

**Address of Symposium President:  
THE URANIUM WORLD IN TRANSITION FROM STAGNANCY TO REVIVAL**

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This International Symposium on the Uranium Raw Materials for the Nuclear Fuel Cycle is in succession of previous uranium symposia organized and hosted by the IAEA over a period of almost four decades – the first conference of this kind took place in 1970.

Although delegates came and come from nations of various political systems, and ethnic or cultural heritage, all these symposia were characterized by a spirit of frankness and tolerance that permitted, in addition to the public presentations, an individual exchange of knowledge and experience beyond that of official directives.

Therefore let me begin by expressing my gratitude to the IAEA authorities, today represented by the Deputy Director General Mr. Y.A. Sokolov, for initiating this conference, and providing the facilities and services.

Mr. C. Ganguly and Mr. J. Slezak also deserve special mention and thanks since they conceived the multidisciplinary program and, together with their co-workers, organized it and put it into action. And as the agenda shows, the spectrum of topics covered this week is indeed broad, ranging from exploration to mining and milling through to environmental, socio-economic and regulatory aspects. Besides providing an update on the state of the uranium industry today, this multidisciplinary approach pursues two additional goals:

- First; to provide an indication of the wealth of information contained in numerous publications covering past and present uranium research, exploration and recovery results, concepts, techniques etc., and
- Second; to promote and facilitate communication, not only between the representatives of the various disciplines actively engaged in the uranium raw materials cycle, but also between professionals and the public.

**With Respect to the little-known wealth of previously published information:**

After the decline of the uranium industry in the 1980s, exploration and mining activities fell dormant for almost a quarter century prior to the revival in the first decade of the 21<sup>st</sup> century. During that quiet interval, the uranium sector lost many well-trained, experienced and knowledgeable geologists as well as mining and metallurgical engineers. As a consequence, during the ongoing revival, the industry suffers from a lack of staff with depth in uranium-specific knowledge.

As traditional internal company education was largely abandoned – except by a few large corporations that kept their most experienced staff as tutors and mentors for younger trainees - most newcomers had (and still have) to educate themselves, which is not an easy task, especially without mentors. But which is the optimal option to achieve adequate education and, in consequence, professional competency?

To quote Thomas Alva Edison, - there are three ways to achieve education:

- (a) By learning/studying which is the hardest way requiring patience and endurance,
- (b) by copying, which may be the easiest mode, but which is subject to the caprice of fortune, and
- (c) by experience, which represents often the most unnerving or demoralizing and costly mode.

Due to the lack of mentor- and tutorship on one side and lack of patience, ignorance and/or understanding on the other, the younger generation – with few exceptions – tends to perform their duties and solve related problems by their own means without taking the, admittedly, often boring search for and study of relevant literature; in other words, they practically invest their time in trying to re-invent the wheel. In doing so they are acting in an inefficient and costly fashion. Indeed, the search for appropriate literature references has become an arduous task caused by the numerous publications on uranium subjects; but not only that, the content of papers is highly mixed in quality.

The organizers of this symposium hope, therefore, that presentations and discussions this week will provide those interested with sources of pertinent information and that all papers presented will include comprehensive bibliography with adequate accuracy.

**With respect to facilitating communication:**

There are examples showing that incomplete communication between the various disciplines involved in uranium projects can result in misunderstanding and misinterpretation of data. As this may result in the failure of a project, open communication across disciplinary boundaries needs to be maintained and encouraged at all times.

Not considering emotion-based staff-internal rivalry, clashes of personalities and competing characters fighting for priority of their concepts or methods, different ways of resolving issues and developing solutions are typically the result of profession-specific upbringing and working logic. And even though members of all technical disciplines involved in the uranium cycle may be speaking the same language and may be using the same professional terminology, misunderstanding or misinterpretation of documents and data is common.

A historical case may serve as an example: The exploration department of a mining company has compiled all relevant data of a discovered U deposit hosted in Precambrian rocks in comprehensive reports, maps and tables.

What did the mining department do? Neglecting the distribution of ore properties, the pit was designed in agreement with topographic requirements.

How did the metallurgical department use the deposit documentation? It decided to install autogenous grinders for ore crushing under the assumption that Precambrian rocks are hard and massive. And, by assuming an ore with an average carbonate content of about 3 %, it implemented an acid leach process.

After the first truck loads of ore had been treated, the process engineers complained that

- (a) the grinding technique does not function due to too much argillaceous ore components and that
- (b) the acid consumption exceeds by far the calculated amount. Subsequent analyses of the ore treated showed a carbonate content of some 8-9 %.

What were the reasons for these difficulties? Simply put, the mill designers had ignored the petrographic-mineralogical description of the ore and the miners had ignored in their open pit design the heterogeneous carbonate distribution in the deposit.

A scape-goat was quickly found: the geological department, but only for a short while. The geologists could easily show that all features of the deposit were properly documented but were not taken into consideration by the engineers. Clearly, a proper exchange and mutual check of data interpretation by the three departments would have avoided the unpleasant experience.

In order to help to overcome or at least to reduce such interdepartmental communication breakdowns, everybody in this symposium is encouraged not only to attend his profession-specific presentations but also those of the other specialists.

**With respect to Environmental, socio-economic and public relations aspects:**

Last but certainly not least, in these times not only economic conditions but also environmental, socio-economic and social licenses to mine an ore deposit are required, hence trans-disciplinary communication should also be an obligation in the following areas:

**Environmental surveys:** Underdeveloped co-ordination of geochemical surveys during the exploration stage with environmental studies has been noted. Soil and water sampling by exploration staff and collecting samples for certain environmental studies could easily and cost-efficiently be combined if both parties are capable and willing to co-ordinate their programs.

**Socio-economic aspects:** Indigenous people like Inuit, Papuas, or Aborigines have historically and culturally different lifestyles and attitudes toward development, compared to people of industrialized nations. Developing cross-cultural understanding and communication skills should be included in standard training programs for company personnel destined to work in regions with indigenous people.

**Public relations:** Individuals working in the uranium industry are at times asked to respond to critical questions from the public, that are not necessarily friendly in nature. How does one best react to these questions, in particular to those of anti-nuke al-gore-rythms? The tried and true way is still to respond with facts. This, of course, requires the capability to respond in a simple, accurate, and understandable way what one is doing technically but also how his work complies with environmental and regulatory constraints.

**In short:** This conference attempts to

- comprehensively describe the state of the industry,
- indicate the wealth of information available as a basis for more efficient work and development of new ideas,
- enhance communication between generations of uranium specialists, separated by a lengthy period of stagnation in the industry,
- open lines of communication to facilitate understanding between the professional factions and, finally,
- provide guidance on how to communicate efficiently and tactfully with the public, arguably the industry's most important stakeholder.