

SECURITY OF THE NATION'S 103 NUCLEAR REACTORS

NUCLEAR CONTROL INSTITUTE AND COMMITTEE TO BRIDGE THE GAP NEWS CONFERENCE

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- **TOM CLEMENTS**, EXECUTIVE DIRECTOR, NUCLEAR CONTROL INSTITUTE

MR. LEVENTHAL: Good morning, and thank you very much for coming to this press conference. My name is Paul Leventhal. I'm president of the Nuclear Control Institute. And we've organized this press conference in coordination with Daniel Hirsch, the president of the Committee to Bridge the Gap, in Los Angeles.

Mr. Hirsch and I have been working on the problem of nuclear terrorism, and in particular potential threats to nuclear power plants, for over 15 years. And we called this press conference today because it is our belief that the nation's 103 nuclear power reactors are vulnerable to attack by terrorists, and the Nuclear Regulatory Commission and other government agencies have failed to move decisively to impose the further security measures that are needed to prevent attack and to avert catastrophic consequences.

I wish to emphasize that the proposals that we have laid out for the Nuclear Regulatory Commission are in the correspondence that you have with you. We fully believe that the measures that we propose can go far to substantially reducing, if not eliminating, the vulnerabilities of nuclear power plants today. We wrote to NRC Chairman Meserve and laid out our proposals, and we have received back what we regard as an unsatisfactory wait-and-see response. The attacks that took place on the World Trade Center and the Pentagon clearly demonstrate the need for timely and effective action. And what we have proposed is the prompt deployment of National Guard forces around the nation's 103 nuclear power plants and the major access points within those plants in order to provide a visible show of force and a credible deterrent to any thought, much less an attempt, at a terrorist attack.

We also believe that the demonstration of the vulnerability of critical installations to suicidal air attack necessitates the strong consideration of deployment of advanced anti-aircraft weaponry that would be capable of defeating a suicide attack on a nuclear power plant. We also urge that all plant employees be fully vetted and re-vetted to ensure that there are no terrorists among the employees and among the contractors that do maintenance work, particularly during fuel outages at these plants.

We have also recommended a series of longer-term improvements in the so-called design basis threat --the security arrangements, the security precautions that the NRC requires plant operators to implement --and Dan Hirsch will address those.

We have done an analysis of the vulnerability of the containment structures of nuclear power plants and have found that these could be penetrated by high-speed commercial aircraft impact. And our scientific director, Edwin Lyman, will address that. And he will also address the issue that makes these types of measures imperative and timely, and that is the potential consequences of a successful attack on a nuclear power plant.

I'll simply say in my introduction that the consequences of an attack that would succeed in releasing a plume of radioactive materials, particularly over a nearby city, would dwarf the consequences of the World Trade Center and the Pentagon attacks. We also wish to point out that the consequences of an attack on a nuclear plant would be magnified if the plant were fueled with a plutonium- based fuel rather than the low-enriched uranium fuel that is now in use in U.S. plants. And our executive director, Tom Clements, will address that point.

And finally, we have among our speakers, but from Los Angeles by speakerphone, Dr. Bennett Ramberg, who is the author of a leading book; in fact, the book that first brought to public attention the potential vulnerability of nuclear power plants to terrorist attack. And he will address what the issues are today that have a particular bearing on the need to upgrade security .

So at this point I would like to turn the microphone over to Dan Hirsch, who will discuss the rather long-term effort that we've undertaken to upgrade security at nuclear power plants and the lessons learned from those efforts and how they may be applied today. Thank you.

MR. HIRSCH: A nuclear reactor has in it an immense quantity of radioactivity that, if released, could cause tens or hundreds of thousands of cancers and contaminate an area the size of a large state for generations. It is among the most high-value targets that we have in the United States. And the tragic situation that we are now in after the September 11 the event suggests that we must take the risk of terrorism far more seriously than we have to date.

I'm going to summarize for you the current state of protection and our efforts over a decade and a half to try to get authorities to recognize the increasing risk, an effort that has largely failed and that needs to right now be rectified. There is in your packet an article that I wrote to colleagues in the Bulletin of Atomic Scientists in 1986, which, with one exception, still today summarizes the current state of regulatory requirements.

I'm going to be fairly circumspect in what I say, for obvious reasons. And I assume that you folks will be as well in your message to your audiences. But what I'm going to tell you is what you can find simply by reading the code of federal regulations for the Nuclear Regulatory Commission. Those regulations for security were put in place a quarter of a century ago and have only been modified in one relatively small way since that time. And the terrorist threat has increased tremendously since those regulations were put in place.

Those regulations require a reactor to protect only against an attack by a very small group of attackers acting as --(audio break). --no coordinated teams we saw on September 11th. It requires protection against only one insider, yet exempts reactors from having to protect against attacks by enemies of the United States, be they a nation or a person. And in addition, the regulations exempt you from having to protect against attacks by airplanes and boats. They also assume that the attacking group is using relatively unsophisticated tactics and equipment.

Those regulations were put in place based on the following assumptions, which for 15 years our two organizations have challenged. One is that there was no known group, according to intelligence information, quote, "having the combination of motivation, skill and resources to attack a nuclear power reactor." Secondly, there was a belief that terrorists had demonstrated a reluctance to undertake actions that could take large casualties; and third, that we would have intelligence information in advance that would permit us to upgrade security before an attack.

