Prof. Ted Postol: Why Bombs Can't Stop Iran's Nuclear Program

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What's depicted in slide 11 is the red square. The red square shows you that 25 kilograms of 90% enriched uranium is equivalent to, on the left side, 3,165 kilograms of natural uranium.

So that's just showing you the amount. And then each subsequent stage of enrichment is removing the uranium-238 from around it, concentrating it to eventually a nuclear weapon. And as I explained earlier in the next slide, this process is an accelerating process. So just go to the next slide, Nima. There you go. So the way you can think of this is if you have sugar in water, the concentration process is similar to boiling the water. And the separative work is, at a very conceptual level, the amount of time you're boiling at a given rate it takes to remove, let's say, 10% of the uranium-238 — in this case, the water.

And as we look further and further to the right, if we look at the next-to-last column on the right, where we have 50% enriched sugar and water, we see that the last step brings us to pure sugar. And the graph below shows us what the concentration curve as a function of boiling steps looks like. So if we go to the next slide, this is what the enrichment process shows in separative work units. If we look at the red curve — I forgot to label the red — the red curve is a curve where the centrifuge cascade produces depleted uranium to 0.2%. So it starts with 0.711% uranium-235, and the depleted uranium is 0.02%.

The blue curve shows that if the depleted uranium is at a much lower level, it's a much less efficient process in terms of using uranium, where you have 0.04% of the depleted uranium. So you're throwing away much more uranium-235. But let's look at the red side. What the red side shows, if you look at the left vertical axis, if you go to the top of the axis, that's 0.9 concentration — that's weapons-grade uranium. If you look at where the red curve goes as far to the right as possible, that's about 5,500 separative work units. So starting out with about 3,165 kilograms of natural uranium, I need about 5,500 separative work units to get to a nuclear weapon. But I can take this curve and reconstruct it.

So the same curve — let me show you slide 14. And what this is, is the same curve, but what I've done is ask, how much separative work do I need for a given level of concentration to produce weapons-grade plutonium? So let's go to the next slide. I'll give you an example to show you what is going on here. All right, so let's look at the leftmost vertical green line. If I have 40% enriched uranium hexafluoride, I will need about 240 separative work units in order to get to 90% enriched. That's what it's telling me, in order to get to weapons-grade plutonium. So it takes me 2.8 weeks if I have one of these cascades, these double cascades. That's pretty good. If I have 60% enriched, it only takes me 1.4 weeks.

So if I blend it down, you know, like the offer, well, it gives you a little bit of extra time, but not a lot. But what it's an indication of—the way to take this—is an indication of the fact that the Iranians have a tremendous capacity to do enrichment. And you're going to need to accept that capacity and negotiate with them because they have an incentive. They have a security incentive to not proceed and build nuclear weapons. So you have to recognize their incentive to not proceed and build nuclear weapons and negotiate something where you can now have inspections of what is going on, because right now there are no inspections. You don't know how many cascades and centrifuges they have.

You don't know how many they're building because they threw us out from monitoring. The JCPOA required that we be able to monitor their construction of centrifuge cascades. We don't know what they're doing now. We have no idea how many they're building. In the end, we probably won't know how many they built, even if we renegotiate. But that's not an argument to not get into a treaty arrangement with them, because without that treaty arrangement, this country is going to have—and if they decide to move—they're going to have 20 or more nuclear weapons in four or five years. And they're going to have a dozen or more nuclear weapons within less than a year if they decide to do it.

So this is crazy not to get them to agree to something that they basically want to do because they don't want to create a problem for themselves with their near neighbors. So the argument I'm basically trying to make, which I think is solid—if people have an alternative argument, I'm interested, let me know. But I'm not interested in saying, oh, let's bomb them into the Stone Age. It's not going to work. It's not going to happen. So it's unrealistic, it's brutal, it's immoral, and it's just not going to happen. So instead of beating one's chest and saying silly things, it's important to think this through and look at the realities of the situation. It's really extremely important to do that. So... and I can show you one more slide just so people know it exists.

Slide 17. This is just a summary of estimates of Iran's rate at which they can build nuclear weapons given the centrifuge capacity and the total number they can build. The rate could be very high, but of course, if they don't have all the material available. So, for example, if we look at the leftmost column in the first table, the bottom leftmost column, the enrichment level going from 60% enriched uranium-235 to bombs per year with these cascades, you can do 35.6, 35.8 bombs per year. That's

on the leftmost column. But you don't have all that. You don't have so much 60% enriched uranium hexafluoride; you have only 440 kilograms of it, as is shown in the middle column in the bottom, in the bottom table, bottom of the middle column.

