Limitation on Nuclear Weapons

Since nuclear weapons constitute the great urge behind disarmament today, sympathetic and intense consideration has been given to the possibility of measures which would lead to their elimination. The conclusion has been reluctantly reached that the United States cannot afford to agree to eliminate or drastically reduce its nuclear capability unless and until there exists effective means for enforcing international law to which it can entrust its security.

In the first place, an agreement by the Soviet Union to eliminate nuclear weapons could not be relied upon, because there is at present no known way of detecting hidden nuclear warheads, and less than 100 high yield nuclear warheads would put us at the mercy of the Soviet Union if we had surrendered ours. This problem is particularly acute with ICBM's, which are composed of the nuclear warheads and the rocket vehicle. The "Atoms for Peace" program results in enriched uranium going into peaceful reactors, and plutonium -- a major element of warheads -- coming out.

Similarly,

Similarly, the "Peaceful Use of Outer Space" program will result in the production and improvement of rockets of a type admirably suited for use as the delivery vehicle for nuclear warheads. So two important peaceful programs greatly complicate the problem of controlling ICBM's.

In the second place, even if we could be certain that the Soviet Union retained no nuclear weapons, the overwhelming manpower of the Soviet Union and Red China requires us to retain a nuclear capability unless and until there is created a world authority capable of enforcing international law. If we now surrender our nuclear capability, the uneasy balance of power which now exists between the Free World and the Sino-Soviet bloc would be upset, because the elimination of the risk of nuclear war would encourage the Soviet Union and Red China to step up their military efforts to attain their goal of Communist domination of the world.

This does not mean that a nuclear arms race must go on unabated. It seems possible that the Soviet Union may also desire to reduce the risk of a general nuclear war. At the moment, its leaders apparently prefer other means for attaining world domination. It appears sensible to explore and build on this possibly mutual desire for a stable balance of deterrence of general nuclear war which might set a limit to a nuclear arms race.

If the general nuclear warfare capabilities of each side are sufficiently invulnerable so that, for example, it will take from three to five of the attacker's missiles to knock out each of the defender's missiles, then the attacker must have three to five times as many missiles as the defender to destroy the latter's missiles completely. On a 3-to-1 basis, if the attacker has 1,800 missiles and the defender 1,000, then the 1,800 missiles of the attacker would destroy only 600 of the defender's 1,000. The defender would be left with 400, which could inflict frightful damage on the attacker's governmental and industrial centers.

Therefore, if both sides are aware of this situation and make their general nuclear warfare capabilities sufficiently invulnerable to produce a ratio of, say 3-to-1 or better, through mobility, concealment, dispersal, hardening and the like, then neither will be likely to attack. A stable balance of deterrence of general nuclear war will have been created. Once such a situation has been created, the proportionate three-fold greater effort required to break the balance than to maintain it could price a potential aggressor out of the race. Hence, the nuclear arms race is likely to level off at an acceptable point. Just where the point must be is a matter of military-scientific judgment, but there clearly is a point where "enough is enough".

Of course, the situation at any given moment of time will not lend itself to a mathematical computation such as that outlined above. The stability of the deterrence can be upset by technological advances producing greater accuracy or larger yield, or by anything else which would reduce the number of attacker's missiles required to knock out each

of the

of the defender's missiles. The situation, therefore, must be kept under continuous review. There is, however, no immediate problem on this score. When general nuclear warfare capabilities attain a high degree of invulnerability, it will be time enough to worry about the leveling-off point.

It is concluded that insofar as it works, a stable balance of deterrence is a way, though admittedly an expensive one, of "banning the bomb" -- not by eliminating the capability to use it, but by eliminating the willingness to use it. (See Annex B.)

Arms control measures could at some point be helpful in maintaining a stable balance of deterrence of general nuclear war. Sooner or later such agreements could be helpful in the following ways:

(a) They could help to determine the level at which the balance of deterrence is initially stabilized and might later reduce the level. It should, however, be noted that the lower the level, the more effective the inspection system must be. At a high level, a few clandestine missiles may not be dangerous, but at a low level they might be very dangerous.

(b) Technological improvements which tend to upset stability could be slowed or halted through monitored agreements to control the testing of missiles, thus enhancing stability and saving money.

