

September 4, 2009

INSAG Insights on MDEP Activities

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I seek in this presentation to provide some perspectives on the role and importance of the MDEP program to what INSAG terms the “global nuclear safety regime.” I will focus on a particular challenge that arises in the context of new entrants to the nuclear enterprise – those countries who are exploring the construction of a nuclear power plant (“NPP”), but who have no prior experience with one. Let me start, however, with the overall context. My remarks in some areas may extend beyond the formal statements of INSAG, but I believe that my remarks will be true to the main thrust of the INSAG perspective on the issues.

I. Context

There are 436 NPPs in operation around the globe, supporting approximately 16 percent of the electrical needs of the world’s population. Because electrical power provides the foundation for economic and societal progress, NPPs make a very meaningful contribution to humankind. Moreover, because of the need to reduce the world’s dependence on carbon-emitting sources of energy – principally coal, oil and natural gas – in order to minimize the adverse consequences of growing concentrations of greenhouse gases in the atmosphere, nuclear power is of ever growing importance.

Of course, an absolute precondition for reliance on nuclear power is safe operations. It is reassuring that safety performance, in general, has been strong in recent years. Various metrics to assess safety performance – such as numbers of unplanned shutdowns, availability of safety equipment, radiation releases to the environment, and radiation exposure of workers – show quite striking improvement over the course of a decade or two. But constant vigilance to reduce accident vulnerability must be and must remain part of the universal culture.

Maintaining this sound recent safety performance will be a challenge. We live in a time of important change. There is substantial new construction that is either underway or likely to be undertaken in the next several years. Over 50 reactors are under construction around the globe today, which means that operators and regulators will be stretched to provide scrutiny of new plants while maintaining attention to existing operations. Perhaps of even greater import is the interest in the acquisition of a NPP by countries that currently do not have nuclear experience. I understand that nuclear power is under serious consideration in over 30 such countries.

It is in the context of this change that I will discuss MDEP.

## II. The Global Nuclear Security Regime

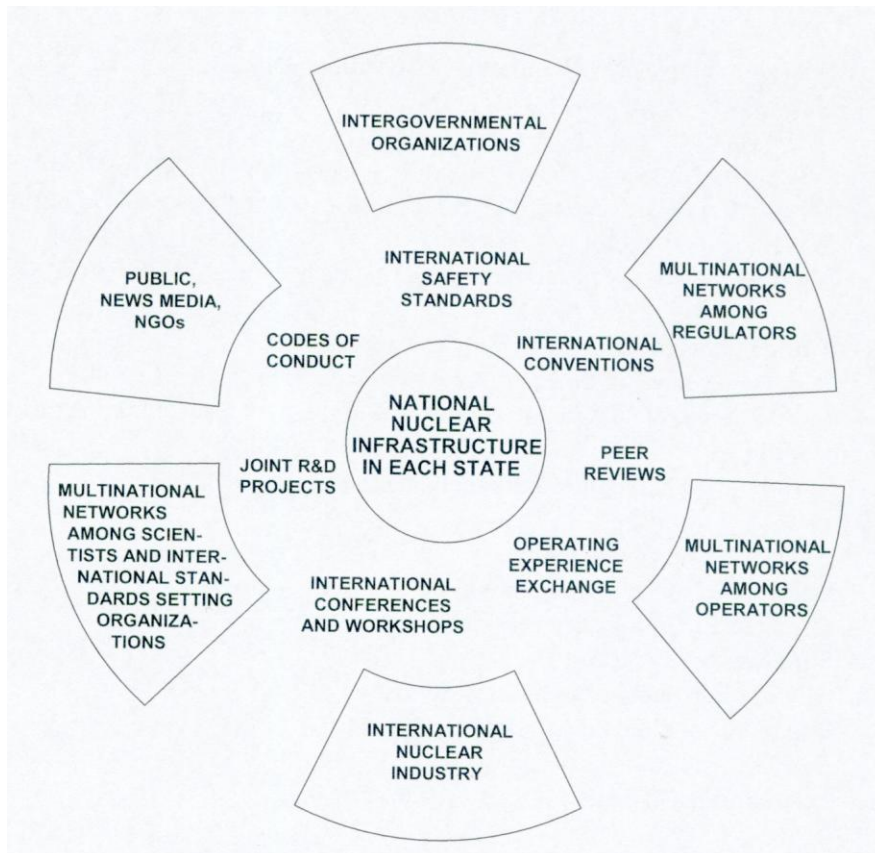
In recent years, INSAG has focused on what it terms the “Global Nuclear Safety Regime.” As all of you are aware, each country bears the central responsibility for safety. One lesson from years of experience is that the operator must assume the primary obligation for assuring safety because the operator controls what happens in the plant and, as a result, can best assure continuing safe performance. The national nuclear safety regulator, in turn, undertakes the reinforcement and policing of the operator, defining the operator’s responsibilities and seeking to ensure that those responsibilities are being met.