The horrendous events of September 11th have demonstrated that all of those presumptions are erroneous and that we must now protect against far larger groups acting in concert in several different teams, with high levels of sophistication, dedication and, unfortunately, a willingness to take vast numbers of casualties in their target population.

For 15 years we have quietly tried to get the NRC to fix those problems. And with one exception --there is now protection against truck bombs, although insufficient, in our view, to fully protect --but with that one exception, we have failed. Shortly after the September 11th events, we wrote to the chairman of the NRC, with whom we have met on these matters before, and asked the NRC to take urgent action to protect facilities --immediate action --the National Guard, anti- aircraft, and vetting the insiders; and longer-term actions of changing these regs to now protect against the threat we now know exists.

We essentially got the same response we've gotten for a decade and a half, which is basically not a response. And so, reluctantly, we believe that this matter now needs to be taken to higher levels in the crisis that we are in --responsible people in the White House, responsible people on the Hill --and have this matter resolved now.

A great deal of talk is that there is a retaliatory action going to occur sometime by the United States in the near-future. One must presume there's a possibility of response in the United States' back. We have heard officials say that there may well be other cells in the United States who may have other targets. Nuclear power plants would be a prime target for such attacks.

So, in summary , the consequences could be immense, absolutely immense. Facilities are inadequately protected. The response to the war that we have been told we are in by the officials responsible has to date been essentially business as usual, and that needs to change.

MR. LEVENTHAL: Thank you. I now ask Dr. Edwin Lyman, who is a physicist and the scientific director of the Nuclear Control Institute, to discuss the issue that's on a lot of people's minds today, which is the containment structures of these reactors --could they withstand a hit? - -and generally what the consequences of a successful attack would be on a nuclear power plant. Dr. Lyman.

DR. LYMAN: Thanks. There have been a number of misstatements, unclear statements in the press from the Nuclear Energy Institute and even from NRC about the issue of whether nuclear power plants are likely to withstand the kind of attack that occurred on September 11th. So I took it upon myself to convince myself what actually might happen if a passenger jet like a 767, fully loaded with fuel, were to stage a direct attack on a nuclear power plant container .

The analysis I did, we've decided to withhold at this point from the public, but I'd just like to describe some of the general results. We have a number of different nuclear power plant containment types over here. On the left-hand side is a pressurized water reactor, which is the most common type of reactor containment in the United States. This is what's known as a large dry containment. And these are the most robust nuclear plant containments we have in the United States.

This is typical. We see that the walls on the side are about four-and-a-half-feet-thick concrete. Actually, they range anywhere from three to four and a half feet. There's a wide variety of different reactors. The dome is somewhat narrower. Here we have one that's about two and a half feet thick. Some plants that are actually near flight paths have domes up to three and a half feet thick.

My analysis indicates that really any nuclear power plant is conceivably vulnerable, or there are certainly good technical reasons to believe that these containments are vulnerable to penetration. And therefore it's highly prudent to take measures to protect the air space around nuclear power plants.

What would happen if the worst occurred and a jet plane smashed into one of these containments? Well, the engines are one of the most rigid parts of the jet and would penetrate the containment, leading to a fuel spill within the building and most likely a severe jet fuel fire and/or explosion, like we saw at the World Trade Center. Nuclear power plants are not well- equipped to deal with severe fires. In fact, fires are what are known as common-mode failures.

In other words, nuclear power plants are robust. They have a variety of different (redundant?) safety systems. But there are certain types of accidents, like this one, that would actually cause all these systems to fail simultaneously. And therefore, the type of severe mechanical and

thermal damage that would occur from this type of attack could well cause a failure of numerous safety systems, leading to a loss of coolant, that cannot be mitigated, and ultimately resulting in a meltdown of the fuel.

So if the containment has already been breached, the radioactivity released from the fuel as it's melting will have no barrier to the environment, and therefore a Chernobyl-type massive release of radioactivity is something that can't be excluded. Such an accident, as we heard, could conceivably cause tens to hundreds of thousands of cancer deaths.

The pattern of injury would be different than what we saw at the World Trade Center. There would well be fewer immediate deaths from the impact and from radiation sickness, but over the lifetime, potentially many more people could be affected by this accident and have their lives shortened.

Now I'd like to address one other vulnerability which we believe exists in nuclear power plants today, and that's simply the ability of the forces, security forces at nuclear power plants, to repel an attack. It's been widely reported in the press now that there's a program run by the Nuclear Regulatory Commission called the Operational Safeguards Response Evaluation, or OSRE.

This is a performance-testing program whereby a small number of mock attackers test the security forces at nuclear plants with the goal of destroying enough equipment to cause core damage. So this is testing how robust the plant security and strategy is to protect against attackers. And it's been widely reported that roughly half the nuclear power plants in the country have failed the test, meaning if this were a real attacking force, they would have been able to cause enough damage to lead to the same kind of meltdown accident that I just described and a release of radiation.

We believe that this is a problem that needs urgent correction, so the existing security plans at nuclear power plants need to be reviewed. Security forces need to be upgraded on an urgent basis. Unfortunately, the tendency before the tragic intentional event of September 11th was a move by the industry and the NRC toward self- regulation of security on the basis that the security threat is not really something that has to be actively monitored and

supervised at nuclear power plants to provide protection.