Even though the occasion for fruitful negotiation with the Soviet Union on arms control measures affecting general nuclear warfare capabilities may be some time away, the concept should underlie thinking on disarmament measures which would affect general nuclear warfare capabilities.

Since neither the elimination of nuclear weapons nor other measures of control of such weapons appear at this time to be consistent with the security of the United States and the remainder of the Free World, none of the following proposals on nuclear weapons should be negotiated at this time:

1. Elimination of Nuclear Weapons:- We must retain a nuclear capability as an offset to the overwhelming manpower of the Sino-Soviet bloc. This capability must be retained unless and until effective machinery for enforcing international law is in operation.

2. Limitation on Numbers of Nuclear Weapons:- No negotiations should be undertaken on limiting the number of strategic nuclear weapons until a stable balance of deterrence is established, and then only if an adequate inspection system can be devised. Limitation of numbers, as used here, includes cut-off of production of missiles, which is an indirect way of freezing numbers.

Nor should

Nor should negotiations be undertaken on limiting tactical nuclear weapons. Certainly not unless and until the conventional capability of the Free World equals that of the Sino-Soviet bloc, and maybe not even then in view of the preponderant manpower reserves of the bloc.

3. Cut-Off or Reduction of the Production of Nuclear Materials for Weapons Purposes:- The controlling reason why there should at this time be no negotiations looking toward a cessation or reduction of the production of nuclear material is that considerable additional production will be needed during at least the next few years in order to attain a stable balance of deterrence of general nuclear war and adequate deterrence of limited wars. No negotiations for a cut-off or reduction should be undertaken until exhaustive unilateral study demonstrates that on balance it would be to our advantage. This study should be undertaken promptly since a reduction or cut-off of nuclear production for weapons purposes appears to be one of the more potentially feasible methods to limit nuclear weapons.

4. The "Nth Country" Question:- Should the United States presently negotiate an agreement with the Soviet Union that we will not directly contribute to the attainment by another country of a nuclear weapons capability?

There are those who advocate seeking an amendment to the Atomic Energy Act which would permit the United States to transfer nuclear weapons to selected allies or assist them in manufacturing their own nuclear weapons. If selected allies should acquire their own nuclear weapons, this might well increase the stability of balanced deterrence between the Free World and the Soviet Union. (It should be noted in this connection that there are a number of nations which might well acquire a nuclear weapon capability without outside help.) On the other hand, there are many who believe that the more nations who have nuclear weapons, the greater the likelihood of a major nuclear war, and the less chance there is that effective controls over nuclear weapons will ever be established.

Of course, if an agreed prohibition on aiding other nations to acquire a nuclear weapons capability were effective, it would prevent the Soviet Union from aiding Red China in this field. But it seems unlikely that the Soviet Union would so aid Red China, for reasons of its own security, unless badly threatened by the West, in which case the agreement undoubtedly would be violated anyway.

On balance it seems that in the present state of the world the United States should not forego the right to aid its allies in this area. This right is an extremely valuable bargaining tool and should not be traded away. In any case, until there is a beneficial change in

 the world

the world situation, we should refuse to negotiate proposals to eliminate our right to transfer to other nations either the capability to manufacture nuclear weapons or the weapons themselves.

C. Limitation on Testing of Missiles

Once we establish a stable balance of deterrence, with an adequate number of relatively invulnerable missiles, it may well be worthwhile to negotiate for a cut-off of missile testing, although study should be undertaken as to whether the knowledge to be gained in the development of space vehicles may not render such a cut-off largely meaningless. But until satisfactory invulnerability is attained we should not agree to a cessation of missile tests.

D. Elimination of Foreign Bases

Insofar as the abandonment of these bases would hurt general nuclear warfare capabilities, they should not be abandoned. Nor should bases which are useful to support limited war operations be given up. Western supply problems for such operations, as compared with those of the Soviet Union, are bad enough even with these bases. And lastly, while some present bases may be relinquished, additional bases for new weapons systems may be needed to strengthen general nuclear and limited warfare capabilities of the West.

