

	<b>ISGQ-2003-M0007379</b>
	[TN: Begins in progress]
<b>Male 1</b>	...General manager and tell him we'll promote you after a year if you provide a proof that what you accomplished helps this center, there would be a promotion for those working in the center. You'll see everyone working within a general program, encouraged to produce so the center can advance. So out of 15 centers you'll find one or two being promoted to general manager. So we always have continued motivation, and those who under perform can be demoted. This is how we've been operating when I was at Energy and now at Military Industry and it's an excellent way to run a military installation. So in summary and to answer your question sir about the administrative performance of the center, it can be on a manager level but not a general manager.
<b>Male 2</b>	I've read a little about laser and I'm following it. What is the Plasma?
<b>Male 3</b>	Sir the brothers that we brought here...
<b>Male 2</b>	The experts, yes we brought them here for this reason. Everyone who's going to speak press on the microphone in front of you.
<b>Male 3</b>	Dr Thamir Nu'man al-Mawdud from the Theory Application Center, Military Industrial Organization. Plasma has many applications used in different countries. The industrial application uses matter and...
<b>Male 2</b>	What?
<b>Male 3</b>	<p>Matter, science of matter. For example, painting matter happens with plasma. Plasma is a condition of the 4<sup>th</sup> matter, which happens or forms in situations that require very specific systems and conditions. These systems start in the Vacuum Creating Systems, which we have in some systems. Then Plasma Diagnosing Systems and Plasma producing systems. There are several ways to produce it. It is used in several countries in producing electrical energy. Big countries participate in big projects to produce electrical energy, like the English-European project in England and called the "Jet" [Joint European Tokamak] or called in English "Tokamak". And also used in some military manufacturing in making "Triggers or cocks" that are used as "Dense Plasma" which is used in producing neutrons, which in turn are used for explosion purposes or triggers in missiles. It's very technologically advanced.</p> <p>It is also used in high energy that is also used in these fields. The Iraqi national experiment with Plasma that started in the 80's, sir, and you know about it, started in Plasma sources. We started creating plasma sources in 1981 that is used in the Iraqi nuclear program. The plasma sources that we created started in research and development and then turned into products in the initial experiments, then experiments in mathematical systems, then advanced production that we achieved in the late 90's. These plasma sources were used as a start for certain production.</p> <p>We formed plasma in the 80's and started building plasma theories while expanding the work force. We started building the work force, and the national Iraqi experiment; we built the work force and the plasma experiments, until we got to the mathematical stage and then production.</p> <p>At the present time, and after the aggression of the 30 against us [the gulf war in 91], some of our plasma activities became limited as a result of the unjust</p>

	<p>UN resolutions. So the plasma activity now is limited to lab issues and industrial experiments so we don't let the plasma activity completely fade away. And that's because we're allowed to do these experiments. According to our experience in building the plasma activity, we had a huge industrial base available to us. I mean we built factories to make the Plasma systems, specialized factories with the military industry. So building a plasma center in a university needs a lot of effort and financial and industrial resources. When it comes to a center, we have to think whether it's going to be an application center or a center to build the plasma systems. This needs huge scientific, industrial and financial resources. The industrial part needed already exists in our factories. So if we need any plasma system, it will take time, effort and working factories.</p> <p>Also, what is the main application purpose for the plasma? I mean when I build plasma, I need to set a goal to achieve. It should be a clear purpose and goal to achieve. I mean what do we do with the plasma. Our experience back then, we had a clear goal that we had to achieve. And we spent 8 to 10 years until we achieved the goal that you sir overlooked.</p> <p>Big countries now set huge budgets for plasma to get to an industrial level. If we want a lab level for the plasma then it's possible as long as it's in the form of a section in universities. And it has to be efficient enough to prepare the people and the experts and get them ready to join our military industrial institutions. Thank you sir.</p>
<b>Male 2</b>	<p>The plasma applications on the same level that we used to have before is not feasible right now. But in any case, any science that we want to apply will need people to do it. If we stop producing experienced people from universities and higher studies, it means that if at any time you want to keep things the way they are or even try to expand, you won't be able to cause you don't have the people experienced in the field. In that case, it's necessary for universities to be active in that field to give what's needed to keep what we have and expand in the future if the opportunity presented itself.</p>
<b>Male 3</b>	<p>Of course sir, we can't separate the initial scientist from the application ones. The academic people need to stay the course to support the application people in the future. This stage exists now. The plasma and laser center suggested by the Ministry of Education already have advanced experts now that participate in improving the center.</p>
<b>Male 2</b>	<p>Dr Hunaa [TN: Only first name is used, not clear]</p>
<b>Male 4</b>	<p>Sir I just wanted to make clear that this center is up and running and has been active for more than 6 months. And I called it "Fati" [TN: means youth] because as a six months old scientific and research center it is youthful. But I think that if anyone visits it and evaluates it, they'll be amazed that in six months we were able to establish such a center.</p> <p>But we do need to organize things, and sir I think we need to make a whole system for scientific research centers, and an order from the Minister for each center determines their specialties. But there's no need to issue a system or law for each center like we do now for the scientific research centers in our ministry.</p>

