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On the record

**Anil Kakodkar, Chairman of the Atomic Energy Commission and Secretary, Department of Atomic Energy**

**'The Fast Breeder Programme just cannot be put on the civilian list'**

Anil Kakodkar played a key role in the 1974 'peaceful nuclear explosion' at Pokharan and was dubbed the 'baby' of that team. He subsequently rose among the ranks to be mission director for the 1998 nuclear explosions. Chairman of the Atomic Energy Commission and Secretary, Department of Atomic Energy, Kakodkar tells Pallava Bagla about the ongoing negotiations with the US. Excerpts from the interview:

**What is happening on the Indo-US nuclear deal? Where is it headed?**

Well, I think the discussions are on. It is a difficult exercise. I think slowly we will make progress. The July 18 statement is in my view is very clear, so the important thing is to convert this into practical implementation. That is a matter of detail.

**Are there certain sticking points?**

I have a very clear concept about this and that is, as I said, the framework is the July 18 joint statement and the PM's suo motu statement in Parliament. So, we are essentially approaching on that basis. I hope we reach some convergence soon.

**You've also said it's a phased process.**

Yes, but the point is, that has to be understood in practical terms and the understanding has to be same on both sides.

**So, we are not even at a stage where we have at a point of understanding on how to take forward the July 18 agreement.**

No, no. Conceptually it is clear but it's on practical implementation that we have to reach common understanding.

**Is separation the point bothering you?**

Yes, the July 18 statement did say what is the purpose of separation. It says India will identify and separate civilian facilities and then sort of voluntarily place them under IAEA safeguards. The purpose of that is because there is an earlier linkage there that India should be able to get full advantages in terms of the full civil nuclear cooperation. It also says India has a military programme and this arrangement should assure everybody that there will be no diversion to India's military programme or anywhere else. And once things are under IAEA safeguards, it is essentially ensured. But the determination of what is the civilian domain which should be eligible for full international civil nuclear cooperation, according to the July 18 statement, this is an Indian determination and we

think we have done a very objective job. That is what is under debate right now. If you approach the problem from the other end, and it is sort of to say that, well, you make this civil domain so big that the strategic interest get affected, then that is not going to be acceptable to us. Is it not? It is not the intent of July 18 statement. This discussion will take place so as to find out where it lies.

**So you are not averse to the idea of separation?**

Not at all. Not at all. At the same time we cannot allow strategic interest to be compromised, and this is what the July 18 statement means.

**Who determines strategic interest?**

According to July 18, of course, India will determine. We cannot allow India's strategic interest to be determined by others. How can that happen?

**The impression is that the DAE is kind of becoming a stumbling block.**

I think DAE is mandated to sort of implement the country's atomic energy programme in accordance with national policies. National policies include the country's strategic interest and energy interest. So obviously DAE has to act in a manner where both are protected. We cannot compromise one for the other. Finally the question is, somebody has to determine or somebody has to identify where this intermediate interface lies. And I think we have done a most objective exercise.

**But that is not acceptable to the US.**

No, no. According to the July 18 statement, this determination has to be made by India. Now, if somebody tells me that you compromise your strategic interest, then at least as a technical person I have to say, it is my job to point out.

**Sure. Is it not that the ultimate determination whether our strategic needs are met, be it energy or security, is actually a political decision. If the political masters decide to move in a certain direction...**

That is true. But it is my job to, what shall I say, bring out all the points, all the details that are involved in it. So, now, if I bring out all aspects to it, I certainly cannot be qualified or classified as a stumbling block. It is my job.

**Was the separation process and the civilian nuclear deal initiated by DAE or by the MEA? Or from overseas?**

It is very difficult to say where what originated. I think we are, at least in the last several years, making very confident progress. I am not saying there are no difficulties. The nuclear reactors today are, in terms of their performance world class and it has been so acknowledged by many. We are constructing power stations in less than five years, which is also comparable with the best in the world. So we have fast reactors, for example — not too many countries have that capability. We are going very confidently on the 500 MW prototype fast breeder. Now, we have looked at the country's total energy requirement and then we have looked at its total energy resources. We did this