I think what happened on September 11th changes that calculus, and we are hopeful that the Nuclear Regulatory Commission will see the wisdom in not allowing nuclear power plants to assume the lion's share of responsibility for their own security, because I do not believe before the event of September 11th they were responding to this issue in good faith.

So I'd be happy to take questions afterward.

MR. LEVENTHAL: Our next presentation will be a brief one by Tom Clements, the executive director of the Nuclear Control Institute. I just want to mention that NCI has long been concerned, and, in fact, has been a principal focus of our work, on the adequacy of protection over fissile materials, weapons-usable nuclear materials, plutonium and highly-enriched uranium. The concern in the civil sector is that plutonium is used for fuel in power reactors outside the United States. The Bush administration is contemplating its use in U.S. reactors, particularly in connection with a disposition program of warhead plutonium.

There's a security issue involved in this, but there's also a safety issue, since the consequences of an accident or an attack on a plant would be magnified because of the toxicity of plutonium. And Tom Clements will describe what our concerns are in that respect.

MR. CLEMENTS: First, I'm just going to take a couple of minutes to talk further about this plutonium disposition program. But I'd like to point out that a representative from Representative Ed Markey's office is here, Brendan Plapp.

Representative Markey has taken a leading role in this issue over the years, and I think you have some of the materials that Representative Markey -- a letter he sent to the NRC last week, as well as a news release.

And I'd also like to encourage you to call Senator Reid's office for their reaction. Senator Reid from Nevada is the head of the subcommittee of Environment & Public Works which oversees the Nuclear Regulatory Commission, and we are aware that he is tracking this issue pretty closely.

As Paul said, there is a plan in the United States to dispose of surplus weapons plutonium in nuclear power reactors. These reactors are the four reactors owned by Duke Energy in North and South Carolina. These are the Catawba and McGuire reactors. These reactors are of the ice-condenser type, which is the last display over there, which has a thinner-type containment than the pressurized water reactor in the first display there.

Ice-condenser containments have been called by a former nuclear regulatory commissioner as being an "egg-shell" type containment because of being weaker than conventional pressurized water reactors. There's not been a lot of analysis on the strength of the varying types of reactors, but there's reason to believe that the ice-condenser types, because the concrete is thicker -- thinner, sorry -- are less resistant to some kind of attack like we witnessed on September 11th.

We're concerned about use of plutonium in these reactors for a couple of main reasons. One, in the event of a severe accident involving breach of the reactor itself, by using plutonium, there would be about 25 percent more latent cancer deaths over the use of low-enriched fuel. So we think particularly the choice of the ice-condenser containment reactors is not good. But in any event, there would be increased cancer deaths if the material we use in other types of reactors as well.

Also, the transport and storage of Mixed Oxide fuel to the reactors presents a target for

terrorists itself and storage at the reactor sites and is of concern. The National Academy of Sciences said that storage of the plutonium fuel, called mixed oxide, or MOX, should meet what's called the stored weapons standard. It should be protected to the equivalent of stored nuclear weapons. And we are not really aware if Duke Energy is going to be able to meet the standard or not. They have not really answered this question.

So given our concerns about use of plutonium fuel in the Duke reactors in North and South Carolina, we feel that a couple of things need to be done immediately. There is a proceeding now to license the reactors for use of this fuel. We feel this proceeding should be halted, particularly until a review of the special risks presented by the ice-condenser containment.

And secondly, Congress should restore full funding for the alternative program to the use of this fuel in the reactors, which is a mobilizing of plutonium as nuclear waste at the Savannah River site. The discussion was curtailed on restoring this funding with the events of September 11th,

but they should proceed now to put the money back into this program, which was terminated by the Department of Energy earlier this year.

Thank you.

MR. LEVENTHAL: Our last speaker will come to you by speakerphone. He is Bennett Ramberg, the author of "Nuclear Power Plants as Weapons for the Enemy: An Unrecognized Military Peril." This book was published in the early 1980s and really represented a prescient view of the threats that we now face today. So I'm going to put this microphone down to the speaker and hopefully Dr. Ramberg will be audible to you.

Okay, Bennett.

DR. RAMBERG: Thank you, Paul. Again, by way of background, in 1980, under the auspices of Princeton University Center for International Studies and the UCLA Center for International Strategic Affairs, I authored a book entitled "Destruction of Nuclear Energy Facilities in War." In 1984, in the aftermath of Israel's bombing of Iraq's Osirak reactor, the book was republished in paperback by the University of California Press under a new title, "Nuclear Power Plants as Weapons for the Enemy: An Unrecognized Military Peril."

The new title was designed to focus the reader's attention to the study's thesis that host countries' nuclear facilities would be radiological hostages and radiological weapons to the acts of adversaries. The recent bombing at the World Trade Center, demonstrating the willingness of terrorists to take large numbers of lives by using our own airplanes as they could use our own reactors, underscores the specter .

During my research, I investigated and demonstrated how multiple barriers, or what's called "defense in depth," designed to prevent or contain accidents, could be overcome by willful sabotage. The book also demonstrated that there are some scenarios impacted by the dimension of the radiological release, the composition of material, weather, topography, the failure to relocate or shield populations, that large numbers, many thousands of people, could be put at risk.

At the very least, hundreds to thousands of square miles could be placed off-limits to human habitation due to the lingering impact of long-lived radioactive elements. At a minimum, the economic consequences would be devastating.

