BIOLOGICAL WARFARE TESTING

HEARING

BEFORE THE

SUBCOMMITTEE ON ARMS CONTROL, INTERNATIONAL SECURITY AND SCIENCE

OF THE

COMMITTEE ON FOREIGN AFFAIRS

AND THE

SUBCOMMITTEE ON ENERGY AND ENVIRONMENT

OF THE

COMMITTEE ON INTERIOR AND INSULAR AFFAIRS

AND THE

SUBCOMMITTEE ON MILITARY INSTALLATIONS AND FACILITIES

OF THE

COMMITTEE ON ARMED SERVICES

[H.A.S.C. No. 100-66]

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WITNESSES

BIOLOGICAL WARFARE TESTING

TUESDAY, MAY 3, 1988

HOUSE OF REPRESENTATIVES, COMMITTEE ON FOREIGN AFFAIRS, SUBCOMMITTEE ON ARMS CONTROL, INTERNATIONAL SECURITY AND SCIENCE, COMMITTEE ON INTERIOR AND INSULAR AFFAIRS, SUBCOMMITTEE ON ENERGY AND ENVIRONMENT, COMMITTEE ON ARMED SERVICES, SUBCOMMITTEE ON MILITARY INSTALLATIONS AND FACILITIES,
Washington, DC.

The subcommittees met at 10 a.m. in room 2171, Rayburn House Office Building, Hon. Dante B. Fascell, Hon. Morris K. Udall, and Hon. Ron Dellums (chairmen) presiding.

Chairman FASCELL. The meeting will come to order, please. The subject of today's hearing is biological warfare testing, its impact on public health and safety, our defense and our arms control policy.

The importance and complexity of this hearing is reflected by the fact that this hearing involves three subcommittees of three major committees in the United States House of Representatives: the Subcommittee on Arms Control, International Security and Science of the Foreign Affairs Committee, which I chair; the Subcommittee on Military Installations and Facilities of the Armed Services Committee, chaired by my distinguished colleague, Mr. Ron Dellums and the Subcommittee on Energy and Environment of the Interior and Insular Affairs Committee, chaired by my distinguished colleague Mo Udall, who is also a member of the Arms Control Subcommittee.

We will have two panels of witnesses. The first panel will be administration witnesses, representing the Departments of State, Defense, Interior, U.S. Arms Control and Disarmament Agency, and Environmental Protection Agency.

The second panel will be private witnesses, representing experts in public health and safety, defense and arms control issues.

Biological warfare testing poses special and complex public safety and arms control problems. Many aspects of biological warfare testing seem to defy the usual assumptions about weaponry. Biological agents do not seem to need the normal forms of weaponry to deliver their lethal effect. The line between offensive and defensive biological agents seems fuzzy, at best.

It is not live ammunition we are talking about, but living ammunition. And research and development seems to create unusual public safety dangers.

The concerns about biological warfare testing are broad, and we hope to address them as comprehensively as possible. This hearing of three major committees offers us an opportunity to get a comprehensive overview and pinpoint the most serious problems which lie in the interrelationships of defense, arms control, public health and environmental safety and just plain common sense.

[Chairman Fascell's prepared statement follows:]

PREPARED STATEMENT OF HON. DANTE B. FASCELL, CHAIRMAN, SUBCOMMITTEE ON ARMS CONTROL, INTERNATIONAL SECURITY AND SCIENCE

The subject of today's hearing is biological warfare testing -- its impact on public health and safety, our defense, and our arms control policy. Three subcommittees of three different House Committees have called the hearing. I chair the Subcommittee on Arms Control, International Security and Science of the Foreign Affairs Committee and I am joined today by the Subcommittee on Military Installations and Facilities of the Armed Services Committee chaired by my colleague Ron Dellums and by the Subcommittee on Energy and Environment of the Interior and Insular Affairs Committee chaired by my colleague Mo Udall who is also a member of the Arms Control Subcommittee. A hearing of three subcommittees is somewhat unusual and I think it illustrates the importance and overlapping concerns of this subject, biological warfare testing and its impact on public health and safety, our defense needs, and our efforts to avoid extending the arms race into biological weapons.

It is my honor to host this hearing in the Foreign Affairs Committee room. We will also hear from the other Chairmen -- Chairman Udall, Chairman Dellums and Chairman Aspin. Unfortunately, the Department of Defense authorization bill is on the floor today so it will be very difficult for members of the Armed Services Committee to participate fully in this morning's hearing and there may be interruptions for votes. I also understand my colleague Rep. Wayne Owens of Utah has opening remarks on today's hearing.

We will have two panels of witnesses. The first panel will be administration witnesses representing the Departments of State, Defense and Interior in addition to the U.S. Arms Control and Disarmament Agency and the Environmental Protection Agency. The second panel will be private witnesses. We will ask each witness to summarize their written testimony in five minutes and we will make their written testimony a part of the hearing record. After the administration panel witnesses have summarized their statements there will be time for questions before turning to the second panel.

There are several substantive areas that we hope to cover in this hearing and serious concerns that must be addressed. We want to know exactly what our policy is on biological warfare -- what is the threat to our national defense in this area from the Soviet Union or other countries and what is and should be our response. We also need to know if this problem can best be solved through arms control -- can the existing treaty be made to work and be respected? Can biological weapons proliferation be stopped? Is the only alternative an arms race? A prime concern for all of us as we approach this subject of whether or not to test biological warfare agents is how in the world we can assure public safety when the risks and dangers of an accident appear to be so great.

Biological warfare testing poses a special and complex arms control problem. Many aspects of biological warfare testing seem to defy the usual assumptions about weaponry

o biological agents don't seem to need the normal forms of weaponry to deliver their lethal effect;

o the line between offensive and defensive biological agents seems fuzzy at best;

o it's not <u>live</u> ammunition we are talking about but <u>living</u> ammunition; and

o research and development seem to create unusual public safety dangers.

The concerns about biological warfare testing are broad and we hope to address them as comprehensively as possible. Obviously, each different Committee will undoubtedly pursue various aspects of the subject in their own way and in their own context. This hearing of three major committees offers us an opportunity to get a comprehensive overview and pinpoint the most serious problems which probably lie in the interrelationships of defense, arms control, public health and environmental safety and just plain common sense.

(OTHER OPENING REMARKS:

CHAIRMAN ASPIN

CHAIRMAN DELLUMS

CHAIRMAN UDALL

REP. WAYNE OWENS)

We will now call on the witnesses in the first panel to give their five-minute summaries. Please introduce yourselves by stating your position.

Thomas J. Welch, Department of Defense

LYNN HANSEN, ACDA

ROGER HARRISON, Department of State

RICHARD SANDERSON, EPA

MICHAEL POLLING, Department of the Interior

Now, I would like to recognize Chairman Ron Dellums for an opening statement.

Mr. DELLUMS. Thank you very much, Mr. Chairman. Let me, at the outset, ask unanimous consent that the statement of the gentleman from Wisconsin, Mr. Aspin, who chairs the Armed Services Committee, be submitted for the record at the appropriate point.

Chairman FASCELL. Without objection, so ordered. His statement will be entered in the record.

[Chairman Aspin's prepared statement follows:]

PREPARED STATEMENT OF HON. LES ASPIN, CHAIRMAN, COMMITTEE ON ARMED SERVICES

In an unprecedented joint hearing this morning between three committees of the Congress, we intend to evaluate the international and environmental implications posed by the administration's plans to construct a facility for biological weapons testing at Dugway Proving Ground in Utah.

Our colleague and friend, Congressman Wayne Owens, has made us all aware of the seriousness of the yet unanswered questions concerning policy and security in this extremely important area of our national defense.

Three substantive areas will be covered this morning: (1) the policy and treaty implications of biological weapons testing; (2) existing and future plans for funding and facilities to carry out such testing; and (3) review of the safety measures to protect the population and the environment from misuse or accident.

I regret that I will be unable to participate fully in these hearings today because of floor action on the Defense Authorization Bill. However, my colleague, Congressman Ron Delums, who chairs the Subcommittee on Military Installations and Facilities, will be here representing the Armed Services Committee as time permits.

Mr. DELLUMS. Mr. Chairman, on behalf of Chairman Aspin and other members of the Armed Services Committee, I would like to indicate how pleased we are to join with you and Chairman Udall and their committees in holding these hearings on biological warfare testing.

This issue is of such importance that all three chairmen have agreed to look at the matter in a comprehensive manner. This approach will allow the members the opportunity to benefit from the same testimony, and to participate in exchanges between the witnesses and members from other committees.

The Armed Services Committee is also vitally interested in the policy and treaty implications of biological warfare testing and the safety measures in place and planned to protect the population and the environment from any possible misuse or accident involving biological warfare testing.

However, the jurisdiction of the Subcommittee on Military Installations and Facilities, the subcommittee that I chair, only covers the existing and future plans for funding any facilities required to carry out any such testing.

I should point out to you, Mr. Chairman, and to the committees, that there is presently no request pending before the Armed Services Committee for any construction associated with this testing program.

However, it is our understanding that the project may be included in the fiscal year 1990 military construction budget as a cost of approximately $5.2 million. So this oversight hearing is both timely and vital to our overall understanding of the issue.

I thank the gentleman very much for his time and I yield back my time.

Chairman FASCELL. I thank the gentleman.

The Chair now recognizes our colleague, Mr. Wayne Owens.

Mr. OWENS. Thank you, Mr. Chairman.

I requested this unprecedented, three-committee hearing because the Army, in moving to construct a high-hazard biological aerosol test facility in Dugway Proving Ground in Utah, has left behind an alarming trail of unanswered questions.

We cannot afford to allow the Army to move recklessly forward with this test facility without better answers to those questions, because the proposed Dugway laboratory would be designed to test the most deadly organisms known to man.

It is imperative that we cautiously examine both the goals and the potential results of the Department of Defense's biological research; imperative that we answer vital questions now, before unforeseen accidents or miscalculations answer those questions for us.

So we all should be greatly indebted to the chairmen of these three standing committees and the subcommittee chairmen for their willingness to hold these important hearings.

The Biological Aerosol Test Facility envisioned at Dugway is a major departure from the Army's past research endeavors. It is a facility where work would be done that is so dangerous that it simply cannot be viewed as another part of a larger, harmless renovation project at Dugway Proving Ground.

Like the Army's other high-hazard laboratory at Fort Detrick, Dugway would have the capability to test at bio-safety level four. That is unlike the Army's other high-hazard laboratory at Fort Detrick. This is a category reserved for the most lethal of pathogens for which no known cure exists.

However, unlike any other American laboratory, the Dugway facility would have the capability to convert these lethal pathogens into aerosol form. And it is this dangerous aerosol capability, Mr. Chairman, that is setting off alarm bells throughout the scientific community, both internationally and in Utah, as to the public safety and the wisdom of building the Dugway facility.

Defense-related biological research did not, of course, originate with the proposal to build a new facility at Dugway Proving Ground.

In fact the very real threat of a biological arms race brought about the 1972 Biological Weapons Convention banning biological weapons, a treaty to which both the United States and the Soviet Union are signatories.

However, while the treaty prohibits the production and stockpiling of biological weapons, it also allows defense research, and such research has followed, so far as we know, for legitimate purposes, sometimes with positive medical results and sometimes, credible people argue, with no result at all.

But there appears to be serious treaty implications involved in constructing the Dugway facility, implications that did not surround research projects of the past.

According to a number of experts, the line between defensive and offensive research would be so hopelessly blurred by the construction of a level four aerosol facility that the Dugway lab may be perceived by other nations as a provocative violation of the 1972 Bio-Weapons Treaty.

Given the advances in biotechnology over the past decade, which are potentially very dangerous, it seems appropriate to ask ourselves why not work toward building a stronger treaty, rather than risk the world's judgment that we are breaching the line between defensive and offensive biological testing.

In responding to questions about both the safety and treaty implications of building the Dugway laboratory, the Army has consolingly suggested that only testing of the bio-safety level three variety is currently planned at Dugway—that is, testing with less dangerous pathogens.

Yet that raises more questions than it answers. Why, for example, is the Army building a provocative, high hazard facility to do low hazard, level three testing? The Army's not so consoling answer is that, and I am quoting, quote: "Constructing the new facility at a lesser containment level, and upgrading it at a later date to a BL4 level, would result in a significant delay in the implementation of the testing program." End quote.

What, I wonder, does that mean?

Mr. Chairman, such statements clearly demonstrate the Army's belief that upgrading to level four testing is a real possibility in the future. Why, then, has the Army spent two years conducting an environmental impact statement for the Dugway laboratory that deals exclusively with less dangerous, level three testing?

Until the Army rules out high-hazard testing, it should base its environmental impact statement on the assumption that the most dangerous of testing will be conducted.

So I say to the Army, either construct a lower-hazard facility or start the environmental impact statement all over.

Before construction at any level, however, the Army must product a credible environmental impact statement. About this one, the informed experts say, almost with one voice, it is careless and it is irresponsible.

We want an environmental statement that does not explain away the possibility of an accident by saying it is "not reasonably foreseeable." We want it to examine the procedures in the event that an accident does occur.

In 1969, Mr. Chairman, six thousand sheep were killed from an accidental release of nerve gas at Dugway. And those were innocent sheet, not test sheep, not laboratory animals. Six thousand Utahans, in the same place, at the same time, would have suffered the same fate.

Utah residents, or the residents of any other state, cannot reasonably tolerate a biological test facility as dangerous as that proposed at Dugway unless every precaution has been taken and each problem solved before construction begins.

Such cautious planning in this instance is apparently being abandoned under the dubious cover of national security.

I do not summarily dismiss the Army's concerns about threats to national security. I share them. But in pursuit of legitimate American goals, America's Army must not use illegitimate means and unsafe procedures. And that is what they are planning to do at Dugway.

Thank you.

Chairman FASCELL. I thank my colleague for detailing the concerns which concern all of us in this hearing. And I yield now to Mr. Leach, who is a member of the Arms Control Subcommittee.

Mr. LEACH. Thank you, Mr. Chairman. I wanted to raise several perspectives.

A decade and a half ago I was a young foreign service officer assigned to two delegation meetings that led to the negotiation of the Biological and Toxin Weapons Convention. As one of the youngest member of our delegation, I felt to some extent that I was more observer than participant.

But I would like to stress the background of this particular treaty, because I think it is relevant to some of the concerns that Mr. Owens has raised.

To begin with, in arms control, the entire world is concerned about nuclear weapons, but sometimes we forget about the fact that they may be the second most dangerous weapons devised by science, with the most dangerous weapons being those of a biological nature. A biological nature, just in the essence, is a living organism that can multiply.

In 1969, President Nixon, after a careful national security study, reached the conclusion that in the most sophisticated, advanced scientific country in the world, it was too dangerous to experiment with the development of biological weapons, because there was too great a prospect of an accident.

And it just happens that an accident of this nature is less likely to be contained than a nuclear accident. A nuclear accident has a given parameter of destructive capacity. A biological agent, which may imply a plague for which there is no known antidote, can live and multiply and expand across vast reaches of territory, if not the entirety of the globe.

Therefore, a decision was made by the United States of America, in an unprecedented arms control direction, to make a unilateral decision to cease testing in a serious way of biological weapons.

Based on that, we decided to go forth, having made a unilateral decision, towards an international treaty. Although the international treaty is unprecedented in one respect, and it is not a very good model for other kinds of arms control, because it lacks any and all verification capabilities.

That is an enormous weakness. On the other hand, it was the assumption of the United States negotiators in the Nixon Administration that having made a unilateral decision, it was better to have a treaty restricting other countries at least in theory, although there would be no verification.

Now, I would simply like to stress, as we look at this issue, that there was some basis of legitimacy to that philosophical position, and to some extent the Biological and Toxin Convention has worked. That is, most other countries have accepted the imprimatur of the United States' conclusions that these agents are too dangerous to deal with.

On the other hand, the convention covers a second agent, called a toxin, which is a biologically derived agent, but one in which there is a dormant aspect. That is, it cannot multiply. So a toxin, while biologically derived, is closer to a chemical weapon.

In this regard, as we look at the history of arms control and the history of strategic actions in the world, we all have to recognize the convention was breached. It was breached in Laos, it was breached in Camp Buchean (ph) and in all probability it was breached in Afghanistan, in the latter instance by the Soviets and in the first two instances by Soviet surrogates.

And so as we look at this whole issue that Mr. Owens has raised, I think we have to recognize that we are dealing with a treaty that is of enormous import but also a treaty that has been stretched, if not absolutely and totally breached.

And in that regard, I think all of us ought to be concerned with ways and techniques of strengthening the verification provisions of this treaty.

But let me stress that the other assumption in 1969 that was raised by the Nixon administration as it moved towards this treaty was the assumption that as much as we would like verification, as much as we would like, among other things, the principle of on-site inspection, that it was probably impossible with on-site inspection to be able to know what was happening in any laboratory anywhere in the world.

In fact, these agents have sometimes been described as a spectrum of poor men's weapons of mass destruction. They are not only cheap, but also are very easy to disguise.

And so unlike a lot of areas of nuclear weaponry, the prospects of verification are slim, although in a symbolic way they ought to be pursued.

Finally, as everyone on the Defense and Foreign Affairs Committees understands, there in all probability was an accident in the Soviet Union in 1979 in Sverdlorsk where an outbreak of anthrax occurred. We think anywhere from 500 to 1,500 people—not sheep, people—killed.

And so, as we look at our own circumstance, we do not know if this was a stockpile accidental explosion, if it might have been related to the destruction of some agents, or in what exact circumstance it actually occurred. But we have to realize that we have had one accident in this country where some 6,000 sheep were killed. We have had an accident in the Soviet Union were 500 to 1,500 people were killed. That underscores the danger of the issue, although we do believe again, in the Soviet example, that the accident probably was a toxin.

Again, a toxin is a dormant agent that could not multiply. What we are contemplating as a society here is going forth with the development of agents that can multiply. And that incredible distinction has to be borne in mind as a Congress and as a military society.

And so all I would say is that this is an area of intense interest, and one in which the discussions of 1969—and a very high level scientific panel had been brought together to advise President Nixon—should apply as well today as it did then, in fact, probably to an even greater extent based upon the furtherance of biological research.

Thank you very much.

Chairman FASCELL. I thank my colleague for that very important historical perspective.

Now, let us turn to our Administration experts. And the first witness is the Honorable Thomas J. Welch, Deputy Assistant to the Secretary of Defense, Department of Defense. Mr. Secretary.

STATEMENT OF THOMAS J. WELCH, DEPUTY ASSISTANT TO THE SECRETARY OF DEFENSE (ATOMIC ENERGY) (CHEMICAL MATTERS), DEPARTMENT OF DEFENSE

Mr. WELCH. Thank you, Mr. Chairman.

It is a pleasure to represent the Department this morning. With your permission, I would like to submit my prepared statement for the record.

Chairman FASCELL. Without objection, all the statements will be included in the record, and hopefully you can highlight it and summarize it.

Mr. WELCH. I would like very much to do that.

As you mentioned earlier, Mr. Chairman, I am the first of a number of administration witnesses this morning. I will, in my short statement, talk about our policy regarding defense against biological agents, toxin agents.

We were invited this morning to discuss what unfortunately has been termed the U.S. biological warfare program, or, in some cases, the testing of U.S. biological weapons.

The United States has no such program or has no such weapons, and to suggest that it does is a suggested violation of the Biological Weapons Convention and of U.S. national policy.

On the other hand, the United States, along with NATO, many other allied nations, has conducted a defensive program against these weapons. This was permitted under the 1972 treaty and indeed it was with this understanding, to defend against threatened biological and toxin agents, that the Congress agreed to the Biological Weapons Convention.

We think, Mr. Chairman, that the distinction between warfare and defense is very important. Definitions, especially in treaties, as we read daily, are very important. And I would ask the Chairman's assistance throughout this hearing in maintaining this distinction between defense and warfare.

Certainly if we are going to make this a helpful hearing, a dispassionate hearing, we have to be very careful of what we mean by what we say.

We hope that all of you will agree with the Commanders in Chiefs, the men and women of the armed forces, that the starting point for all of the things we are discussing this morning is defense against biological agents.

This start point, this very real threat of biological weapons in the hands of unfriendly nations, is indeed real. As this chart will illustrate, since the United States signed the Biological Weapons Convention, and destroyed all of its biological weapons, the number of nations possessing both chemical and biological weapons has increased.

Some of these nations are unfriendly. Some are located in the Middle East. Some are signatories of the Biological Weapons Convention.

I respectfully but very strongly recommend that each of you receive, either collectively or one on one, the Director of Central Intelligence, or DIA briefing on the biological threat. It is real. It has increased, from the time that we stopped producing chemical weapons, and indeed destroyed all of our biological weapons.

I would point out that biological defense efforts provide additional support for the prohibitions contained in the treaty by seeking to reduce the advantages a would-be violator might enjoy.

As was pointed out, the Biological Weapons Convention has no verification mechanism. This is another reason why we should, it seems to me, maintain a strong defense.

Finally, having renounced the use, the possession, the development of biological warfare, I hope you will agree with me that we all have the responsibility to the soldier to protect him and her against those who would use biological weapons.

I hope you will agree with me that we need to do the vaccine work, the mask, protective mask work, the detectors and so on, needed to prevent the soldier from the terrible suffering that would come with these weapons.

This means that we have to test this equipment to make sure that it works, test them in secure chambers to find out if these masks really protect, if the detectors really detect, and so on.

We have, of course, renounced the sword in this area. It seems to me the least we can do is maintain a strong shield. We owe that to those who represent us in the field.

I will be pleased, Mr. Chairman, to respond to any questions you may have now, or you may wish to go on to Department of State.

[Dr. Welch's prepared statement follows:]

PREPARED STATEMENT OF DR. THOMAS J. WELCH, DEPUTY ASSISTANT TO THE SECRETARY OF DEFENSE (ATOMIC ENERGY) (CHEMICAL MATTERS)

Mr. Chairmen:

I am pleased to represent the Department of Defense at this hearing. The Department has been invited today to discuss what has been unfortunately termed the US Biological Warfare Program. The US has no such program; to suggest that it does is to suggest violation of the Biological Weapons Convention and of US national policy. The US, along with NATO and other Allied nations, must defend against weapons resulting from the biological warfare programs of others. The US and many of our Allies conduct this defensive work today. Indeed, it was with this understanding of the need to defend against threat biological agents that the Congress agreed to support the Biological Weapons Convention. Since that time, the Congress has supported defense against threat biological warfare and we believe you will do so in the future.

We hold, Mr. Chairmen, the distinction between "warfare" and "defense" to be non-trivial. We ask your help in maintaining this distinction throughout the hearing and at later times.

We hope you will agree with the Commanders-in-Chief and the men and women they represent on the starting point for defense against biological agents. This start point is the very real threat of biological weapons in the hands of unfriendly nations. Since the US d··troyed all of its

biological munitions and signed the Biological Weapons Convention, the number of known and suspected nations possessing biological weapons has increased. Additionally, the nature of threat bio-chemical agents has undergone revolutionary changes since the signing of the Biological Weapons Convention. These changes have resulted in threat agents with effects that the developer can predict, control, and understand. Thus, verification of the Biological Weapons Convention is far more important today than was believed to be a decade and a half ago when the Congress considered the Biological Weapons Convention.

Biological defense efforts provide additional support for the prohibitions contained in the treaty by seeking to reduce the advantages a would-be violator would enjoy. Treaties (such as the Biological Warfare Convention) with no verification mechanism and marginal compliance provisions mandate a defense effort since only nations that are known to honor treaties (e.g., the US) can be expected to comply with the provisions.

Having renounced the use, possession and development of biological warfare, we certainly have the responsibility to the soldier to protect him and her against those who would use biological weapons. We hope you will agree with us that we must provide the masks, detectors, vaccines, and so on, needed to prevent the soldier from the terrible suffering that would come from these threat weapons.

Chairman FASCELL. Thank you very much. Our next witness is the Honorable Roger Harrison, Deputy Assistant Secretary, Department of State.

STATEMENT OF ROGER G. HARRISON, DEPUTY ASSISTANT SECRETARY, BUREAU OF POLITICO-MILITARY AFFAIRS, DEPARTMENT OF STATE

Mr. HARRISON. Thank you, Mr. Chairman. The immediate basis of our policy on biological weapons is Article 1 of the 1972 Biological and Toxin Weapons Convention, which obliges each party never in any circumstances to develop, produce, stockpile or otherwise acquire or retain microbial or other biological agents or toxins, whatever their origin, or method of production, of types in quantities that have no justification for prophylactic, protective or other peaceful purposes, or weapons equipment or means of delivery designed to use such agents or toxins for hostile purposes or in armed conflict.

We have always been in full compliance with our international treaty obligations including the 1972 convention. Indeed, the United States unconditionally renounces the use of lethal biological and toxin weapons and all other methods of biological warfare.

Our policy, however, is also founded on recognition of the national security need for a strong biological defense program as specifically permitted under the Article 1 provision for prophylactic, protective or other peaceful purposes.

As President Reagan reported to the Congress last December, our judgment is that the Soviet Union has maintained an offensive biological warfare program and capability in violation of its legal obligations under the 1972 Biological and Toxin Weapons Convention. Accordingly, our biological defense research program is aimed solely at measures to protect our armed forces and those of our allies against such a threat.

