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Letter from the Chairman of the International Nuclear Safety Group

On 20 August 2004, Dr. Richard Meserve, the Chairman of the International Nuclear Safety Group (INSAG) submitted to the IAEA, via a letter to the Director General, his perspectives concerning the worldwide nuclear environment as the INSAG embarks on its four-year term. As noted in the Director General's opening comments to the General Conference, four areas of focus are being pursued by the Group. The Director General wishes to share the vision submitted by the INSAG Chairman with all delegates to the General Conference. The transcript of the substantive parts of Dr. Meserve's letter is given below:

“INSAG has now held two meetings—on November 13-14, 2003, and March 24-26, 2004. The group spent considerable time discussing the range of possible topics that might warrant an INSAG review. We were particularly sensitive to the need to focus our attention on matters that are significant and that lend themselves to analysis by a part-time group of our type. We, of course, have the benefit of the very substantial efforts that have been undertaken by the IAEA, the OECD/NEA, and the nuclear industry, as well as by nuclear regulators and academics from around the globe. As a result, we believe that our efforts are best directed at crystallizing issues that have been the subject of attention by others over the years, as well as to identify and, if possible, respond to any gaps that require attention.

Guided by this understanding of the appropriate niche that INSAG can fill, the group has decided that its early work might focus on the following matters:

Global Safety Regime. INSAG will seek to further the development of a consistent and comprehensive approach to nuclear safety. Our approach is to define an appropriate ultimate safety regime and then explore means to achieve it.

Safety Principles. Safety principles are subject to change, in part as a result of the application of probabilistic approaches to complement deterministic analyses, the need to encompass fuel-cycle facilities as well as reactors, and the necessity to prepare for new reactor concepts and designs. INSAG will pursue the conceptual aspects of this problem.

Operational Safety. There are opportunities for continuing improvement of operational safety at existing plants. INSAG will seek to define some of these opportunities, guided by the experience of operators around the globe.

Stakeholder Involvement. Various stakeholders have a legitimate expectation that they will be informed of nuclear matters and their active involvement can serve to enhance nuclear safety. INSAG will seek to encourage openness in communication and to promote relationships between the nuclear enterprise and various stakeholders that could have a positive impact on nuclear safety. We will seek to develop insights as to when and how to enhance stakeholder involvement.

In setting the context for its work, INSAG also plans at a lower level of priority to develop a survey of how approaches to nuclear safety have changed over the past five decades. INSAG will seek to survey this evolution in order to provide a backdrop for further change.

INSAG plans to undertake these projects principally through working groups that will report their efforts to the parent group on a periodic basis. We anticipate that each of these efforts will ultimately result in a publication or paper of some sort that we hope will prove of value to the IAEA, the public, and the world nuclear community.

Of course, INSAG stands ready to adjust its agenda to accommodate the review of a significant nuclear event or development and the assessment of its safety implications. In this connection, we would also be prepared to consider particular issues that you believe might warrant examination by INSAG. We believe that the role of the IAEA in enhancing world nuclear safety is of singular importance and we would like to be of assistance to you in fulfilling this responsibility.

You have asked for INSAG's assessment of current issues bearing on the safe operation of the world's commercial nuclear facilities. Although INSAG has not undertaken an inspection or even a detailed assessment of facilities around the globe—indeed, we do not have the capability to do so—we do bring perspectives arising from the group's extensive global experience. Moreover, we obtained helpful insights on significant issues from the IAEA staff, based on the IAEA's safety-related missions and services. Nonetheless, this assessment should be seen to reflect informed judgment, rather than to arise from detailed first-hand study.

There are approximately 440 nuclear power plants around the globe contributing roughly 16% of the world's total generation of electrical power. Because of the importance of electricity as a foundation for societal activities and for economic growth, nuclear energy is making a significant contribution to the well-being of the world's people. The electrical energy that is provided by nuclear power plants is all the more important when it is recognized that nuclear power does not present many of the environmental challenges that attend other major sources of energy. Moreover, nuclear technology and materials offer diverse and significant benefits in many health and industrial applications.

Of course, the application of nuclear technology can present significant risks if care in design, construction, and operations is not provided. Although accidents are more common in the handling and use of nuclear materials than in electrical power generation, the public has a particular concern about an accident at a nuclear power plant. And because an accident at a nuclear power plant could have transnational effects, there is strong international interest in ensuring that such plants are designed, constructed, and operated with close attention to safety. Indeed, it is a commonplace but nonetheless valid observation that a nuclear accident anywhere will have consequences around the globe, if only through indirect impacts on public opinion. There is therefore both a local and an international interest in ensuring nuclear safety.