exercise essentially to find out the niche area for atomic energy. See, normally one carries out such studies over a horizon of 10, 15 years. I feel that is not appropriate when we are talking about a programme where there is not just commercial, industrial implementation, but we are also talking about sequential technology evolutions — you know, the three-stage programme. It is not the project gestation period, but the technology gestation period. And so this study has been done over a 50-year horizon. We have looked at what are the requirements of energy, what are the energy resources available in this country and it sort of tells you something about the niche area for atomic energy, so that we have to create a long-term vision and proceed on that basis. There are quantitative numbers which have been worked out and what does this say? This says the following: that we have at this moment to plan on the basis of what is reality. The reality is that we don't get fuel from outside, so we have to do everything within the fuel available in the country.

Now the uranium that we know is available in the country today, we can support 10,000 MW — through the classic Pressurised Heavy Water Reactors (PHWR). We are making good headway, say, if you take into account the reactors both under operation and under construction and we will complete all that by early 2008. This will roughly account for 4500 MW, meaning we are roughly half-way there already in the first stage. The next PHWR we have is a 700 MW design. So another eight PHWR's, if I construct these, they will amount to 5600 MW. So that plus the 4500 MW capacity, it completes the 10,000 quota.

### **When do you hope to have...**

I will come to that. Now, today we are constructing eight reactors simultaneously. In terms of time it is not a big deal. I have go through this uranium mis-match, you know, the tie-up of mining capacity I am growing and all. But strictly speaking, if all the projects are started simultaneously, which we can do because we are running eight reactors/projects simultaneously, within five years we should go there. I'm not saying it will happen. But this is the time we have to think about. So we said we will start the fast reactor because that is the next growth area. Now, initially the growth will take place based on the plutonium that will come from the heavy-water reactors, so the growth rate can be supported by feeding more and more plutonium from the reactor. But that will also come to a halt at that point. One, you have pushed all plutonium in fast reactors. The growth rate will stop and beyond that also we have to support growth rate and that will happen only if we are talking about a fuel cycle which has a very short-doubling time. Today, we have taken the first step of fast reactor which is based on oxide because this is where the maximum experience is available internationally and in India. So all these things have to also stand the test of commercial viability. I cannot just do R&D because it is huge money. We have made a beginning with oxide but we have to change this fuel cycle to metallic fuel. Metallic fuel gives you short-doubling time, of the order of 12-14 years, even 10. Once that happens this fast reactor capacity will multiply on its own. Then only when we go to sufficiently high capacity, then the question of thorium, the third stage, comes in. The point I am making is, there are limitations to the growth rate. You can't say, I will pump in more money and get more megawatts.

### **I get your point.**

Against this backdrop what we are visualising is that in the long run, the energy that will come out from the nuclear fuel resources available in India should always form the larger

share of the nuclear energy programme compared to the energy that'll come out of imported fuel. Because let us see what is happening in the petroleum (sector), so much dependent on outside import. We can always justify that you import energy and it has a multiplier effect to boost the economy and you can always pay for that with earned profits. That is not the point. If you superimpose that on a large country like India, the fact will remain that it will amount to a huge import bill, and although the country will have capacity to pay that bill — but an alternative where you produce that within the country, all that energy which is based on the fuel within the country, it will be always superior from a balance of payment point of view. So it is important in the long run our strategy should be such that the integrity and autonomy of our being able to develop the three-stage nuclear power programme, that we have to maintain, we cannot compromise that.

Now you look at it from the other end. It can generate lot of energy in the future. If there are opportunities for international cooperation, civil-nuclear cooperation, we can get that as an additionality — additionality is the important word. We have never had any problem in getting reactors or fuel from outside and putting that under safeguard, we have done that in the past, so we can do that again. The only thing now as I said is, okay, see our track record has been extremely good, so there need not be any fear. But then if you have to satisfy somebody, then if you have carried out this separation and put the civil part in IAEA safeguards then people are sure that there cannot be any diversion, but the fact still remains that we are putting some of the indigenously built reactors also under safeguard.

**We are?**

Well, that is what it would mean, no?