All these considerations lead to the conclusion that no agreement should be negotiated with the Soviet Union which calls for any substantial or indiscriminate reduction in overseas bases of the Western Allies until there is a sufficient change in the situation so that the above considerations will have lost their force.

E. Budget Controls

There can be considerable advantage in obtaining budget information from the Soviet Union -- more than it will get from receiving such information from us. But the difficulty of checking the accuracy of Soviet information means that an agreement to limit military expenditures should be regarded only as supplementing other more reliable measures of control. It would be valuable, when combined with other intelligence data, but not reliable by itself. The measures here recommended for immediate negotiation are so few and of such character that they need no such supplementing.

F. Limitations on Chemical, Biological, and Radiological (CBR) Weapons

Insofar as CBR elements are capable of mass destruction, they should be classed for arms control purposes in the same category as nuclear weapons. Ultimately, therefore, no CBR capability should remain in national control. However, the problems of monitoring an agreement to limit or abolish CBR weapons when the time comes are not at all the same as those of monitoring

limitations

limitations on nuclear weapons, nor are they the same for the different elements of CBR. In particular, the biological element requires very little in the way of plant, equipment and materials and would be extremely difficult to control. Since this report recommends no limitations on nuclear weapons in the immediate future, the problems of controlling CBR weapons need not be faced at this time.

G. Indiscriminate Joint East-West Technical Studies

Joint East-West studies on technical problems may seem innocuous and desirable, not only as evidencing activity but also as an aid to assessing the merits of a particular proposal. But they carry with them a strong implication that, if the Western and Soviet experts solve the technical problems, we will agree to the proposal itself. We should be sure we are willing to go through with a proposal before we agree that a group of Eastern and Western experts should be convened to study the technical problems it involves.

H. Separate Measures in Re: Surprise Attack and Unintentional War

These subjects do not lend themselves readily to separate negotiations apart from substantive arms control measures because, since they involve the use of weapons, they cut across many arms control measures. The unsuccessful effort of a year ago to discuss technical measures to prevent surprise attack as a separate matter illustrates the difficulty of separate treatment. Nevertheless, these two priority subjects have been kept constantly in mind and some of the measures recommended in this report are helpful either directly or indirectly.

1. Surprise Attack:- The recommended inspection zone in Europe is specifically designed to lessen the possibility of surprise ground attack against NATO forces in Europe. While lessening the possibility of surprise ground attack is less vital than preventing a surprise strategic nuclear attack, it is nonetheless important and worthy of support.

On the all-important problem of preventing a surprise strategic nuclear attack, it is difficult to envisage any presently practicable agreement which can prevent such a surprise attack in the missile age. The danger of it has increased, and so has the difficulty of preventing it. However, the creation of a stable balance of deterrence will diminish the likelihood of such an attack. Further, the use of photographic and other types of earth satellites should be of some help in detecting surprise attack preparations. Additionally, the more inspection of other measures which can be put into effect, the greater is the chance that information indicating preparations for a surprise attack may be detected.

2. Unintentional

2. Unintentional War:- Limited measures directed specifically to the prevention of unintentional or accidental war are outlined in III. D. 1, above (page 10). In addition, the creation of a high degree of invulnerability in general nuclear warfare forces as a part of establishing a stable balance of deterrence should permit the decision to set such forces in motion to be delayed long enough to determine the real meaning of an ambiguous incident and thus lessen the likelihood of an accidental war.

It is probable that if and as arms control proposals other than those recommended in this report come under negotiation, further measures can be worked into them which will be helpful in preventing surprise attack and unintentional war. This should be borne in mind.

V. CONSIDERATION OF OTHER MATTERS IN THE 1957 WESTERN PROPOSALS

The foregoing comments have covered most of the important measures contained in the Western proposals of August 29, 1957. Comments on the remainder follow:

1. Deposit of Arms in Depots:- There is no objection in principle to the 1957 proposal for placing conventional arms in storage depots within the national territories of signatory states under the supervision of an international control organization as the levels of the forces which would use those arms are reduced. But there is a real question whether it is worth the effort to try to negotiate with the Soviet Union either on the principle or on the lists of armaments to be deposited. Since the arms would be deposited on national territories and would be either obsolete or quickly available in the event of hostilities or of violation of any other agreement limiting arms or armed forces, the proposal is largely of symbolic value and seems scarcely worth pursuing.