As a general matter, the safety performance of nuclear power plants continues to show steady gains. Safety indicators (e.g., measures of such things as actuations of reactor safety equipment, availability

of safety-related equipment, and unplanned shutdowns) have shown steady improvement over a period of decades. These improvements are no doubt the result of heightened management attention to safety, improved maintenance, improved training, improved diagnostic and other technology, and safety upgrades, among other factors. This improved performance is impressive and, as a general matter, should be reassuring.

Nonetheless, there are safety challenges with which the world's nuclear enterprises must grapple now and in the years ahead. In the past year there were several noteworthy events that warrant careful examination to ensure that the appropriate lessons are learned. Some of these events occurred in plants that had an otherwise impressive operational and safety record and that were operated by organizations with extensive experience in countries with strong regulatory capabilities. These facts underscore the need for constant vigilance in maintaining a high safety level. Moreover, there are several issues to which I would like to draw particular attention.

First, every operator and regulator must overcome the complacency that can arise from uneventful past operations. Nuclear technology is not forgiving and even nations with the most advanced nuclear programs have found that there must be constant attention to safety. It is often appropriately observed that backsliding in safety performance is inevitable unless there is a continuing effort for safety improvement. The nuclear industry has learned that the effort must include not only careful maintenance and thorough training, but also the establishment of an appropriate "safety culture" in design, construction, and operations. Safety must be the highest priority and there must be in place a management structure and set of incentives that serve to ensure that everyone associated with a nuclear facility understands and seeks to pursue safety.

In this context, operators must resist any economic pressures to cutback attention to safety matters in the face of uneventful operations. There should be vigilance to avoid changes that tend to reduce existing safety margins or to limit the expert knowledge that is available and is applied in operating organizations. Knowledge relating to safety is increasing as we learn from operating experience, from safety research, and from revised safety analyses using improved tools. That new knowledge should be applied in a process of ongoing safety improvement. Operators must recognize that every nuclear plant requires continuing investments in staff, systems, and equipment.

Second, there is the challenge presented by aging nuclear power plants. Plant and equipment can deteriorate as a result of continuing use and the ravages of time. Some plants were built without the safety features or characteristics that would attend more modern designs. There also are fewer suppliers of nuclear equipment and services and the acquisition of spare parts and components of appropriate quality can sometimes be difficult. Nonetheless, there is the necessity of ensuring that all operating plants have and maintain an adequate safety margin over the whole life cycle of the facility. This is a continuing challenge, particularly as a result of the complacency that can arise from uneventful past operations and the costs associated with extensive repairs or construction of replacement facilities.

Third, in many parts of the world, the nuclear infrastructure, including in particular the human resources involved in the nuclear enterprise, is deteriorating. While older workers can provide experience and informed judgment, there is a need to ensure that their specialized skills are replicated in a younger generation. Indeed, the sustainability of the nuclear enterprise requires a continuing influx of new recruits and the current flow is simply too small to meet the need. In this context, we observe that, in comparison with 20-30 years ago, there is a smaller cadre of highly qualified experts, fewer graduates in nuclear engineering from the world's universities, and less global financing for safety research. Focused effort to rebuild the nuclear infrastructure, including important human resources, is necessary if nuclear safety is to be maintained and enhanced.

Finally, I note the need to solve issues associated with nuclear waste. The operation of nuclear power plants results either in spent fuel or in reprocessing wastes that are highly radioactive and that must be isolated from the environment. Although the mainstream of the scientific community is confident that the construction of appropriate disposal facilities is well within mankind's technical capacity, scientific consensus by itself is not enough. Disposal facilities have not yet gone into operation anywhere in the world, in part because of public concerns. Those who are skeptics of nuclear power point to the failure to establish disposal facilities as a significant vulnerability. Progress on the safe disposal of nuclear waste is essential if reliance on nuclear power is to continue for the long term.

All of these challenges arise at a time when there are increased public expectations for safety in the application of nuclear technology. The obligation to meet this demand reinforces the importance of establishing independent, effective, and competent regulators that operate openly and in a way that nurtures credibility and public trust. At the same time, the prime responsibility for safety must lie with nuclear industry and, in particular, with the operating organizations. It is not sufficient simply to follow the requirements established by regulatory authorities, but instead these organizations must be committed to safety in every aspect of design, construction, and operations.

There is an important international element in all of these challenges because the nuclear industry is increasingly international and interdependent. Each regulator and operator can learn appropriate safety lessons from others and can draw knowledge from experiences elsewhere. The IAEA provides an important forum for the exchange of information and for reinforcement of the necessary attention to safety. Indeed, the IAEA role is becoming even more significant as advanced reactors presenting different safety challenges are developed and as nuclear programs, such as those in China, expand. We see a continuing need for aggressive IAEA programs to harmonize nuclear safety standards and to enhance nuclear safety for the benefit of all mankind.”