[Mr. Harrison's prepared statement follows:]

PREPARED STATEMENT OF ROGER G. HARRISON, DEPUTY ASSISTANT SECRETARY OF STATE, BUREAU OF POLITICO-MILITARY AFFAIRS

MR. CHAIRMAN: I appreciate this opportunity to testify, along with representatives from the Departments of Defense and the Interior, the Arms Control and Disarmament Agency, and the Environmental Protection Agency, on the subject of our biological defense research program.

By way of introduction, I would like briefly to review U.S. policy with respect to biological weapons.

Our policy with respect to biological weapons is founded primarily on two international agreements—the 1925 Geneva Protocol and the 1972 Biological and Toxin Weapons Convention—and on decisions announced by President Nixon on November 25, 1969, supplemented by Congressionally-enacted legislation, primarily associated with Defense Authorization and Appropriation Acts. This policy—pertaining equally to biological and toxin weapons, but not to chemical weapons—is clear: The United States unconditionally renounces the use of lethal biological and toxin weapons and all other methods of biological warfare; and the United States does not and will not possess biological weapons.

Article I of the 1972 Biological and Toxin Weapons Convention obliges each State Party never in any circumstances to develop, produce, stockpile or otherwise acquire or retain: Microbial or other biological agents, or toxins whatever their origin or method of production, of types and in quantities that have no justification for prophylactic, protective, or other peaceful purposes; or weapons, equipment, or means

of delivery designed to use such agents or toxins for hostile purposes or in armed conflict.

We have always been in full compliance with our international treaty obligations, including the 1972 Convention.

Our policy is also founded on recognition of the national security need for a strong biological defense program, as specifically permitted under the Article I provision for "prophylactic, protective, or other peaceful purposes."

As President Reagan reported to the Congress last December, our judgment is that the Soviet Union has maintained an offensive biological warfare program and capability in violation of its legal obligations under the 1972 Biological and Toxin Weapons Convention. Accordingly, our biological defense research program is aimed solely at measures to protect our armed forces and those of our allies against such a threat.

Chairman FASCELL. Our next witness is the Honorable Lynn Hansen, Assistant Director for Multilateral Affairs, U.S. Arms Control and Disarmament Agency. Mr. Hansen.

STATEMENT OF HON. LYNN M. HANSEN, ASSISTANT DIRECTOR (MULTILATERAL NEGOTIATIONS) U.S. ARMS CONTROL AND DISARMAMENT AGENCY

Mr. HANSEN. Thank you, Mr. Chairman. I shall not read my statement, but summarize to some extent.

Let me begin by saying, from the arms control point of view, the United States Government is in full compliance with the 1972 Biological and Toxin Weapons Convention. That convention stipulates that all research must be aimed at determining strictly defined measures of defense.

This basic policy goes back to the decision of President Nixon in 1969, already referred to by Mr. Leach. May I add that the question of use of biological weapons was also already covered in the 1925 Geneva Protocol.

In 1969, however, the question of banning biological weapons was separated out from that of banning chemical weapons, largely, I think, as a result of President Nixon's decision, which resulted then in the 1972 Biological and Toxin Weapons Convention.

We have had, now, two review conferences that have reviewed the implementation and compliance with that particular convention—one in 1980 and one in 1986. In both cases, we confirmed that the United States is in compliance with the basic convention.

As regards Soviet compliance, the words used in that review conference in 1986 were that Soviet compliance with its legal obligation was subject to grave doubt.

And, as has already been mentioned, this convention does not contain a single measure relating to verification. It is interesting to note that Mr. Shevchenko, in his book, "Breaking with Moscow," addresses this subject and makes three points which I think are relevant. First, the Soviet military was opposed to the negotiation of the convention. Secondly, in response to that opposition, Mr. Gromyko promised them a toothless convention. And thirdly, after this happened, Defense Minister Grechko instructed the military not to abandon its programs.

In our own time, Mr. Valentin Falin, a well known Soviet spokesman who has been Ambassador to West Germany and is now Chairman of the press agency, Novosti, recently said: "We will not copy you any longer in producing planes and missiles. . . . We'll take asymmetric measures proceeding from the new scientific data

we have. . . . Even now genetic engineering enables people to develop that for which they aren't always capable of making an antidote."

Mr. Chairman, the United States Government, in trying to deal with this aspect of the convention, that is, that there are no verification provisions, has tried to further a fundamental U.S. concept, that concept being openness, and in the 1986 review meeting, agreed with other states that there should be greater exchanges of information relating to each state's activities in this area.

It was agreed that there would be an exchange of data including the name, the location, the scope and general description of activities on research centers and laboratories that meet very high safety standards.

It was agreed that there would be an exchange of information on unusual outbreaks of infectious diseases. It was agreed that we would encourage the publication of results of biological research and that we would promote contact between scientists.

The United States has, on two occasions, in October of 1987 and again this Spring, provided such information to the United Nations.

As has been noted, the Soviet Union has not been in compliance with this convention. One needs only to mention the myco-toxins in Laos/Cambodia, which of course were used by surrogate forces, or surrogates, and then Afghanistan, and the fact that we have not yet received any satisfactory explanation of the outbreak of anthrax, which by the way was caused by live anthrax spores, in 1979.

And as has already been noted, there are indeed threats emanating from other parts of the world, specifically the Middle East.

Yet, in our society, a free society such as we have, compliance is almost automatic. There are moral constraints. There are ethical constraints. There are legal constraints. There are the concerns of an active citizenry.

Yet, I think it was recognized already in 1969, that it is government's obligation to provide for the defense and that an active defense, testing and research program is an obligation of government to do so.

Mr. Chairman, I think this basic idea goes right back to the initiation of U.S. policy in the 1969 framework, where it was recognized that maintaining a strong program to provide for defense against biological and toxin weapons is essential to our national security and to protecting the lives of U.S. servicemen.

Thank you.

[Mr. Hansen's prepared statement follows:]

PREPARED STATEMENT OF HON. LYNN M. HANSEN

Mr. Chairman:

I am here today to testify on the arms control aspects of the U.S. research program dealing with defense against the possible use of biological and toxin agents in military action against our forces. At the outset, I want to make it clear that the defensive research program being conducted is in full compliance with the 1972 Biological Weapons Convention.

You may recall that in November 1969 President Nixon unconditionally renounced all aspects of biological warfare and ordered the Department of Defense to draw up a plan for the disposal of existing stocks of biological agents and weapons. In February 1970, this unilateral United States ban on biological agents was extended to cover toxins. All research in the area of biological warfare was to be confined to determining strictly defined measures of defense. This enunciation of policy helped define U.S. arms control policy in this area.

Prior to 1969, biological weapons were assumed to be covered by the same arms control negotiations as chemical weapons. In that year, biological weapons were first addressed separately

as a subject for negotiation. For two years, 1970 and 1971, the Eighteen-Nation Disarmament Committee in Geneva negotiated on a draft agreement submitted by the United Kingdom. The resulting Biological and Toxin Weapons Convention was opened for signature on April 10, 1972. It was approved by the U.S. Senate on December 16, 1974 and entered into force on March 26, 1975.

In contrast to the arms reduction agreements this Administration has negotiated and is in the process of negotiating, the 1972 Biological and Toxin Weapons Convention contains no provisions for verification.

All U.S. stocks of biological and toxin agents, weapons, equipment or means of delivery prohibited by the Convention were destroyed before the nine months after entry into force deadline specified in Article II. Those facilities in the United States which had been built and used for biological or toxin weapons purposes were converted to other use. For example, those military facilities at Fort Detrick, Maryland and Pine Bluff Arsenal, Arkansas which previously housed activities prohibited by the Convention are now the property of the U.S. Department of Health and Human Services and are used by the National Cancer Institute and the National Center for Toxicological Research.

Two review conferences for the Biological and Toxin Weapons Convention have been held, in 1980 and 1986. At both conferences, the United States confirmed that it is in full compliance with the Convention. At the second Review Conference, the United States expressed its concern that the Soviet Union, Laos and Vietnam had violated the Convention. Several other States Party to the Convention also expressed concern about compliance. These concerns are reflected in the Final Declaration of the Second Review Conference, which notes statements that compliance with Articles I, II, and III of the Convention was "subject to grave doubt" and that efforts to resolve the concerns expressed had not been successful.

We have joined with other States Party in agreeing that more information should be made available concerning legitimate biological research actitivies. By creating greater openness in these areas, it is hoped that the norm against biological weapons created by the Convention can be strengthened. The United States joined with others at the Second Review Conference in calling for an annual exchange of information on each Party's research activities using the United States' policies on program openness as the standard for parties to follow. In October 1987 we submitted our first report with the second following in April 1988. These reports to the United

Nations provide information on permitted biological research conducted at maximum containment research centers and laboratories as well as at biological defense related facilities.

We identified a total of six laboratories while the Soviets listed sixteen such facilities. It should be clear that the Soviet Union has an active research program in the sciences which relate to our subject today.

The reports we have exchanged also contain information on unusual outbreaks of infectious diseases, a list of journals in which research results are published and announcement of open conferences, symposia and seminars.

In contrast to the openness we have practiced regarding our military programs, the Soviets, to date, have never officially acknowledged even having a biological weapons program.

The conclusion drawn by the experts from all Parties except the Soviet Union at the Second Review Conference, and reported by President Reagan in his 1987 report to the Congress on Soviet Noncompliance With Arms Control Agreements is that the Soviet Union has continued to maintain an offensive biological warfare

program and accompanying capability, and that the Soviet Union has been involved in the production, transfer and use of mycotoxins for hostile purposes in Laos, Cambodia and Afghanistan in violation of the 1972 Biological Weapons Convention. We have yet to receive a satisfactory official explanation of the unprecedented outbreak of anthrax at Sverdlovsk in the Soviet Union in 1979.

The Presidential decision of 1969, to which I referred at the beginning of my testimony, recognized that maintaining a strong program to provide for defense against biological weapons is essential for national security. That requirement is reflected in Article I of the Convention which permits production of biological agents and toxins in quantities required to develop protective measures. In today's circumstances, with the extremely rapid advances in biotechnology in the civilian sector which could be used for military purposes, the requirement to ensure, strengthen and preserve defensive measures is greater than it was in 1969.

Given the potential for misuse of scientific advances and the knowledge that the Soviet Union has violated the obligations it incurred under the 1972 Convention, an active research program in full compliance with the 1972 Convention is essential to

safeguard American servicemen against the threat of biological or toxin agents use by the Soviet Union or any other belligerent. As advances are made in the field of biotechnology, the potential for using this technology to create increasingly egregious biological and toxin weapons increases commensurately. At a time when distinguishing between legitimate research for peaceful purposes and illegitimate research has become increasingly difficult, not only has the time from basic research to mass production of lethal weapons decreased, but the ability to create agents and toxins with more optimal weapons potential has increased. To state this more simply: the potential for rapid, undetected breakout from treaty constraints has increased signficantly.

The 1972 Convention on Biological and Toxin Weapons has no verification provisions, as I noted earlier. Yet, in a free and open society such as ours, compliance is almost automatic. We are bound by moral, ethical, and legal constraints which ensure that the United States complies with the obligations it undertakes. An active defense research program is fully consistent with those obligations and fulfills another obligation placed upon the government: to provide for the common defense.

Chairman FASCELL. Thank you very much. Our next witness is the Honorable Richard E. Sanderson, Director, Office of Federal Activities, Environmental Protection Agency. Mr. Sanderson.

STATEMENT OF HON. RICHARD E. SANDERSON, DIRECTOR, OFFICE OF FEDERAL ACTIVITIES, ENVIRONMENTAL PROTECTION AGENCY

Mr. SANDERSON. Mr. Chairman, I, too, shall summarize my comments and submit my statement for the record. My comments today will be limited to discussing the environmental impact statement that the Department of the Army prepared for the Dugway Test Facility.

In EPA we have the responsibility to review and comment in writing on the environmental impact of a ny matter relating to major federal actions within the federal government. Activities under the review program include, as I said earlier, the review in draft and final environmental impact statements. A project of a regional or a site-specific nature is reviewed by the EPA regional office in which the project is located.

The Army filed the draft and final environmental impact statement for the proposed biological aerosol test facility at Dugway Proving Grounds in Utah February 4, 1988, was reviewed by our Denver regional office, with some assistance from my staff and from our office of toxic substances and pesticides. EPA's comments on the draft EIS were signed by the regional administrator on March 28, 1988 and have been transmitted to the Army.

With respect to the specific project at Dugway, EPA has direct regulatory responsibility for any use of disinfectants or sterilants under the Federal Insecticide, Fungicide and Rodenticide Act. We have responsibility for wastewater discharges during the construction regulated under the Clean Water Act. We have responsibility for the disposal of hazardous waste under the Resource Conservation and Recovery Act, and we have responsibility for the issuance of air quality approval orders.

With these specific authorities in mind, I would like to summarize the relevant concerns that EPA identified in our review of the draft environmental impact statement.

First we suggested that the final environmental impact statement due out by Army later this year, would include further discussion of nonhazardous simulants as a way to reduce risk. While this is not a sole or viable option, according to the draft environmental impact statement, EPA believes this use might be able to reduce the number of tests using disease organisms and still accomplish the agency's mission.

Second, the draft environmental impact statement stated that the facility would be constructed, as had been discussed earlier, to meet the Center for Disease Control, National Institutes of Health, by a safety level of four, but that the Army is only proposing to use organism to biosafety level three at the facility.

The EPA agrees with the added level of protection, however, the army is also proposing this added level of protection as a cost savings for future need of BL-4 contaminant capability in the facility.

Although the Army is committed to preparing additional environmental documents if the facility were to be used in the future for BL-4 experiments, EPA suggested in our letter back to them that further information be included to cover possible future uses.

Finally, we also requested additional information in the final impact statement relating to the facility's public information program and security procedures applicable to the base. We anticipate that the Army will have no difficulty in providing this information.

But we do have and did express these concerns over the analysis of the draft environmental impact statement, and did request this additional information. We believe this facility can be adequate from an environmental perspective.

This summarizes my statement, Mr. Chairman. I'll be pleased to answer any additional questions.

[Mr. Sanderson's prepared statement follows:]

PREPARED STATEMENT OF RICHARD E. SANDERSON

Mr. Chairman, my name is Richard E. Sanderson and I am Director of the Office of Federal Activities in the Headquarters of the Environmental Protection Agency (EPA). I am the national program manager carrying out EPA's responsibility to review activities of other agencies as they affect the environment. The EPA environmental review program is carried out under the authorities of the National Environmental Policy Act (NEPA), the Council on Environmental Quality's NEPA implementing regulations, and Section 309 of the Clear Air Act. Under these authorities, we have the responsibility to review and comment in writing on the environmental impact of any matter relating to the duties and responsibilities of the Administrator, contained in any legislation proposed by a Federal department or agency, proposed major Federal action or actions, and proposed regulations published by any department or agency of the Federal Government.

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Activities under the review program include the review of draft and final Environmental Impact Statements (EIS), proposed environmental regulations, and other major Federal agency proposals. In general, regulations and national-level projects are reviewed and commented on by my office. Projects of a regional or site-specific nature are reviewed by the EPA regional office in which the project is located.

The Army filed the Draft EIS for the proposed Biological Aerosol Test Facility at Dugway Proving Ground in Utah on February 4, 1988. It was reviewed by EPA's Denver Regional Office, with some assistance from my staff and from EPA's Office of Pesticides and Toxic Substances. EPA's comments on the draft EIS were signed by the Regional Administrator James J. Scherer on March 28, 1988, and have been transmitted to the Army.

With respect to the specific project at Dugway, EPA has direct regulatory responsibility for:

1) Any use of disinfectants or sterilants under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA). Such materials must be registered pursuant to FIFRA;
2) Wastewater discharges for construction regulated under the Clean Water Act. The applicable permit would be issued by the Utah State Bureau of Water Pollution Control, with oversight from EPA's Denver Regional Office;

3) Disposal of hazardous waste governed by the Resource Conservation and Recovery Act. Again permits would be issued by Utah with EPA oversight. EPA has published guidelines describing prudent practices for the handling and disposal of infectious waste. We will be happy to provide you with a copy of our most recent guidance document; and
4) Issuance of an Air Quality Approval Order. This would be issued by Utah with EPA oversight.

EPA's policy on biotechnology under FIFRA and the Toxic Substances Control Act (TSCA) published in the June 1986 Federal Register is applicable to some biological engineering work. However, the Army has stated (Page II-32 of the draft EIS) that no work would be done at the facility on genetically engineered organisms. Accordingly, the EPA policy would not apply at this time.

With these specific authorities in mind, I would like to summarize the relevant concerns EPA identified in our review of the draft EIS. First, we suggested that the final EIS include further discussion of non-hazardous simulants as a way to reduce risk. While this is not a sole, viable option, according to the draft EIS, EPA believes this use might be able to reduce the number of tests using disease organisms and still accomplish the Army's mission.

Second, the draft EIS stated that the facility would be constructed to meet the CDC/NIH Biosafety Level 4, but that the Army is only proposing to use organisms to Biosafety Level 3 at the facility. EPA agrees with the added level of protection; however, the Army is also proposing this added level of protection as a cost savings for any future need of BL 4 containment capability in the facility. Although the Army is committed to preparing additional environmental documents, if the facility were to be used in the future for BL 4 experiments, EPA suggested that further information be included in the current EIS to cover possible future uses.

Finally, we also requested additional information in the final EIS relating to the facility's public information program and the security procedures applicable to the base. We expect the Army will have no difficulty providing this information.

While we do have some concerns over the analysis in the draft EIS and have requested additional information, we believe this facility can be adequate from an environmental perspective.

This concludes my statement. I will be happy to address any questions that you may have.

Chairman FASCELL. Thank you very much, Mr. Sanderson.

And now, the Honorable Michael Poling, Deputy Assistant Secretary for Land and Minerals Management, Department of the Interior.

Mr. POLING. Thank you very much, Mr. Chairman.

STATEMENT OF MICHAEL A. POLING, DEPUTY ASSISTANT SECRETARY FOR LAND AND MINERALS MANAGEMENT, DEPARTMENT OF THE INTERIOR

Mr. POLING. I appreciate the opportunity to be here to testify at this morning's hearing. The Department of Interior's Bureau of Land Management has stewardship responsibilities for management of the public lands surrounding the Dugway Proving Ground. As a neighbor of Dugway, we've enjoyed a good working relationship with them in the past. We hope this relationship will continue in the future. You have my statement for the record, and if you have any questions, I'd be pleased to respond.

[Mr. Poling's prepared statement follows:]

STATEMENT OF MICHAEL A. POLING

I appreciate the opportunity to appear here today on behalf of the Department of the Interior.

Dugway Proving Ground in Utah is surrounded by public lands administered by the Bureau of Land Management under the principles of multiple use. To name just a few of the varied uses: there are permittees who are authorized to graze cattle on the lands; there is considerable recreational use of the lands; and there are wildlife values. The lands are desert in character and in some areas mountainous, and they are largely uninhabited.

The relationship between the Bureau of Land Management and Dugway has been a good one, and we hope that it will continue this way in the future. As with any neighbor, we are concerned that the activities at Dugway not adversely affect the many activities on the public lands. In its management of the public lands the Bureau is alert to that potential.

Chairman FASCELL. Thank you very much. And we will start with questioning now. Mr. Ron Dellums?

SWORD AND SHIELD—DISTINCTION BETWEEN OFFENSE AND DEFENSE

Mr. DELLUMS. Thank you very much. Dr. Welch, I'd like to begin where you ended and correct me if I'm inappropriately paraphrasing you: you said, "now that we've renounced the sword, don't preclude us from the development of the shield?"

I think that's a fascinating place for us to start. A number of my colleagues in their opening remarks spoke about blurring the distinction between defensive and offensive biological research. To use your analogy of the sword and the shield, if you begin with the development of the shield, and then test a number of swords against the shield, then are you suggesting that that's defensive research? Or if you start with the sword, and develop a number of shields, is that offensive?

The question that I would ask is first of all, would you please explain the difference between defensive and offensive biological research. Because it seems to me whether you start with the sword or the shield you end up at the exact same place, because if you're going to test the efficacy of the shield, then you have to proceed

with the development of the most handiest sword that you can find in order to test whether or not the shield makes sense.

So aren't we really talking here about a technical distinction that really takes us—it may begin at different points, but ends up at the very same point, with the development of both offensive and defensive weapon capabilities in order to determine the efficacy of whatever you're building from whatever starting point. Is my point clear?

Mr. WELCH. Yes, I think I understand your question, Mr. Dellums, and I respect what you've said, but I must profoundly disagree. There is a very clear distinction between offense and defense, especially in this area. It goes back to my opening statement where I said that it was important that the Chairman and all of us maintain a distinction between what it is we mean. We do a great deal of work, for example, in vaccines. We don't do it in a haphazard, arbitrary way. We work from a list of known or suspected Soviet and other nations' threat agents. It is directed research.

We do research in areas in the civil sector in cancer and diabetes, and other disease areas fully with the intention of disease prevention, disease control, disease treatment. We have a legitimate right on the military side to look at the impact on the soldier—what can we do to help him and her with respect to threat use of these diseases? So there is a legitimate need, it seems to me, and it seems to me the best answer perhaps for your point, is intentions: the Congress clearly intends to abide by the biological weapons convention.

It clearly intends, it seems to me, to abide by what it said at the time of the ratification of that convention and that is, we'll maintain defenses against these agents, even though we renounce possession ourselves.

If we carry this kind of argument of intent to its logical ending, then we have to ask ourselves whether today we would entertain funding for a young Army bacteriologist interested in defending against Yellow Fever? Would we deny Walter Reed the rights to do research in this area because we were concerned about his intention that he would use this in an offensive manner?

I don't think we would, and I think the same position has to be taken with regard to all of our defensive areas. The biological area, of course, is one that is not always dispassionately discussed; it's one that brings fear to the minds of many, but I would suggest that our intentions here, especially the congressional intent, is very important. It's something we've got to do; it's something we have done successfully in the past; it's something that we must do in the future. And I think we can do it carefully without getting ourselves into what is clearly the prohibited area under the treaty.

Mr. DELLUMS. Let me go to it in another way. Are we on the five-minute rule, Mr. Chairman?

Chairman FASCELL. Go ahead.

LEVEL 3 AND LEVEL 4 BIOLOGICAL AGENT RESEARCH

Mr. DELLUMS. Fine. Then let me ask the question in a little different way since the time constraints are on me and not on you. I'll just propound my questions and then ask you to respond. You've

testified upon this in your opening response to my question. But I'd like you to develop a little more specificity.

To plan a defense against the so-called enemy's biological weapon, don't you have to have a sample of the biological organism that you suspect that they might use? How do you go about obtaining such a sample?

My next question: don't you also have to speculate as to what they might develop? Doesn't this mean you have to try to develop new biological organisms yourself?

And finally, could you explain the difference between level three and level four research as it pertains to Dugway that my distinguished colleague outlined? Are those three questions you——

Mr. WELCH. Well, I'm given the red light. Does that mean I don't have to answer those questions?

Mr. DELLUMS. No, I think you have to answer them. The time constraints are only on me.

Mr. WELCH. Picking up the last question, the level four is a more secure, safer, facility. It requires more precautions, more extensive use of safety controls. I will, as I said in my opening statement, ask the Army subject matter expert on this to come to the table and address that in more detail.

We clearly want to do what is necessary in research and development to protect us in the safest possible manner. That is our requirement first, middle and last. And we're going to do it and we believe the Army has done this successfully in the past.

We believe their level four facility request is a good one. We think it goes beyond the minimal safety requirements and, indeed, is specifying the maximum safety requirements for this kind of work.

You asked second about how do we determine about how do we determine what threat agents we would use in testing? They come, this list, comes from a number of sources, for example, human intelligence people telling us that they're aware of a threat biological agent program and the threat is using these kinds of chemicals; these kinds of biological and toxic agents in that program.

If this is confirmed or if it gets a second endorsement from another source, then that certainly something that we can manufacture. Sometimes it's a known and kind of agent that's available in the United States; we can obtain it against our masks; test it against our detectors and see if we can indeed protect against it.

Of course, then, another source of biological intoxication agents is the field, if they are used against friendly forces or in other wars, not involved in friendly forces, we can sometimes attempt to obtain samples of that agent. If we can't do that, there is a possibility of obtaining the symptoms of the victims of these attacks, and working backwards, try to determine what agent on the known list of agents that might have been.

So there are a number of ways we can come to find out what we should be defending against?

Mr. DELLUMS. One question that I'm not sure you did answer, and that is, in the speculative area where you're speculating as to what they may develop, or utilize, doesn't that not require you to develop new forms of biological organisms yourself?

Mr. WELCH. The Army can answer that specifically, but I'm not aware that our defensive program speculates to the point of manufacturing new biological agents that we would speculate the threat to have. I think all of the, certainly the ones that I'm familiar with, all of the agents that we do test, are based on intelligence data that is not speculative.

Mr. DELLUMS. Thank you very much Mr. Chairman.

Chairman FASCELL. Mr. Leach.

DEFENSE AGAINST TOXINS OR BIOLOGICAL AGENTS

Mr. LEACH. I want to just make a couple of references to a little bit of history and then come back to some specific questions, because we all understand this is really an aberrational agreement, the biological and toxic weapons conventions, because we have an aberrational problem. The problem is aberrational because it's so profound. The agreement is aberrational because it was based on the unilateral decision; it was based on no verification.