2. International Control Organization:- As indicated earlier, the measures recommended for immediate negotiation do not require the creation of an over-all international control organization. They call for limited, specialized inspection mechanics, adapted to the particular measures they are to verify. It may therefore be premature to negotiate the establishment of an over-all control organization. However, planning for the reduction in force levels, which could be started presently might well include planning for such an international control organization. But the establishment of such an organization involves many difficult political problems, such as the relationship of the organization to the United Nations Security Council, its composition in the light of Soviet insistence on parity, and its voting procedures in the light of the Soviet preference of unanimity. These problems

 are at issue

are at issue in the Geneva Nuclear Test negotiations and, even though the inspection there involved is of a specialized nature, until the negotiations have terminated, it may be well to fight the battle there rather than begin it anew in a parallel forum. If they result in the establishment of a Nuclear Test Control Organization, it may be desirable to use that organization as a nucleus for a control apparatus of wider responsibilities.

3. Political Problems:- It is obvious that such political problems as Berlin, German reunification and Formosa have an important bearing on the amount of disarmament that can be safely accepted. No specific tie-in between arms control measures and political problems is, however, recommended. The 1957 Western proposals conditioned future steps on progress in solving political problems, and that did not prove to be a fruitful approach.

4. Movement of Armaments:- A related aspect of the 1957 Western proposals which has not yet been mentioned is the proposal that there be a study of a system for regulating the export and import of designated armaments. While there may be some justification for considering arms export controls applicable to specific areas (for example, the Middle East), the general concept of control of arms traffic has serious implications for Western military aid programs and it is better not to raise the issue until there has been a change in the world situation.

5. Provision for Suspension of Agreements:- Provision for modifying or suspending an arms control agreement should be incorporated in the agreement itself. Since future political and technological changes may render an agreement obsolete, procedures for keeping it up to date are highly desirable. Suspension should be provided for in order to protect signatories in the event of violation by one of the parties. Such provisions should be formulated in the light of the measures included in each agreement, and, therefore, are not discussed in detail in this report.

VI. CONSIDERATION OF PARTICIPATION BY RED CHINA

Red China presently appears to have more than 2.8 million men in her armed forces and apparently is building up their effectiveness. Further, her violently aggressive and hostile attitude toward the Free World in general and the United States in particular, make it clear that we should agree to no arms control measure without careful consideration of how it leaves us with respect to Red China. This is particularly true of measures which would limit our nuclear capability. Red China must also be considered in connection with verification and inspection, whether or not she is a party to the particular arms control agreement. Otherwise the Soviet Union might well evade an agreement by carrying on forbidden activities in Chinese territory.

VII. CONSIDERATION

VII. CONSIDERATION OF INSPECTION PROBLEMS

The all-important problem of inspection is involved in some of the measures recommended for immediate negotiation and is certain to come up frequently in connection with other measures. It deserves careful analysis.

Verification is commonly thought of as being synonymous with inspection. That is not strictly true; there are measures which can be verified without inspection, such as an agreement to establish an international peace force. Of course, if verification of a particular measure can be assured without inspection, it is an advantage in favor of that measure. Nevertheless, inspection is the most important and effective method of verification.

It should be noted at this point that verification is not the same thing as control or enforcement. Verification merely spots whether or not there has been performance of an agreement. What should be done if verification discloses a breach of the agreement is very important, but is an entirely separate problem. The action required to offset a breach has nothing to do with the action required to detect one. Adequate verification does not make an agreement "self-enforcing".

A fresh look at the inspection problem suggests that arms control measures fall into two distinguishable categories. The first deals with the readiness of forces, such as the destination of operational training flights, presence of warheads with delivery vehicles, and the like. These are matters of great concern in connection with surprise strategic attack. They require that accurate information be quickly available if the other side is to take action to offset a breach of agreement. The second category deals with more static matters such as composition of forces, numbers and types of conventional weapons, military budgets, and the like. On such matters, information can be less precise and time is not of the essence.