	<p>There's another issue that I would like to discuss and it might be important. After the embargo is over soon, and we can start working in the scientific and technological fields more than we do right now. This center would be a perfect cover for the technology sectors so they can practice their international activities in conferences, publishing and research, away from the sensitivity of being active in their field, because I think these sectors will be monitored for a long time. So it should practice a scientific activity in universities that has to do with technological and scientific issues without the restraints that our technological sectors suffer from now. So it's not competing with the technological sector, it completes it. And it will be very useful to us. And I've witnessed in this short period of time that the relationship between this center and the technological sector is very strong. An interaction relationship, so this center can be a model center if we gave it enough support. And that's happening now.</p>
<b>Male 2</b>	<p>There are no doubts about the center and no one is complaining about it. But we just want to understand, I want to understand. That's it. It's an important center in our country so I want to understand it more.</p>
<b>Male 4</b>	<p>If you need any more explanation sir, then I'm ready.</p>
<b>Male 2</b>	<p>Dr 'Amir.</p>
<b>Male 5</b>	<p>Sir the issue with this center like the Minister of Higher Education has mentioned, we have to discuss it within the general understanding of scientific research, and how to work with it within the higher education. And also how the scientific research in higher education is connected to scientific research in industrial sector. And as a county we have experience, like the Scientific Research Council and the reason we cancelled it and what were its goals. There also was a military research program in the Ministry of Defense that was transferred to the Industrial Organization, and at the time I was the Director of Military Research and Development Department in it. There are some different ideas that might seem acceptable and similar when we discuss them in a simple form. But when we start getting deep into the issues, everything changes. We all believe that there should be scientific research in universities. No doubt about that. And there also should be research in the industrial sector. But the main issue here is how do they work together in a specific specialty or the same sector. This is why we're discussing plasma sir. Let's talk about something simple like electronics. Should there be a research program in universities? The answer is yes for sure. Should there be a research program in the industrial sector? The answer is also yes. Is it possible in the future when Iraq is advanced and capable to establish research centers that are independent of both the universities and the industrial sectors? The answer is yes and they have them in advanced countries. So how do we operate all three without a mix up happening in missions and duties? There's a danger in giving the universities and their research centers goals that they cannot achieve, which will lead to accountability and if I may be honest sir, it's unfair to the people working there and going through with the experience for years, because we'd be giving them goals that we know in advance are impossible to achieve.</p>