It was also based very uniquely on the understanding that biological weapons are one of a spectrum of weapons of mass destruction and, vis-a-vis the Soviet threat, we understood that we had other weapons of mass destruction that were uncurtained by that particular agreement, most importantly nuclear.

And so one of them, the major aspects of the biological and toxic weapons agreement was that it wasn't to be considered to be entirely in a U.S.-Soviet parameter, but in the parameter of all other countries in the world, And here, somewhat interestingly, even though we've seen Soviet breaches of the agreement in the toxin area that are very serious, most students of the treaty would come to the conclusion that, with regard to the spread of the biological agent, it probably has been a fairly successful agreement in presenting a legal imprimatur on not having other countries that have the clear capacity to develop these weapons to develop them.

And to my knowledge, there has been only one instance in the usage in the history of mankind of biological agents in warfare. And that was a Japanese effort in 1937 to drop germ agents by cotton balls in Northern Manchuria.

The other instances that have occurred in terms of breaches of the agreement have been usages of toxins. And this is a terrible breach of the agreement and some thing that we should all take with the most enormous degree of seriousness, I personally think it's the single greatest Soviet arms control violation, at least in modern times.

But having said that, I would like to ask you, is your major concern at this time defenses against toxins or is the major problem defense against biological agents? And what is the Dugway effort all about in that regard?

Mr. WELCH. Our concern starts with an educated appraisal of those states most likely to use biological and toxic weapons against us. As we mentioned in our opening statement, the chart indicating the increase in the number of states possessing biological weapons before 1972 is something like 10 to date.

Mr. LEACH. Let me just make—define: ten with biological agents or ten with biological and toxin? I mean, let's distinguish the two?

Mr. WELCH. Yes, with biological and toxins.

Chairman LEACH. Okay, and how many have biological weapons of war?

Mr. WELCH. I would have to address that in a closed session, and I think the Director of Central Intelligence would be very pleased to do that either individually or collectively. But we are, to answer your question, sir, very much concerned with toxins. We do believe they are probably, at least when compared with the classical biological warfare agents, more controllable. They certainly are extraordinarily lethal; some certainly more lethal than nerve agents on the chemical side.

So we are concerned with that. For that reason we must find out if this mask we give the soldier will protect against them. The awful truth is we do not have the basis to assure the soldier that his mask, his detector, his other protective devices, will work against these agents, until we test them.

Chairman LEACH. Let me just stress, for a second, that frankly the convention not only visualizes but approves of the development of defensive techniques, and that has been noted, and I think we all should be aware of that.

Secondly, my own sense is particularly with regard to toxins, if anything, in terms of defensive techniques, the Defense Department has an obligation to increase, not decrease, the experimentation and its efforts.

In the biological area, there is some understandable concern about what it is we might be contemplating developing and going forth with. I think that, frankly, is my major concern at this particular time.

CHEMICAL WEAPONS NEGOTIATIONS

Finally, let me just ask one other question: Article seven of the biological and toxin weapons convention goes to the issue of chemical weapons and it obligates the parties to go forth on a timely basis with negotiation of a chemical weapons convention.

Can you tell us, do you have any optimism that (a) the Soviets are more sympathetic to looking at this approach at this time; and (b) whether in that new agreement touching on chemical weapons, that we might produce tighter verification provisions applying to toxin weapons constraints as well as chemical weapons constraints?

Mr. WELCH. I would certainly ask my colleagues from ACDA and State to respond. I would say, however, that in the Defense Department, in addition to being very much concerned with the quote by the fellow that was given just a few moments ago about genetic engineering, we're also concerned. In response to your question about another position taken by the Warsaw Pact in which states, "The differences between chemical and biological weapons have become less noticeable, and are expected to disappear altogether in the near future."

That's the kind of blurring of distinctions and narrow interpretations that we do not appreciate and we are concerned about any future arms agreement that does not make these distinctions.

Mr. HARRISON. If I may pick up on that, Congressman, I think that there is some reason to think that the chemical weapons nego-

tiations now are on a better footing than they have been in the past. The Soviets have taken some steps, which are positive, the first one taken in 1986 was to admit that they did in fact possess chemical weapons, something they had denied theretofore, and that gave us a basis for negotiations that would go into action.

They've also said now that in principal they will except challenge inspections—anywhere, any time challenge inspections. They haven't told us yet precisely how they envision that challenge inspection working, so there's still an area of difficulty there.

There are also concerns that we obviously have about effectiveness of verification regime; about proliferation, and the next country problem, assuring that other countries also accede to the treaty. So I think if you compared the situation now with that a year ago, we're on a better footing, but they're obviously obstacles in front of us.

Mr. LEACH. I thank you, Mr. Chairman. I have no further questions. I would like just to conclude with the observation that the material that we've received from Laos and Cambodia, which are toxin derivatives, blood-blister and vomit agents that are of enormously lethal dimensions, but they are still not nearly as dangerous as anything involved in biological, and sometimes in our discussions, we have a tendency to blur biological and toxin when in essence one issue is one issue; and one issue is the other.

It's the biological area of research that I think should be the area that all of us as a society have the greatest vested interest in looking at in the most careful way.

My own view is that we do have responsibilities, particularly in the defensive area, that have been articulated by this panel to be enormously concerned. But that concern ought to be done with the highest conceivable level of safeguards. If anything, you know, when I look at a proposal for $5.4 billion, it doesn't strike me as being very significant in terms of the safeguards that might be applied with that amount of funding, and ironically is one that is doubtful that you should go ahead with the proposal.

I would almost suggest that, if you do go ahead, if you literally feel obligated to do research in the biological area, it might involve a level of funding substantially higher than that in terms of the kinds of safeguards that would be necessary.

And then, I would assert as strongly as I can, that you're probably going to have to be awfully open in some ways to make the world community understand that you're not going forth with offensive kinds of weaponry, because one of the great restraints and usages of other countries developing this sort of weapon, and here I'm as, if not more, concerned about the panoply of countries from the Middle East, from Africa to Asia, than I am the Soviet Union, that we, ourselves, are not in any conceivable way breaching the constraints of this enormously significant treaty, as flawed as the treaty itself may be on verification grounds and other grounds. Thank you.

Chairman FASCELL. Mr. Welch, in response to Chairman Dellums' question, you referred to an Army report that you would submit for the record that responded to the question in further detail, we'd be pleased to have that.

Mr. WELCH. Yes, sir.

Chairman FASCELL. Now the Chair recognizes the Chairman of the Interior Committee and a member of the Arms Control Subcommittee, Chairman Mo Udall.

DEFENSE DEPARTMENT CONTINGENCY PLANS FOR BIOLOGICAL WEAPONS USE

Mr. UDALL. I thank you, Mr. Chairman, and I am kind of new to this field. Let me ask, to get back to basics a minute, maybe already known to my colleagues.

Dr. Welch, does the Defense Department have a serious policy being studied by officers and enlisted personnel, by the civilians and scientists in our technical fields that seriously considers that, at some point we in this great, humane country of ours would take biological and chemical weapons out of their places of storage and use them on Soviets, or residents of other countries? Is there a serious contingency plan that includes our use of biological weapons against an enemy?

Mr. WELCH. Mr. Udall, it would be impossible for us to use biological weapons against anyone, because we don't possess them. We make very certain that no development work is done, and indeed, we don't do research in those areas.

Mr. UDALL. Do we have a policy that we will keep doing research until the Soviets and all other countries have disposed of theirs? Are we trying to catch up with them?

Mr. WELCH. We have a policy that says that we will——

Mr. UDALL. Under certain circumstances, could chemical and biological weapons be used against an enemy? An adversary?

Mr. WELCH. We would never use biological weapons against any enemy. We've renounced their use.

Mr. UDALL. What are we doing out at Dugway, then?

Mr. WELCH. We owe it to the soldier for humanitarian reasons; for reasons of strengthening the biological weapons convention to do everything we can to deny any advantage to the would-be user of these weapons by doing defensive work, so what we're doing at places like Dugway is to develop the detectors, the masks, the decontaminants, all of the defensive items, that would lower the probability of biological war breaking out in the first place.

Mr. UDALL. Have we ever gone back in recent years to ground zero and asked ourselves should we? What are the plusses and minuses about having a supply of these weapons, or the capacity to build them?

Mr. WELCH. We believe that the Geneva Convention, taken together with a strong biological and chemical defense, and with a strong, credible, no-first-use chemical retaliatory capability will buy us the deterrence that's required.

Mr. UDALL. If we get a situation with the Soviets or Eastern Europe or anywhere else, and we exhaust our supply of conventional riflemen's bullets and machine guns, exhaust the supply of conventional bombs we have, some of which level eight or ten story buildings, covering the whole block; as we found out in Lebanon and other places; we've utilized everything else we've got in our armory, then we go to nuclear, and I suppose we could go back to tactical methods and use all of them, would there be anything left

to hit? Does any sane person think that having at that stage in a conflict, that having a capability to puts some AIDS virus or something we can think of more horrible than has already been conceived, we would then in a rational way consider using these weapons?

Mr. WELCH. The answer, of course, is to never get ourselves into that position. That has been the thrust of this Administration for the last seven years. The billions that we have requested are designed for the most part to prevent us from having to face the awful decision of losing a war; or reaching for nuclear weapons. The answer seems to me to maintain our conventional strengths; maintain our defense against the biological and chemical weapons that people would use, and certainly to maintain a no-first-use retaliatory-only chemical response to violators of the Geneva convention.

POLICY ON USE OF BIOLOGICAL AND CHEMICAL WEAPONS

Mr. UDALL. Do chemical and biological come ahead of nuclear, do we use those first?

Mr. WELCH. We have a no-first-use chemical policy; we have a no-use-under-any-circumstances in the biological area.

Mr. UDALL. Have you ever had the view of a board of good civilians or good defense people, people in the Armed Services, and ask ourselves whether the additional deterrent is worth it even if we could make it work?

Chairman FASCELL. Mr. Harrison.

Mr. HARRISON. Mr. Chairman, we in fact have tabled the treaty in Geneva which would result in a comprehensive ban on chemical weapons and we are willing, ourselves, to engage in such a ban if we can negotiate a treaty which has tough enough verification provisions, and if we can be assured that all chemical weapons states are parties to that treaty, and that's the effort in which we are engaged in at the moment, so our policy judgment has been, we are willing to forego chemical weapons, as well as biological weapons, which we decided unilaterally to forego, before the biological weapons convention was signed—if we can in fact create that kind of international compact. And that's the process we're engaged in now.

Mr. UDALL. Well, for my part, and I won't belabor the point—I would rather that we consider maybe another option, not adopt it, but at least talk about it, and that is, to say that if all the conventional weaponry hasn't done the job; the situation in which nuclear won't do the job—that we're not the kind of country that's going to biological. If we're not beaten flat-out at that point, I can't imagine what kind of a weapon, they are considering, maybe some kind of a virus that would give AIDS to little kids, maybe that would do the job, but I think we ought to consider an option, a no-use option that doesn't depend on others following our lead.

Mr. HARRISON. Well, for biological weapons, we do have that option. We would not have, in fact, the capability to use biological weapons because we've done neither research nor have we produced the kinds of weapons systems that we could use in those circumstances. So we've made that decision on biological weapons.

Mr. UDALL. Well, I won't belabor it as I say, but I'm always suspicious about Dugway, since those 300 or 3,000 sheep joined up to our test program. How long ago was that incident?

Mr. HARRISON. 1969.

Mr. UDALL. Thank you. That's enough for me. Chairman Fascell. A ranking member of the Subcommittee on Military Installations, Mr. Martin of New York.

U.S. RENUNCIATION OF BIOLOGICAL AND TOXIN WEAPONS

Mr. MARTIN of New York. Thank you very much, Mr. Chairman.

Mr. Harrison, in listening as best I could to your responses to Chairman Udall, let me make sure I understand. Your testimony stated unequivocally, the United States unconditionally renounces the use of lethal, biological and toxin weapons and all other methods of biological warfare; and moreover, the United States does not and will not possess biological weapons. And moreover, the United States does not and will not test biological weapons. And in response to Chairman Udall, did you leave any room open whatsoever for biological or toxin nature——

Mr. HARRISON. No, I don't think I left that possibility open. What I meant to say to Chairman Udall was that in the scenario that he described, that last ditch scenario, he asked whether we would be tempted under those circumstances to use biologic weapons, and my response was that we would have no biological weapons to use because we possess none.

Mr. MARTIN of New York. Thank you.

Everybody has things, I suppose that scare them more than other things. I suppose everybody, and certainly me, is terrified by the prospect or possibility of the use of nuclear weapons. Having had the experience of having the sergeant march you into a gas chamber where they had CS gas and tell you to take your mask off, that's something that no one who's had that opportunity will ever forget—absolutely terrifying.

And that's the kind of gas we use to disperse riots and that type of thing.

And nerve gases and that type of thing, thank God they didn't allow us the opportunity to experience that. But boy, I can recall from the time I was in the service, what really captured my imagination when it comes to terror are these biological weapons, and that's why it's so important that we stress the fact that we don't have them.

And what we are attempting to do, if I understand it, wherever this testing is going to go on, is just to allow that soldier who is faced with this prospect, of knowing that this agent or this biological weapon has been used against that soldier and to give him whatever little hope you can hold out with a mask and a rubber suit and gloves; that he's going to protect himself. Isn't that what this is all about, as well as vaccinations?

Mr. WELCH. It's all about deterring first use, and anything we can do to cause someone to think twice about using it. For example, a good mask; a good protective suit is all-important for deterrence.

Mr. MARTIN of New York. But under any circumstances there's no possibility or thought of retaliation with these kinds of biological weapons, is that correct?

Mr. WELCH. That's correct, sir.

VERIFICATION OF CHEMICAL AND BIOLOGICAL WEAPONS AGREEMENTS

Mr. MARTIN of New York. One other point for you, Dr. Welch. The Soviets give you the enormity of trying to negotiate a treaty and have them live up to their end of it. It is a startling revelation that they made in 1986, that they possess chemical weapons.

I know that came as a real shock to the rest of the Western world, but that kind of speaks to the difficulty you have in getting an agreement and treaty to which they're going to live up to.

I guess the bad news is that the states that now have biological weapons are model citizens of the world compared to the Soviet Union, without enumerating those countries. How in the name of God as a practical matter, do you ever suspect that the signatories, be they the Soviet Unions' or some of the other worthies who have these terrible weapons, how would you ever expect to verify, as a practical matter, to find out who owns those weapons?

Mr. WELCH. Verification of these weapons poses extraordinarily difficult problems. Certainly before the day arrives when we sign up for such a treaty, we've got to maintain a defense against them. And that's my responsibility. Perhaps Mr. Hansen would care to respond to that question, from Arms Control and Disarmament Agency?

Mr. HANSEN. Thank you. One thing that has escaped attention here is that, in negotiating the ban on chemical weapons, that particular treaty would also cover toxin weapons. And in the draft which we put on the table in 1984, one of the articles of that draft specifies the right to go anywhere, any time, to investigate any illegal activities, suspected or known.

Now, while it is clear that that will not answer all the mail, it is equally clear that that has its own effect, the ability to go and do this at any time.

Mr. Chairman, with your permission, let me make another point, which I think has not been made in this hearing, and that is that the facility at Dugway will not produce any substances at all. It will only test substances against defensive means. It is a facility which would use substances, pathogenic substances which already exist, against our defensive measures. So it has no production capability at all.

DEFENSE AGAINST BIOLOGICAL WEAPONS

Mr. MARTIN of New York. One last question if I may? In the task that you set for yourself as far as defending and attempting to reduce the possibility of someone, some country, actually using these biological weapons, that having been said, and I understand that, would it be a fair statement to say that real significant defense against biological weapons is impossible? What we have is some kind of a moral obligation to do everything we can to at least give the people against whom these weapons would be used some

type of a chance, some modicum of relief or vaccine or protection with mask, isn't that what we're trying to do?

Mr. WELCH. Defense against biological agents is necessary, but as you point out, it might not be sufficient. We've got to look to arms control; we've got to look to other means to deter first use of biological weapons against our people.

I would point out that the 1925 Geneva Convention prohibits the use of biological as well as chemical, weapons. And I would remind all of us that the United States maintains a reservation to that treaty which in short says that it is not bound—will not be bound, by that treaty if someone uses biological or chemical weapons against it.

So here's another form of deterrence, if you will, for those who use biological weapons against us.

Mr. HANSEN. If I can add, Mr. Congressman, to that answer, there is a threshold against the use of biological and toxin weapons, which is something like the threshold against the use of chemical weapons. The chemical threshold has now been breached. We have evidence as well that the toxin threshold was breached by Soviet surrogates in Southeast Asia, and we reacted to that breach as strongly as we did precisely because we want to reinforce the existence of a threshold, because one of the things which is going to prevent the use of these weapons is the agreement of nations that the consequences of use would be negative for all of us.

Mr. MARTIN of New York. In a closed session, I'd like to run down through the list of those states that have those weapons and find out what moral responsibility anyone would feel they would have against using those kinds of weapons if it occurred to them.

Mr. LEACH. Would the gentleman yield for just ten seconds?

Mr. MARTIN of New York. Yes, certainly.

Mr. LEACH. I just want to correct a statement you just made, Mr. Harrison, because it's very important and reflects one of the problems here. The toxin threshold was breached in Southeast Asia. It's a terrible breach, but not the biological. And just as we talk about the blurring of these weapons, I think we want to be very careful in that distinction.

Mr. MARTIN of New York. Yield back. Thank you, Mr. Chairman.

Chairman FASCELL. The Chair recognizes Mr. Sonny Montgomery.

NATIONS POSSESSING BIOLOGICAL AND CHEMICAL WEAPONS

Mr. MONTGOMERY. Thank you very much, Mr. Chairman. Dr. Welch, would you put the chart back up, the only chart I believe you had. I'd like to look at that again, if I could.

I think it showed that some nations are moving ahead with biological offensive chem—they're moving ahead with chemical weapons, is that correct? And also, is that biological weapons too? Offensive weapons? They are increasing the numbers?

Mr. WELCH. Yes sir. And that's absolutely correct—and it's important to realize that we're looking at, to begin with, in 1972, at the time of the convention, up to 1988, up to the present, this is a period, of course, where we did not have any biological weapons.

We destroyed all of our biological weapons. It's also a period in which we did not produce any chemical weapons.

Mr. MONTGOMERY. Is it restrictive, or confidential as to which nations are moving ahead in this area?

Mr. WELCH. The list is classified, but I would be happy, very pleased, to have the, to ask, the Director of Central Intelligence to provide that briefing to you.

I can say that some of the people in that biological list are signatories of the convention. Some are in the Middle East; some are not friendly to the United States; and we have some real, legitimate concerns about these states and these weapons.

PROTECTING SOLDIERS AGAINST TESTING EXPOSURE

Mr. MONTGOMERY. Mr. Chairman, I want to make two points and then I will yield back the balance of my time, unless there's other comments from the panel.

First, it seems to me if they are increasing, nations with biological and chemical warfare, testing and storage, then certainly we have to keep up on our defensive testing also. As a Member of the Armed Forces Committee, that's one of our big problems, that chemical warfare is not up to date, Mr. Chairman, and we would suffer the consequences, because we really hadn't done enough defensive work, in my opinion, on chemical weapons.

So I agree we have to continue to have defensive testing and defensive improvements.

But shifting over onto the other side of the issue, yesterday, our panel members, and all the Members of Congress here, voted on legislation that passed 400 to 2, that was known as the Veterans Atomic Exposure Act. Where we sent young soldiers into the Nevada testing field after we exploded atomic weapons, and also we sent these young men into Japan to go into the various sites where we exploded those atomic weapons.

This bill we passed only yesterday with only two votes against it, is probably a little late, that those that probably had the exposure might not be around now, and the General Accounting Office and others have told us one reason we had such a big vote in favor of this bill was that badges that these people wore at the testing sites and where the bombs had been exploded in Japan, was not workable. It didn't have a true sense.

So my point is to you who monitors this program? Let's be sure that we have a protection for these people involved in this defensive work that you are doing, and we don't have to come back 30 years after that, of testing these type of weapons and find out that some of these people did develop cancer and did die or are going to die.

Mr. WELCH. I assure you, Sir, that we will, and I would like to commend you again for your passion for the Soldier. I would hope that, as we go through the rest of the morning and talk about environmental impact statements, we talk about concern over local citizen groups, concerns over the public health issues, that it will come up that we never forget the Soldier. If we have to talk about a "Soldier impact statement," let us do so.

It's certainly important to him and her that we (1) conduct the necessary defensive tests as safe as possible; and (2) proceed with those tests so that they don't become battlefield victims of these horrible agents.

Chairman FASCELL. Mr. Rhodes.

CHART OF COUNTRIES WITH CHEMICAL AND BIOLOGICAL WEAPONS

Mr. RHODES. Thank you, Mr. Chairman. Referring again to the chart, if you could put the chart back up again, the bouncing chart—would it be correct to assume that there are countries which fall into both categories; in other words, if there are countries represented on that chart which have both the CW and the BW capability?

Mr. WELCH. That's a good assumption, sir.

Mr. RHODES. Also again, would it be correct to assume that the countries that are on that chart have a full capability; in other words, they not only have the capability to produce the agents, but they also have the capability to deliver them, that they've developed a complete weapons system?

Mr. WELCH. You may assume that.

We need, however, to give you a detailed briefing of the facilities involved; the nations involved; the personalities involved; the agents that we know about; the delivery means that we're familiar with; as well as knowledge gaps.

But that can be provided.

Mr. RHODES. But without a means to deliver, there's truly not a complete weapon, is that a correct assumption as well?

Mr. WELCH. If I understand your question, there is certainly a need for a delivery means. Unfortunately, delivery means for chemical and biological agents do not require a great deal of sophistication.

Mr. RHODES. Thank you, Mr. Chairman, that's all the questions I have.

Chairman FASCELL. Mr. Weiss.

Mr. WEISS. Thank you, Mr. Chairman. With your permission, I would like to yield my time to Mr. Owens.

REQUEST FOR SUPPLEMENTAL STATEMENT BY DEPARTMENT OF INTERIOR ON ADEQUACY OF ENVIRONMENTAL IMPACT STATEMENT

Mr. OWENS. Thank you, Mr. Chairman. I would first like to address a comment to the Deputy Assistant Secretary Poling.

The statement that you presented today is offensive and totally lacking in any substance. And not responsive in any way to what was requested of you.

May, Mr. Chairman, Dr. Poling be requested or directed to respond to the question regarding the adequacy of the environmental impact statement? He is responsible for the public lands surrounding Dugway; public lands on which the 6,000 sheep died, and he limits his statement today to a brief comment on the good relationship the BLM has with the Army. That's not surprising, given the fact they won't raise any questions about the Army's environmental impact statement.

Chairman FASCELL. Fire away. Ask him whatever you want.

Mr. OWENS of Utah. I don't want to spend my time on it. I just want him to respond to it, because he hasn't and I'd like him to prepare a statement on the adequacy of the Draft Environmental Impact Statement with your permission and direction, Mr. Chairman.

ADEQUACY OF ENVIRONMENTAL IMPACT STATEMENT

Dr. Welch please? No one dealt today in this panel, except the EPA, with the adequacy of the environmental impact statement, an important question that you were all asked to assess. Can we assume, that you will address the concerns that the EPA expressed today, when they set forth at least two major weaknesses in the environmental impact statement?

Can we expect that you will readdress the environmental impact statement.

Mr. WELCH. We will insist that the Army address those issues raised by EPA, as executive agent for the Department for biological and chemical defense, it's certainly their responsibility to do it.

Mr. OWENS of Utah. Then would you ask them to address my concerns as well?

Mr. WELCH. Yes, sir, I will, I would be very pleased to.

Indeed, if you want to talk about the details of the assessment, or of the test facility, I'd be very pleased to ask the Army to come forward and respond to them.

Mr. OWENS of Utah. Let me ask instead of taking time on that, that you respond to both my and the EPA's request, if you would, and to decide, whether in fact, as I have suggested, you need basically to start all over on the environmental impact statement.

And let me ask this question: what would constitute success in developing a defense against biological weapons? My understanding is that, with the new capability in biological engineering, it is possible to create multiple new, dangerous pathogens, virtually at-will. How would you know which vaccines to develop against pathogens not yet created?

WHAT CONSTITUTES SUCCESSFUL DEFENSE AND VACCINES AGAINST PATHOGENS

Mr. WELCH. First, we look to and demand from our intelligence sources what others are doing. If there's any good news about that increase in the number of nations possessing biological weapons, it is that they have selected for the most part the classical, the well-known, biologicals and toxins. We can develop vaccines against that list.

But even if we don't know what some of these future agents might be, we can proceed in the defensive area to make masks; to make filtration systems; detectors that are universal in nature, where we do not need to know the specific agent that's harmful to man, but only to know that it is harmful to man.

This is the kind of work that's been going on now for the last few years in our defensive area, and it's showing a great deal of promise.

Mr. OWENS of Utah. I think you need to approach that microphone a little more, if you would. We're having trouble hearing you.

Mr. WELCH. Well, to summarize what I have just said, sir, there are a number of things we can do—push the intelligence services for the known list of agents; we can conduct and are conducting, defensive work in masks, detectors, that are universal in nature, or generic in nature, that will work in the presence of any substance harmful to man.