Inspection systems adapted to deal with matters in the first category pose complicated requirements in terms of numbers of inspectors, freedom of access, speedy and reliable communications, and so on. Such systems probably are unacceptable to the Soviet Union and in some cases also to the Western Allies. Above all, the consequences of failure could be serious.

On the other hand, inspection may be workable and effective when applied to the second category of matters, where timeliness and margin of error are not so critical. Less cumbersome inspection machinery and the use of sampling techniques supplemented by unilateral intelligence might make such systems acceptable.

As a general

As a general criterion it would, therefore, appear that arms control measures which require elaborate inspection and in which even small-scale violations could be serious, should be avoided. (See Annex C.)

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While the attached Annexes have been reviewed for consistency with this synopsis, in case any inconsistencies remain, this synopsis and not the Annexes, is to govern.

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ANNEX D

CUTOFF OF NUCLEAR PRODUCTION

This annex summarizes the status of work done to date on problems of inspecting arms control agreements for a cutoff of production of nuclear materials for weapons purposes and also the principal substantive elements of technical studies on inspection. It does not address itself to the question whether a production cutoff agreement would be in the interests of the United States nor does it attempt to determine the degree of inspection required to ensure the effectiveness of such an agreement.

A. Status of Investigation of the Inspection Problem

The problems of inspection have been studied primarily from the standpoint of gaseous diffusion plants for uranium isotopic separation and reactor plants for plutonium production, using United States plants as models for the inspection systems which would be required. The Joint Disarmament Study did not independently study these problems but, rather, drew upon the conclusions of studies made by other groups.

The case in which all nuclear materials production would be completely cut off (i.e., no production for either military or peaceful purposes) has not been studied in detail from the inspection standpoint. This reflects the view that no real technical inspection problem would exist, since it would merely be a matter of checking "padlocked" and non-operative facilities (presuming all facilities had been declared).

B. General Rationale of Inspection Systems Investigated

Control of nuclear weapons may be attempted at various stages. The first stage is the production of vital materials, fissionable products such as U-235 and plutonium and fusionable products such as tritium. The production of U-235, in the present state of the art, requires large and complicated establishments. Plutonium, obtained by subjecting uranium to the fissioning process in a reactor, requires a reactor of considerable size to accomplish this and large chemical processing facilities to recover the plutonium after discharge from the reactor. Use of thorium in a reactor results in production of U-233. Although difficult to handle, U-233 is theoretically capable of being used for weapons purposes. The production of tritium is accomplished by exposing lithium to the fissioning process in a reactor.

While it is possible to devise control systems with high degrees of effectiveness in determining whether any portion of future production of such

of such materials was being diverted from peaceful purposes, there is no way of making certain that all past production has been accounted for. This would be more important for plutonium, which retains its effectiveness for centuries than in the case of tritium which has a half-life of only twelve years.

The approach thus far to inspection of disclosed plants has been to develop systems and techniques which adapt production process controls and accounting to inspection ends.

Material balance data are the crux of this approach to inspection. That is, measured variations from "normal" material balances provide the clue to suspected diversion of nuclear materials. The fineness of data required makes a rather complicated system of inspection necessary. In addition to materials balance data, both physical controls and process surveillance are required.

Inspection and control can be best initiated at the point where nuclear material begins to assume potential value in the weapons material production process. Attempts to control uranium ore or other process materials do not appear worthwhile.

There appears to be no practical way to exercise control over non-nuclear components of nuclear weapons (e.g., electronic gear). Nuclear materials, at appropriate stages in the production process, represent the best object of control.

For plutonium, control at the reactor appears a desirable starting point. But this must be complemented by control at the chemical separation plant following irradiation.

For U-235, control requires close measurement, throughout the gaseous diffusion process, of feed input and also of product output, tails, and process inventory.

To be successful, inspection based on materials balance accounting at U-235 and plutonium production facilities would require prior determination of "normal" performance. A shakedown period of 6 to 18 months would be necessary to establish such a norm. An additional 12 months of inspection operations would be necessary to acquire and evaluate sufficient data to establish a reasonable basis for suspicion of diversion.

Given the above general conditions, no insurmountable technical difficulties exist in controlling primary facilities for U-235 and plutonium production through the material balance inspection technique.

