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July 18, 2019

Mr. Yukiya Amano, Director General
International Atomic Energy Agency
Wagramer Strasse 5
A-1400 Vienna
Austria

Dear Director General Amano:

I am writing in my capacity as Chairman of the International Nuclear Safety Group ("INSAG"). Our terms of reference state that INSAG should provide "recommendations and opinion on current emerging safety issues" to the IAEA and others. During my term as Chairman, I have customarily sought to fulfill this obligation not only through the various INSAG reports, but also with an annual letter. My past letters are available on the INSAG website at http://goto.iaea.org/insag. This correspondence constitutes this year's installment of the annual letter.

This letter will be somewhat different from my past communications. Rather than seeking to identify and address an emerging challenge, this letter will focus on an abiding problem for which too little progress has been made. It is written to urge action by policy-makers in Member States on a long-recognized challenge – the need to deal permanently with the accumulation of spent fuel and high level radioactive waste.

To the extent they have addressed the matter at all, some countries contemplate the direct disposal of spent fuel in mined deep underground facilities or boreholes. Others reprocess spent fuel and produce high level waste, in some cases in contemplation of transmutation to reduce long-term toxicity. Nonetheless, regardless of whether a country pursues an open or a closed fuel cycle, there is an inevitable need for a geological disposal facility. As you emphasized in your opening address at the Sixth Review meeting of the Joint Convention on the Safety of Spent Fuel Management and on the Safety of Radioactive Waste Management in May 2018, "[a]ll countries using nuclear technologies have a responsibility to establish and implement comprehensive radioactive waste management strategies, with disposal as their endpoint." It is long overdue for such strategies to be established and pursued.

As you are aware, there are now 449 power reactors in 31 nations that serve to provide about 10 percent of the world's electrical energy. Moreover, 54 additional reactors are under construction and many more are contemplated, some in countries

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that do not currently benefit from nuclear energy. The carbon-free production of electricity from these reactors is extraordinarily valuable in a world that confronts an existential threat arising from carbon emissions. Given the growing importance of nuclear power to meeting the world's energy needs in a way that addresses climate change, the barriers to its full implementation must be confronted and overcome. The Member States, with assistance from the IAEA and others, have sought to assure that nuclear power benefits from the opportunities to increase safety and security and to minimize proliferation threats. But they have not dealt adequately with the Achilles Heel of nuclear power, the spent fuel and high level waste that result from operations.

The situation is not a present threat. The world's nuclear power plant operators have demonstrated that spent fuel and high level waste can be stored safely and securely for many decades. And proponents of nuclear power can argue that the storage of nuclear material is far preferable to the huge volume of carbon dioxide and other pollutants contributed by fossil alternatives to nuclear power. But the overhang of accumulated materials must eventually be addressed. A strategy of simply deferring action does not serve to meet our responsibilities. Indeed, given that the process for introducing a disposal facility – establishing appropriate regulatory requirements, selecting a disposal strategy, searching for an appropriate site, engaging affected stakeholders, and licensing and constructing a facility – is likely to require at least 20-30 years, there is no excuse for delay. In fact, planning for disposal should be undertaken at the outset of a nuclear power program.

There are many adverse consequences that arise from the failure to establish and implement a strategy for the long-term disposition of spent fuel and high level waste. First, the failure to grapple with the problem serves to undermine the prospects for the usage of nuclear power at a time when it is most needed. Those concerned about nuclear power can justifiably point to the situation as a reason to reject nuclear power. Second, the failure of Member States to confront the matter serves to undermine confidence in Government. This is particularly true in those communities that have welcomed nuclear power, but on the promise that any long-term consequences would be dealt with responsibly. As it stands, some nuclear facilities have become long-term storage locations, with attendant risks (albeit small) and the commitment of resources and land that could be used for other productive purposes. Finally, there is the reality that the costs of long-term disposal are uncertain and that delay in addressing the need for disposal results not only in the continuing costs of safe and secure storage, but the possible increase in costs for disposal in the future.

The need to address the challenge is reinforced by considerations of intergenerational equity. We have enjoyed the benefits of the electrical power that resulted in spent fuel, but, if we fail to deal with it, we are leaving future generations to bear the burden of disposal of material that we created. This situation is not fair to our successors. An argument could be made that future generations might seek to pursue emerging technologies and developments for the use of spent fuel and that we should preserve options that enable future generations to further their best interests. A sensible strategy should seek to preserve optionality. But no known technology can avoid the need for a disposal facility and thus, a strategy premised on the preservation of optionality cannot justify ignoring the problem. Indeed, given that the time for establishment of a disposal facility and the placement of material will extend for many decades, there is a capacity to accommodate technological advance as progress is made on disposal.

There is consensus within the relevant technical community that the disposal of spent fuel and high level waste in appropriate geologic media through mined repositories or boreholes can isolate the material from the environment for the necessary long periods of time. There also is an abundance of technical guidance by the IAEA and others on how to deal with the geological and engineering issues. The principal challenge in establishing a disposal facility is political, chiefly the challenge of siting. Local communities in many cases are concerned that they may be burdened unfairly with risks from activities that largely benefitted others.

This letter is prompted, however, by the demonstration that the careful and honest confrontation of concerns can overcome the siting challenge. The establishment of disposal facilities is in the final stages in Finland and Sweden and progress is being made elsewhere.[1] The key seems to be a willingness to address concerns and, through that process, to obtain consent by the affected stakeholders. This progress demonstrates that the political barriers to the establishment of a disposal facility can be overcome. These examples should provide a model for and a stimulus to action by others.

There are many associated issues. For example, countries with few nuclear power plants may find that the costs of establishing a disposal facility are prohibitive. Some countries may not have suitable geologic circumstances for a disposal facility. These challenges can be addressed by the development of international disposal facilities or mechanisms to allow the safe disposal of foreign materials in a national repository.

[1] For example, a license application for a disposal facility is being prepared in France. And waste management agencies in Belgium, Canada and Switzerland are investigating appropriate disposal sites.

Such arrangements will be difficult to accomplish. But the accumulation of spent fuel and high level waste must eventually be confronted and there is no justification for delay.

Best regards.

Very truly yours,

Richard A. Meserve

cc: Juan Carlos Lentijo
INSAG Members