So there are some very real things we can. Of course, the whole point of this exercise is deterrence. It's not warfighting. We must continue to ask ourselves and the Congress, also, what we can do to deter these nations from using biological and toxin weapons against us.

OPENNESS OF RISK OF ABUSE UNDER SECRECY

Mr. OWENS of Utah. And I appreciate that statement and strongly support your moving in that direction. The concern is, that by conducting your research in secrecy, and in preparing to build a level four laboratory, you are raising serious questions at least in the eyes of the international community, about the goals and policies of the U.S. Army. Personally, I trust Defense and State Department policymakers.

But what if you have a biological Oliver North who sees his own goals and doesn't care what the law is in charge of some of those pathogens? How can you provide protection there, and why didn't you address that in the environmental impact statement?

Mr. WELCH. Your question, as I understand it, is one of openness. And I have to agree with you 100 percent.

Mr. OWENS of Utah. Well, there are really two thrusts, and I apologize for combining two questions in the same long phrase.

Mr. WELCH. The need, especially in this area, is for the Department to be transparent, and I think with the oversight that we've seen to date of the Congress, the keen awareness by the Secretary of Defense and by me and others of this concern, it will remain an open program. It's something that's reviewed regularly and intensely by those of us who are concerned about the remarks made by you and by others, about such dangerous outcomes as you perceive.

There is no question in my mind today that this is entirely defensive; that it's necessary; that it's good. We have, I think, made attempts to be open. Certainly we can do better. And I would be very pleased to receive any recommendations you have about increasing our openness.

Mr. OWENS of Utah. What about the second part of that question, the concern that somebody out there decides that this is an area of such grave importance that we must blur the line between defense and offense. It seems like to me that the environmental impact statement ought to address that, and I think that you cannot adequately deal with that here this morning. Of course, I am happy to let you try.

But I think the environmental impact needs to deal more carefully with the control of pathogens. Dr. Hansen said that you don't

produce any new substances, at the Dugway test center. But my understanding is that you would not just deal with simulants; you will use the real "germs," in layman's terms. Where will those germs come from? And how do you control them? How do you ship them?

SHIPMENT OF PATHOGENS IN OPEN MAIL

Mr. WELCH. The shipping, controlling, and so on, are subject to the same regulations that biological toxin substances are subject to on the civilian side, and I would ask the Army subject matter expert to come to the table to respond in more detail to that question.

Chairman FASCELL. Colonel, will you please come up, identify yourself for the record?

Colonel HUXALL. Yes, Mr. Chairman. I'm Col. Dave Huxall, Commander of the Army Medical Research Institute of Infectious Diseases.

The shipment of pathogens is in accordance with Department of Transportation regulations, as well as those of the Public Health Service and the Department of Agriculture.

Mr. OWENS of Utah. Are they shipped in the open mail?

Colonel HUXALL. Yes, sir.

Mr. OWENS of Utah. Where are they produced? Where will they be produced in the future?

Colonel HUXALL. They can be produced in a number of facilities that have a capability of producing them.

Mr. OWENS of Utah. Will any pathogens be produced, at Dugway?

Colonel HUXALL. I'd have to ask somebody from Dugway. I think it was stated here just a few minutes ago that Dugway plans no production capability.

RESEARCH PROGRAM AT DUGWAY

Mr. OWENS of Utah. Maybe Mr. Hansen could elaborate on that statement?

Mr. HANSEN. Mr. Chairman, the proposed BL-4 facility at Dugway would, in fat, test known and suspected agents which propose a threat. Many of these are classical bacteriological, viral; that is, viruses; and biological substances which exist in the research community and public health and otherwise.

And these agents could, in fact, and might be, the result of, the reproduction of these agents through some biogenetic engineering techniques. but they would still be the same basic substances.

As far as I understand, not being an expert, they would not differ in their substances from naturally produced bacteriological or biological agents.

The research that would be done in Dugway is expressly in the defensive mode; that is, to test possible defensive mechanisms against these things which already exist; and that Dugway itself would not from the ground up, would not construct, produce, or whatever, these particular things.

I would assume, sir, that there would be some growth of some things allowed in order to meet research requirements.

Mr. OWENS of Utah. Can we assume they do genetic engineering out there?

Mr. HANSEN. My understanding is that they would not be participating in genetic engineering at Dugway. What they might do is to use products which have been genetically engineered in their test program to establish defensive mechanisms.

NO USE OF GENETICALLY-ENGINEERED MATERIAL AT DUGWAY AEROSOL FACILITY SCHEDULED FOR 1991 BUDGET

Mr. OWENS of Utah. Is that your understanding, Colonel?

Colonel BUSBY. Sir, if I may, I am Colonel Walter Busby of the Department of the Army with the oversight for the development testing for all services. There are no plans to use genetically engineered material in the biological aerosol test facility that we currently have environmental impact statements on the street to build in the 1991 budget, not 1990, sir.

Mr. OWEN. Thank you very much.

Chairman FASCELL. Thank you, Colonel.

Mr. OWENS of Utah. Mr. Chairman, I have one final question. Is that possible? I can wait until the second round.

Chairman FASCELL. Go right ahead.

SOVIET PERCEPTION OF DUGWAY AEROSOL FACILITY AS OFFENSIVE

Mr. OWENS of Utah. This is addressed to Dr. Harrison, Deputy Assistant Secretary Harrison.

The facility proposed at Dugway would have the ability to convert pathogens into aerosol form. What reason would the Soviets have for believing that offensive work is not being conducted at Dugway? Is it not the first step toward producing weapons, and would we not perceive a level four aerosol test facility in the Soviet Union as offensive research?

Mr. HARRISON. Well, it's difficult for me to answer the question, Mr. Congressman, with regard to Soviet perceptions of our activity. I think we made it very clear to the Soviets that what we're after here is a defensive capability.

The Soviets have access, since they have access to our open publications, to most of the workings of our government, and our policy process, I think they are reasonably confident that what we say about those programs is, in fact, true, and that they are defensive programs.

I think you would have to be directed to the intelligence community of what our perception would be if we perceived a similar facility on the Soviet side. Obviously, we don't have the same advantages of open-source literature, for example.

Mr. OWENS of Utah. But you are a policy maker, and that's really the perception that I'm interested in, that of American policy makers. What if they were doing what we propose to do at Dugway and you had that intelligence? Wouldn't that be of concern? Wouldn't that have some implications for the 1972 treaty.

Mr. HARRISON. I can only say this, Mr. Congressman. If we perceive that what they were engaged in is the testing of defensive equipment, then obviously it would not be a breach; nor would it be a cause of concern.

If we perceive that they were trying to develop an offensive capability, that would be of concern; but I think there would be other indicators; and again, I yield to my intelligence colleagues.

But to create an offensive capability requires more than simply the agent. You have to have equipment for delivering the agent and decontamination equipment, and other indicators like that.

So I think that would have to be a judgment made on the basis of a number of different sources and a wide range of information.

Mr. OWENS of Utah. But wouldn't it be rational, again, as an American policy maker in the field, to assume that the Soviets may very well be suspicious, looking at the potential and capability that a level four gives you in Dugway?

Mr. HARRISON. My personal judgment, Congressman, would be that they are perfectly aware of the rationale for that program, and I would assume they're reasonably confident that they would be able to detect from open source literature and from congressional hearings and from Aviation Week if that purpose changed.

Mr. OWENS of Utah. Thank you very much. Thank you, Mr. Chairman.

Chairman FASCELL. Our distinguished colleague, Ms. Martin from Illinois.

DEFENSE AGAINST BIOLOGICAL WEAPONS

Ms. MARTIN of Illinois. Thank you, Mr. Chairman.

A general question, but setting up a kind of what I fear won't be too great a leap into the future: if we consider Representative Leach's dictum to keep these things very separate, in recognizing on a series of fears that the biological warfare probably hits the deepest fear perhaps of anything, and if for a moment we put aside Chairman Montgomery's correctly-held view that we protect the Soldier, the fear of biological warfare, one of the reasons it's greater, is because everyone can imagine the horror movie of it being introduced into the general population, not limited to a battlefield.

So I guess I have to ask the question, which strikes me as a moral conundrum, what if in your research, the only defense against a series or a type of, biological weapon, is another biological weapon? Where does that put us?

Chairman FASCELL. Would that be called "Viral-Sterile Star-Wars?"

Mr. WELCH. We have renounced the course of, even the possession of, biological weapons. We did that knowing that we were giving up a sword in our arsenal. We did that knowing, and I continue to believe that, there will be no time when someone is going to develop a biological weapon which would cause us to not have some kind of deterrent posture against it, and this means even if we can't defend against it, even if it's unknown; even if it's extraordinarily lethal, we do maintain a deterrent, one, in our conventional weapons; two in our no-first-use retaliatory systems, and as we mentioned earlier, the 1925 Geneva Convention prohibits use of biological and chemical.

And third, if we had to go further, we would be prepared to do so, but I think the purpose of the Defense Department is one first of deterrence, and we support doing all of those things in a defen-

sive area that would cause that not to happen in the first place. Not that use to happen.

Ms. MARTIN of Illinois. Okay, but let me ask the question that people want to know, maybe not defense strategists, but a renegade nation, an offshoot of a renegade nation; not even the Soviet Union, as difficult as they are, at least we are in negotiation. There's a lot of people with whom we are not in negotiation.

A renegade group from that nation, wherever it may be, comes into the United States bringing with it something that can affect the food source, the water supply, something—this is the fear—no one will ask the question; that we're not frightened of it; you know, we haven't seen—cartoons have it on Saturday mornings. What is our protection against that?

It's not—walking through the thing at the airport doesn't detect—you know, what if we find out after the fact that this has occurred? Are you suggesting that, because of that policy, that our only response would be to go destroy that nation by convention or nuclear means, or are you also suggesting that the kind of research that's being done, even though it does not ever propose a use of offensive biological weapons, would allow enough research to perhaps help after the fact or to withstand such a terrorist—to call it no other word—attack?

Mr. WELCH. Certainly I very much agree with the latter part of your statement. There is considerable payout from military medical defensive programs for the civilian community, and it runs all the way from Walter Reed's time right up to the present.

I took your earlier question to be in the battlefield contest, and I understand that's not what you had in mind. Certainly the problem with terrorism, with chemical and biological weapons, is a real one, and we are concerned, and yes, there is something to be said for maintaining a military defensive program in this area to assist first in knowing what intelligence questions should be asked before the act happens; second, to help detect or at least get some indicators that this might be happening and three, the therapeutic, the caring for, casualties afterwards.

Chairman FASCELL. Mr. Hansen?

Mr. HANSEN. I didn't really mean to add anything, but let me anyway, because I spoke earlier in the arms control context of having an agreement whereby we had exchanged information with the Soviet Union, and other countries in the context of the Biological and Toxin Weapons Convention.

In that exchange of information, we identified, I believe, six facilities which meet the requirements.

Of these six, only two of them are defense related. The others are engaged in the kind of research that would be important in protecting public health, as is the military research. I would add to this—when you look at the type of organisms and the like with which they deal, they clearly have application in terms of defensive measures that could be taken in the kinds of instances which you are speaking of. And I think that's an important point.

And I would add to this, that in this exchange, the Soviets identified 16 facilities that met these same standards, and in those 16 facilities, five are under their ministry of defense which demonstrates that the Ministry of Defense in the Soviet Union does have

in fact a very strong interest in this particular area. We do not have the capability to identify whether they are in fact engaged in offensive research; defensive research, or the nature of it, but the fact that five facilities are related to their Ministry of Defense is a significant fact.

Chairman FASCELL. Mr. Clarke.

EPA STUDIES ON POSSIBLE ACCIDENTS AT DUGWAY

Mr. CLARKE. Thank you, Mr. Chairman. I just have one question to Mr. Sanderson. What studies, Mr. Sanderson, have been conducted by EPA to assess the effects of accidents at the proposed Dugway facility?

Mr. SANDERSON. The entire environmental impact statement has been reviewed both by the people who have knowledge of the kinds of issues that have been there; they've gone through the scoping process that the Army held in public hearings in Salt Lake City; they've looked at the issues that the Army brought out at in them, and we've gone back and asked them for additional final information on their final environmental impact statement.

As to the specific tests, we have not conducted specific tests on any of the issues that were raised in that environmental impact statement. We would look to the other agencies and to the Army itself to prove the validity of their concerns.

Mr. CLARKE. Thank you. Thank you, Mr. Chairman.

Chairman FASCELL. Mr. Darden.

Mr. DARDEN. Thank you, Mr. Chairman. As a member of both the Armed Services Committee and the Interior Committee, I regret that I have not been able to participate more fully in this hearing because of the preparation of the day's work for the Department of Defense authorization bill, which will be going on the floor in a few moments.

However, I did want to take just a moment to commend my colleague from Utah for his initiative in bringing the various groups here together for this very important hearing today. I think it is a classic example of representation of one's constituents in ways that I think can produce results which are very beneficial, not only for your district, but for matters which are national and international in scope, which have very broad ethical and moral, legal and military concerns.

So I simply want to close by saying thank you Mr. Owens, for bringing this hearing together today, and I look forward to learning more about this very sensitive problem that we're facing. Thank you, Mr. Chairman.

SOVIET AND U.S. CONCEPTS OF CHEMICAL AND BIOLOGICAL WARFARE

Chairman FASCELL. Thank you, Mr. Darden.

Gentlemen, let me ask a question about the theory of biological and, chemical warfare. Does Defense have a concept that biological and chemical warfare can be strategic, or is it just tactical?

Mr. WELCH. As my quote regarding the Warsaw Pact interpretation of using new engineering techniques to blur the distinction between toxins and biologicals, it's clear that they perceive a military utility for these B&C weapons both in the technical sense, and pre-

sumably in some kind of strategic sense. Certainly the classical agents, the known biological weapons have——

Chairman FASCELL. So, you're proceeding on the theory that the Soviets, as the principal and largest potential user, have both a strategic and a tactical vision for use as these weapons?

Mr. WELCH. Their writings over the years clearly indicate they have envisioned both of these.

Chairman FASCELL. And now, what I've heard you say today, and I'm all for deterrence, and for defending the soldier, but that's simply a tactical assumption on your part. I haven't heard you address what happens to civilians. Or is that somebody else's responsibility, not Defense? I mean, does Interior want to take the responsibility? State?

Mr. WELCH. I very much, and the Department, very much cares about civilian——

Chairman FASCELL. I didn't mean that. I'm sure you do. I wasn't being facetious here or argumentative. It's just a question of who's got the responsibility. DOD doesn't. Or do you? I don't know.

Mr. WELCH. We believe we do to the extent of our defensive research having payoff for the civilian community as we talked about a moment ago.

Chairman FASCELL. Yes, and how that defense is implemented may or may not be a DOD responsibility, is that what you're saying?

Mr. WELCH. That's correct, Mr. Chairman.

Chairman FASCELL. I thank you. All right now, on to other assumptions about this program. Are you looking at or considering biological and chemical weaponry as long-term, medium-term, or immediate? Or a combination of all of those?

Mr. WELCH. For the Soviets and other adversaries, B&C weapons have been part of their stockpile for years. They are at the moment, and——

Chairman FASCELL. No, that's not what I meant. I meant, your defense, are you looking at a possibility of a short-term agent, bacterial, viral, or other, against which you are defending? An immediate kill, or are you looking at one that has a delayed reaction? 20 years? 30 years?

Mr. WELCH. The Soviet literature indicates their belief that these weapons can be tailored for immediate use, immediate impact, an immediate kind of longer term——

Chairman FASCELL. Oh, I'm sure they can.

Mr. WELCH. So we're defending against all those possibilities to the extent we can with the resources and knowledge that we have.

Chairman FASCELL. I understand. Now, a filter or a gas mask, or protective clothing's not going to protect an individual against a long-term agent that can live?

Mr. WELCH. One could speculate—certainly——

Chairman FASCELL. In a variety of places, like his hair or on the ground, or in his tent.

Mr. WELCH. I suppose the most fruitful outcome of this kind of speculation is to do everything we can to deter someone from using such an agent.

Chairman FASCELL. Okay, that leads me to the next question. Thank you. I'm just inquiring now with respect to chemical warfare and toxins and the treaty that's been laid down, have the Soviets in fact accepted challenge on-site inspection for verification purposes?

Mr. HARRISON. Yes, Mr. Chairman, that is a fact. They have accepted that in principle.

Chairman FASCELL. Now, has the United States, as a matter of policy, accepted that?

Mr. HARRISON. That's right, Mr. Chairman.

Chairman FASCELL. What's right? That we have accepted that?

Mr. HARRISON. That we now have accepted that in principle. The question is to work out procedures to make it effective.

Chairman FASCELL. I see, and are we, 'we,' meaning both countries, are we in the process of detailing and refining the methods by which on-site challenge inspections will take place?

Mr. HARRISON. Yes, indeed we are, and we are discussing with the Soviets some of the problems which we uniquely have in this kind of regime, among them Fourth Amendment problems.

Chairman FASCELL. Now, what kind of 'unique problems' do we have? You're talking about the objections of industry or the political questions?

Mr. HARRISON. Well, we have constitutional issues having to do with the Fourth Amendment that have to be resolved so that our position is that anywhere, any time, challenge inspection is confined to government owned or operated facilities, or to relevant private facilities.

Chairman FASCELL. So that the question arises with respect to an automatic inspection, mandated by the treaty of a private facility under contract to DOD?

Mr. HARRISON. A facility like that under contract to DOD, I don't have anyone to advise me legally, but I believe that would be covered by our provisions.

Chairman FASCELL. It would be governed. You're referring, then, to a private facility not under contract to the government?

Mr. HARRISON. That's right, and not relevant to the production of these weapons.

Chairman FASCELL. And the assumption in that statement is, if you'll permit me to pursue it, that somebody is in the business of producing deadly biological agents that the government doesn't need, doesn't want, and hasn't contracted for? But somebody else has?

Mr. HARRISON. I'm not sure I follow the line of reasoning, Mr. Chairman?

Chairman FASCELL. Well, if you're not concerned about the application of the Fourth Amendment of the Constitution to a defense contractor, and your concern only applies to a non-defense contractor, the question is whether somebody who is producing biological weapons that the government doesn't want and hasn't contracted for has the right to seek and receive protection under the Constitution?

Mr. HARRISON. Well, we're dealing here with only chemical weapons. As you realize, not with biological weapons, the case of chemical weapons is a question of what the Soviets are satisfied with.

Chairman FASCELL. No, I understand.

Mr. HARRISON. We understand, I think, it would be safe to say——

Chairman FASCELL. What we're narrowing down to is a non-defense contractor producing chemicals that might be used in chemical warfare subject to a challenge inspection.

Mr. HARRISON. I think that's probably right, Mr. Chairman. I'm a little on shaky ground here not having legal help, but it sounds right to me.

Chairman FASCELL. Well, I see somebody behind you nodding his head, and maybe he would simply——

Mr. HARRISON. Good, he's my expert. If he nods his head, I'm OK.

Chairman FASCELL. Okay, well let's identify this person for the record so that we can see who it is that's saying the statement is correct?

Mr. HARRISON. That's David Lambert, Col. David Lambert, who is an officer of the political/military department of the Department of State.

Chairman FASCELL. And that last statement was correct as the reason you were nodding your head affirmatively? Thank you.

Mr. Owens.

OPENNESS AND OVERSIGHT COMMISSION

Mr. OWENS. Thank you, Mr. Chairman, I want to commend particularly Dr. Welch for his testimony, and I appreciate your comments about the ultimate goal. As I understood it, I want to loosely interpret what you said, because of the futility of really providing for either defensive clothing, as the Chairman was bringing out, or with bioengineering, the ability really to contemplate what they might, the enemy, might someday use against us in some imaginary encounter.

And therefore, the real solution has to be negotiation and learning to live openly.

And then, secondly, your comment about the goal being transparency and how important openness is: so let me ask you a two part question?

Why secrecy at all in this program? And I appreciate what I perceive to be an invitation in essence for us to urge you toward openness. Why secrecy at all in this biological area where we have renounced not only first use, but any use whatever?

Then secondly, I'm preparing legislation to provide for a board of independent civilian overseers, experts, to watch what is done in biological testing for safety reasons as well as openness reasons, concerned that we ship these things, these pathogens, openly through the mail. Would you welcome that kind of oversight?

Again, the two-part question.

Mr. WELCH. Yes sir, I'd be very pleased to participate with you in the preparation of that legislation.

Your first part, why do we have any secrecy at all in this defense area? The only, certainly one of the major, legitimate, reasons for secrecy is that we do not want to expose our vulnerabilities in any area. We do not want to indicate, for example, that our protective mask is vulnerable to a certain known or suspected threat agent. That does not mean, however, that we cannot be open with a panel, such as you suggested in your second part, with people with the proper security clearances and need-to-know. And I would certainly welcome, as I said, participation with you in the preparation of that——

Chairman FASCELL. Will the gentleman yield at that point.

Mr. OWENS of Utah. A pleasure.

Chairman FASCELL. You might well consider the same kind of regime or a similar kind of regime for the Soviets, and at some time at least make the suggestion to put it together as a scientific regime on verification. We might as well see if we can't do it on a coordinated basis, rather than unilaterally.

Mr. Dellums.

MILITARY OR CIVIL DEFENSE AGAINST BW AGENTS

Mr. DELLUMS. Thank you, Mr. Chairman. I'd like to take that even one step further: in talking about biological warfare research. Mr. Chairman, you made a side comment that I thought was pregnant with meaning. When you said with respect to biological warfare research, there is—warfare, rather, there is no such thing as a battlefield agent. And if one assumes that you cannot necessarily contain a biological agent that has the capacity to grow and multiply strictly on a battlefield, then you are potentially talking about civilian personnel. The gentle woman from Illinois raised this issue in a very profound way. This is my question:

Rather than simply a civilian oversight board, I would want to question the basic rationale for this being strictly military research in the first place. If biological warfare cannot really in many ways be confined to the battlefield, because I didn't hear very clear and definitive answers to the Chairman when he said, "are you talking about long-term agents? Near-term agents, or whatever?" Then why not make this matter a public health issue for the civilian population that would also be overwhelmingly endangered by this, rather than simply being a military research project. Why should this not be considered a public health issue and the research taken outside the bounds of the military and dealt with as a human consideration on a civilian basis, rather than contained in military research strictly within the confines of warfare weapon development capability, even if it's in a so-called defensive mode? Can you respond to that?

Because I appreciated your comment about openness. Why not take it the full step? Take it outside the narrow confines of research in the military area and make this a public health issue?

Chairman FASCELL. You'd have to have leadership, though. You'd have to have the military lead on it.

Mr. DELLUMS. Well, whatever configuration, if it was military lead, military participation—but why not perceive this as a public

health issue rather than through the myopic view of it purely being a military issue contained in some kind of battlefield notion?

Mr. WELCH. First——

Mr. DELLUMS. I don't minimize military input.

Mr. WELCH. The agents that the threat nations possess and are attempting to possess in some instances make it very complicated to say whether or not they are going to be used for strategic or tactical purposes. When they produce a toxin, for example, in violation of the treaty, they have produced a chemical that's not going to infect others and so on—it's a chemical.

Mr. DELLUMS. My comment was directly to biological—the capacity to grow and multiply, that particular area—not something you could dump on someone.

Mr. WELCH. I think the most helpful answer to your question is that the Department has a defined mission, one of deterrence, one of preventing the use of, in this case, biological and toxin weapons against its people, and we are doing all that we can to take care of that mission. We respond to suggestions for openness, and I, as I mentioned, would like to participate in making this even better.

We are not, however, in the business of the F.B.I. or the mission of FEMA or others, who are concerned by law with the problems that a terrorism attack might bring.

Mr. DELLUMS. Thank you.

Chairman FASCELL. Mr. Leach.

COUNTRIES WITH BIOLOGICAL AND/OR TOXIN WARFARE CAPABILITIES

Mr. LEACH. Two queries, Dr. Welch. First, relating to a question asked earlier, subsequent to a question in which I asked you to produce this chart, which indicates that, in 1988 there are about 10 countries with biological warfare capabilities.

Of that ten, how many have biological warfare capabilities distinct from toxin warfare capabilities?

Mr. WELCH. Mr. Leach, I don't have the answer to that, but I would be very pleased to get it to you.

Mr. LEACH. The only reason again I raised it was with some criticism, you indicated earlier that in the Soviet lexicon they were starting to blur the biological and chemical. Frankly you fall into a little bit of the same problem in blurring the biological and toxin, and these are exceedingly important distinctions. And I want to just stress that.

Secondly, and to come back with some comments on the idea suggested by Mr. Dellums and Mr. Owens: if you're too precise in your need-to-know criteria, you may run into problems in terms of the best scientific researchers. And let me relate to you a story, and I don't mean to draw too many conclusions from it, but as you know, starting in the late seventies, there are indications that there are usages of some sort of new weapon in Southeast Asia.

Many samples came out of Southeast Asia. Some came to my office. Some came through other sources and other means. And we kept giving them to the appropriate intelligence community who passed them to the appropriate Department of Defense, and there was no isolation of the agents that were used.

Frankly I wrote a letter and made a personal appeal to the then-Undersecretary of Defense, the current Secretary of Defense, and a decision was made to take the analysis out of the Department of Army's hands. A decision also was made to take some samples to the University of Minnesota, to a Dr. Chester Moroka, who then analyzed these agents and literally, almost overnight, defined three tricothecine microtixins.