C. Potential Inspection Loopholes

Inspection loopholes might arise in the following areas:-

1. Clandestine

1. Clandestine production facilities, unless discovered by other means and brought into the inspection system, would constitute a glaring hole in the system.

2. U-235 might appear more attractive to an evader than plutonium because it can be processed into weapons with simpler equipment and less hazard. This feature is offset by the greater difficulty of concealing a gaseous diffusion plant compared to a plutonium-producing reactor. However, possible alternative methods of producing U-235 have to be taken into account. Centrifuges, for example, would be easier to conceal than diffusion plants.

3. Possible clandestine production of plutonium by propulsion reactors (submarines, ships, etc.) would pose a problem which no inspection system to date has covered in depth.

4. Some problems may arise in connection with control of nuclear materials possessed by or produced at experimental research establishments or utilized for military applications (such as propulsion or portable power reactors). But present indications are that they probably can be resolved without undue technical difficulty.

5. Loophole possibilities in any inspection scheme will exist unless all countries adhere to it, since a major nuclear power could arrange for a small country to serve as an "exclusion area" for clandestine reactor operations. The extent to which such possibilities are cause for concern may vary widely, depending upon the country being considered.

6. The possibility of erroneous accusations of diversion exists under any conceivable inspection system based on material balances. This might degrade inspection efficiency, since if a false accusation were made inspectors might subsequently be reluctant to press the issue in cases of doubt.

7. The problem set forth in 6., above, points up the need for tying contemplated sanctions in closely to the design of an inspection system. The requirements for establishing "suspicion" of diversion may well be insufficient to furnish the "proof" needed as a basis for applying sanctions.

8. Material balance inspection systems are designed on the assumption that production operations will be carried out rationally to optimize plant efficiency. If plant operators deliberately were to introduce vagaries into the production process, inspection could be made very difficult.

D. Probabilities of Detecting Evasion at Various Levels of Inspection Effort

1. The chances

1. The chances of detecting diversion of materials up to about 1% of annual production for either U-235 or plutonium are uncertain, even if a very elaborate inspection effort were made. Beyond 1%, diversion becomes increasingly difficult. The 1% figure, as the approximate dividing line between a poor and a good probability of detection, is based on the most recent detailed technical studies.

2. Gaseous Diffusion Inspection

(a) For a diffusion plant like that at Oak Ridge, it is estimated that an inspection team of about 370 personnel would be required to establish a reasonable basis for suspicion of a 0.5% diversion of annual production. This would call for inspection in six steps and would virtually necessitate a share in management decisions. It would also require plant operation at optimum efficiency and no attempt to hamper inspection. The cost of such inspection is estimated at about $5,000,000 annually per diffusion plant.

(b) The undetectable percentage of material diversion could rise to between 1% and 5% of annual production if a four-step level of inspection were attempted; and to as high as 25% if a one-step inspection level were attempted. The cost for these alternative levels of inspection has not been estimated.

3. Plutonium Production Inspection

(a) The diversion probabilities for a plutonium-producing installation like Hanford in the cases of a 500-man inspection team and of a 50-man inspection team have been studied. For the 500-man team, the probability is very high (90% or better) for detecting diversion of 1% or more of annual production. Probability falls off sharply for detecting less than 1%, even with the 500-man team.

(b) For the 50-man team, detection probability declines noticeably. There is less than a 50% chance of detecting 1% evasion, and only about a 60% chance of detecting 2.5% evasion. The criterion in both cases above is "suspecting" rather than "proving" diversion.

4. International Inspection System Requirement

(a) The studies examined by the Joint Disarmament Study do not develop the requirements for a complete international inspection system. Available data are based on inspection models for particular installations rather than on complete international systems.

(b) An approach to an international system requirement is made in broad terms in one study. This study estimates a need for about 5,600 personnel in 1960, of whom about 1,500 would be scientists and technicians. This number is estimated to increase by 1966 (with more extensive peaceful uses, new members of the "nuclear club,"

club," etc.) to about 13,000 personnel, of whom 3,000 would be scientists and technicians. These estimates may be on the conservative side. No cost calculations are included.

