
DEVELOPING AND MAINTAINING NUCLEAR COMPETENCIES

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Ladies and Gentlemen,

I have the –should I say, dreadful ?–, privilege of being the first to speak among all the distinguished colleagues who have been scheduled to make a presentation during this International Conference which addresses a matter of strategic and undisputed importance.

My topic is "Developing and Maintaining Nuclear Competencies". I shall try to approach it with a few remarks in mind . From the [standpoint](#) of a profit-oriented nuclear group in a competitive world, - which [therefore](#) considers that its accumulated knowledge and know-how is a valuable asset -, [which obviously faces operational priorities, and which normal attitude is to protect its proprietary rights.](#)

1) First, I wish to state that nuclear issues have to be approached with modesty –and without any form of self-complacency. [Let's recognise, too, that having operational objectives helps!](#) [However](#), I would not pretend to be able to offer ready-made solutions to all and any aspect of the matter of this Conference. Inside our [three-year old](#) group, we are just progressively adapting ourselves to a moving situation. I intend and need to learn from the speakers of this conference !

2) Second, the issues involved are complex.

One given nuclear operator, –it is the case with the AREVA Group, which, on one hand, designs nuclear islands and contribute in many ways to build or to the operating and maintenance of nuclear power plants, and directly designs, builds and operates nuclear plants of the fuel cycle, on the other–, cannot claim that all aspects of these issues are within its control. For instance, this industry has to rely on the people educational systems can provide, [or want to provide, as well](#) . Nuclear development in any given area depends of the political, regulatory, scientific, technological, educational and social environment, or background, which prevails in this area.

3) Further, it happened, historically, that the development of nuclear power generation, as a whole, did not follow a really regular and progressive pace. Actually, it was not a "stop and go" journey but, there are motives for speaking today of a nuclear revival, of a kind. Having recognized that nuclear energy is to be part of the solution to major global issues, it is legitimate to wonder whether the necessary human resources will effectively be available in time and place, according to regional perspectives, for decision-makers, investors, operators, etc...

4) [We](#) are all aware that nuclear [power](#) generation, together with the nuclear industry which supports it, have an acute, if not special, responsibility towards the public at large. As Dr ElBaradei once said :

"... It is essential that we preserve nuclear scientific and technical competence for the safe operation of existing facilities ...".

To put it simply and plainly : As a nuclear designer and operator , [which](#) accumulated know-how and knowledge is obviously an asset, to preserve competencies is [not only in](#) our economical best interest . It falls in line, too, with our commitment to Sustainable Development. Above all, it is our duty .

To preserve competencies is also a requisite for safety agencies.

5) Last remark, no need to remind this assembly that our industry is fully aware of the non-proliferation issue and international commitments on this purpose.

Allow me now, while drawing on past experience, but without pretending to be exhaustive, to make comments on some aspects of nuclear knowledge maintaining and development. Namely:

- Assimilation of knowledge management,
- Recognition of the nuclear specificity,
- Attracting young talents.

1) Make use of the appropriate knowledge management processes or techniques.

Many papers will be presented at this Conference on this topic. Therefore, I shall limit myself to mention one [issue for those who](#) seek to accordingly adapt organisations. It lays in the fact that knowledge management, more or less implies sharing and networking, which itself implies adequate individual (or group) propensity to work in that mode.

Individual (or group) propensities may be influenced by historical, cultural or organisational features. Negatively, in an global organisation by a possible diversity of cultural backgrounds or, more simply, in difficulties to understand each other. Positively, if persons of diverse cultural background, are positioned and organized because they are given the opportunity of working on common concrete projects.

My point is that one can rely, of course, on good planning, good organisational decisions, but the human factor cannot be ruled out of the picture ! Management may be expected to manifest a strong determination and maintain a steady approach in the implementation of knowledge management, and may be quite good at doing that. One may also think that the necessity of being efficient in a competitive world is, by itself, a powerful enough motivation for people. But, a decisive or basic factor lays, nevertheless, in working at establishing a common "cultural core" which each person (or group) in the organisation has the capability of recognizing as his or her own. Let's call it micromanagement, may be , in that sense that it should reach as far as individual attitudes.