	<p>If we take a look at the goals set by the Laser and Plasma Research Center now, they interact in a way that needs an industrial base. These kinds of goals need labs and experts like Dr Thamer said. It also needs an industrial depth. The result is going to be that it will start asking and demanding for more and more. It will eventually turn into a laser and plasma center that should be in the industrial sector. So it won't achieve that nor will it achieve its main goals and we'll find ourselves after a few years looking into it. This is exactly what happened with the Scientific Research Council when it was given goals impossible to achieve, and I always discussed that with Dr Najih and said that we'll fall in that trap, and we did. So what happened then? We got a memo from the Presidency Office to transfer systems to the center. If you want to achieve the goals you have to transfer the systems. That was just the start. They didn't have experts so they asked to borrow our experts temporary then permanently. Because now, we have a small activity in Plasma...</p>
<b>Male 2</b>	<p>Our activity in laser is still new.</p>
<b>Male 5</b>	<p>Yes sir, in plasma, we have nine PhD and four Masters and we consider it small. We have seven labs for plasma and we still consider it a small program in the industrial sector. So what happens when we start a research program with an application aspect? Sir, in Iraq and other third world countries, out of our desire for industrial advances and application research, we tend to give universities application ideas that they just can't achieve. We exhaust them as a result. Research centers in universities shouldn't turn into an application program. If they do then they're lose their goals. They should stick to academic research. Is there an Electronic Research Center? Yes there is, but are these centers attached to the office of the Minister of Education. He can't deal with them; they don't do that in the rest of the world. He supports it because it is called academic education. If it doesn't interact with the high studies students, it loses its value. When it's attached to the Ministry of Education it won't have the connections with the scientific sectors that perform higher studies. Someone might say that we have to support it cause it's something new and not like the electronic or mechanical research and we have to attach it to a dean of a university or college. Or we might need to attach it to the Ministry of Defense instead of the Ministry of Education. The truth is sir; the application activity exists in the industrial sector and not just the Industrial Organization. Dr 'Amir is responsible for the plasma activity in the Atomic Energy, we have in the Military Industry but less than them. We don't feel there's interaction within the center if it's formed within the ideas of the scientific research in the university.</p> <p>The suggested idea is to increase the application activity and raising the level. The industrial sectors have their systems and the educational sectors have their systems. They don't need to establish labs and build systems. They started something that they can't achieve. Just like the Scientific Research Council that we had before, but we changed a name form the Electronic Research Center. And after three years we have a meeting and determine that the center is not capable of achieving its goals and we say it's academic. It is true that it's academic, and we say that it is not an application center. Then we hold it</p>

	accountable. It should be academic, and it should do research and expand the scientific base, expand the technological base, do higher studies like the Minister of Education have said, and produce experts. But the application part should be left for the Industrial Organization within its capabilities. Thank you sir.
<b>Male 2</b>	Should we hear from the specialists that we sent after? Go ahead.
<b>Male 6</b>	Mister president, I think we should go back to deciding the goals of plasma. And I think we should add other issues to what Dr...
<b>Male 2</b>	What is your name and specialty?
<b>Male 6</b>	Dr. 'Amir 'Abbas, Director of Plasma Section in Atomic Energy. Interest was first shown in plasma in the 19 <sup>th</sup> century. At the end of the 19 <sup>th</sup> century. When the need arose to produce gas pipes that can transfer electric current. That need back then resulted in producing light. So the first use of plasma was in producing light, which is the simplest use of plasma. In 1950, it was discovered that plasma could be used in controlling nuclear reactions, meaning controlling the hydrogen bomb. Back then the United States started a program called Shiroot [?]. It was a closed program. In the same year, the Soviet Union and Britain showed interest in similar projects. Ever since then, the system was given a name that's being used till now, "the Tokomak" like Dr. Thamir have mentioned.
<b>Male 2</b>	What is the name?
<b>Male 6</b>	Tokomak [23:39], which is a Russian word.
	From 1950 till 1956, a conference to discuss the Tokomak [23:55] was held for the first time. The first country to make a Tokomak system was the Soviet Union. Those countries started since then spending billions of dollars to make the project succeed. The project simply is a method of producing energy.
	Natural energy is produced using several methods, using coal, oil, or using nuclear fission using Uranium. These energy sources are not infinite. So the

way everyone was thinking was trying to use an energy source that's infinite. The materials used in thermal nuclear fission are infinite. Presently there's the Tokomak project [25:14] or the JET [Joint European Tokamak] project between all the major countries, after that there's the "Entor" [?] [25:23] and they're spending billions of dollars on them.