E. Other Approaches to Nuclear Materials Inspection

1. Control of Peaceful Uses

Detailed work is in progress on the design of a system for implementing safeguards and control provisions with respect to the use of nuclear materials for peaceful purposes. Particular attention is given to reducing the requirement for inspectors by the use of special instruments and devices. The study has three principal goals:

(a) Devising a control system.
(b) Developing and evaluating special instruments and devices.
(c) Assembling and testing the complete system in a realistic environment.

2. Input-Output Approach

A possible alternative to the material balance approach to inspection has been suggested and is undergoing initial evaluation. This alternative, based simply on input and output data, is intended to simplify inspection requirements.

(a) The heart of the proposal is the requirement that output equal input. There is no concern with operating considerations, material balances, or possible attempts to divert material. The plant operator would simply be required to have an output which equalled the input; if necessary, making up any deficiency by removing it from process inventory or withdrawing it from stockpile.

(b) Under this scheme, nations which possessed nuclear weapons would be assumed to retain them after a cutoff of nuclear materials production. The in-process inventory of nuclear materials in production plants would be considered in the same category as previously produced weapons; i.e., undeclared and unverified.

(c) The apparent simplicity of this approach may hide some real difficulties, which require close and expert study. If workable, its advantages are:-

1. The "shakedown" period for establishing inspection norms could be significantly shortened. Moreover, the subsequent 12-month period to establish a reasonable basis for suspicion of diversion would be eliminated.

2. It would

2. It would place a premium on efficient operation of plants. This is an important contrast to the material balance plan of inspection where inefficient operation could facilitate diversion. Further, there might be a marginal advantage to the United States if, as presumed, United States operating efficiency is somewhat better than that of Soviet plants.

3. It would provide a supplementary means of transferring nuclear material from weapons uses to peaceful uses (i.e., any failure of output to equal input would be compensated for by transfer from stockpile of sufficient weapons material to make good the deficiency.)

The input-output approach is greatly dependent upon accurate input measurement, since other checks and observations during the production process are not available to furnish a correction if the original input data proved greatly in error. This means that confidence in recommending an input-output inspection system will rest largely on the confidence factor that can be established for measuring input. Further work on this particular problem is underway for both U-235 and plutonium production. At present, the range of uncertainty in input measurement is greater for the latter.

Power reactors for peaceful uses pose a difficult measuring problem, due to the fact that there is no good method for nondestructive assay of reactor fuel elements. However, the measurement problem might be eased by requiring output commensurate with what the producing party declares the fuel element content prior to irradiation to be.

In the case of gaseous diffusion plants, the input-output inspection approach would have to deal with the possibility that a large amount of feed material might be accumulated at a plant as "undeclared inventory" prior to implementation of an agreement, to be surreptitiously used later for producing weapons material. However, the physical problem of introducing large volume feed streams clandestinely into the cascade would probably make evasion difficult.

The "output equals input" approach to inspection would be applicable only to countries which are nuclear "haves," since deficiencies would have to be replaced by drawing on existing stocks.

F. Some Unresolved Difficulties

1. The possibility of detecting undeclared nuclear materials production facilities operated clandestinely within the Soviet bloc,

 including

including the feasibility of constructing facilities specifically designed to avoid detection; e.g., through effluent containment.

2. The possibility of detecting clandestine production of nuclear materials in ship and submarine reactors.

3. The problem of commercial secrecy in the United States and Great Britain, as it might affect the operation of the system of inspection of nuclear materials production.

4. Legal and constitutional aspects, in the United States, of agreements for inspecting nuclear materials production cutoff.

5. Economic dislocation and readjustment problems which might stem from nuclear materials production cutoff proposals. This involves both technical and economic problems of orderly plant shutdown, avoidance of disruptive effects on the nuclear industry, power industry, and other sectors of the economy, etc.

6. Problems of detection posed for an inspection system if uranium isotopic separation methods other than gaseous diffusion are involved, such as gas centrifuges.

7. The effects of non-adherence by some countries to a production cutoff agreement, thereby creating "exclusion areas" outside the inspection system.

8. The design of an appropriate over-all inspection system applicable to the Soviet Union, taking into account what is known in advance as to the size and characteristics of the Soviet nuclear establishment.

9. The proper relationship between sanctions for violation and the inspection provisions of any contemplated production cutoff agreement.