And the reason I raise this is, as Mr. Dellums has talked about, public health concerns—perhaps it's the salary structure; perhaps it's other aspects of basic scientific research, but the greatest capacity in scientific research at this time is frankly in the private sector, not the public.

And in the public sector it's probably less in the Department of Defense than it is in some of the health agencies, whether it be in the NIH or the CDC.

And my own sense is that, if you're moving in a direction, and we're talking about public health, although we're also talking about military implications to public health, I would certainly hope that you would use capacity that is far broader than that is resident exclusively within the military services.

Finally, I must say, and I am a little reluctant to say this, but in summary of listening to the testimony of very serious, very thoughtful witnesses today, including from the military services, I am still left a little bit in the air of believing that there has not been a precise definition of what it is you want to occur at this particular facility, and that lack of precision of definition is one that makes me think that things haven't been thought through quite as deeply as perhaps they might. And I would hope that as you go forth with whatever it is that might come to pass, that not only is there a great philosophical thought, and hopefully, including people from the outside, but that you, for certain, include the very highest levels of government in the decisionmaking, and that we do not have a kind of momentum built into an interdepartmental structure that may philosophically cause certain things to occur that I am not precisely assured at this moment in time may not occur.

And all I would say is that the great advantage of public hearings in this nature, and I commend the gentleman, Mr. Owens, for precipitating this hearing, is that I personally think that this energy of thought has not occurred to quite the degree I suspected it probably would have, and I hope you take that seriously under consideration as you consider whatever options are prudent for a country. Thank you.

Chairman FASCELL. I thank our first panel of witnesses for their appearance here today. You made a significant contribution to the consideration of these important matters. Thank you.

Now, our next panel is Dr. Jay Jacobson, Associate Professor, Internal Medicine, Division of Infectious Diseases, University of Utah School of Medicine, in the LDS Hospital, Salt Lake City, Utah.

The Hon. James Leonard, (Ret.) Chief negotiator, Biological Weapons Convention; Jeremy Rifkin, President of the Foundation on Economic Trends. Dr. Anthony Robbins, Professor of Public Health, Boston University School of Public Health, and Past President of the American Public Health Association. Gentlemen, we're

delighted to welcome all of you to this hearing. We want to thank you for your appearance and your willingness to participate in this important hearing. And for your patience. I know all of you probably have prepared statements. If you would be kind enough, we'll accept all of the written statements for the record, and we would appreciate it if you could highlight and summarize your message, and we'll start with Dr. Jacobson.

Dr. JACOBSON. Thank you very much, Mr. Chairman.

STATEMENT OF JAY A. JACOBSON, M.D., ASSOCIATE PROFESSOR, INTERNAL MEDICINE, DIVISION OF INFECTIOUS DISEASES, UNIVERSITY OF UTAH SCHOOL OF MEDICINE AND LDS HOSPITAL, SALT LAKE CITY, UT

Dr. JACOBSON. I am, as you said, a physician and an infectious disease specialist and medical epidemiologist. My research interests include toxigenic bacterial infections and vaccine-preventable diseases.

I will attempt simply to highlight several of the points that I made in my written statement.

The plethora of real and constructable microbial pathogens, and the numerous ways in which exposure to them can occur makes development of agent and route-specific defenses both foolish and futile.

For example, infection, as has been stated this morning, can be acquired from the air, water, food, animals, insects, and even other people.

The microbes that can be used as weapons are not just the hundreds that are known to produce serious disease, but uncountable numbers that can be constructed to live longer, to be more lethal, to be resistant to conventional treatment, to be more transmissible, or even to wear microbial camouflage.

This wolf in sheep's clothing concept is now feasible by inserting a lethal, toxin-producing gene into otherwise harmless bacteria. This same technology has already been amply demonstrated and used for our benefit by having a yeast genetically reprogrammed to manufacture a part of the hepatitis-B virus, which is used in a vaccine.

Any surveillance device which has the ostensible advantage of detecting a specific agent has the real disadvantage of not being able to detect thousands of others. Any device that protects against acquisition through air will not necessarily protect against exposure via water or food. And a rather grim scenario indeed would occur whereby individuals infected by any route could at least temporarily serve as asymptomatic transmitters of infection to their companions or to health care personnel.

No one device or reasonable combination of devices is likely to detect and protect against all the various threats that can be mounted.

Biological warfare research is dangerous. It's hazardous to the health of those who do it; those who live with them, and potentially, to all of us.

Pathogenic microbes are dangerous. They produce disease and death, and those who work with them are exposed to risk just as

those who work with explosives and radioactive material are. The risks in biological research are real.

Islands have been contaminated by anthrax spores—Gruinard Island, in 1941. Laboratory employees have become ill and died even in the most sophisticated containment facilities. Thousands of sheep were killed in 1969 within 70 miles of Salt Lake County, where more than 500,000 people live, by an accidental release of a biological nerve agent.

As long as the military insists on using pathogens, agents that cause disease in their research, a serious accident, or even an epidemic, remains possible.

Some of the organisms they acknowledge testing, the agents of tularemia, anthrax and Q-fever, so-called level three pathogens all produce pneumonia and can produce death. They are especially lethal when infection follows exposure via aerosol, the very route the military is testing. For these organisms, there is at least some treatment, although it is not always effective, and the complications of infection may not be reversible.

These are uncommon, however, and they're not necessarily distinctive infections. And though many of us are likely to see laboratory workers or other inadvertently infected individuals as patients, we fear that we will not immediately recognize the nature of their infection and we may not provide appropriate or effective treatment.

We believe that for compelling security reasons, the military may not reveal the nature of the organisms to which these people have been exposed, effectively precluding us from treating them quickly and correctly.

The Army plans to evacuate and care for employees who become recognizably ill, or who have an observed exposure, but infectious diseases have variable incubation periods, and an employee may be well at work only to become ill later off-site, and possibly even in another city. No provisions are made for the diagnosis and care of household contacts or non-employees that may become infected as a consequence of a recognized or unrecognized accident.

The Army's proposed construction at Dugway, which is capable of handling level four pathogens, stretches their credibility by their proposal to use it only for testing level three pathogens. Because there is some treatment for level three pathogens, you will recognize that they are not necessarily the most potent or attractive candidates as biological agents.

There are organisms for which there are no treatments or no preventative measures. These are the level four pathogens. The Army has pledged to inform the public before commencing testing on these agents, but it was only under judicial directive that they have informed us of their present plan, and it would be startling indeed if they were to voluntarily announce even more provocative information which could "compromise security" and signal potential offensive research.

Level four pathogens do exist. They are currently studied at Fort Detrich, and they may already have provided illness and death in at least one employee there.

New, manmade, genetically engineered level four pathogens could be recovered by espionage or developed in domestic laborato-

ries and shipped to Dugway for testing. Any accident en- route poses a whole new set of problems with respect to managing an incurable illness of unknown etiology and unknown communicability.

The Army's proposals in their statement for medical surveillance of their employees are woefully inadequate and for contacts of employees, they are non-existent.

Not addressed is the possibility of an employee becoming a temporary or prolonged carrier of an agent that subsequently infects a family member or casual contact. Contamination of the inanimate environment has occurred as a consequence of biological warfare research, but even more frightening is the possibility of establishing a reservoir of infection in an animal or an insect species with potential for transmission to man.

Although judged "unlikely" in the Army's environmental impact statement, no reference was made to an unlikely event which actually transpired in Louisiana. There, research on leprosy was conducted on armadillos, because of their particular suitability. Despite all precautions, leprosy infection has now become established in the wild population of armadillos.

The significance of this for the human population does not appear major, but it is illustrative of an unanticipated consequence of well-intentioned research. One of the most disturbing features of the Army's published description of its research program is the need for testing under real or simulated field conditions. The feasibility of replicating field conditions in a small aerosol chamber is not great, but the temptation to do open-air testing must be.

The Army has done open-air testing in several cities in the relatively recent past. If the perceived threat of biological warfare increases, so will the military's desire to test their defensive equipment in a simulated combat setting.

I cannot stress strongly enough what a mistake this would be. Even a comparison with tests of live ammunition fails to adequately portray the danger, since once a bullet is spent, it poses no threat, but a microbe may survive, multiply and spread infection to others, perhaps indefinitely.

Finally, can the Army be relied on to keep their promises to perform only the tests they outlined; to test only the pathogens they list in public documents? Historically, they have done little to inform the public about potentially-dangerous tests, and when testing went awry or the unexpected happened, they have been obstinate in releasing facts or acknowledging responsibility.

In fairness, though, can we ask them to be honest with us when we mandate them to develop devices which necessitate the use of new, deadly biological agents, and a knowledge that their efforts will only be successful if they maintain secrecy from our enemies? I cannot expect truth or open disclosure. I would urge the Congress to act in the national and international interest and proscribe all military research associated with biological warfare and direct its attention, emphasis and financial support to our biological welfare. Thank you.

[Dr. Jacobson's prepared statement follows:]

PREPARED STATEMENT OF JAY A. JACOBSON

I am a physician, an infectious disease specialist and medical epidemiologist. I was educated and trained at the University of Florida, College of Medicine and took further training at the Centers for Disease Control and at the University of Utah where I am currently on the faculty. My research interests include toxigenic bacterial infections and vaccine preventable diseases.

My infectious disease colleagues and I are actively engaged in biological warfare. Since the mid-19th Century when Pasteur, Koch and others first identified some of our microbial enemies, we have engaged in a continuing struggle. Our weapons have been improved sanitation, aseptic technique, antibiotics and vaccines. We have won several battles. We have vanquished smallpox and nearly eliminated measles, polio, diphtheria, tetanus and whooping cough in our country and some parts of the world, but we have not won the war. Some agents have eluded our surveillance until very recently when we recognized their role in Legionnaires Disease and Toxic Shock Syndrome. Some such as HIV, the cause of AIDS, have only recently emerged as major threats to public health. Our biological enemies are highly adaptable, seemingly able to parry when we thrust our chemical swords at them. Staphylococci, initially vulnerable to treatment with penicillin became resistant to it and are now becoming resistant to more potent agents necessitating the use of very expensive and potentially dangerous antibiotics. Some bacteria have appeared which are resistant to virtually all of our antimicrobial drugs.

The enemy with which we are engaged is our natural enemy. It consists of viruses, bacteria, fungi, and parasites living out their life cycles which sometimes require injury to man and sometimes accidentally result in great harm to the human host as he or she attempts to imprison or repel these invaders.

The great havoc that infectious diseases can wreak and the fear that they engender has not gone unnoticed by military weapons strategists. New techniques in molecular biology and recombinant DNA technology now make it possible not only to use existing pathogens, our natural enemies, but also to create an infinite variety of new and tailor-made microbes, for the purpose of deliberately infecting, disabling or killing soldiers and civilians.

I will speak today about six reasons why our defense department should not participate in efforts which increase the likelihood of deliberate biological warfare or an accidental biological attack on our own population or innocent global bystanders.

A theme that will permeate my remarks is that of risk and benefit. In the context of biological warfare research, the risk of a particular adverse event occurring may be small, but the consequences catastrophic. The benefits achieved may be theoretically very appealing, but the likelihood of achieving them is abysmally small.

First, biological warfare research is inappropriately expensive. According to one source (The New York Times) the budget for chemical and biological warfare research has risen from $18 million in 1980 to $90 million in 1986 and according to another (Cole, L. Clouds of Secrecy), it rose from $160 million to $1 billion in the same period. The proposed five-year modernization program at Dugway alone is to cost more than $300 million.

It is not at all clear to me what significant advances have been made as a result of this enormous expense. If all that is forthcoming is an improved mask or protective clothing which cannot be worn longer than several hours I believe the investment has been a poor one and would predict no better return on the millions yet to be spent.

The risk is diversion of support from other more important, more worthy, and more solvable problems. The benefits to date have been trivial.

Second, proposed biological warfare research may be illegal. We signed a 1972 treaty which bans the development or stockpiling of biological warfare agents. Senator James Sasser has written to former Secretary of Defense Weinberger that the expanded facility at Dugway could be used "to test offensive biological and toxin weapons, a capability which is prohibited by the 1972 treaty." The military describes their research program on biological warfare as defensive and compatible with our obligations under the treaty. The projects are offensive to those of us who work toward the elimination rather than the creation of infectious diseases. They are likely to be construed as offensive by our political enemies and for understandable reasons.

In order to evaluate the efficacy of defensive equipment, be it surveillance or protective devices, the Army has insisted that it will be necessary to use real, virulent, microorganisms under field conditions. They are stating essentially that you can't test a bullet-proof vest without firing a real bullet at it. This means they must test the enemies' present weapons, future weapons and anticipated weapons. This logically leads to the need to actually develop these biological weapons, use them and study their success or failure in overcoming defensive equipment. This weapons development is certainly in violation of the spirit if not the letter of the 1972 treaty and will inevitably lead to an escalation of overt or clandestine offensive research by others.

The risks here are to increase rather than decrease the development of

biological warfare agents and to promote the creation of those that are harder to detect, harder to protect against and harder to treat.

The benefits are inapparent. No adequate specific or general defense has yet been developed despite more than 40 years of effort on this problem and none seems likely now--in fact, useful defenses seem less likely.

Third, the plethora of real and constructible microbial pathogens and the numerous ways in which exposure to them can occur makes development of agent and route specific defenses foolish and futile. For example, infection can be acquired through the air, from water and food, from animals, insects, and even other people. It can result from contamination of the soil. The microbes that can be used as weapons are not just the hundreds that are known to produce serious disease but uncountable numbers that can be constructed to live longer, to be more lethal, to be resistant to conventional treatment, to be more transmissible or even to wear microbial camouflage. This wolf in sheep's clothing concept is now feasible by inserting a lethal toxin-producing gene into an othervise harmless bacteria. This same technology has already been used for our benefit by having a yeast genetically reprogrammed to manufacture a part of the hepatitis B virus which is used in a vaccine.

Any surveillance device which has the ostensible advantage of detecting a specific biological agent has the real disadvantage of not being able to detect thousands or millions of others. Any device that protects against acquisition through the air will not protect against exposure via water or food. A very grim scenario, indeed, would occur whereby individuals infected by any route could at least temporarily serve as asymptomatic transmitters of infection to companions or health care personnel. No one device or reasonable combination of devices is likely to detect and protect against all the various

threats that can be mounted. The protective benefits of biological warfare defensive research are unlikely to be realized.

Fourth, developing so-called defenses against biological warfare seems not only expensive, politically dangerous and futile, but also unnecessary. Once man had the rifle, a leather shield against arrows became obsolete. There is no requirement that a defense must be specific or somehow symmetrical with an offensive weapon. There are, in fact, many weapons for which we have no specific individual defenses such as hand grenades or napalm. What we attempt to do is thwart their delivery by attacking soldiers and destroying airplanes. We have no lack of anti-personnel, anti-battalion, anti-airbase or anti-city weapons of the so-called conventional or nuclear type. Our ability to prevent the launching of a biological attack is extensive and our means for retaliating overwhelming. There is no particular advantage in biological warfare parity since the threat of biological counter attack is no greater than that of nuclear devastation or conventional conflict. If potential benefits are unnecessary or redundant, no cost and no level of risk is justified.

Fifth, biological warfare research is dangerous. It is hazardous to the health of those who do it, those who live with them, and potentially to all of us. Pathogenic microbes are dangerous. They produce disease and death. Those who work with them are exposed to risk just as those who work with explosives and radio-active material are. Accidents happen despite the most well-meaning, most conscientious, most well-monitored, most expensive and extensive precautions that can be taken. Witness, in our country, the space shuttle disaster, the accident at Three Mile Island. Witness, in the Soviet Union, the Chernobyl catastrophe. You realize that accident prevention and

risk control programs were operating in all of those cases and you know that the planners calculated the risk of such accidents to be negligible. We continue to pursue development in nuclear power and space exploration because we believe the benefits outweigh the risks.

The risks in biological warfare research are also real. Islands have been contaminated by anthrax spores (Gruinard Island, 1941), laboratory employees have become ill and died even in the most sophisticated "containment facilities." Thousands of sheep were killed in 1968 within 70 miles of Salt Lake County, where nearly 500,000 people live, by an accidental release of a biological nerve agent. The military has charged that hundreds or thousands of people recently died in the Soviet Union in an epidemic of anthrax related to a biological warfare facility. The Soviets have denied this, but even if it is so, don't you believe they would have taken every conceivable precaution to prevent it.

As long as the Army insists on using pathogens, agents that cause disease, in their research a serious accident or even an epidemic remains possible. Some of the pathogens they acknowledge testing, the agents of tularemia, anthrax, and Q fever, so called level 3 pathogens, can all produce pneumonia and death. They are especially lethal when infection follows exposure via aerosol, the very route the military is testing. For these pathogens there is at least some treatment although it is not always effective and the complications of infection may not be reversible. These infections are uncommon, however, and not necessarily distinctive. Though many of us are likely to see laboratory workers or other inadvertently infected individuals as patients, we fear that we will not immediately recognize the nature of the infection and we may not provide appropriate or effective treatment. We

believe that for compelling security reasons, the military may not reveal the nature of the organisms to which these people have been exposed, effectively precluding us from treating them quickly and correctly. The Army plans to evacuate and care for employees who become recognizably ill or who have an observed exposure. However, infectious diseases have variable incubation periods and an employee may be well at work only to become ill later off site and possibly even in another city. No provisions are made for the diagnosis and care of household contacts or non employees that may become infected as a consequence of a recognized or unrecognized accident.

The Army has proposed building a facility at Dugway, which is capable of handling level 4 pathogens but stresses our credulity by proposing to use it only for testing level 3 pathogens. Because there is some treatment for level 3 pathogens, you will recognize that they are not necessarily the most potent or attractive candidates as biological agents. There are organisms for which there are no treatments and no preventive measures. These are the level 4 pathogens. The Army has pledged to inform the public before commencing testing on these agents. It was only under judicial directive that they have informed us of their present plan and it would be startling, indeed, if they were to voluntarily announce even more provocative information which could compromise security and signal potential offensive research. Level 4 pathogens exist now. They are currently studied at Fort Detrich and they may already have produced illness and death in at least one employee there. New man made genetically engineered level 4 pathogens could be recovered by espionage or developed in domestic laboratories and shipped to Dugway for testing. An accident enroute poses a whole new set of problems with respect

to managing an incurable illness of unknown etiology and unknown communicability.

The Army's proposals for medical surveillance of their employees are woefully inadequate and for contacts of employees they are non-existent. Not addressed is the possibility of an employee becoming a temporary or prolonged carrier of an agent that subsequently infects a family member or casual contact. Such a tragedy has occurred when a laboratory worker acquired an asymptomatic gastrointestinal infection with Salmonella typhi and later unknowingly transmitted typhoid fever to his spouse resulting in her death.

Contamination of the inanimate environment has occurred as a consequence of biological warfare research but even more frightening is the prospect of establishing a reservoir of infection in an animal or an insect species with potential for transmission to man. Although judged unlikely in the Army's environmental impact statement, no reference is made to an unlikely event which actually transpired in Louisiana. There, research on leprosy was conducted on armadillos because of their particular suitability. Despite all precautions, leprosy infection has now become established in the wild population of armadillos. The significance of this for the human population does not appear major, but it is illustrative of an unanticipated consequence of well intentioned research. Many of the most dangerous viral pathogens are harbored by rodents and transmitted to man. Several of these such as Lassa fever virus and Machupo virus are level 4 pathogens and could conceivably infect one of the several species of rodents, native to the Utah Desert, which the Army selected specifically for its "safety."

One of the most disturbing features of the Army's published description of its research program is the need for testing under real or simulated "field

conditions." The feasibility of replicating field conditions in a small aerosol chamber is not great, but the temptation to do open-air testing must be. The Army has done open-air testing in San Francisco and in Minneapolis in 1950, in New York City in 1966, and in the Utah Desert. If the perceived threat of biological warfare increases, so will the military's desire to test their "defensive" equipment in a simulated combat setting. I can't stress strongly enough what a mistake that would be. Even a comparison with tests of live ammunition fails to adequately portray the danger since once a bullet is spent it poses no threat but a microbe may survive, multiply and spread infection to others, perhaps indefinitely.

We need only think for a moment about the AIDS epidemic to envision some of the awful consequences of an accident at a facility or site where untreatable, deadly pathogens are stored, grown, and aerosolized. The event could be observed or unrecognized, unintentional or deliberate but if a new necessarily secret communicable disease is established in man or animals what can we expect? It took us three years to isolate and identify the agent of AIDS; after seven years we still have no cure and the prospects for a vaccine are slim while the number of deaths approaches 50,000 and the number of HIV infected patients exceeds 1 million in our country alone. The risk of an accident may be small, but real; the benefits to the military seem illusory.

Sixth, can the Army be relied on to keep their promises to perform only the tests they outline, to test only the pathogens they list in public documents. Historically, they have done little to inform the public about potentially dangerous tests and when testing went awry or the unexpected happened, they have been obstinate in releasing facts or acknowledging responsibility. Witness the fallout, radioactive and medical, from atomic

bomb testing in Nevada and the massive sheep kill in Utah. In fairness, can we ask them to be honest with us when we mandate them to develop devices which necessitate the use of new deadly biological agents and acknowledge that their efforts can only be successful if they maintain complete secrecy from our enemies. I don't expect truth or open disclosure.

To summarize my concerns about biological warfare research, even "defensive" research: it is expensive, probably illegal, futile, unnecessary, dangerous, and necessarily secret.

My suggestion is to set aside biological warfare research, negotiate an even stronger treaty which is more comprehensive and which includes inspection and verification.

If any work in this area continues, it should be made as safe as humanly possible. This would require oversight at the planning and execution stage which should be provided by civilian public health authorities, microbiologists, molecular biologists, epidemiologists and physicians. Development of microbe specific identification systems is so unlikely to be successful or useful that it should be abandoned. Development of protective equipment could be pursued but testing can and should be with the least harmful simulant organisms, not pathogens. The test facility should be located as far as possible from a civilian population and in an area where environmental or animal contamination would have the least consequences. Personnel working at the facility must be under rigorous medical surveillance for asymptomatic as well as clinically apparent infection at a number of different body sites.

I would urge the Congress to act in the national and international interest and proscribe all military research associated with biological warfare and direct its attention, emphasis, and financial support to our biological welfare.

Chairman FASCELL. Thank you, Doctor Jacobson. Mr. Leonard.
Mr. LEONARD. Thank you, Mr. Chairman.

STATEMENT OF HON. JAMES F. LEONARD, (RETIRED) CHIEF NEGOTIATOR, BIOLOGICAL WEAPONS CONVENTION (1972)

Mr. LEONARD. I am very honored to have this opportunity to appear before you and your colleagues.

A number of the problems that you are addressing here are obviously not ones that I, myself, can address. I am not a doctor of anything. I am a retired professional diplomat, and what I can do is address the question of the biological weapons treaty and what it prohibits and what it permits.

Chairman FASCELL. That would be helpful.

Mr. LEONARD. Some of the history of this has already been reviewed for you by my former colleague, Mr. Leach, your present colleague on the Foreign Affairs Committee, and I will skip over some elements in the prepared statement.

But I do want to underline that, in the preparation of the draft, which eventually became the biological weapons treaty, we were very puzzled by this problem of how to address the dividing line between what's permitted and what's prohibited. And we came up with what I think is the only possible solution to that problem. It's what we called at that time and still call the "purpose criterion."

That is, the criterion of intent or objective or purpose is the only one that can distinguish between what is permitted and what is permitted. And as I review in my statement, we were very pleased when the Soviets made no problem about this. They came some time after ourselves, they came in 1971, to agree that a BW treaty should be done, and this was a couple of years after we had unilaterally renounced biological weapons and biological warfare, and when they did, they accepted the purpose criterion.

It was not a subject of serious controversy at that time in the negotiations, nor has it been since then in the various review conferences. That doesn't mean that it's free of problems—it simply means that it was the best solution that anybody had found then or has found yet to the problem of how to draw a dividing line.

But it doesn't produce a yardstick, a scientific test of an objective character which anyone could use to discriminate between what's permitted and what's prohibited.

The stockpiling of militarily significant quantities of agent is clearly prohibited. That's what the treaty is all about. But research is a much more complicated matter. And we have to ask ourselves in terms of what is the treaty prohibits—what is the intent—what is the objective of that?

I was pleased to see that criterion reaffirmed in the testimony that Mr. Welch gave just a few moments ago.

But that means that, when we look at particular research activities to see if they are permitted, we have to look at them and say do we think that there is a justification or do we think that, in the language of the treaty, they have no justification for peaceful purposes?

These are judgments. I might make a judgment one way and you or others might make a judgment another way, and there's obvi-

ously going to be a grey area, particularly when it's a matter of deciding what another country is doing, and I think it's clear that the ambiguous character of research, the inherently ambiguous character of certain research activities, which Representative Dellums has address very explicitly—in his own comments here, makes it difficult to apply this purpose criterion to the activities—certainly of other countries, but even to the activities of our own country.

I for one do not doubt that the activities of the Department of Defense are legitimate, and are aimed at defensive purposes, at peaceful purposes.