In the end, the purpose of my work was to demonstrate the problem and to suggest remedies. At the time my book first appeared, no nuclear facility had ever been bombed, and defense analysts were skeptical. During my book's incubation, authorities from the Departments of

Defense and State, from whom I originally sought research funding, discouraged my investigation.

The U.S. misgivings about the legitimacy of the subject matter was undermined shortly after the publication of the first edition of the book when Iran bombed Iraq's Osirak reactor in September 1980 and Israel finished the job in June of 1981. Subsequently, other attacks occurred as Iraq bombed Iranian plants under construction and the United States bombed a small research reactor outside Baghdad at the outset of the Persian Gulf War in 1991.

In 1986, Chernobyl demonstrated what could happen in a major accident, which willful sabotage could replicate. As a result of my work and my tracking of international terrorist incidents in the mid- 1980s, I testified before the Nuclear Regulatory Commission, raising questions about the vulnerability of American reactors to terrorist actions in this country. The commission dismissed my concerns.

However, in 1993, the commission was far more attentive to my testimony as a result of the World Trade Center bombing. Efforts were undertaken to reduce risks posed by vehicular bombs. However, by and large, the design basis threat that governed defenses at reactor sites was not and has not been altered.

When I testified before the Nuclear Regulatory Commission in 1993, I concluded that the commission largely relied on trends indicating that nuclear plants were unlikely to be attractive targets. (Informing?) this view was the conclusion that it was not in the political interest of terrorists to take large numbers of lives. Furthermore, the commission concluded that the intelligence community would provide timely warning of an attack.

It appears that these factors continue to guide the commission today. Clearly the recent bombing of the Trade Center is a wake-up call that demands a change in business as usual. Furthermore, there are troubling reports that terrorists have recently contemplated sabotaging reactors. For example, news from South Asia that Pakistani mujaheddin have threatened to sabotage Indian nuclear reactors. Recent events demand the obvious --an immediate modification of the design based on threat, and the application of corrective defensive measures.

And like my colleagues, I'd be happy to answer your questions. I think Paul Leventhal may also have a copy of book that I authored some years ago present at your news conference. Thank you.

MR. LEVENTHAL: Thank you, Bennett. I did show them the book. On that last point Bennett made about the training of terrorists, I would just add that it was reporting of a recent trial in which Ahmed Ressay, who was the Algerian arrested crossing into the United States from Canada just before the new year of the millennium, testified in a trial of another terrorist that the Bin Laden training camps are training attackers in what they call "urban warfare," "enemy installation," including nuclear power plants.

And I would simply say, as we open up for questions, that this is why we feel there is a particular urgency to bringing about immediate remedies, not a long-term bureaucratic process to contemplate what might be done.

Q Scott --(inaudible) --UPI. What specifically do you recommend in terms of anti-aircraft weapons to be deployed?

MR. LEVENTHAL: Our understanding, in checking security specialists, is that the advanced anti-aircraft weapons are either radar or wire directed. They're capable of being fired at the last moment, after it has been established that an aircraft is coming at high speed, for a direct collision hit with the plant. At 500 miles an hour at one mile out, that gives you

about seven seconds. But it is our understanding that these precision weapons could be fired, and would defeat or deflect an incoming. And we think, under skilled military personnel, that type of weaponry should be considered right now. I would also add that it may require -- not National Guard forces for that type of weapon, but regular forces, and that would require, as we understand, an act of Congress to authorize its use.

Q Just to follow-up. So, you're contemplating the use of Patriot style anti-aircraft weapons in position around nuclear power plants?

MR. LEVENTHAL: I'm not going to characterize it as Patriot --there are other weapons that are specifically intended not for incoming missiles but for incoming aircraft. And if said before anti- ballistic, that was a misstatement on my part. I mean to say anti- aircraft.

Q Even though those sorts of systems are designed against military style aircraft which are much smaller, and there's a likelihood that even if you use one of these advanced missiles against a target as large as a commercial jetliner, you're not going to break it up enough to prevent damage to a containment vessel?

MR. LEVENTHAL: Well, that's not my understanding, but I think that's why we said this should be given very strong consideration by the experts who could determine what sort of weaponry it would take to bring down a large commercial aircraft, if necessary .

Q Tom --(inaudible) --with Reuters. Are there specific plants that you have identified that are more vulnerable because they are near a city that could therefore cause more damage or an open area where they are easy to see, not surrounded by trees?

MR. LEVENTHAL: Dan, would you like to take that question?

MR. HIRSCH: No. I'm not going to identify the cities, but that's a particular problem. There are a number of reactors that are very close to urban areas with very high populations. And anyone can go to the public document room at the NRC and look at the casualty estimates the NRC has estimated for accidents at those sites and see how the population density affects things. Any adversary would have immediately thought of all that and knows what reactors are close to cities. It's a major problem.

Q But is the East Coast more vulnerable because --

MR. HIRSCH: Higher density, sure.

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Q --whereas the Midwest perhaps --(inaudible.)

MR. HIRSCH: Perhaps, but the real question is where is the reactor located compared to a large urban area, and which way does the wind normally blow. And we have some problems in California, where I come from, in that regard.

MR. LEVENTHAL: Yes.

Q Are you saying we should close down the nuclear power plants, or would that help?