2) Recognize, and take full account, of the nuclear specificity.

[You certainly guessed, already, that I am not talking here of its scientific specificity \(neutronics, corrosion or ageing of materials when exposed to radiations, etc...\), which the nuclear industry draws on, along with more "classical" parts of scientific or technological knowledge and progresses, without which, incidentally, no nuclear industrial development would have been possible!](#)

As a matter of fact our nuclear industry is certainly not the only high-tech, highly-sophisticated industry in the world. Not the only one, either, with above-average social responsibility. Not the only one on which vigorous public demands for accountability are expressed. Nevertheless, one tends to consider nuclear as "special"; nuclear knowledge is no exception to that. Nuclear knowledge maintenance and development should integrate this fact.

One might add another feature which, possibly, differentiates nuclear from other high-tech industries. A feature that our industry has been living with: that is, time constraints in some nuclear development may very well exceed the duration of a generation of professionals.

Translated in our organizations, that means, not only maintaining scientific and technical knowledge, which, as a minimum, leads to maintain :

- A rigorous supervision of human resources in quality and quantity ;
- Anticipatory planning of human resources, with a special focus on succession planning concerning expertise positions ;
- A steady and continuous effort in training and retraining programs.

But also, maintaining, nurturing, what I shall call the safety culture inside the organization. Safety culture encompasses design, construction, operating and maintenance of any nuclear facility. **We cannot take for granted that safety culture is totally included in textbooks and databases.** Safety culture means not only to know "how", but also, and perhaps above all, to know... "why..."

Maintaining the safety culture is one among all other major managerial duties you might think of. It is a permanent concern, an endless issue, and an objective with managerial and organisational consequences, **centered on: knowledge sharing on return of operational experience, regular retraining, defining and abiding to operational and maintenance procedures**. Individually, to assimilate the basic concepts: defence in depth, anticipation, etc...

Eventually, taking full account of the nuclear specificity in knowledge maintenance and development in our group –which, quite likely, I believe is no exception–, requests a multi-functional approach, which combines efforts of Research and Innovation, and Human Resources departments, plus the group Nuclear inspectorate.

3) Attract young talents with the proper scientific background, while, at least in Western Europe, **a big portion of** the generation which built the nuclear industry as it stands today will progressively retire in the, let us say, present decade or so, and/or because we are convinced that, worldwide, nuclear energy will have to expand in a not so distant future.

Attract young talents at a period of time when, at least in our Western societies, scientific higher educational courses are relatively shunned.

Attract young talents, while also recognizing that our industry has to compete with other activities.

I must acknowledge that the industry, basically, would **readily** rely on the capabilities of the academic world and research centers **in ensuring that training and education in nuclear science and technologies are attuned to the evolving needs of the industry, in maintaining the proper educational programs and in fostering fruitful cooperations between them.** But we know we have to do more, because we are not any more in the 70's and early 80's of the past century. That is why, for instance, our Group intends to develop or strengthen organized relations with selected academic entities.

As a whole, I am convinced that, –certainly, with time permitting– with proper networking, active and perseverant cooperation with research, academic or training organisations, through the action of WNU, etc....., the industry will eventually find significant elements of solution to this obviously very important issue.

My point **here** is that it will be part only of the solution, for our industry has first not to be perceived as inhibiting younger people to join it because of a negative image. It has to present itself as attractive to the younger generation, and more broadly, to convince the general public that it is attractive, and globally useful. In that view it is not enough, though necessary, to be able to propose potentially attractive individual careers and contracts, possibly supplemented by well-fitting in-house retraining programs (which is, for instance, the purpose and ambition of the AREVA University).

Without mentioning **here** what can be done on national stages, promotion of the use of nuclear energy as developed by the IAEA or by the WNA on the global stage, is of paramount importance. **But, certainly,** communication policies, operational events and results, of the nuclear actors are also **very** influential, in helping shaping up in background the perception that the general public, and especially, younger professionals or fresh graduates, may have.

My conclusive suggestion, **from the standpoint of a nuclear operator,** is that knowledge management maintaining and development request, in order to be wholly effective, and

coherent, a multi-sided approach, a strong and steady commitment of the management, and extreme attention to the ... human factor.