But I can understand others, including other American citizens whom you will be hearing from, may have doubts about that. That leaves us with a very serious problem, and it's that I would like to offer a suggestion on: a suggestion that has, in fact, already been picked up by Congressman Owens, and yourself. That suggestion is "maximum openness."

I would say almost total openness. It may sound unrealistic, and from what has already been said in this room this morning, one can see that there are possible objections and problems, but in fact, I believe that there are no activities relating to research on biological warfare, agents, weapons, whatever, no activities relating to those which need to be kept secret, except intelligence activities.

With regard to intelligence activities, I think it's healthy for other governments to be somewhat uncertain how much we know about what they're up to. In fact, I think the intelligence activities of other governments to verify for themselves that we're up to no bad business in this area, is a healthy thing, even though it's very easy to denounce Soviet spying as something that is inherently evil.

I think that we want them to know that our purposes are purely defensive in what we do. But we also want them to be uncertain just how much we know about them, and that applies not only to the Soviet Union, but also to a lot of other governments around the world, as the previous witnesses have indicated.

But when it comes to our legitimate research, it seems to me that it's healthy for us to make available to all qualified scientists everywhere the totality of the research that we're doing on defense against biological and toxin weapons.

I've been told, Mr. Chairman, that some years ago a panel of experts looked into this matter led by a very distinguished figure, Dr. Ivan Bennett; there are many complex questions involved, which I am not competent to go into, but I understand that this panel which looked at this came up with essentially the conclusion which I've tried to summarize, that everything legitimate could in fact be made public.

Let me conclude with noting that, with regard to openness, Article 10 of the treaty, if one looks at it very carefully, indicates to me that this total openness is not merely in our interest, not merely something that's desireable, but is something that is required of the parties to the treaty.

The treaty calls on them to the maximum extent possible to exchange information with regard to these activities. So I believe it is

an obligation of ourselves as a party, to do what we can in this area.

Now, I don't for a moment imagine that the Soviet Union will immediately agree with what I've just been saying here, and that they will immediately agree to make everything that they're doing public.

I nevertheless think that that subject should be seriously addressed between our government and their government, and I would commend the actions which Mr. Hansen noted for you of taking initiatives in this area to make public some of the things we have been doing and to make sure that the Soviet Union knows about them.

We talk a lot about deterrence in this area, and one of the most serious deterrents that I can imagine, would be the transmission to the Soviet Union of the statement that's just been made to you by Dr. Jacobson on the dangers inherent on this kind of research. I would not want to see us simply rely on their reading of the Congressional Record to get that. We know that, in fact, Mr. Gorbachev does, from time to time, have the Congressional Record put in front of him—and there was one occasion in a speech in Leningrad where he responded very specifically to a discussion which had taken place here on Capitol Hill, but I would think a little more active engagement with them on this issue would be in our interest, and I think the kind of dangers that Dr. Jacobson has underlined would be understood by Soviet scientists and would go a long way toward discouraging dangerous activities on their part, as well as in other countries around the world.

But I note that, even if the Soviets do not respond favorably, we have a record which should be somewhat instructive to us. As Mr. Leach underlined in his opening comments, this whole treaty was the result of a unilateral initiative on the part of President Nixon, and I think unilateralism has paid off in this case, the unilateral renunciation of biological warfare.

And I think moving toward complete transparency, unilaterally on our part, is very much worth considering as another act of American statesmanship and American leadership. Thank you, Mr. Chairman.

[Ambassador Leonards' prepared statement follows:]

PREPARED STATEMENT OF HON. JAMES F. LEONARD

Mr. Chairman:

I am honored to have this opportunity to appear before you and your colleagues on questions relating to biological warfare testing. A number of the problems that concern you are not ones that I can address. I am, as you know, a professional diplomat, now retired. I was the principal negotiator for the United States in the development of the Biological Weapons Convention which entered into force in 1975. What I can address, therefore, is the question of the intent of the parties as they worked out the text of that treaty, and in particular the question of what is permitted and what is prohibited by the treaty.

The BW Convention (or treaty - the terms are interchangeable) became a practical possibility in 1971, when the Soviet Union dropped its resistance to our position that the problem of prohibiting possession of biological weapons should be separated from the problem of chemical weapons and should be negotiated first. We had been urging this since 1969 and our British allies had led the way even earlier. In consultation with our allies, we had presented a draft text to the 26-nation disarmament conference in Geneva and in 1971 the Soviet Government indicated its acquiescence to our viewpoint by tabling a text which was in its most important provisions simply a rewrite of our draft.

The problem of a criterion for distinguishing between what the treaty would permit and would prohibit had been a difficult one for us, both in our deliberations within the U.S. Government and in our discussions with our allies. I will not go through the alternatives that were rejected but will simply say that we had settled on what we called a "purpose criterion." We had agreed that despite the advantages of prohibiting all activity involving research on possible agents of biological warfare, it was essential to permit governments to do research and other activities relating to defense against biological warfare. Moreover, many potential agents are naturally occuring substances which humanity must study and improve its ability to deal with.

It was clear, therefore, that "objective" criteria such as the toxicity of agents or quantities of agents could not be used and that the only possible criterion was the "subjective" criterion of intent. Activities aimed at "prophylactic, protective or other peaceful purposes" are permitted. The possession of agents "of types and in quantities that have no justification" for these peaceful purposes is prohibited by Article I of the treaty, from which I have been quoting.

The U.S. and other delegations had been discussing this problem of the criterion throughout 1970 and we were thus pleased but not surprised to find that in 1971 the Soviets readily agreed to the use of this criterion as the basis of the joint text which we quickly developed. The text, as you may recall, was refined very rapidly during the summer of 1971, presented to the UN General Assembly that autumn, and approved by the Assembly in December by

a vote of 116 to 0. Certain aspects of the treaty were controversial, but not Article I and the purpose criterion. It has not been the subject of serious controversy since then, including at the Review Conferences.

The use of the purpose criterion, though unavoidable and uncontroversial, means that there is no ready yardstick, no scientific test, available to us to discriminate between what a government may and may not do under the treaty. The stockpiling of militarily significant quantities of agent is clearly prohibited. That is what the treaty is about. But research is a more complicated matter and we have to ask what is the object, the intent of the research program. We can look at particular research activities and say that these "have no justification" or do have a justification, but these will be judgments on our part, not a matter of reading a dial that "proves" a conclusion beyond any dispute.

That, Mr. Chairman, is as far as I can take you on the basis of the treaty text, the negotiating background, and subsequent diplomatic activity. I would like, however, to offer a suggestion which may be helpful in your deliberations.

The ambiguous character of certain research activities and the difficulty of applying the purpose criteria to the activities of other governments are well known. Some people, though not I, are even dubious about the activities of their own government. There is a remedy for most of these doubts: it is openness.

It may sound radical and quite unrealistic, but I believe that in fact there are no activities relating to research on biological warfare which should be kept secret, except intelligence studies. It is healthy, I believe, for other governments to be somewhat uncertain how much we know about their activities, but it is also healthy for us to deliberately make available to all qualified scientists everywhere the totality of the research that we are doing on defense against biological and toxin weapons. I have been told that some years ago a panel chaired by a distinguished expert in this area, Dr. Ivan Bennett, studied thoroughly the pros and cons of this question and reached the conclusion that I have just summarized.

I will conclude by noting that a careful reading of Article X of the treaty indicates to me that this "total openness" or "transparency" or "glasnost", if you will, is not only in our security interest but is in fact an obligation of parties to the treaty. I do not imagine that the Soviet Government will readily agree, but I recall that the BW treaty grew out of a unilateral renunciation of BW by President Nixon in 1969. Moving toward complete transparency seems to me not only worth exploring with the Soviet Government but also worth considering as another act of unilateral American statesmanship and leadership.

Chairman FASCELL. Thank you very much, Mr. Ambassador.
Mr. Rifkin.
Mr. RIFKIN. Thank you. Good morning.

STATEMENT OF JEREMY RIFKIN, PRESIDENT OF THE FOUNDATION ON ECONOMIC TRENDS

Mr. RIFKIN. First I would like to thank Congressman Owens for initiating a process that led to these hearings today. I'm with the foundation on Economic Trends. We've been involved with the biological warfare issue for over a decade. In the summer of 1984 the Department of Defense requested funds to construct a high-tech biological warfare laboratory at Dugway, Utah.

At that time my foundation brought a lawsuit in U.S. District Court for the District of Columbia challenging the Department of Defense pointing out that they had not appropriately assessed the environmental impact to public health in building this potentially dangerous facility. The result of that lawsuit, that on May 1, 1985, the U.S. District Court here in the District of Columbia granted our permanent injunction barring the Department of Defense and the Department of the Army from building this facility pending an environmental impact statement. I would just like to point out for the record, had that suit not been brought, this facility would be running today; it would be in full operational form, and there was no intent by the Department of Defense at that time to even do an environmental assessment.

So I shudder to think what might have happened had there not been court intervention and the environmental impact statement forced on the Department of the Army. In September 1986, Mr. Chairman, we brought a second lawsuit against the Armed Services, the Army, Navy and Air Force, against the entire biological warfare program.

We challenged the Department of Defense, essentially pointing out that they had not assessed the environmental risk, the risk to public safety and health of their entire program across the United States. We subsequently won that case in U.S. District Court. The Court has ordered the Department of Defense to conduct a programmatic environmental impact statement of all facilities across the country.

This was probably the most sweeping victory in the history of the National Environmental Policy Act in terms of programmatic impact statements. That impact statement is due by the Department of Defense on May 12, just a few weeks from now.

The question I think essentially that is at interest here is why all the renewed activity and interest in biological warfare after a dormant period after the biological weapons convention was signed? As we know, there are four types of warfare: conventional, nuclear, chemical and biological.

As has been pointed out this morning, the 1972 treaty outlawed any offensive use of biological warfare.

But it's interesting to note for the record, that same year, Mr. Chairman, scientists at the University of California and Stanford successfully recombined genetic material across species lines, inventing a new technology called recombinant DNA. This technolo-

gy has revolutionized the possibilities of biological warfare. It is now theoretically possible to conceive of novel agents they could not have even dreamed of when this treaty was negotiated back in the early 1970s.

Let me pose some theoretical possibilities. All of these are still theoretical. Theoretically it would be possible in the years to come to conceive of developing a virus that would only attack specific ethnic and racial populations, because each ethnic and racial group has different genetic proclivities for diseases assaults from the environment.

And in fact as we map the human genome over the next fifteen years we will be developing a data base on genetic readout by various ethnic and racial groups and that information would be potentially convertible for developing viral weapons that would be ethnic and racial specific.

It's also possible to entertain the idea of developing a genetically engineered virus or microorganisms that would attack monocultured economies—economies that relied on a specific crop or a specific animal for their economic livelihood.

It would even be possible to entertain sending in microbes in the future in areas of the world where it would be too sensitive to send in troops or advisors. Microbes are versatile; they don't die out in the field; and it's very difficult to find out who the enemy is that sent those microbes in.

In fact, there's been two great technology advances since World War Two: we split the atom and we spliced the gene. The split atom was first used for military purposes and then it was convertible for commercial uses. The spliced gene is now being used for commercial purposes, but the data base that's being developed in animal husbandry and agriculture and human medicine, is potentially convertible to develop weapons to kill plants, animals, and humans. That's why we need to pay specific attention to the tremendous and profound possibilities here of a new biological arms race.

Just parenthetically in passing, an interest in biological and genetic engineering as applied to biological warfare dates back to the 1960s, and specifically to a hearing held in this House of Representatives in June 1969. At that time the Department of Defense went on record with their first public statement with the Congress about their interest in molecular biology.

And I would like to read to you from a remarkable congressional hearing document that's been overlooked over the years that's instructive of the potential problems we might face in developing this research. Speaking for the Department of Defense, Dr. MacArthur said to the Committee that "Molecular biology is a field that is advancing very rapidly and eminent biologists believe that within a period of five to ten years it would be possible to produce a synthetic biological agent, an agent that does not naturally exist and for which no natural immunity could have been acquired."

The Congressman at that time, Congressman Sykes, then requested a study.

The Department of Defense then presented a study and they went on to say that a small group of experts had met in the Pentagon; they said that they could come up within the next five to ten

years, "would be possible to make a new infective microorganism which could differ in certain important aspects from any known disease-causing micro-organisms. Most important of these is that it might be refractory to the immunological and therapeutic practices upon which we depend to maintain our freedom from infectious disease."

They then went on to say in the study that "a program had been initiated with the National Academy of Science to develop an agent for which there is no immunity," but the National Academy then pulled out and instructed the President of the United States that they would not take part.

In conclusion, the Department of Defense said "It is a highly controversial issue. There are many who believe such research should not be undertaken, lest it lead to yet another method of massive killing of large populations."

"On the other hand, without the sure scientific knowledge that such a weapon is possible and an understanding of the ways it could be done, there is little that could be done to devise defensive measures."

The reason I think this is instructive is that at the dawn of genetic engineering and molecular biology, the Department of Defense would even dream of developing an AIDS-like virus?

Now, let me be very clear: the AIDS-like virus is a naturally occurring virus. It is something that, as far as the scientific experts around the world conclude, is naturally occurring.

But it's instructive historically that the Department of Defense would even conceive of developing this type of virus using this molecular biology research.

Now, in the 1970s the whole area of biological warfare was dormant, even in research. When President Reagan came into office, things changed. The biological warfare research budget has increased by 500 percent in the last five years, and the Department of Defense is working on every deadly pathogen known to humanity in 129 university, corporate and military laboratories across this country.

Now, about two years ago, just before the Biological Weapons Review Conference, Douglas Fise, speaking for the administration before a House Committee, termed the Biological Weapons Treaty "critically deficient and unfixable," and suggested that our only proper response would be tremendous defensive research by the Armed Services.

Now earlier today, Mr. Chairman, there was some talk about whether or not we would—what was the capability of delivery systems for biological agents? During one of our lawsuits, we requested all strategic studies done by the Department of Defense. This is the listing of studies they came back with, which we were told were unclassified.

One of the studies that the DOD has done in the last few years is a study on biological agent delivery by intercontinental ballistic missile. We then requested those studies and they said they were now classified. I would be curious whether to see this particular study was a violation of that convention?

Now, as to—since many of the areas I would cover have already been covered, I would like to skip over those, if I may, and go di-

rectly to the Dugway Proving Grounds, as we were principal in that biological warfare lawsuit.

First of all, it instructed to note that the presence of Dynomat, which is the company that did this environmental impact statement for the Department for the Defense, the president of the company is Dr. MacArthur, the same Dr. MacArthur who provided testimony 20 years ago to the Congress that I read to you that we could develop an agent to which there is no effective immunity.

I would seriously have to challenge the veracity of having the Department of Defense contract with a company whose president was interested in developing, while he was with the DOD, a weapon of that kind of lethality, and we have petitioned Secretary Carlucci and asked for an investigation of that.

As to the particulars of Dugway, this environmental impact statement is shoddy, it's reckless, and I think it's an insult to the environmental process. For example—let me give you several quick examples:

The Army says that the only way a microbe could escape from this lab at Dugway is by an infected worker. But that the workers would all be vaccinated so that they wouldn't be able to bring the infected agent out of the lab.

This is—I don't know whether to be amused or chagrined. For most of the agents they'll be working on at Dugway, there are no vaccines. The whole intent of this program, according to the Army, is to develop vaccines against known pathogens.

So obviously, there is no effective vaccines for many of the agents they'll be working on. Secondly, they said that if someone is infected, they will quarantine them immediately.

Well, that's interesting, because many of these diseases you cannot immediately detect—where an agent has entered a body, it could take weeks—or months, for those characteristics to show up. Meanwhile the person could leave the laboratory and infect the local population.

Nowhere, sir, in this environmental impact statement, do they deal with the question of security. The fact is that security at Fort Detrick and at these other 129 laboratories, is virtually non-existent for laboratory personnel. There is nothing to bar an employee working in this lab from walking out of that laboratory with a vial of deadly virus.

Obviously the problems of saboteur and terrorism is real. But let's just think of the problem of the disgruntled employee and has a complaint and walks out of that laboratory with a virus and lets it loose? It could be comparable to a nuclear meltdown in its potential impact.

At Fort Detrick, where we have considerable knowledge, two hundred people have keys to the "hot" suites, lab technicians; animal caretakers; people without security clearance; people who have been on alcohol and drug syndrome programs. Any one of those technicians could walk out of that laboratory with a deadly virus and they've never been checked once. Nobody has ever been checked leaving a "hot" suite to see what's in their suitcases or what's in their clothes.

And the EIS doesn't deal with it at all.

They do not deal with transportation. What are the problems in shipping deadly viruses to Dugway through the mails, through Federal Express? There have been several accidents over the last several months that point out the potential dangers.

At Fort Detrick, at the post office, one postal worker accepted a package—it was soaking and leaking with flu virus and got on his hands.

They don't deal with the question of fire or explosion because they say it's a remote possibility. But Mr. Chairman, there's been fires and explosions at Detrick and other laboratories.

Finally, there have been no provisions for evacuation of populations in any of the areas in Utah, in case there is an accident. There is no provision for quarantine of populations there is no provisions for emergency medical treatment.

And last, as to the question of simulants, when we went into court against the Department of Defense, we brought distinguished scientists to testify that simulants could be adequate to the job at hand at Dugway. The only point here is to develop a means to check whether clothing and equipment is penetrated by microbes, use a simulant, a microbe that is not deadly but shares the property of these particular microbes—then we could protect the national defense and national security without endangering the population of Utah or other cities where these labs are.

To this time the Department of Defense has come up with no scientific studies or data to back up their conclusory statement that simulants are inadequate, and they take no attention to alternative sites.

They have a conclusory statement that the one site they looked at, the Johnson Atoll Island in the South Pacific, is not adequate logistically. No studies to back it up; no cross-benefit analysis whatsoever.

In conclusion, I notice that public officials in the State of Utah were very concerned about building, this facility. Congressman Owens, I believe, was the first in the State to address some of these concerns and then Governor Bangator, who said that the State would oppose the building—the construction of this facility at this time, and I take—would like to take note, of the comments of Senator Orrin Hatch.

Senator Orrin Hatch put out a press release several—about a month ago, saying he thought the construction of the proposed facility at Dugway was "reckless endangerment" by the Pentagon, and that "Utahans should not be subjected to this unconscionable possibility in their State."

Well, I suggest that, if it's too dangerous to house these deadly viruses in Utah, then it's too deadly, too dangerous, to house these viruses in some of these other 129 laboratories, university labs; corporate labs, military labs, that are also under contract with the DOD; also working on the range of viruses that would be worked on in Dugway.

It seems to me we don't want a double standard. If it's dangerous for Utah, it's dangerous for the rest of the country.

Finally, in terms of what we plan on doing in the future, we don't need a new, deadly biological arms race to compete with the nuclear arms race. I used a phrase about ten years ago that I said I

thought would be in the popular vocabulary within a decade, the "gene gap."

We're all familiar with the "missile gap" and the "missile gap paranoia" of the early '60s, the superpowers each accusing the other of escalating their military arsenals so they could escalate their own.

Now, I'm afraid we're on the verge of a "gene gap." Superpowers accusing each other of doing probably more than they really are doing, but the paranoia, sir, is building up to such an extent that I suspect that many countries feel they have to engage in defensive research, and that is creating the possibility of a runaway biological arms race.

We, at the foundation, will be mobilizing communities across the country starting in July and August of this year, and every single community where these laboratories are now under contract for the Department of Defense, and in the fall, we would also be mobilizing at university facilities, so that we can bring to the public some of the real environmental problems and disarmament problems raised by this technology.

And we've also made it clear to the Department of Defense that we plan, our attorneys, plan on going back into court as soon as this environmental impact statement is completed. If it's not adequate to the concerns that we raise, we are prepared to go back into court, maintain that permanent injunction. We don't think this facility should be built and we will maintain our vigilance in the U.S. District Court for as many years as it takes until these issues are resolved by the U.S. Congress and by the Department of Defense. Thank you, Mr. Chairman, for the time.

[Mr. Rifkin's prepared statement follows:]

PREPARED STATEMENT OF JEREMY RIFKIN

I. INTRODUCTION

Biological Warfare involves the use of living organisms for military purposes. Biological weapons can be viral, bacterial, fungal, rickettsial and protozoan. They can be used to destroy animals, crops, and people. Biological agents can mutate, reproduce, multiply and spread over a large geographic terrain by wind, animal, and insect transmission. Once released, many biological pathogens are capable of developing a viable niche and maintaining themselves in the environment indefinitely. Traditional biological agents include yersinia pestis (the plague), tularemia, rift valley fever, coxiella burnetii (Q fever), eastern equine encephalitis, and small pox.

Biological Warfare has never been widely used because of the expense and danger involved in processing and stock piling large large volumes of toxic materials, and the difficulty in targeting the dissemination of biological agents. However, new advances in genetic engineering technologies over the past decade have made biological warfare a viable possibility for the first time in history.

In a May 1986 report to the Committee on Appropriations of the United States House of Representatives, the Department of Defense pointed out that recombinant DNA and other genetic engineering technologies are finally making biological warfare an effective military option. Genetic engineers are cloning previously unattainable quantities of "traditional" pathogens. The technology can also be used to create "novel" pathogens never before seen. As summarized in the report,

> [new advances in biotechnology]...permit the elaboration of a wide variety of 'novel' warfare materials...The novel agents represent the newly found ability to modify, improve or produce large amounts of natural materials or organisms previously considered to be militarily insignificant due to problems such as availability, stability, infectivity and producibility. (1)

The report goes on to say that

> potent toxins which until now were available only in minute quantities, and only upon isolation from immense amounts of biological materials, can now be prepared in industrial quantities after a relatively short developmental period. This process consists of identifying genes, encoding for the desired molecule and transferring the sequence to a receptive micro-organism which then becomes capable of producing the substance. The recombinant organisms may then be cultured and grown at any desired scale...Large quantities of compounds, previously available only in minute amounts, thus become available at relatively low costs. (2)

With recombinant DNA technology, it is now possible to develop "a nearly infinite variety of what might be termed 'designer agents', ". (3) The DOD report concludes that the new developments in genetic engineering technology enable "the rapid exploitation of nature's resources for warfare purposes in ways not even imagined ten to fifteen years ago." (4) In August of 1986, Douglas J. Feith, Deputy Secretary of Defense, noted the near impossibility of defending against this newfound ability to genetically engineer biowarfare agents:

> It is now possible to synthesize BW agents tailored to military specifications. The technology that makes possible so-called "designer drugs" also makes possible designer BW....It is [becoming] a simple matter to produce new agents but a problem to develop antidotes. New agents can be produced in hours; antidotes may take years. To gauge the magnitude of the antidote problem, consider the many years and millions of dollars that have been invested as yet without success, in developing a means of countering a single biological agent outside the BW field -- the AIDS virus. Such an investment far surpasses the resources available for BW defense work. (5)

In examining the potential impact of genetic engineering on biological warfare research, it is important to recognize the parallels between present bioengineering research and nuclear research in the 1940s and 1950s. The data base developed from nuclear technology was convertible to both military and industrial purposes. Similarly, the data base being developed for the commercial uses of genetic engineering in the fields of agriculture, animal husbandry, and human medicine is potentially convertible to the development of a wide range of novel microorganisms that can attack plant, animal, and human populations.

Recombinant DNA "designer" weapons can be created in many ways. The new technologies can be used to program genes into infectious micro-organisms to increase their antibiotic resistance, virulence, and environmental stability. It is also possible to insert lethal genes into harmless microorganisms resulting in biological agents that the body recognizes as friendly and does not resist. It is even possible to insert genes into organisms which affect regulatory functions that control mood and behavior, mental status, body temperature, and other functions. Scientists say they may be able to clone selective toxins to eliminate specific racial or ethnic groups whose genotypical make-up predisposes them to certain disease patterns. Genetic engineering can also be used to destroy specific strains of agricultural plants or domestic animals if the intent is to cripple the economy of a country. In recent months advances have been made in the creation of genetically

engineered microbes which are designed to self destruct after a given period of time. The implications of this, and other advances in genetic engineering, are extraordinary and frightening.

The new genetic engineering technologies provide a versatile form of weaponry that can be used for a wide variety of military purposes ranging from terrorism and counter-insurgency operations to large scale warfare aimed at entire populations. Unlike nuclear technologies, genetic engineering can be cheaply developed and produced, requires far less scientific expertise, and can be effectively employed in many more diverse settings.

II. HISTORY

Interest in the use of molecular biology to develop novel biological agents dates back to the 1960s. In June, 1969, the House Subcommittee on Defense Appropriations held hearings on Chemical and Biological Warfare. As part of that hearing, the Subcommittee heard testimony by Dr. Donald M. MacArthur, then Deputy Director for Research and Technology at the DOD. Dr MacArthur testified that, "Molecular biology is a field that is advancing very rapidly, and eminent biologists believe that within a period of five to ten years it would be possible to produce a synthetic biological agent that does not naturally exist and for which no natural immunity could have been acquired."

When asked for further information on this project and its cost, MacArthur promised to provide the Subcommittee with a report. As submitted to the Subcommittee, this report turned out to be a remarkable document. According to the report, DOD convened a "small group of experts" in the field of molecular biology. These scientists concluded that it would indeed be possible within five to ten years to "make a new infective microorganism which could differ in certain important aspects from any known disease causing organisms. Most important of these, is that it might be refractory to the immunological and therapeutic processes upon which we depend to maintain our relative freedom from infectious diseases." The DOD report estimated that the cost for producing this novel virus would be about 10 million dollars and that the project would take approximately 5 years to complete.