**I do not know, sir, nobody knows.**

No, no, it will mean that. But then I have to maintain some proportion (outside safeguards) and that has to be based on good strategic calculation. This has to be necessarily an Indian judgment and decision. Now, if somebody says, no, you should put this under safeguards, that also under safeguards, there is a problem. So this is what is under discussion. See, you must be also clear that these linkages for the three stage, those linkages are through fuel cycles. And fuel cycle is intimately linked with the strategic programme and our programmes unlike all the weapon states, India's programme began as a civilian programme — people must understand this — and then the weapon capability had to be acquired when it became necessary; and we have not violated any rule in that. We have done this at the most minimum cost. But this also means that they are intimately intertwined.

**We were not expected to have separate programmes, it was probably cost effective to have it together.**

Exactly. I have to keep that in view.

**If you are talking about the end stages and fuel linkages then it means the breeder can never be under safeguard.**

That is absolutely the point.

**Because if the breeder, as you say, cannot be under safeguard, then to feed the breeder you need fuel from some of our civilian programme power reactors. So some of the civilian programme reactors obviously cannot be under safeguards.**

So I had to factor that in deciding those domains, so that is exactly the point. But we will see.

**So categorically the breeder will not go under safeguard?**

No way because it hurts our strategic interest. You follow, no? There is no way.

**The strategic interest of security or strategic interest of energy security?**

Both. It is linked through fuel cycle.

**So will placing the fast breeder reactor programme on the civilian list and hence under safeguards hurt India's efforts at maintaining in perpetuity the 'minimum credible deterrent' while hurting its need for long-term energy security?**

Yes, there can be no doubts on that. Both, from the point of view of maintaining long-term energy security and for maintaining the 'minimum credible deterrent', the Fast Breeder Programme just cannot be put on the civilian list. This would amount to getting shackled and India certainly cannot compromise one (security) for the other.

**What you are saying is that you could well be diverting plutonium out of the breeder for security interests.**

I am not saying that. I am saying the sequential stages are linked through the fuel cycle. The fuel cycle is for the same infrastructure which also feeds the strategic programme and I don't have such a big infrastructure that I divide this saying, ek beta ye aap ke liye, ek beta ye aap ke liye (I can't divide the family saying this son goes to this part, the second to the other).

**So where do we come at a compromise? The US has tremendous allergy to the plutonium fuel cycle.**

But for us it is fundamental. For that matter, they are also now coming to closed fuel cycle, you must have heard this.

**So it is not merely a question of you trying to protect your intellectual property...**

That is right. But intellectual property is also an issue. It is not IPR issue in the sense of patents rights or something. See, it all depends on how one approaches this problem. It is like this. I want to do something new, I want to try out some new idea. Now if I am doing it without safeguards I simply do it. Now when you do R&D, you cannot be sure that if you started with a particular strategy, you will be successful. You may have to change. Now, if you have to do R&D with an inspector breathing or looking over your shoulder, you have to tell him, look this is the way I am going to do. Now after some time you change your idea, you do it differently, now how do I implement that new idea if I am

bound by this old one? I have to go through the whole paper work all over again. I will spend all my time doing that paper work, rather than research.

There is a more fundamental question. If I am treated as an advanced country, where is the compulsion for me to do it? I will do R&D in an autonomous manner, finished. I have separated a domain and whatever comes from outside is in that domain. It is subject to full inspection, (with) no diversion.

**It essentially means the breeder is out of the circuit of safeguards.**

Yes, breeder has to be out.

**Obviously it means some of our power reactors will be out of the circuit of safeguards as they're what are feeding into it.**

Yes, but that proportion is something...

**What is the proportion?**

I cannot tell you. It is a matter of detail.

**Is your strategic need not met by Dhruva and CIRUS? You need additional capacity from these civilian reactors?**

Yes, very clearly. Not from civilian reactors but from the power reactors.

**They are in the civilian domain.**

We have not said that.

**That is the assessment you are still making. Correct?**

Once I define something in the civilian domain that will go in safeguards, but then I also have to satisfy my strategic needs. It is very straightforward.

**But then where is the compromise likely because the US is insisting that you put the breeder within safeguards and also put a chunk of your power reactors.**

So, we have to discuss that logic. According to me, it cannot be done. And in fact it goes beyond the July 18 statement. It amounts to changing the goal-post.