Although operators and national regulators play the essential roles, there is an important backstop to the licensee and regulator: the global nuclear safety regime. The regime is a collective international enterprise that sets a level of performance expected of all operators and regulators, monitors that performance, and builds competence and capability among both operators and national regulators. This global nuclear safety regime will be increasingly important as the nuclear renaissance takes full flower.

The regime has grown and developed over many years. It is made up of several components:

- Intergovernmental organizations such as the IAEA and the NEA .
- Multinational networks among regulators, including the International Nuclear Regulators Association and the Western European Nuclear Regulators Association.
- Multinational networks among operators, the most important of which is the World Association of Nuclear Operators (WANO).
- Stakeholders in the international nuclear industry. The vendors that design and sell NPPs are international businesses that market their products throughout the world. Similarly, the architect-engineering firms and the suppliers of equipment and services are worldwide enterprises. These enterprises provide a means for transferring knowledge from country to country.
- Multinational networks among scientists and engineers. Scientific and engineering societies encourage communication among experts in many nations.
- Standard development organizations—for example, the American Society of Mechanical Engineers (ASME), IEEE, and the American Nuclear Society (ANS)—and their interfaces with the International Organization for Standardization (ISO).
- Nongovernmental organizations and the international press. Nuclear activities attract attention and interest around the globe, including from NGOs and the press. This attention provides an important stimulus for change.

## The Global Nuclear Safety Regime



From IAEA, *Strengthening the Global Nuclear Safety Regime (INSAG-21)* (2006).

A framework of international conventions, international safety standards, codes of conduct, joint projects, and international conferences and workshops holds the system together. Chief among these, of course, is the Convention on Nuclear Safety. These elements together provide the context in which every national nuclear program operates.

In INSAG's view, several overlapping factors serve to make the examination and strengthening of the global nuclear safety regime a pressing obligation. Every nation's reliance on nuclear power is to some extent hostage to safety performance elsewhere in the world; a nuclear accident anywhere will have significant consequences everywhere, if only through an indirect impact on public opinion. Thus each country currently using or contemplating nuclear power has an interest in ensuring that there is attention to nuclear safety everywhere. There is also the simple reality that we have much to learn from each other.

The MDEP program is and should be seen as an important component of this global nuclear safety regime. As noted above, the nuclear industry has become more concentrated, with the result that a small group of vendors seeks to construct NPPs

around the globe. Efficiencies and safety advantages can arise from avoiding needless country-specific differences that require design modifications or that present unique operational challenges. Nuclear power must compete in the economic marketplace with other sources of energy, and the legal regime should further, rather than retard, economic efficiency, while simultaneously ensuring adequate safety. The global safety regime should reflect and respond to the changing structure of the industry by encouraging greater international harmonization.

The multinational evaluation process serves these ends. The coordination of safety assessments should enable more complete and thorough assessments than any one country could accomplish. It should serve to promote international trade, by bringing cost savings to the parties involved in licensing the plants and in constructing them. And it should further the general goal of advancing greater international harmonization, thereby avoiding questions that may reasonably arise if significant differences in design were to be required from country to country. We can hope that greater understanding of each other's regulatory system can facilitate eventual convergence of regulatory requirements.