The report concludes, "It is a highly controversial issue and there are many who believe such research should not be undertaken, lest it lead to yet another method of massive killing of large populations. On the other hand without the sure scientific knowledge that such a weapon is possible and an understanding of the ways it could be done, there is little that could be done to devise defensive measures. Should an enemy develop it there is little doubt that this is an important arena

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of potential military technological inferiority in which there is no adequate research program."

The DOD report described arrangements that had already been made with the National Academy of Science's National Research Council (NAS-NRC) to engage in this research. According to the report the DOD and the NAS-NRC had already discussed the plans to develop the "super" virus. At the time of the DOD proposal, NAS was so concerned that its president informed the Science Advisor to the President of the United States that it would not involve itself in this program.

The ultimate results of this proposal to create a "super" virus are not known. However, after the signing of the Biological Warfare Convention of 1972, research in molecular biology for biological warfare purposes diminished until the beginning of the Reagan Administration. Under the rubric of "defensive research," the United States Department of Defense launched a significant R&D effort over the last half decade. In 1981, the Pentagon budget for "defensive" biological warfare research was only $15.1 million. In fiscal 1982 it rose to $21.6 million. In fiscal 1983 it jumped again to $38.8 million. In 1984 it rose still higher to $39.1 million. In 1985 the DOD budget grew to $50 million and in 1986 to $90 million. (6) The various branches of the Armed Services now work with virtually every major pathogen in the world from hemorrhagic fevers to exotic virus disease like Chikungunya and Mayaro to newly discovered viruses like AIDS. The Department of Defense claims that most of the work is unclassified and intended to provide the United States military with defensive protection in the form of vaccines and antidotes. Despite the Department of Defense assurances that its biological warfare program is defensive in nature and not in violation of the Biological Weapons Convention, many observers are alarmed over the increased commitment of funds for genetic engineering research.

This Administration is particularly concerned over what it perceives as a "gene gap". In the fall of 1984, Secretary of Defense Caspar Weinberger told Members of Congress that he had obtained "new evidence that the Soviet Union has maintained its offensive biological warfare programs and that it is exploring genetic engineering to expand its program's scope." Weinberger went on to warn the Congress that "it is essential and urgent that we develop and field adequate biological and toxin protection." (7)

Convinced that the Soviets are violating the Convention and broadening the "gene gap" by launching a rigorous research and development program in genetic weaponry, the United States Department of Defense has announced its intentions to respond in turn with an abitious "defensive" program of its own. Whether or not the Soviet Union or the United States has been violating the

Biological Weapons Convention, as each has accused the other, is still a matter of conjecture and speculation, despite the rhetoric of both sides. Nonetheless, the Soviet Union is likely to react to the new U.S. intention to accelerate "defensive" research by increasing its own R&D efforts. The "missile gap" paranoia of the 1970's and 80's is bound to be joined by the "gene" gap as each nation's accustions and counter accusations tears away at the fabric of the Biological Weapons Convention, preparing the groundwork for a deadly arms race with genetic engineering weaponry.

Even though the Biological Weapons Convention prohibits the stockpiling of biological weapons for offensive purposes, it does allow member nations to maintain small quantities of biological agents for "peaceful purposes." Both the United States and the Soviet Union have interpreted this provision of the treaty so as to justify "research into those offensive aspects of bacteriological/biological agents necessary to determine what defensive measures are required." (8)

III. ENVIRONMENTAL IMPACT

The exponential growth of the Biological Defense Program (BDP) over the last seven years has the potential for significant adverse effects on the environment and public health. According to the DOD, as of February 1988, biological warfare research is ongoing in more than 19 government labs, 50 non-governmental research labs and institutions, and over 85 colleges and universities. This research involves numerous bacteria strains such as Salmonella marcescenes, and Yersina pestis, numerous viruses including Rift Valley Fever, Yellow Fever, poliovirus, Ebola and Marburg viruses and human retroviruses; and more than seventy toxins, including T2 mycotoxin, Scorpion toxin, and Mojasve rattlesnake toxin. The BDP has also conducted over 75 recombinant DNA experiments.

Senator Orrin Hatch (R-UT) has maintained that biological warfare experiments in populated areas constitute "reckless endangerment" and has advocated "a remote island for any future biotoxin work." (9) The environmental impacts of this research brings up the following concerns: 1) effects on the general public from potential exposure to biological warfare agents during normal operations or due to advertant or inadvertant release of the hazardous organisms (i.e. human error, equipment failure, terrorism, or natural disasters); 2) effects on DOD personnel from potential exposure to biological warfare agents being researched; 3)impacts on air, and water quality and biota from BDP operations or accidents; 4)laboratory security; 5)risks involved in decontaminating facilities; 6) treatment and disposal of BDP research wastes; 7) transportation and shipping of BDP pathogens; and 8) economic and social impacts to areas adjoining

BDP sites.

The Foundation on Economic Trends has embarked on a series of actions over the last 5 years which temporarily halted certain biological warfare research work, focused public attention on the military application of genetic engineering technology, and forced the Department of Defense (DOD) to prepare environmental impact statements (EISs) on the health and environmental implications of the BDP.

In December, 1984, the Foundation on Economic Trends (Foundation), its President Jeremy Rifkin, and other plaintiffs filed a motion for preliminary injunction to enjoin the construction of the proposed aerosol biological warfare testing facility (BATF) at Dugway, Utah. Plaintiffs maintained that the Army had not prepared an environmental assessment (EA) for the facility and were therefore not in compliance with the National Environmental Policy Act (NEPA). Approximately one month later, the Army released an EA for the BATF. Contending that the EA was grossly inadequate, plaintiffs quickly moved for a permanent injunction on the facility.

On May 31, 1985, Federal district court judge, Joyce Hens Green, permanently enjoined the construction of the lab citing the "serious and far-reaching risks" involved in its operation. Judge Green held that the EA was "clearly inadequate" and a "substantive violation" of NEPA. Judge Green concluded, "Given the deadly nature of the material being tested, considerations of the larger interests of society--particularly concerns for public health and safety--militate heavily in favor of enjoining construction." See Foundation on Economic Trends et al. v. Caspar W. Weinberger et al., 610 F. Supp. 829 (D.D.C. 1985).

As a result of the Federal court order, the Army elected to prepare an Environmental Impact Statement for the Dugway facility (herinafter "Dugway EIS"). After months of delay, the Dugway EIS was released in February 1988. A public hearing was scheduled for March 14, at Tooele, Utah.

The release of the Dugway EIS has led to considerable controversy in Utah. Scientists, environmentalists, and several elected officials, including the Governor, have spoken out against the construction of the BL4 lab in Utah and called for additional public hearings. The Army responding to requests from several Utah political leaders held an additional hearing on the Dugway EIS at Salt Lake City on March 22, 1988.

The form and content of an EIS must foster both informed decision-making and informed public participation. Crucial to fulfilling this purpose is that an EIS "provide full and fair discussion of significant environmental impacts and...inform the

decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts..." (40 C.F.R. 1502.1)

The Dugway EIS fails in both of these purposes. It does not adequately address the environmental consequences of the proposed action, nor does it provide a full and fair description of possible alternatives to the construction and operation of the BATF. Its findings are conclusory and unsupported.

The eight pages that the Dugway EIS devotes to the environmental consequences of the construction and operation of the BATF and its alternatives are woefully inadequate in both methodology and substance. The issues identified above as central environmental concerns about BDP research are not subsantially addressed. This is in part due to the Army's novel and blatant misuse of the "reasonably forseeable" environmental impact concept (contained in 40 C.F.R. 1502.22) as a means by which to summarily reject all possible hazards in the operating of the BATF.

The Dugway EIS dismisses the risks of all human error, mechanical error, fire, explosion, contamination through infected clothing, equipment, instruments, or lab animals in a single page. Each risk is seen as "highly improbable and not reasonably forseeable." Moreover, the Dugway EIS contains no discussion of terrorism, sabotage or other forms of intentional release. No scientific evidence is given for these conclusions and ommisions despite the fact that each of these risks has been well publicized and many have occureed at high level containment military and research labs. These risks are clearly forseeable and their consequences deserve and require detailed examination.

The Army should be aware that the "reasonably forseeable" concept in assessing environmental consequences in EIS's specifically includes the mandate to examine impacts which have catastrophic consequences" even if their probability of occurrence is low." 40 C.F.R. 1502.22. Additionally, courts have consistently held that "the mere fact that the possibility of an event occurring is remote or unlikely does not obviate the necessity to do a worse case analysis." See Save Our Ecosystems v. Clark, 740 F.2d 1240, 1243-45 (1984); Oregon Natural Resources Council v. Marsh, 820 F.2d 1051 (1987)(reaffirming worst case analysis requirement). The Army must perform such analyses on the potential risks of the BATF.

The only impact given any analysis in the Dugway EIS is the possibility of an infected worker acting as a potential transmitter of infection. Here the Army insists that vaccinations and isolations make any impacts caused by worker infection not "reasonably forseeable." These claims contradict other statements in the EIS and simple logic. There simply are

no vaccinations for many of the pathogens which will be involved in the testing at the BATF, including those "suspect threat agents known or believed to include exceptional hazardousness" which will be a significant focus of the BATF research. (C-4)

Moreover, the EIS assumes that an infected worker can be immediately spotted and isolated. Many bacteria and viruses will not immediately cause symptoms and it could be days, months, or even years before the worker realizes that he has been infected. During this entire time he could infect his family and community with the pathogen. It is worth noting that the biological warfare research facilitiy at Fort Dietrich, Maryland has experienced hundreds of accidental infections over the last 30 years. That facility has also experienced fires, explosions, missing quantities of pathogens, and the loss of pathogens in the mail.

The consideration of alternatives is generally accorded the role of "linchpin" for any EIS. A full and detailed discussion of the alternatives to a proposed action is essential for a legally adequate EIS. An alternative may not be given short shrift because it is outside the jurisdiction of the agency or is contrary to existing agency policy. In sum, the discussion of alternatives must demonstrate that the agency has taken a "hard look" at the environmental consequences of its proposal and those of possible alternatives. In the Dugway EIS, the Army has failed to adequately address the alternatives to its proposed action. Its discussion of alternatives is replete with sweeping conclusions unsupported by facts and scientific studies. As noted, the CEQ regulations specifically forbid such vague, conclusory and unsupported discussion of alternatives to a proposed action. See 40 C.F.R. 1502.24. The three most important alternatives which are not adequately addressed in the Dugway EIS are the use of simulants, the construction of the facility at a remote DOD location, and the "no action" alternative.

a. SIMULANTS-- The Army admits that "exclusive use of simulants would practically eliminate environmental and health hazards of the proposed action." It is therefore extraordinary that the Army dismisses this alternative without citing any scientific sources, research, or study in support of its conclusion. Additionally, the Army states that, "some of the procedures used to evaluate detectors depend on specific properties of pathogens that are not demonstrated by simulants."(E-7) Yet the EIS does not contain any specific references or descriptions of which evaluative procedures are being referred to, and/or which specific properties of pathogens are not demonstrated by simulants. Moreover, the assertion that simulants inadeqautely mimic pathogens is offered without any scientific references and is directly contradicted by the statements of other scientists.

Any legally adequate discussion of the simulant alternative should include, inter alia: 1) a listing by the Army of how many

simulants have been approved by the Army for use and for what uses; 2) an explanation by the Army of its procedures for developing simulants or surrogates for testing, including a description of its program, if any, for developing such simulants, including facilities, personnel and funds dedicated to such purposes and what priority the Army has given to their development; 3) a precise description of which tests, and for which pathogenic organisms, simulants are ineffective; 4) an explanation and description of what specific characteristics in each of the pathogenic microorganisms will be useful for tests to be performed in the facility and to what extent those characteristics may be developed (or retained) in such simulants; 5) an explanation of why simulants in the form of attenuated strains, vaccine strains or related not-pathogenic species are not suitable for various contamination and decontamination tests, including specific characteristics of each specific simulant which do not make them useful in such tests.

b. CONSTRUCT AND OPERATE A BATF AT A REMOTE AND ISOLATED LOCATION WITHIN DOD-- The Army's summary rejection of this alternative in a single paragraph is based on conjecture, and conclusory statements.(E-2) The Army admits that constructing and operating a BATF at a remote location would "achieve the utmost minimization of possible risk to the general public and to economically important environmental resources . . . [and] ensure security as well as safety." Yet without citing any figures or studies the Army concludes that this alternative would present unacceptable logistical and economic problems. The Army further justifies its rejection of this alternative by maintaining in a self-serving fashion that the BATF facility will not pose hazards sufficient to justify the use of a remote cite.

In order for the Army's logistic and economic objections to this alternative to be maintained, the Dugway EIS would have to contain detailed studies comparing the logistical and economic difficulties of building the facility in a remote DOD location (the EIS suggests the Johnston Atoll, in the Pacific Ocean), as against building it at Dugway. Only after conducting such comparative studies could the additional costs and difficulties of construction and operation of the BATF at a remote location be balanced against the vast minimization of risk that such an alternative would provide.

It has already been shown that the EIS does not take a "hard look" at the potential risks of the operation of the proposed facility. Thus the Army's dismissal of this alternative on the basis that the BATF does not pose hazards significant enough to justify operation at a remote location, is misleading and inaccurate, as is the EIS's entire risk assessment.

c. NO ACTION -- The EIS under this heading discusses only the no action alternative of conducting the proposed aerosol testing with the use of present facilities at Dugway. The no action

alternative should also discuss the merits of not conducting the expanded aerosol experimentation at all. The efficacy and practicality of this testing approach has been questioned by distinguished scientists knowledgable in the field. The scientific credibility of the advance detection premise is questionable, particularly at a time when genetic engineering is becoming capable of fashioning infinite varieties of BW agents. The only real defense for such weapons lies not in hazardous aerosol and genetic engineering experimentation but rather in strengthening the 1972 Biological Weapons Convention.

In sum, the Dugway EIS is shoddily prepared, grossly inadequate, and in clear violation of NEPA and its relevant regulations. The Dugway EIS fails to adequately assess the risks of the construction and operation of the BATF and also fails to conduct a full discussion of possible alternatives. The EIS is virtually useless as a document to inform either decisionmakers or the public on the BATF.

The Foundation is organizing grass roots opposition in Utah to counter the construction of the Dugway facility. Furthermore, the Foundation will once again litigate to stop the DOD from buiding and using this hazardous facility.

In September 1986, the Foundation filed another law suit against the DOD challenging the environmental, and public health and safety risks of the entire biological research program. On February 17, 1987, the U.S. District Court of the District of Columbia held for the Foundation and ordered that the DOD undertake the preparation of a programmatic EIS covering all 129 private and military laboratories which conduct biological warfare research. This court decision represents one of the broadest victories in the history of the National Environmental Policy Act. On August 12, 1987, the Foundation participated in the "scoping" of this EIS. The Foundation insisted that its major concerns about the efficacy of the biological warfare program, its security, and its environmental effects be included in the court ordered environmental documentation. The Army is expected to produce this comprehensive programmatic impact statement in late May 1988.

IV. FUTURE ACTION

In order for the DOD to minimize the environmental impacts of its BDP program, it will have to significantly modify its implementation of the BDP program. This alteration would have to involve the change in the conduct, type and scale of BDP activities. The first step in improving the conduct of BDP activities would be mandatory compliance with NIH Guidelines, vastly improved security at BDP labs, and greater care taken to insure the safety of workers. Changes in BDP activities should include a total commitment to the use of simulants rather than

the toxic materials currently in use. Reducing the scale of BDP would require maintaining a precise inventory of all BDP materials.

Finally, the environmental impacts of the BDP program could be minimized through a change in the location of BDP operations. Such research should not be dispersed through the several dozen laboratories currently in use. Instead any BDP research found absolutely necessary should be located at remote sites away from populations.

Footnotes

1. Department of Defense Biological Defense Program, Report to the Committee on Appropriations House Representatives, May 1986, p. 4.

2. Ibid., p. 8.

3. Ibid., p. 8.

4. Ibid., p. 4.

5. Testimony of Douglas J. Feith Before the Subcommittee on Oversight and Evaluation of the House Permanent Select Committee on Intelligence, August 8, 1986.

6. Tucker, pp. 60-69. See also: Department of Defense Annual Report on Chemical Warfare, Biological Defefnse Research Program Obligations Oct. 1, 1984 through Sept. 30, 1985, RCS: DDUSDRE (A) 1065.

7. Correspondence from Secretary of Defense Casper Weinberger to Senator Jim Sasser, November 20, 1984.

8. National Security Decision Memorandum 35, November 25, 1969, reported in Jonathan B. Tucker, "Gene Wars," Foreign Policy (Winter, 1984-85), p. 68.

9. Press Release,"Hatch Proposes Island Location For Germ Warfare Testing", Office of Orrin Hatch, March 25, 1988.

Chairman FASCELL. Thank you, Mr. Rifkin. Dr. Robbins.
Dr. ROBBINS. Thank you, Mr. Chairman.

STATEMENT OF ANTHONY ROBBINS, M.D., PROFESSOR OF PUBLIC HEALTH, BOSTON UNIVERSITY SCHOOL OF PUBLIC HEALTH, PAST PRESIDENT, AMERICAN PUBLIC HEALTH ASSOCIATION

Dr. ROBBINS. On behalf of the American Public Health Association and its 35,000 public health professionals that make up its membership, I urge the Congress to recognize that modern biological weapons offer no reasonable opportunity for prevention and control.

Public health measures have always been considered the basic defense against biological weapons. Ordinarily, prevention and control of biological agents are achieved by protective clothing; by specific vaccines against the organisms and their toxins, and by specific drugs.

However, weapons designed and built with modern biotechnology will leave us no reasonable opportunity to protect the public. This is true whether the public is exposed by military attack; by accident; or by terrorism.

Advances in genetic engineering and other new techniques of biotechnology have magnified both the theoretical lethal capabilities of biological agents, and their potential to create public health catastrophes. As the AIDS epidemic reminds us so forcefully, the great advances in controlling both endemic and epidemic infectious diseases may be inadequate to cope with a novel organism.

To illustrate the kind of hazard we might face if military researchers are able to modify the disease causing potential of an organism by transferring genetic information from another organism, I have dreamed up a new, and I point out, strictly hypothetical, AIDS virus. This example can illustrate how biological warfare agents might get out of control.

As a starting point, you should understand that AIDS, which will eventually destroy a large portion of the urban population of Africa, as well as smaller portions of the U.S., European, Asian and Latin American populace, before it is controlled—is highly controllable compared to what could be created by biotechnology.

In AIDS, only a small percentage of sexual acts results in the transmission of HIV from the infected individual to an uninfected individual. Transmission by blood still occurs in a minority of exposures. Because of the slow course of the epidemic, we've had over five years to change behavior and develop a preventive or curative vaccine or drug. Yet no vaccine has been effective, and in fact, a conventional vaccine may be impossible against HIV. And no drug has cured an AIDS patient or blocked transmission of the virus.

Now imagine a hypothetical, new HIV as contagious as measles, which still kills more children in the world than AIDS. It is possible, for example, for your child to visit a doctor's office where another child had been seen shortly before. The other child develops the classic signs of measles the next day. Your child, even without direct contact was exposed to the measles virus and may develop the disease about two weeks later.

If HIV were as infectious as measles, the devastation from AIDS in the world might already be beyond repair. Yet this is exactly the capacity of modern biology. It is possible to merge the characteristics of different organisms in a single new organism.

We are thrilled when the vaccinia virus, which was used for smallpox vaccination, can be engineered to immunize against six diseases at the same time, but we should be terrified that other viruses can be made highly infectious, highly virulent, and highly toxic.

Many scientists will tell you that it is unlikely that a hybrid organism would be more pathogenic than either of the parent species from which it was derived. Rather, it might combine certain important characteristics of one species, such as survival characteristics or immunologic properties with the disease causing properties that make it a better weapon. And with the new science, now thousands and maybe millions of deadly organisms are possible.

Everyone knows that biological weapons are dangerous—that's why they're designed and built. But what are the sources of these organisms that worry public health officials and should worry the Congress? First is military testing, which is being considered here today, testing even for defense means our country possessing the biological warfare agents here in the U.S. As explained to me, the main strategy for defense against biological weapons is to invent, design, and build all of the organisms that an opponent might be building to use against us, and then to create specific defenses, such as vaccines.

Even if this were possible, and few believe it is, it would mean that we would be using and storing within the United States the very organisms that we and our enemies agree would be good weapons.

The second source is still incomplete. The new biotechnology industry is experimenting with vectors. Vectors are simply the infectious agents capable of transferring genetic material and information from one organism to another—one species to another.

Vectors are essential to biotechnology and an important element in building biological weapons. Thus, elements of biological weapons are increasingly available in industry. Industry might also represent a source of more complete biological agents, if the defense department contracts with biotechnology firms to develop these agents. The hazard is then magnified because most of the new biotechnology firms are located in populated areas around universities, near Boston, San Francisco, Washington.

Finally, we could be exposed to biological weapons by terrorists. Although biotechnology is very sophisticated and demands great brainpower, in some ways it's still low-technology. Many new organisms could be built in a kitchen and produced in great quantities in a brewery. It appears that a knowledgeable terrorist could produce biological weapons far more easily than nuclear weapons.

One cannot overstate our inability to deal with novel agents. In principle, a scientist who designs a new biological agent and then produces it, might also be able to produce a vaccine or drug against the new organism. But unprepared for public health authorities who know nothing of the weapon's origins, its structure, it's patho-

genic mechanism and transmission, the task of producing a vaccine or drug and doing it very rapidly is almost impossible.

There was a time when microbiologists could catalogue in just a few pages the organisms and toxins that were most likely to be used as weapons. Today the number of potential agents has multiplied to the point where it is no longer possible to plan or respond with defenses. Defense of the population against new biological weapons is no longer possible. There is no public health or medical strategy.

The American Public Health Association believes the United States must not engage in testing of biological warfare agents. There are three reasons: first, and it's been mentioned already, is the treaty. But second, as indicated above, the development of agents to test defenses is operationally equivalent to the development of agents for offense. But even if defense were possible, which it is not, it would be impossible to convince other nations that our testing activities are not intended for an attack rather than for protection of our population.

And third, I guess it seems almost unnecessary to remind the Congress that promises about safety measures should be highly suspect. It's hard to believe that any safety system is sufficient to cope with a biological agent that has been created in advance of any control or prevention method.

The risks may approach the infinite, but I sincerely doubt that the effectiveness of safety measures approach the infinite. The goal, afterall, in building biological warfare agents is to achieve uncontrollable spread, except for protected populations.

Chernobyl and Three Mile Island happened despite assurances about safety measures. But even the worst nuclear accident has a limited effect. Biological agents may spread death until the susceptible population is reduced to the point where the epidemic peters out.

[Dr. Robbins' prepared statement follows:]

Prepared Statement of Anthony Robbins

On behalf of the American Public Health Association and the 35,000 public health professionals that make up its membership, I urge the Congress to recognize that modern biological weapons offer no reasonable opportunity for prevention and control. Public health measures have always been considered the basic defense against biological weapons. Ordinarily, prevention and control of biological agents are achieved by protective clothing, specific vaccines against the organisms and toxins, and specific drugs. However, weapons designed and built with modern biotechnology will leave us no reasonable opportunity to protect the public. This is true whether the public is exposed by military attack, by accident, or by terrorism.

The American Public Health Association has twice adopted policy statements on biological warfare, the first in 1969 when President Nixon unilaterally renounced these methods and ordered the destruction of existing US stockpiles, and again in 1974, just prior to the Senate's ultimate ratification of the Biological Warfare Convention which legally obligated this country to cease the development, production, and stockpiling of biological weapons. On each occasion APHA took note of the possibility that such weapons, however limited their tactical use, could cause unforseen and uncontrollable public health and ecological effects.

Nothing has occurred in the meantime to mitigate these concerns. On the contrary, advances in genetic engineering and other new techniques of biotechnology have magnified both the theoretical lethal abilities of agents and their potential to create public health catastrophes. As the AIDS epidemic reminds us so forcefully, the great advances in controlling endemic and epidemic infectious diseases may be inadequate to cope with a

novel microorganism. Recall that more people have died from malaria in this century than on all the battlefields in human history.

To illustrate the kind of hazard we might face if military researchers are able to modify the disease causing potential of an organism by transferring genetic information from another organism, I have dreamed up a new and strictly hypothetical AIDS virus. This example can illustrate how biological warfare agents might get beyond any control. As a starting point you should understand that AIDS, which may destroy a large part of the urban population of Africa, as well as smaller portions of the US, Europe, Asia and Latin America populace before it is controlled, is highly controllable compared to what could be created by biotechnology. Only a small percentage of sexual acts result in transmission of HIV from the infected individual to an uninfected individual. Transmission by blood is more efficient, but still only occurs in a minority of exposures. Because of the slow course of the epidemic, we have had over five years to change behavior and develop a preventive or curative vaccine or drug. Yet no vaccine has been effective and, in fact, a conventional vaccine may be impossible against HIV. And no drug has cured an AIDS patient or blocked transmission of the virus.