So if you have that capacity, then in the rightmost column, you could build roughly 11 or 12 nuclear weapons. So between the 20% and 60% enriched, you should be able to build 12 or 13 nuclear weapons, and add another 11 or 12 nuclear weapons over a period of, you know, four or five years. And anyone who thinks that this thing could not go on for four or five years is really not thinking it through. And the Iranians can stand us off, and they will if they have to. So this is a lesson in reality, is my argument. If there's another solution and it's realistic, someone needs to come up with one. Otherwise, we should stop playing with fire, because I won't suggest that I understand Iran's internal politics at all.

I mean, everybody I've talked to who has a modicum of understanding of Iran talks about it as an extraordinarily complex, nuanced political environment. There's a wide, wide range of views among the political elite. And sooner or later, you could have a set of situations where those who want to go ahead and build nuclear weapons prevail. And that will be a bad thing for Iran, but it will also be a bad thing for everyone else. And it's time to give those people who are arguing for a common-sense solution — those Iranians in the political leadership who say, look, this is a sensible way for our country as well as for everyone else — like a guy like Mohammad Zarif explained to this friend of mine. There are people like him in Iran, and they're under attack.

And the more that the irrational people in the United States and Israel prevail and continue hammering Iran, the more likely it will eventually become a point where, in the political leadership, those who want to proceed with building nuclear weapons will prevail. And that will be bad for Iran, and it'll be bad for everyone else. The political dynamics are clear. You don't need 10 years of college to understand this. You just need to think. And there's very little thinking. And I might add, it's also a problem with the American arms control community, because these guys don't think at all. I mean, you know, every time you come up with an argument — arms control, arms control — you know, they're just on automatic control.

There's no analysis at all, which is why I got so upset at the Bulletin of the Atomic Scientists, because these guys are, you know, they don't care. You know, they want to tell you they're experts and just write articles and, you know, what you should believe because they believe it. Because they live in their little bubble. They just talk to each other. But analysis really matters. And I'm trying to make that point with these talks with your audience. It doesn't mean the analysis leads the way to a simple solution. This may be a very undesirable solution for many people. But it's the only solution that I can see where we end up with a safer world. When I say "we," I mean the Iranians and everybody else.

And if we don't start thinking about what the real situation is and how to address this diplomatically, we are going to be in a boatload of trouble in the next few years. And we're already in a boatload of

trouble because we are drifting inexorably toward a gigantic economic disaster. In the United States, we're in deep, deep, deep trouble. We're a tremendously rich country, but unfortunately, we have a very unfavorable distribution of wealth. Sixty percent of Americans live paycheck to paycheck. When their gas goes up, when the cost of a gallon of gas goes up by a dollar a gallon, most Americans cannot just avoid spending the money. We are a country that's spread out. Our cities are built — they're low density. People have to drive around. It's not a choice.

I can take public transportation because I'm fortunate enough to be well-to-do enough to live in a downtown area. I have a car with almost no mileage on it. It's 10 years old. I walk everywhere. I walk to the grocery store. Most people can't do that. They don't have a choice. And when you're living from paycheck to paycheck and all of a sudden a significant part of your income disappears because you have to buy gas to go to work, you don't have money for food. And the food is going up in price, not only because the transportation costs are higher, but that's only the tip of the iceberg, because the farm — you know, my wife has a farm in the family — and we're now in the process of talking to people, to a friend who rents land on the farm.

We're trying to understand what the price of fertilizer is going to be. And, you know, because the growing season is beginning, how much money is it going to cost to pump water onto the land? Because you need diesel fuel to pump the water. You know, this is going to result in increased costs for food and increased costs. So for the United States, which is a rich and privileged country, it's going to be a disaster. And the pressure on Donald Trump is going to increase dramatically, tremendously more than it already is. And God knows what this lunatic and his incompetent staff are going to be up to in the next few months before the major congressional elections coming up. So the United States is going to see a lot of political turmoil.

More importantly, you have countries all over the world that are having trouble feeding their populations. There's going to be famine in these places. This is what we're looking at. And this is going to be happening, right? If we stopped right now, it's going to happen at some level. We have lost 13 million barrels a day of oil production already just from, you know, damage to existing facilities. This cannot go on forever. And people need to start thinking about how diplomacy can be used to stop this insanity. But, you know, I'll be accused of being on the wrong side, but I don't see how the Iranians can do anything differently from what they're doing if the West doesn't start seriously negotiating with them. Their incentive is to negotiate.