MR. LEVENTHAL: The way I would address that is to say that there really must be a hard-nosed, bottom line examination of whether these plants can be effectively protected against a new terrorist threat that we now recognize in this country.

Q (Off-mike.)

MR. LEVENTHAL: And I think the answer to that question is that the kinds of remedies we've proposed would go far to protect these plants. But we have to see whether the government and the industry are prepared to accept those measures and to implement them. I think, given the potential consequences of a successful attack on a nuclear power plant, if these plants cannot be protected effectively, then they should be shut down. And Americans would simply have to conserve. Alternative sources would have to be found. But, the consequences, particularly to nearby cities, of a successful hit are unacceptable. And these plants should not remain vulnerable to that kind of a threat for any period of time.

The NRC's response to us suggests a long bureaucratic review process. This is simply unacceptable. The National Guard has been activated by the president. Some of those National Guardsmen should be assigned to these plants. There are anti-aircraft weapons available. They should be examined closely to see if they are suitable. If they are not suitable, then what kind of other air cover is possible? If other air cover is not possible, then you have to look at the question of whether these plants must be shut down.

Q If I might ask you to speak frankly, and --(inaudible) --this threat, if you'd analyze it, compare it to an earthquake --(inaudible) --vulnerabilities, accidents, earthquakes. Is this threat any more possible than, say, an earthquake?

MR. LEVENTHAL: I'd like Ed Lyman to answer that question, please.

DR. LYMAN: I think both types of events are similar in nature in that the plant is designed for a certain design basis --earthquake, for example. But, let's determine, arguing that the probability of something more severe than that is sufficiently low so you don't have to worry about it. The same is the case for nuclear power plants. Many which are not located near airports or flights paths were exempt from having to consider any kind of aircraft crash accident because it was argued that the probability was sufficiently low. So, we have the same --but the difference is that you can predict, to some extent, the frequency of earthquakes returning of a certain size after a period. It's uncertain, but you are able to predict. With a terrorist attack you can't predict, so you ; can't exclude an intentional desire to overwhelm to existing design of the plant. You know, as long as there is a willful intent, that's always going to be something you can't plan for or design against.

Q So what a terrorist attack would really do --(inaudible) --it's not any more of a threat. Is it fair to say that?

DR. LYMAN: Well --well it is more of a threat, and in the sense that I just described. It's very unlikely in an accident at a nuclear power plant that you'll have many spontaneous failures of different systems. But there are some types of accidents that can do that, but they're of fairly low probability. In the case of a terrorist attack, you can't assert the probability of that is low, because, let's say if it's a ground assault, you assume that someone knows something about plant design and their intention is to cause multiple failures. So, their intention is to cause what would be ordinarily a very low probability accident. So, to that extent I think it's a special concern.

Q Could you touch on what the roles of some of the other agencies might be?

MR. LEVENTHAL: Well, the chairman of the NRC referred in his letter to a coordinated federal response. And, of course, there is anew agency for homeland defense. In fact, we had hoped Governor Ridge, as being the governor of Pennsylvania until he assumed this duty, and therefore quite sensitive to reactor safety because of the Three Mile Island accident, we hope that he will coordinate the effort on a high-priority and timely basis. But the FBI is involved, of course. FEMA is involved --the Federal Emergency Management Agency. And then there are the intelligence agencies that are presumably trying to assess the extent of the terrorist threat that exists right now inside of the United States. And I would simply

emphasize that what we are talking about is protecting these plants against a threat that may not have been fully identified that exists inside the United States --something we have to be worried about as of now, not by the time the NRC gets its act together.

I would just point out that the work we did with the Committee to Bridge the Gap to effectuate a truck bomb didn't occur until 1993, when there was first the intrusion at the Three Mile Island reactor, the remaining Three Mile Island reactor, by a deranged person who drove his car through the open gate, crashed it into the turbine building, and disappeared for four hours. And there was a lot of concern as to whether that vehicle might contain a bomb. And then, of course, there was the World Trade Center attack. From that point forward, it took the commission over a year to

promulgate the rule. We don't have a year, right now. We don't have a year. We have right now. And I just want to continue to emphasize the timeliness of the situation and the need for effective remedial action.

Q (Off mike.)

MR. LEVENTHAL: Dan Hirsch is a specialist in nuclear waste disposal.

MR. HIRSCH: In addition to the problem of attacking a reactor, there's a grave problem regarding potential attack on the shipments of radioactive waste, the thousands of shipments that would be anticipated to go to a place like Yucca Mountain, were it approved. At present, the industry has resisted having security associated with those shipments, and I'm sure you've all seen the press reports that one of the arrested individuals in the last few days suspected of having links to these events had a license to drive radioactive waste. Now, to put this in perspective, the train fire that occurred in Baltimore a few weeks ago with chemicals --radioactive waste, high-level waste, on a train going through that tunnel, for example, having that kind of fire, you could have as much radioactivity on a single train from six cans as you had from Chernobyl's entire reactor. So having large numbers of train shipments and truck shipments --the truck shipments are somewhat smaller in radioactivity, but still extraordinarily large --pose a very, very major problem: How do you provide security for thousands of shipments on the open road, and when, again, the industry has resisted significant security? So that's one of the developments that I think is troubling that we need to rethink perhaps in light of this event.