So that's the major interest in plasma, producing energy. There's hope that this international system called Entor [?] [25:51] can reach a point in the year 2000 where the amount of energy going into the system will equal the amount of energy it produces. Or what is called in English "break even". The next stage after that, they hope to turn the project from a scientific project into a commercial project, they estimate it will happen in 2050. So there are hopes for energy that should be produced after the year 2050.

Basically that is the major purpose of plasma. But there are many other uses. That goal is not what small countries usually go after because of financial issues.

I participated in some discussions with the suggested center. There was an idea to establish a small fusion system. But any way...

In the 70's, the general direction was to benefit commercially from plasma.

There are some important applications at the present; the most important one is treating materials with plasma. For example, it can be used to harden the surface of materials. We presently have a project in the Atomic Energy with the Walid factory. We're having problems with Katarat [?] [27:30], they break, it happens in all the countries. The katar [?] [27:34] produces material called titanium nitrates, which through plasma hardens the Katarat [?]. This is one of the applications that we presently have. It increases the life of Katar [?] from one year to ten years. And that's considered a commercial profit.

It is believed that every electronic device made using several stages; have plasma used in one of these stages. For example, manufacturing silicon, semi conductors, circuits and electronic device.

This is why we currently have in the Atomic Energy an electronics section that produces electronic devices for the electronic section, which is the basic material.

There are also military applications for plasma, like the [unintelligible] launchers, or the magnetic-hydro-dynamic generators.

Through these general purposes of plasma, I want to discuss where this suggested center will fit in. The general concession among the physicists is to make a fusion system, because the main purpose of plasma in the future is producing energy. The suggested center, as a growing center, should think about the application fields that will benefit society at the present time. They used to say, finding some systems that will deal with the basic ingredients of electronics. This is presently the attractive part of the plasma issue.

Sir, I'm going to talk about the scientific group. Their effectiveness depends on two basic factors, a goal and how clear the goal is, and the method used to accomplish that goal.

The goal right now as far as the suggested center is concerned, is not clear. I read the suggestion and it was a general suggestion. And it interfered with the researchers' ambitions. And I did participate in another suggestion that's not here right now.

It is suggested to manufacture plasma systems, and finding the benefit. That's the really difficult issue when it comes to plasma. We at the Atomic Energy need to find the benefit of it, or the application.

<b>Male 2</b>	It got cold in here.
<b>Male 6</b>	Plasma systems in general are made of several things. They're usually simple if it's for research purposes. A simple and inexpensive system and can be made in any simple factory. We can do a simple research, and the system can change from a research system, if the research was good, and the requirements are available, turn into...
	[TN: Audio goes blank 31:28 to 31:45]
<b>Male 2</b>	... they can let us know if they disagree, and if they do agree, which is better, they can also come to us so we can reach a clear plan. Thank you my brothers from the Military Industry for the valuable information that you provided, and at the same time we got to see you and get to know you. Thank you. Goodbye. Next on our schedule?
<b>Male 7</b>	Mr. President, this program was given out today around 12 o'clock. So if you want we can start with it...
<b>Male 2</b>	Was there anything else given out before that time? Or isn't there anything new?
	[TN: People talking in background]
<b>Male 7</b>	We don't have anything other than what was given out.
<b>Male 2</b>	So it means that we're finished
<b>Male 7</b>	Thank you sir.
<b>Male 2</b>	Good night.
	[TN: Inaudible - people talking in the background.] [TN: Audio is blank from 34:53 to the end of the cut.]