Of course, because each country retains its licensing authority, the final licensing actions will be taken at a national level. Clearly, site- or country-specific issues must be taken into account separately in connection with each construction application – issues such as site-related risk factors (for example, earthquake risk), reliability of off-site power, and the licensee's capability to build, operate, and maintain the plant. Nonetheless, a coordinated international design evaluation serves to streamline and strengthen the process, augmenting the capacities that any particular regulator could bring to bear.

At the same time, because the nuclear industry is part of a world economy in which production capabilities are globally interconnected, parts and components for nuclear plants may come from many areas of the world. The quality-assurance standards for nuclear plants are high, but no one regulator, vendor, or operator can readily have scrutiny over the quality of all these parts and components. As a result, the MDEP program for nurturing coordination among regulators around the globe should serve to encourage global standards and to ensure that those standards are being met.

### III. New Entrants

The importance of the global nuclear safety regime is enhanced in the context of new entrants. As noted above, a large number of countries without previous experience have expressed an interest in constructing and operating a NPP. Any such undertaking entails a commitment that can extend for at least a century and possibly far longer if the country must take responsibility for the long-term disposition of used fuel. This obviously entails the maintenance of financial, legal, regulatory, and technical capabilities over an extended period. Perhaps less obvious are the cultural, educational, and social components of a successful nuclear program.<sup>1</sup>

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<sup>1</sup> INSAG has prepared a report on this subject entitled *Nuclear Safety Infrastructure for a National Nuclear Programme Supported by the IAEA Fundamental Safety Principles* (INSAG-22) (2008) that seeks to define

The fulfillment of these safety obligations is challenging for the existing nuclear countries and will likely be even more challenging for many of the new entrants. It is in the interest of all those involved in the nuclear enterprise, however, to ensure that the new entrants are successful. This interest arises not only from a humanitarian impulse to help others avoid a serious accident, but also from a practical and direct interest in avoiding an accident that would affect the prospects for and attitudes toward nuclear power everywhere. Given that nuclear power is a vital tool in advancing economic development, providing energy security, avoiding greenhouse gas emissions, and enhancing the well-being of the world's population, it would be a tragedy if its prospects were dimmed by an avoidable accident. This reality imposes some special responsibilities on all the participants in the nuclear enterprise.

The new entrants should understand that their responsibilities are extensive and endure throughout the life of the NPP. As you all know, the obligations start long before a plant is constructed and continue for long after commercial operation stops. Of course, prime among the early obligations is the development of a full understanding of the design of a prospective nuclear plant, thereby providing the capacity to ensure that the design is safe and that construction and operations do not compromise safety systems. It is in this context that the MDEP program should play a role.

Because the regulatory capacity in the new entrant must greatly expand with the introduction of a NPP, the international regulatory community should assist in developing a new entrant's regulatory competence. This obligation probably should fall most heavily on the regulators with experience with the vendor's design, which most often would include the home country of the vendor. I would hope that, either directly through the MDEP program or through assistance from a sophisticated participating regulator, the new entrants could benefit from the insights of the evaluation program. It is in the interest of all participants in the nuclear enterprise that all useful information is made available so that the new entrants can succeed.

Of course, there are many other channels for assistance that should be available to the new entrant. Vendors must seek to ensure that a new entrant understands and has the capability to meet its safety commitments throughout the plant life. International organizations, including in particular the IAEA, should provide training and review services that are tailored to the needs of new entrants. Operators of existing nuclear plants should bring management and technical skills that could be of great assistance to the new entrant countries. And, technical support organizations, in turn, should recognize their special responsibility to help build capacity in the new entrant countries. Access to insights from MDEP should be part of an overall package that will enable the new entrants to succeed.

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the various elements of a new entrant's obligations at each stage of the life cycle of a NPP. The INSAG report supplements various other IAEA documents on this subject. See *Milestones in the Development of a National Infrastructure for Nuclear Power* (2007) and *Considerations to Launch a Nuclear Power Programme* (2007).

#### IV. Conclusion

In sum, the MDEP is and should be an important component in the global nuclear safety regime and can play an important role in addressing some of the issues confronting the new entrants. This is an important program and I hope to see it further develop.