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Yet this is exactly the capacity of modern biology. It is possible to merge the characteristics of different organisms in a single new organism. We are thrilled when the vaccinia virus, which was used for smallpox vaccinations, can be engineered to immunize against six diseases at the same time, but we should be terrified that other viruses can be made highly infectious, highly virulent, and highly toxic. Many scientists will tell you that it is unlikely that a hybrid organism would be more pathogenic than either of the parent species from which it was derived; rather it might combine certain important characteristics of one species--survival characteristics or immunological properties--with the disease causing properties that make it a better weapon. And with the new science, thousands or millions of deadly new organisms are now possible.

Everyone knows that biological weapons are dangerous. That is why they are designed and built. But what are the sources of these dangerous organisms that worry public health officials and should worry the Congress? The first is military testing, which is being considered here today. Testing, even for defense, means our country possessing the biological warfare agents here in the US. As explained to me, the main strategy for defense against biological weapons is to invent, design, and build all of the organisms that an opponent might be building to use against us, and then to create specific defenses such as vaccines. Even if this were possible, and few believe it is, it would mean that we would be using and storing within the United States the very organisms that we and our enemies agree would be good weapons.

The second source is incomplete. The new biotechnology industry is experimenting with vectors. Vectors are simply the infectious agents capable of transferring genetic material and information to other

organisms. Vectors are essential to biotechnology and an important element in building biological weapons. Thus elements of biological weapons are increasingly available in industry. Industry might also represent a source of more complete biological agents if the Defense Department contracts with biotechnology firms to develop these agents. The hazard is then magnified because most of the new biotechnology firms are located in populated areas around universities and near Boston, San Francisco and Washington.

Finally, we could be exposed to biological weapons by terrorists. Although biotechnology is very sophisticated and demands great brain power, it is still "low technology." Many new organisms could be built in a kitchen and produced in great quantities in a brewery. It appears that a knowledgeable terrorist could produce biological weapons far more easily than nuclear weapons.

One cannot overstate our inability to deal with novel agents. In principle a scientist who has designed a new biological agent and produced it might also be able to produce a vaccine or drug against the new organism. But for unprepared public health authorities who know nothing of the weapon organism's structure, pathogenic mechanisms, and transmission, the task of producing a vaccine or drug, and doing it very rapidly, is almost impossible.

There was a time when microbiologists could catalogue in a few pages the organisms and toxins that were most likely to be used as weapons. Today the number of potential agents has multiplied to the point where it is no longer possible to plan or respond with defenses. Defense of populations against new biological weapons is no longer possible. There is no public health or medical strategy.

* * *

The American Public Health Association believes that the United States must not engage in testing of biological warfare agents. Here are three reasons:

1. The United States has renounced biological weapons in a treaty. Although the treaty still needs a law to implement it, as proposed by Chairman Rodino in H.R. 901, Secretary Weinberger stated as follows in 1984: "The United States does not and will not possess biological or toxin weapons. We will not develop such weapons nor assist others to do so."
2. As indicated above, the development of agents to test defenses is operationally equivalent to the development of agents for offense. Thus even if defense were possible, which it is not, it would be impossible to convince other nations that our testing activities are not intended for an attack rather than for protection of our population.
3. It seems almost unnecessary to remind the Congress, but promises about safety measures should be highly suspect. It is hard to believe that any safety system is sufficient to cope with a biological agent that has been created in advance of any control or prevention method. The risks may approach the infinite, but I doubt the effectiveness of safety measures do. The goal in building biological warfare agents is to achieve uncontrollable spread, except for protected populations.

Chernobyl and Three Mile Island happened despite assurances about safety measures. But even the worst nuclear accident has a limited effect. Biological agents may spread death until the susceptible population is reduced to the point where the epidemic peters out.

Chairman FASCELL. Gentlemen, thank you very much. Yesterday the Committee received a request from Richard Perle, who thought that this testimony might be a little lopsided, and he wanted to balance it off. But unfortunately the request came in a little too late to accommodate him at this hearing.

But his testimony will be made part of the record, and I'm sure all of us will be very anxious to read it.

DEFINITIONS OF BIOLOGICAL AGENT AND AERSOL

Chairman FASCELL. I wanted to clarify a couple of definitions. "Microbial pathogens," is that the same as pathogenic microbes? "Biological agent," is that the same thing?

Dr. JACOBSON. I think in a medical context, Mr. Chairman, "microbial pathogen" would be identical to pathogenic microbe. In terms of "biological agent," I think medically that's a bit more complicated. I think we think it's——

Chairman FASCELL. Is it broader or narrower?

Dr. JACOBSON. Broader, sir. Biological agents being those which affect the organism which, in this case, could be man, for example.

Chairman FASCELL. Now, aerosol, does it mean what I think it means, they're going to spray the stuff in a room?

Dr. JACOBSON. "Aerosol" indicates the suspension of small particles in the air.

Chairman FASCELL. Atomized, in other words, in one way or another?

Dr. JACOBSON. That is correct.

Chairman FASCELL. Would the idea be that it would either be breathed or ingested through the lungs or through the skin?

Dr. JACOBSON. In fact, that is the purpose of creating aerosol, so that they can indeed be small enough so that they can pass some of the normal barriers and are inspired into the lungs of those who breathe them.

PROTECTIVE MEASURES AND FILTERS

Chairman FASCELL. Is there any kind of mechanical filter that filters a virus or a pathogenic microbe?

Dr. JACOBSON. Yes, Mr. Chairman, there are, and the efficacy of those filters, as has been indicated, can be evaluated either by testing either what are called "simulant organisms," relatively nondangerous microbes.

Chairman FASCELL. Why would it vary from one microbe to another? Why would the filter vary?

Mr. RIFKIN. Mr. Chairman, only the size would affect, would be the important——

Chairman FASCELL. Well, you make the smallest possible size?

Mr. RIFKIN. Exactly. The problem with the various protective equipment when I was the Director of the National Institute for Occupational Safety and Health, we were charged with testing respirators and masks. The problem is that you can often get in tests evidence of effectiveness which, when on workers, and I assume the same would be true of soldiers or the public at-large, don't happen in real life situations. So all of the manufacturers tests and most of

the tests that we did in Morgantown, West Virginia, overstated the capacity of protective equipment to protect the individual.

Chairman FASCELL. How would you ever know whether the thing worked unless you tested it on an individual who'd then be dead?

Dr. JACOBSON. There are ways to simulate it, but in fact you're correct.

Chairman FASCELL. But simulation is simulation. That's a different microbe?

Mr. RIFKIN. Yes.

Chairman FASCELL. I mean, I have to assume that as a layman. I don't know. One thing about laymen, they don't have to worry about scientists. They just make all kinds of statements.

EMERGENCY MEDICAL RESPONSIBILITY, GOVERNMENT OR PRIVATE

Dr. Jacobson, as the head of the infectious disease section of the hospital, is that what you are?

Dr. JACOBSON. Yes sir.

Chairman FASCELL. I suppose that it's your primary public responsibility that, if people get ill from an undetermined source, one would immediately suspect the laboratory and everybody would come running to you for some kind of help, is that the way you envision your responsibility?

Dr. JACOBSON. My responsibility, of course, is to take care of people who seem to have infectious diseases.

Should the consequences occur that we fear might occur at Dugway, it wouldn't even be obvious that the problem arose at a laboratory. I might find myself confronted with a family member who was ill with no information about——

Chairman FASCELL. Do you or do you not have a contract with the Federal Government to provide this care?

Dr. JACOBSON. I have an obligation, sir, to provide a cure.

Chairman FASCELL. No, I understand that. But you don't have a financial contract with the U.S. Government?

Dr. JACOBSON. That is correct.

Chairman FASCELL. So somebody's just assuming that just because the hospital is there, and because you're head of infectious diseases, you're going to take care of the problem.

Dr. JACOBSON. I'm not sure the military has even addressed that assumption, sir.

Chairman FASCELL. I know, but I am addressing that assumption right now, you see, that's the purpose of this questioning. And, as far as you know, does the federal government have anybody under contract and have the responsibility of taking care of accident victims should an accident occur at one of these labs? Whose responsibility is it to provide the kind of care that the citizen would need—medical care I'm talking about, now—immediate? Is there some federal contract somewhere?

Mr. RIFKIN. We raised that, Mr. Chairman, in both lawsuits.

Chairman FASCELL. And?

Mr. RIFKIN. And the fact is that the DOD has no procedures for quarantine, mass evacuation, or mass emergency medical treatment——

Chairman FASCELL. Yes?

Mr. RIFKIN [continuing]. In any of their protocols.

Chairman FASCELL. Well, I was concerned about that, too. But I'm also concerned that, as a citizen, I'd want somebody to pay my bills since it wasn't my fault.

Mr. RIFKIN. Well, this, Mr. Chairman, and I——

Chairman FASCELL. If it could be proven that it was government research?

Mr. RIFKIN. This is a problem, Mr. Chairman, that's been raised in Utah and other places, and I suspect Congressman Owen would be best off to talk about that in terms of the problems of downwinders and other groups that could get infected.

Chairman FASCELL. I didn't mean to get too far into that, because we know what the present law is with regard to a citizen trying to get damages through a tort activity against the federal government. But——

Mr. OWENS of Utah. Mr. Chairman, if you would yield just briefly?

Chairman FASCELL. Sure.

Mr. OWENS of Utah. The 6,000 celebrated sheep, the Army denied absolutely any responsibility but paid every claim.

Chairman FASCELL. Well, that's understandable. I know insurance companies that settle claims all the time and deny responsibility. That's a given fact of life in our society. That's different. I mean, the regime was not set up in advance. That followed afterwards, and that was a long process by which the American citizen had to go through, so it's obvious that a regime exists right now where you can be "compensated," but it's arduous, it's difficult, and sometimes it doesn't even work. We all know that. So, obviously, one of the things that needs to be considered is if we're going to maintain these 129 labs, we're going to get these little buggers loose out there and it's going to infect a lot of the population, it seems to me that, since it's government research, then the government as such has some kind of responsibility because it's government policy that makes it possible for that to happen.

And that would be some kind of natural accident. Then you make compensation but without knowing how to make tolerable limits. I'm still worried about bubonic plague and you guys are talking about manufacturing new ones. And, as far as I know, nobody discovered bubonic plague, and it was probably one of the most virulent and natural ways to kill people.

At least that's what it was back in the dark ages. And I read somewhere that it was caused by little peas rotting in Denmark. So, it seems to me that we have enough problems. But research never really stops.

Mr. Dellums.

CIVILIAN/SCIENTIFIC OVERSIGHT PANEL

Mr. DELLUMS. Thank you very much, Mr. Chairman. I want to just say to all of the panelists that your testimony is extraordinarily telling. It seems to me that the danger that you all speak to is both extraordinary and in my own opinion, extremely frightening, medical and clinical consequences of what you are saying staggers the imagination.

Earlier when the "government" witnesses appeared before the panel, one recommendation that was suggested in order to provide some degree of safeguard was a civilian/scientific panel to oversee this research. I get a clear indication from what you all have said that that is a miniscule response to an incredible problem, but that may be my interpretation. I would like each of you if you would, to comment as to the efficacy and potential effectiveness of a plan that simply allows the military "advance" research proposal to go forward with a superior kind of a proceeding. What do you think about that and I would appreciate if Dr. Jacobson if you would—if all, all, all four of you respond.

Dr. JACOBSON. The technology in the area of development of potential biological agents is so complex and is advancing so rapidly that I think you've heard each of us saying in different ways that the possibility of a comprehensive defense is extremely unlikely.

On the other hand there are perhaps some precautions that could be taken, where investigations might not endanger laboratory workers or others. That would be the employment of simulants, as has been discussed.

My guess is that if there were oversight that would involve civilian scientists working in concert with the military, there would probably be substantial resistance to dealing with virulent pathogens and substantial support for testing protective gear with the use of microbes which are as safe as possible. All microbes, of course, can be potentially somewhat dangerous, but I think that's about a direction that such a combined effort might take.

Chairman FASCELL. Mr. Leonard, you already spoke to the treaty commission. Do you think that this would be a good idea?

Mr. LEONARD. Mr. Chairman, I would perhaps offer a comment in my former capacity as a negotiator, not between the U.S. and the Soviet Union, but between the Administration and the Congress. It seems to me that if the Congress will take up an issue of this sort and pursue it vigorously with the Administration, you and Congressman Owens have already indicated that you think there might be something there, if you will explore it and impress them and try with the aid of counsel from people such as my friends here on this panel, this bench, I think that the possibility of working something out in the national interest would be very much there.

I certainly drew that from the comments that Dr. Welch made in response to Dr. Owens' comments.

Mr. RIFKIN. Congressman Dellums, the real problem here was hit head on by the Chairman, and that is, you take a look at the history of our attempts to develop vaccines against known pathogens, it's been dismal. In the last 20 years, DOD work on vaccines to my knowledge, they've only been able to come up with one effective vaccine, against one known pathogen, that's Chicungunya. There have been some other viruses to which they've developed vaccines that have been ineffective, and many others they've been working on for 30 years, they've never been able to develop vaccines. And that's a billion dollars and a decade of work. So if we jump now to gene splice, which is theoretically possible between various organisms to create infinite possibilities, number one, how would our DOD ever assume to have the kind of intelligence information that

would allow them to know all the possible combinations of microorganisms that could be put in the field, and then be able to expeditiously develop vaccines at a moments notice?

One reporter two years ago did a rather large piece on biological warfare. After the entire piece was done and he had interviewed everyone here in town, after the government and DOD he came back to us and he said, "you know, we come to one remarkable conclusion about gene splicing as a new technology in BW—there is no defense."

And that's the key here. There is no appropriate way ever to develop vaccine against all the possible combinations that might be used, I think that what I'm hoping is that the Congress will take up this issue in very, very deep and probing fashion, and ask "do we want an extensive biological defense and research program, when (1) the possibility of gestation in the environment could cause tremendous catastrophe, and two, the development of this data could potentially be used for military purposes.

Dr. ROBBINS. Mr. Dellums, I really am impressed with the idea of openness and civilian participation. It might be very important from an arms control point of view. I would be very unhappy if the effect of such civilian participation meant that the government had jumped to the conclusion, before starting this research, that it was somehow safe, because that in fact is not the case. It remains dangerous and uncontrollable from a public health point of view.

Mr. Chairman, let me just disagree slightly with my colleagues on the issue of vaccine research. I do believe that new genetic engineering capacity will bring about a real change in our ability to develop vaccines and control naturally recurring diseases.

The U.S. Army has today one of the best vaccine research groups. Unfortunately, it has not been terribly effective; no one has. We've been very slow in developing vaccines.

But I would urge you and the Committee to make sure that that vaccine research group continues to focus on naturally occuring diseases and make sure that the benefits of that research, such as the research on naturally occuring viruses done by the Army benefits all of the world, where many people still die from theoretically preventable infectious diseases.

Mr. DELLUMS. Thank you very much, Mr. Chairman. Dr. Robbins, I appreciate your response to my question, but that wasn't exactly what I was tryin' to determine. Whether or not the surveillance of the Army can be done with civilians in some way that is safe to go forward.

Chairman FASCELL. Mr. Owens.

USE OF STIMULANTS IN DEFENSIVE BW RESEARCH

Mr. OWENS. Thank you, Mr. Chairman. Dr. Jacobson, I appreciate your testifying very much. Your comment on use of stimulants—if you accept the premise that some of the testing should be continued, on the premise that there is no reversal of public policy to provide the ability, is there a way of doing that? With respect to simulants?

Dr. JACOBSON. I understand. Again, I would echo the comments that were made earlier by all of us. Ultimately I think it's some-

what futile to anticipate adequate defenses for all the myriad agents that could be developed. The purpose of simulants would be primarily for the purpose of testing protective gear.

Protective gear is simply one step among many that might be conceived of in terms of blocking acquisition of organisms. We've already discussed that they can be transmitted in a great variety of ways, and any protective gear would probably focus on one of those such as through the aerosol route.

The problems are that it cannot be worn indefinitely for example. One needs to know when to put it on and when to remove it. If it's very comprehensive and contains essentially the whole body within it, you have the problem of the individual being encumbered; of overheating, of carrying heavy equipment, which might bar him from doing other things. Certainly simulants could play a role in the testing of such gear, by judging its adequacy to block the transmission of infection, but that's not a comprehensive answer to the threat of biological warfare. Yes, that part could proceed, but what it would inevitably lead to would be contemplating other routes of exposure, if not through the air, through the water, contamination of the soil, for example, creating a permanent reservoir that couldn't be blocked indefinitely. So yes, I think that the research could be made more safe by eliminating these very virulent agents, which the military insists on testing even in this mode, but that research is no more likely to lead to a comprehensive solution.

DUGWAY—A POSSIBLE BW TREATY VIOLATION

Mr. OWENS of Utah. Thank you. Ambassador Leonard, could the construction of a level four facility at Dugway to be considered to be a possible violation of the convention which you helped to negotiate?

Mr. LEONARD. Yes, Mr. Congressman, it could be conceived as such. I do not believe that it is a violation of the convention. But we're dealing in this area, obviously, with perceptions, and although some of the witnesses have suggested that the Soviets would know very well if they followed very closely what we're doing that it's purely defensive.

Nevertheless I'm not as confident as they are regarding the Soviet reaction to this, and certainly use has been made of the Dugway facility in a propaganda sense against the United States to damage our standing internationally by the suggestion that we're not sincere in our renunciation of biological weapons.

Mr. OWENS of Utah. But what if the Soviet Union were doing the same thing, would we be justified in worrying?

Mr. LEONARD. I think that the testimony you've been given indicates that the administration is worried. They spoke of the 20-odd facilities of which five, if I recall, were in the possession of the Soviet government or the Soviet military, and that indicates to them a very high level of activity on biological warfare, and suggested to them that their fears or their convictions that the Soviets are violating the treaty has considerable justification.

Why that should be that a facility proves the Soviets were violating it, and nevertheless, leaves us completely innocent, is a little difficult to follow, but there you are.

Mr. OWENS of Utah. So it would be your opinion, I gather, that the structure of this Dugway facility would be destabilizing to a certain degree?

Mr. LEONARD. I think that would be putting it too strongly, Mr. Congressman. I think that it might be desirable on some grounds; undesirable on others. You've heard compelling testimony about the dangers involved in it. But I do not think it would destroy the treaty. What I think is appropriate is to pursue the question within the framework of the treaty and of international forums to try to reassure everybody to the maximum degree possible, that it is not in any way intended to violate the treaty and impress others to do the same thing.

The Soviets have indicated, I think the panel should know, that it would be in their judgment appropriate to visit the famous biological weapons facility at Sverdlovsk. It was, in the minds of many people, the origin of the anthrax spores which got loose in the city of Sverdlovsk and contaminated the city and killed a lot of people. I think that should be followed up on.

And we should try to do this to the greatest possible degree not only reciprocally bilaterally between ourselves and the Soviets, but pressing other countries on this. The chart that you saw on which I hope you will get a classified briefing, suggests that we get visit rights at as many of these other facilities as possible and encourage their scientists to come and visit ours.

BW TREATY VIOLATIONS

Mr. OWENS. So there have been violations subject to your treaty on biological weapons. Has the United States filed claims and what is the cross history on confrontation of these issues of the suspected violations?

Mr. LEONARD. Well, there's a long history of this, which Congressman Leach particularly referred to, in Southeast Asia and perhaps Afghanistan and the explosion—alleged explosion—at Sverdlovsk. It's a very complicated matter which I don't think I could get into now, but it gets raised directly bilaterally with the Soviets, and also at the committee in Geneva where the treaty was negotiated. We did not for a long time receive any satisfactory explanations from the Soviet Union, and if I may say so, I think that they failed to fulfill their commitments under the treaty to explain and resolve doubt wherever doubts might arise in the minds of other parties to the treaty.

They did this for reasons for which we needn't go into here, but they were very offended by the way we handled it. Nevertheless, that was their obligation and they have not, until very recently, almost ten years later, come through with the kinds of explanation that they should have offered in the very beginning.

Mr. OWENS. So again, the process is a meeting following Geneva or just a joint meeting? Is there a process for orderly consideration of the complaints?

Mr. LEONARD. The only machinery specified in the treaty is if doubts persist, then the issue can be taken to the Security Council, of course, the Soviet Union, like ourselves has a veto, and the Security Council could then, if it chose, order an investigation. But in fact, other procedures were used in both the Southeast Asia case and the Sverdlovsk case—bilateral procedures and even unilateral procedures, not involving the formalities specified in the treaty. They were not—these procedures were not very successful, but there has been a lot of talk at the Committee in Geneva on improving those, in particular of improving them in the context of the review conferences, and I think that is a matter which could well be pursued.

LEGISLATIVE AND OVERSIGHT SOLUTIONS

Chairman FASCELL. Gentlemen, I want to thank you very much for the testimony you have given.

This is a very serious matter. I didn't know that it was as complex, frankly, but it has had some interesting legal aspects since citizens have brought lawsuits and still are filing lawsuits and Congress has been involved off and on. I'm not ready to say yet whether or not anything is satisfactory by law other than a flat prohibition. A unilateral prohibition might cause a security problem or it might solve the problem. It certainly seems like we need to fight very hard to examine exactly what to do and how to reach some kind of an agreement.

And then one final question: I would recall a case some years ago which involved cyanide, and gene splicing. The next issue went before a commission and the Congress and letters from the National Institutes of Health and the scientific community in general.

Mr. RIFKIN. Generally speaking I can say this that not one piece of legislation in the last eleven years has been passed by the Congress of the United States dealing with genetic engineering. There have been recognized——

Chairman FASCELL. Has there been a feeling in the scientific community that some kind of oversight is desirable and necessary? Dr. Robbins.

Dr. ROBBINS. The activities of the NIH did lead in the early days to a consciousness about the dangers of genetically engineered organisms. It began when the issue was how to contain these organisms properly. I believe that universities and research labs around the country, were generally careful. Two things happened. One is that it became useful to release these organisms to the environment instead of working in controlled laboratory settings, and the other thing was that there were commercial interests, and that it was no longer possible to use federal leverage through federal research grants to make university research laboratories behave well. The universities may have continued to behave well, but biotechnology firms were not constrained in the same fashion and they were risking money and other things and probably were prepared to take greater risks with the public health.

Chairman FASCELL. So the microbe is out of the battle already?

Dr. ROBBINS. Yes, in fact there is no adequate system of surveillance to know what kinds of release have occurred.

Chairman FASCELL. So then, what that tells you is that, if I understand, it is impossible for the scientific community to be responsible, they want self-imposed regulations over industry.

Dr. ROBBINS. I think that's correct, and in fact that may be so physically. It is almost impossible to control these organisms adequately by regulation, because very small quantities of essentially undetectable releases, could be sufficient to cause great damage when the organism is capable of surviving and reproducing to begin all sorts of ecological changes.

My own view is that regulatory approaches will be useful only in describing the hazard and urging scientists to obey the rules. Other than that I know of now way to monitor and conduct surveillance.

Mr. RIFKIN. Mr. Chairman.

Chairman FASCELL. Mr. Rifkin.

Mr. RIFKIN. Yes, I agree with what was just said. I would point out that other nations have taken a more responsible approach on their government to this whole question of releasing organisms. For example, in Germany, the Bundestadt condition on genetic release in the environment has recommended a five-year moratorium on any release in Germany, pending a thorough investigation by the government and scientific community on the potential risk. The government is deadlocked as a prohibition against release.

We meet next week with government leaders. They are entertaining a prohibition on release. I also note Japan and Italy have not significantly released organisms.

There are a few countries, the United States, France, England and Australia that is entertaining the release of organisms before a really thorough of the kind of painstaking analysis of the potential risk to be entertained.

I would like to gently and subtly disagree with what was said. I do think it's going to be hard to regulate.

Chairman FASCELL. You're looking for some kind of federal regulation?

Mr. RIFKIN. I don't think it's not impossible to develop some regulatory regime that would provide at least a minimum assurance. There is no guarantee that there aren't going to be problems and loopholes. But I would hope that the House and the Senate, the Congress of the United States, it's been ten, twelve years now, would seriously entertain the possibility of legislating in many of these areas of genetic engineering because otherwise we're going to have de facto legislation, meaning that technology itself that goes on line becomes its own form of legislation without any kind of serious deliberation and policy resolution by Congress and representatives of the public.

Chairman FASCELL. Well, I understood the interpretation of Dr. Robbins to say the same thing.

Well, gentlemen, thank you very much. You have made a very important contribution to our hearing. I want to thank you very much for your time your interest, your efforts, your testimony, and your patience.

Mr. OWENS of Utah. Mr. Chairman, I wanted to thank you and your respects for your willingness to talk to the facts over this hearing, and for your long-time interest and your willingness to sit

here. I admire the leadership you have shown in trying to resolve some of these issues.

Chairman FASCELL. Both Mr. Dellums and I know to extend our commendation to you in this matter.

Mr. OWENS. That's what I was fishing for.

Chairman FASCELL. We're all in the same danger. And we doubtless have the responsibility of overseeing the DOD research facility. We will have the responsibility regarding the policy question and international agreements. The environmental question and the public health question need consideration by other committees.

The Interior, Armed Services and Foreign Affairs Committees have joined together today for this preliminary review of this issue of biological warfare testing and there seem to be so many important aspects to this issue that there will be further oversight by the committees and others.

Thank you very much.

[Whereupon at 1:25 p.m. the hearing was concluded.]

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