And just to make one related point, there's also been, as you know, a push to have a new generation of nuclear reactors constructed. And they've talked about building those with what are called pebble-bed reactors, and those would be without containments at all and made out of graphite, the material that burned at Chernobyl. So as vulnerable as our current reactors are, going forward with the Yucca Mountain proposal with thousands of shipments, and going forward with building new reactors that would be more vulnerable to attack, I think, need to be rethought.

One other side of the argument, though, is, indeed, the spent fuel stored at sites is also a potential target. And I don't want to go into detail, but it is insufficiently considered compared to the reactor itself, and maybe larger radioactivity amounts and more vulnerable. And we think that needs to be changed, particularly also in the O.S.R.E. test.

MR. CLEMENTS: Let me also add that the Department of Energy has halted shipments of its own nuclear waste, as well as fissile materials. I don't know how long that's going to be in place, but we feel that certainly is very prudent.

MR. LEVENTHAL: I'd like to call on someone who has not been recognized yet. Yes, please.

Q (Off mike.) 20/20 Vision. I was wondering if somebody could address --(inaudible) -- previous bombing of reactors, --(inaudible) --came about because of those bombing?

MR. LEVENTHAL: I'm sorry , could you just repeat that question a little bit louder, just the very last part of it?

Q The gentleman on the phone mentioned that there were bombings that took place in the Middle East around the reactors, and I was wondering if someone could address what sort of fallout came about because of those bombings?

MR. LEVENTHAL: Bennett, did you hear the question?

DR. RAMBERG: At the time the bombings occurred, there was no fallout because the reactors that had been bombed were under construction. In fact, when the Israelis bombed the Osirak plant, they purposely bombed it before the plant could actually operate. In the 1991 bombing of a small research reactor outside of Baghdad, the Iraqis had removed the reactor fuel at the site, so there was some light radioactive contamination which the inspectors detected, but the fuel had been removed prior to the attack. So we haven't had an experience, fortunately, of a reactor that has been subject to sabotage or military attack today. But Chernobyl illustrated what could happen as a result of a willful disablement of a reactor.

MR. LEVENTHAL: Thank you, Bennett. Yes, over there, please.

Q You talked about the threat to --(inaudible).

MR. LEVENTHAL: We are not addressing that at this press conference. There are organizations that are addressing that. And I think efforts are being made on Capitol Hill especially, and also in contacts with the executive branch, to upgrade the protection of Department of Energy facilities. I would simply point out one thing in regard to that, though. One of the problems with the Department of Energy security today is the emphasis placed on self -assessment programs where the operators of those plants do their own assessments and inform headquarters of the results. And unfortunately, this is the same kind of approach that the NRC is now contemplating with the commercial nuclear power-plant operators, where there previously had been an NRC-supervised --where there is currently an NRC-supervised series of exercises, of mock attacks. Industry's insistence that this become a self-regulation program, a self-assessment program, we think that's definitely the wrong way to go.

Again, I'm going to look for people who haven't been recognized yet.

Q With regard to a ground attack by terrorists against the plant, I assume the plants already have a guard forces. With the size of terrorist forces we're talking about, we shouldn't have a problem hiring more guards.

MR. LEVENTHAL: The so-called design basis threat is classified. Dan Hirsch correctly responded that this is a relatively small force, surely compared with the attack that occurred, the highly-coordinated attack involving a cell or perhaps as many as 50 people that occurred on September 11th. There are serious constraints imposed on the kinds of weaponry the simulated force uses, the kind of tactics they use, the kind of explosives they bring. And yet in about half of the cases, the plants failed to repel the attack force. They gained access to the secure area and were able to simulate destruction of critical safety systems that broke down the cooling of the plant that would, in a real situation, lead to a meltdown. Our feeling is that the present level of security at nuclear power plants, even as augmented by the alert that the NRC asked operators to voluntarily engage in, we feel that is still inadequate. And that's why we feel there's an urgency to come out and speak to you, as we have today.

Over there, please. Yes. And could you just speak up so others can hear you?

Q (Off mike.)

MR. LEVENTHAL: Have we been in discussion with whom?

Q With Duke Energy.

MR. LEVENTHAL: Duke Energy. Tom, could you address that, please?

MR. CLEMENTS: Well, we have repeatedly tried to have meetings with them, but I don't think

they're too interested in talking to us. They know our opinion about the issue and have proceeded. So I expect there is some discussion inside the utility about whether they're doing the right thing or not. A management disagreement.

But we are engaged, to varying degrees, in some of the licensing process now for the mixed-oxide fuel plant at the Savannah River site. And I anticipate that it's likely we would get involved in any license amendment that reactor is going to have to get to use the plutonium fuel. So in an official way, we certainly have been involved with Duke and the NRC and DOE, but on a more communicative level between us and the utility. Unfortunately, they don't seem too willing to sit down and discuss this problem.

MR. LEVENTHAL: Have you been called on yet, sir?

Q No.

MR. LEVENTHAL: Okay, please.

Q (Inaudible.) like an attack on a nuclear reactor. Would you say that there is a similar concern whether the potential for attack or consequences on a spent fuel, whether stored in an indoor pool or a dry cast storage or even in an off, away from reactor facility?

MR. LEVENTHAL: I think Ed Lyman can address that issue.