**Which amounts to changing the goal-post? Asking for breeder to go in?**

Asking for a specific thing, that you must put this, you must (put) most of it, this amounts changing the goal-post.

**If the political leadership demands that, would you be willing to accept it?**

Which one?

**The goal-post has been changed according to our wishes, if that is what the political masters say.**

I have to point it out.

**But, will you be willing to accept that?**

Where is the question of my willingness? I am a technocrat and I will point out the all ramifications of this.

**And stomach a problem.**

Why stomach a problem. After all, I have to do my job honestly. I will do it. We are all professionals, right?

**The breeder is out and there are only a few power reactors that we have and the chunk is going to remain in the non-safeguarded domain, so what happens?**

I didn't say chunk.

**You didn't use the word but some will remain obviously in the military domain.**

Of course. The important point is, that has to be an Indian determination.

**So what will happen to CIRUS, because it is also another sticking point.**

See, the CIRUS issue has been coming on and off and even after '74 it had surfaced. Now after '98 too, (even though) it had nothing to with it. You know, we have gone through a whole refurbishing, everything's been changed. CIRUS is located in BARC which is a strategic facility. That doesn't mean that everything that happens in BARC is strategic. We also do crops there. And we maintain CIRUS has been always (been) in use for peaceful purposes. At the same time, you cannot put it in the safeguard simply because it is located inside BARC.

**The other sticking point is about the Ratehhali facility and the naval reactor. What is the logic? They want to cap it.**

But the cap is not acceptable.

**Those will also remain definitely out of safeguard?**

There is no question about that.

**There is criticism that DAE embarked on the separation process far too late seeing the carrot of George Bush's visit is there. You came up with a plan very late in the day, there is little time to discuss it.**

Look separation is a complex exercise. The very fact that we have done something in a few months' time is according to me a lot of work. Certainly we'd like things to move faster. But it does take time.

**Are you under pressure to speed up?**

There is no pressure. We are, as I said, approaching this whole thing in a most objective manner. At the same time we have to do an honest, professional job.

**How much time would it take?**

Depends on both sides. Taali ek haat se thodei bajti hai (you can't clap with one hand)! I cannot predict.

**Do you think the US will be happy at merely opening the gates so that you can buy reactors from France and Russia?**

No, obviously they will have business interests, you know, which is good.

**So, would there be a competitive bid at that point; how will it proceed?**

Ultimately it will end up in competitive bidding. But the roadmap towards that we will have to see. I do not want to guess in thin air.

**In the past you had said — and so had Dr R. Chidambaram and before that Raja Ramana — that technical denial was a blessing in disguise?**

It may be, yes. But that does not mean that becomes the rationale for living in this isolated world; nobody said that. And certainly, we are going to preserve our self-reliance. What is the meaning of self reliance? It does not mean that you create a wall around you and say that I am doing everything myself. Self-reliance means you are not vulnerable to anything, that you don't drive yourself into a vulnerable corner. That is why we are so particular with three-stage power programme and fast reactors because we will preserve self reliance.

**There is no compromise on our thorium programme?**

No way. As I told you, the three-stage programme allows you to have the capability of generating hundreds of thousands of megawatts for a long, long time. I am also telling you, in the 50-year horizon with the kind of energy resources except solar, we won't have a comparable energy source. So you have to develop this capability. Other countries say thorium is not a good idea. But those countries have plenty of uranium; either they have it on their soil or they have no problem of access to uranium. Now, we are endowed with huge thorium (reserves). I see no reason why we should not emphasise on that and obviously nobody else is going to develop thorium technology. So, it is for us to develop thorium technology and I would say this is an opportunity. Kuch areas main to Hindustan ko aagey badhne do (in some areas at least let India be the frontrunner).

**Tomorrow, if a suggestion comes, Dr Kakodkar as chief of DAE and AEC, please put the breeder programme under safeguards, you'd have no qualms?**

No, I will say that this is not in our strategic interest.

**Who benefits from the deal?**

I think both sides. It has to be a win-win situation, you know.

**Do you see in the long future joint reactor development with the US?**

Let us not speculate too much. India will build its own innovative reactor, that much I can tell you.

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