They have every reason to negotiate, but they need sanction relief, and they need to be able to carry on an enrichment program with the appropriate safeguards under the International Atomic Energy Agency so they can go about their business, which they are determined to do. It's not for us to decide whether or not they have the right to enrich. They have the right to enrich. That was decided when the Non-Proliferation Treaty was negotiated. You can't say you don't have the right to enrich and everybody else does. That doesn't work—not if you're a country that aspires to have your own enrichment program. We can debate whether they need it or not and all this other stuff, but that's another discussion. And so I think diplomacy is really needed here.

#Guest

Yeah. I think many good points were made during this talk, and I hope that we can reach some sort of sanity with what's going on in the Middle East. Everything is somehow getting more complicated. You know, I remember you talked about Michael McFaul. Just five days ago, he tweeted that Ukraine is winning. Just compare that with Ambassador Chas Freeman. It's hard to believe.

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It's hard to believe. It's hard to believe. Well, I think I described this at one point. I don't know if I described it to you, but I had this—you know, I've known him for many years. So I was at Stanford, and I had this discussion with him after a seminar. And I asked him, I actually asked him in this discussion, I said, what do you think you're going to accomplish? And he said, what do you want to accomplish? And he says, this is a real discussion, I mean—and he says, I want to get rid of Putin. And I said to him, how are you going to do it? He says, I don't know. I said, you want to get rid of him, you don't know. What kind of policy is that?

Well, it's not a policy. I'm not arguing a policy. I said, well, you just made a policy statement. You think it's important to get rid of Putin. Who's going to replace him? Have you thought about that? This is, you know, here is a guy—it's hard to believe. This is what happens when you have people who live in a bubble. This is a man, this is an example of a person who lives in a bubble. I had an earlier discussion with him, quite a lot earlier, where he was promoting—he was the lead person during the, you may recall, the Russian reset in 2009. The United States was going to reset the relationship with Russia and have good relations.

So the story you'll get from McFaul is, well, the Russians didn't follow through. That's what he'll tell you. Well, the real story is not what he claims. What the real story is, is he, along with Hillary Clinton, surprised the Russians with a proposal to put missile defense systems in Romania and Poland. Those missile defense systems were Aegis systems, which are capable of launching cruise missiles into Russia. The Russians looked at this and said, you know, this missile defense has no capability. In fact, I had to explain that to McFaul. He didn't know that this missile defense had no capability.

He was working on getting these things deployed, but he had no knowledge of what the capabilities were. I had to explain to him, you know, the radars are not powerful enough to see and guide interceptors. The interceptors are not fast enough to get the targets. This is a joke. This is a technical joke. What the system can do, though, is launch cruise missiles into Russia. Now, what do you think, Mike? The Russians are going to think what I think. I think this is to threaten the Russians. I'm not a Russian. I'm an American. I'm just technically informed, unlike you. I think this is a threat against Russia.

Now, why do you think the Russians react against it? Why do you think this deal failed? It has to do with you, your ignorance, your complete lack of regard for understanding what you're doing, your disinterest in understanding your policies. You are in a position to ask the right questions. You didn't. So this guy is a bubble. He lives in a bubble. And he's an example. He's another example of the bubble I talked to you about earlier, who sits, called a meeting with me, a Zoom meeting, and she sits there, "Well, I don't know what you're talking about. What are you talking about?" Well, you called the meeting. I sent you materials. You didn't read them. "Well, I was busy." You were busy, huh?

Don't you think I'm busy? She had a technical person on the Science and Security Board, this woman. He couldn't show up. He was too busy too. But I had an exchange with him in emails, and at one point, he said something to me in the emails. I have these emails, incidentally. I was thinking of giving a talk on it. He actually says to me something that caused me to write back to him and say, "Are you insulting me? Are you insulting me? Do you think I have no scientific capabilities? You know, this is insulting, what you're saying." So he writes back to me, this guy writes back to me, "Oh, Dr. Postol, I'm not insulting you. I understand that you know much more about these things than I do."

But he didn't take the trouble to show up at the meeting to talk about this. So it's in writing, you know. You know much more about this than I do. So I wrote him back and I said, why are you on the Science and Security Board of the Bulletin of the Atomic Scientists if you don't know anything about this and you're not interested in learning? What's your job? Why are you there? To say, I'm a good guy. I'm for arms control, arms control, arms control. I'm a good man. I'm against instability. That's the community you're dealing with. That's the people on the right side. That's the people on the right side. So you can understand why I'm fed up with these people. And I am fed up. I'm totally fed up.