DR. LYMAN: Well, Dan Hirsch already actually alluded to that, and I don't think I want to say too much more. But the fact is that spent fuel that's accumulated at U.S. nuclear plant sites, that has no place to go at the moment, is a potentially vulnerable target. The inventory of radioactivity from spent fuel is considerable. Often the accumulation is several decades' worth of material. And they are not protected in the same way that the nuclear reactor is. In other words, they are usually not under the containment building. And so some of them are vulnerable to attack.

So that is clearly a critical issue that has to be addressed. Even if the nuclear power plants were all shut down tomorrow, the material is still on-site and so additional measures would have to be provided.

MR. LEVENTHAL: Yes, sir.

Q Another question for Dr. Lyman. Although you said that you don't want to release any details of your assessment, could you at least characterize it as whether or not it's simple number crunching or whether you ran a discrete model simulation on a computer? What sort of analysis was it?

MR. LEVENTHAL: Can I just interject that the full analysis that Dr. Lyman did is going to be provided to the Nuclear Energy Commission, to the Nuclear Energy Institute and other governmental entities. We didn't want to have the actual calculation and the results of that calculation in a public document because we didn't want to make it any easier if terrorists are contemplating that. I just wanted to establish that context and let him address the substantive question.

DR. LYMAN: It's essentially a standard methodology which DOE recommends for analyzing its own facilities against aircraft crash, and it's a, let's say just a scoping calculation which would require more detail now and which the Nuclear Regulatory Commission certainly should be doing. They admitted in a press release last Friday that they had not done a full dynamic analysis of what would occur if a plane of that size crashed into a containment. That's sorely needed. But we shouldn't wait for the results of that kind of analysis to take action.

Q I'm not asking for specific numbers but I am asking is this comparing the impact strength of prestressed concrete versus the expected impact force of a jet, and extrapolating, or again, is it a whole model simulation of what might occur?

DR. LYMAN: There's a standard formula for predicting the penetration of a missile through reinforced concrete.

MR. LEVENTHAL: Who has not been recognized yet? Yes, sir.

Q This is a follow up to that. In that analysis, could you find that it is structurally possible to build a containment unit that would withstand? Is that in the realm of possibility?

DR. LYMAN: I really can't comment on that at this point. There may be measures to decrease the risk, but I can't say that it can be completely eliminated. That's really the role of a mechanical engineer or civil engineer.

Q Is the risk you are describing really focused on the vulnerability of the plant prior to September 11th, when you know the American Airlines were open to hijackers, and there wasn't a stepped up ground security at these plants. So really now, the state police and other troops are guarding the plants much more thoroughly than they were before September 11th. You know the steps that are being taken to prevent a hijacking. Are you describing a -- (inaudible) --based on before September 11th. --(Inaudible.)

MR. LEVENTHAL: I'd like to see if I can divide up the answer to that question. I'll address the immediate situation, and I think Dan again can address the longer-term reforms that are necessary. Our understanding of what the heightened state of alert involves is an augmentation of the existing guard force, increased patrols, closing of the plant to --closing the visitor centers of the plants, and the employment of some state police. We are not aware of any federal troops or National Guard units being deployed at these plants. If it has been done, it has not been announced and it is not visible from the outside. What we're calling for is about 30 to 40 National Guard troops around the perimeter of the plant, both on the land side and the water side and at major access points, to provide a visible show of force and a credible deterrent. That's what we're calling for. And as far as we know, that's not in place. But there's a longer-term issue, and that is, when things hopefully get back to normal, what is the level of protection that is then required, given the heightened threat that we now all recognize? And I wonder if Dan could just address that again.

MR. HIRSCH: I might preface it with another part of the answer to your question, I believe. If our concern was solely that there was inadequacy prior to September 11th and those have been cured, we wouldn't be here today. We're here because we tried to get the NRC to upgrade measures sufficiently that we could through the mechanisms --we've always

tried to be very quiet and behind the scenes --then go away, knowing that everyone was protected. We're here because all they did was ask, not even require, but just recommend that reactors go on a higher level of alert with their existing security. That means the same guard force, but working overtime, at least checking packages more thoroughly. But it doesn't mean now having to protect against boats, now having to protect against a larger design basis threat, now being much more vigilant about the insider threat, which is the one that worries me the most, the possible pre- placement of antagonists within a workforce. And those things have not been done, to our knowledge. We know that a few reactors have, on their own, arranged for highway patrols; they have a few additional state police at an entrance. But the idea of bringing --we say we're at war. We say that there needs to be homeland defense. And these are among our most dangerous targets, and that level of protection has not been put in place. And that's what we're hoping someone in authority will now wake up and do. In the longer term, again, there is resistance to recognizing that this old design basic threat is outdated. It makes no sense. It made no sense for a quarter of a century , but September 11th destroyed it. And that needs to be immediately changed so that that guard force and those security plans are upgraded to have to deal with multiple teams, large numbers, highly sophisticated, using all sorts of means like air and boats, multiple insiders, and recognize that you have an immense quantity of radioactivity you've got to keep inside that bottle. You can't let anybody break it. And that's the problem. We don't think that the people responsible enough --responsible for those facilities in terms of the regulators have recognized the new world we live in. We know there's a great many stresses on them and other factors, but the world hasn't changed for them, whereas the world has changed for all the rest of us.

MR. CLEMENTS: Let me just add, we've heard varying reports, as was just mentioned, about what security is being upgraded at the plants. I drove out to the Calvert Cliffs nuclear reactor, which is the closest reactor to Washington. And the visitor center indeed was closed. The parking lot was blocked off right by the main entrance. I saw one guard at the gate with a bulletproof vest on, and I saw one vehicle enter and it was not searched. I certainly didn't see an increased guard force there. It was certainly not visible to me. I imagine it is there, but that's one of the things we're asking for is higher visibility, as Paul mentioned, of the National Guard so we can see them and know that there's a threat inside that plant to anybody that would want to get in.

Q Have you heard of any plants taking good action? Any good reports out there?

MR. CLEMENTS: What we're picking up is just anecdotes about, as Dan mentioned, about the state police in California. We heard one thing about some military, but I tend to think it's rumor. We've heard things about the barricades across the road. We've heard about all the vehicles being searched going on. But, you know, this information or what they do to upgrade is a secret, so it confounds somebody trying to get in. And we certainly don't know what actually is going on. I assume they are communicating all these things to the NRC, because they've established this communication center.

MR. LEVENTHAL: I'll get to your question in just one second, but I'd like to add one point and ask you to focus on this point, and that is that under current regulations, licensed plant operators are not required to protect against a, quote, "enemy of the United States," end quote. "Enemy of the United States" is not defined in the regulations, but it is described as either a government or a person. Our view is --and I think the industry might acknowledge it --that they are not prepared or equipped to protect against an enemy of the United States. The question then, who is? Where is that level of protection to come from? That, I think, is the outstanding issue. That's an issue that has to be addressed by the president on down. If the licensed operators are not required to protect against an enemy of the United States, who is to provide that protection? And our immediate solution is deployment of National Guard forces to provide the kind of show of force that you would want when you're in a state of war. And that's what is absent today. That is the most immediate deficiency that has to be

addressed.

You had a question there.

Q What kind of --the people that are guarding the nuclear plants now --(inaudible) --local law enforcement? Who is --(inaudible)?

MR. LEVENTHAL: The nuclear power plants are guarded by private guard forces hired by the operators. They're not rent-a-cop in the sense that they are not something like Pinkerton Agency. They are hired as employees of the plant. But they are private guards. That's how I would describe it.

Yes, sir.

Q Speaking of the Calvert Cliffs plant, that is the closest to Washington. Is this city safe, because of the distance and the wind direction going from west to east? Are the effects of an attack on that plant from radiation?

MR. LEVENTHAL: Well, of course, the wind shifts. The prevailing wind is from the west, and that presumably would provide a level of protection. The Indian Point plant, in relation to New York City, is to the north and west of the city, and therefore, given the prevailing winds, that would be more worrisome on a probability basis if there were an accident. Art Buchwald once commented that after the Three Mile Island accident, whether you're pro-nuclear or anti-nuclear depends on which way the wind is blowing. So prevailing wind is a consideration. But what you want is something that would effectively prevent that kind of a release coming from a plant as the result of an attempted attack.

MR. HIRSCH: I wouldn't rely on which way the wind blows to protect you from an event that we're talking about. Remember, with Chernobyl, the wind began blowing one way to move the radioactivity, and then it shifted and spread over a very large area. It's a problem for the entire country. These plumes would go vast distances. You really don't --one has to comprehend how much radioactivity is involved, how long-lived it is. So what one needs to do is protect the plant, not count on the weather map.

MR. LEVENTHAL: There's one --all right, we'll take two last questions. I recognize there are two hands up, and I think you've already had an opportunity to ask a question, but please you are free to come to us afterward. There are two more questions, one in the rear and one right here. Please, in the rear .

Q Are the reactor guards on the same scale as in airport security in training and pay?

MR. HIRSCH: No, they'd be higher, but they are not, you know, military type forces. So it's higher than the person who's looking through the x-ray machine but considerably lower than in terms of training skilled military.

MR. LEVENTHAL: Question here, please.

Q Is the security in plants in other countries better than ours?

MR. LEVENTHAL: Well, that's an interesting question. And I think in some countries, the design of the plants was intended to specifically resist a terrorist attack. And I would point out that the German plants have a bunker system where, if the control room were taken out, there is a bunker alternative control room that presumably would be resistant. American plants do have a backup control panel, but it is not bunkered as the plants in Germany.

As far as the guarding of the plants is concerned, some countries --the Netherlands is one that comes to mind --the guards are not armed. I think that's also true in Japan. And those countries rely upon rapid response from the local constabulary once an attack has been identified. This has been particularly troublesome to us, where at some plants, like a research reactor in the Netherlands that they used bomb-grade uranium as fuel, the Dutch marines did a mock attack and the mock terrorists reached the vaults several minutes before the constabulary even arrived. So I think the fact that the U.S. has armed guards at plants probably puts it at a level of protection against what you have in other countries, and I think each country now really has to reassess. Each country with a major commitment to nuclear energy and nuclear power must reassess their level of protection in relation to the new terrorist threat.

MR. CLEMENTS: Let me add, I did go into a nuclear power plant in Korea several years ago; basically just went right through security and right on to the plant in an automobile. I was quite shocked by that. So I do hope steps are being taken in other countries to increase security, as Paul just said.

MR. LEVENTHAL: With that, I'll close the press conference.
Thank you very much for attending.