Address to the Opening Ceremony of the Environment Exhibition

on the Occasion of the

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"NUCLEAR TECHNOLOGIES FOR THE ENVIRONMENT"

Your Excellencies, Distinguished Guests, Ladies and Gentlemen

It gives me great pleasure to address you at this special event on the Environment, and to add my personal thanks to His Serene Highness Prince Albert II of Monaco and the Director General for their opening speeches. I also extend a warm welcome to our distinguished guests who join us in this opening ceremony and thank them and you for giving valuable time to be with us today.

The title of my address is "Nuclear Technologies for the Environment". The word "nuclear", as I am sure that many here will recognise, has unwelcome associations with members of the public, and even with decision makers. It is a word that has become associated with weapons, with accidents and with radioactive waste. We all realise that the Agency is better known in the world for its verification activities, certainly not for protection and management of the environment, but much of our work and the technologies that are involved have, indeed, great potential for understanding and protecting the environment.

If we look to the large picture, climate change and global warming dominate many debates. The oceans are known to play a major part, transporting heat and acting as a sink for the carbon dioxide that we produce, and helping to regulate the world's climate. The Agency's Marine Environmental Laboratory in Monaco contributes to the global knowledge on these phenomena, through nuclear techniques to track ocean currents and to measure ocean climate coupling and carbon cycling. Stable and radioactive isotopes are also used to date and reconstruct past temperature, circulation and glacial events, providing the necessary data for the complex predictions that we need today.

Our ability to use radionuclides as tracers for oceanic processes is to a large extent driven by recent advances in and analytical techniques such as clean sampling and high precision mass spectrometry measurements. These modern techniques have stimulated many recent research programmes on oceanic cycling of trace elements and their isotopes. It is expected that this programme will significantly boost our understanding of the ocean and climate.

Also in the marine environment, one of the more serious problems facing some coastal waters is called Harmful Algal Blooms, or HABs for short. These often grow because of rich nutrient mixes of chemicals from industry, dwellings and agriculture discharged to coastal areas. HABs can cause the entry of toxic substances into the human food chain. Paralytic Shellfish Poisoning is one of the potentially deadly outcomes, and so shellfish have to be monitored and, if necessary, supplies regulated. The traditional methods of testing have been wanting in terms of timeliness and cost, but a nuclear technique called receptor binding assay, which is rapid, more sensitive and cheaper will now ensure sustained and effective shellfish toxicity monitoring worldwide.

Management of the terrestrial environment requires an understanding of the processes that lead to change, which means that we need to be able to measure and to track the critical elements and their dynamics. The Agency's Laboratories at Seibersdorf are at the centre of a worldwide network of 114

laboratories, called the ALMERA network. Participation in Agency proficiency tests or intercomparison trials, specifically organized for ALMERA on a regular basis, are organised to monitor and demonstrate the performance and analytical capabilities of the network members. Through such activities confidences is built that Member States can accurately measure soil pollutants, for example, and so meet international norms for trade and harmonise emergency responses.

Here in Vienna, there is an abundance of good quality water, sometimes too much pouring from the skies, but more than one billion people have no access to clean water, and predictions are that, without intervention, about two-thirds of the world's population will face shortages by 2025. It is a goal of the World Summit on Sustainable Development to halve the number of people without access to clean water by the year 2015. Nuclear technology is part of that effort. By using naturally occurring isotopes, we can trace the origin and movement of water and specific pollutants, as in the case of the arsenic pollution in Bangladesh. This information is difficult to obtain by other means, but is critical for developing robust and affordable policies for the protection of fresh water resources.

Agriculture is the biggest user the worlds' scarce water resources, and as an industry, one of the most wasteful. Any measures that can be taken to reduce this wastage can have dramatic effects on not only people's health and wellbeing, but also on the environment. Neutron moisture gauges can measure the hydrogen component of water in both the plant and the surrounding soil. They are thus ideal instruments to help farmers optimize their irrigation, fulfilling the vision of our joint FAO/IAEA Division of "MORE CROP PER DROP".

Alongside water use efficiency, combating land degradation and improving nutrient uptake efficiency in agriculture are other major issues. To address these, variations in the natural abundance of stable isotopes, such as carbon-13, oxygen-18 and nitrogen-15, in soil, plants and water are increasingly used as research tools to investigate soil-plant-nutrient-water interactions and their influence on crop productivity and environmental sustainability.

Many countries worldwide now use the sterile insect technique, a proven nuclear technique, in controlling or even eradicating insect pests. It involves mass breeding of the insects, sterilising them with gamma radiation and releasing into the affected areas to mate with wild females, in effect, insect birth control. As no offspring are produced, the populations fall or disappear after repeated applications. How does this have a beneficial effect on the environment? The technique replaces the mass use of pesticides, which are harmful to the environment. . With SIT the toxic agent remains in the laboratory, there is no contamination of ground, farm workers and products, and it's good for biodiversity because it is highly targeted towards only one pest, sparing bees and other beneficial insects.

Electron beam treatment of environmental pollutants is now an established technology. In the Republic of Korea an industrial scale operation to treat wastewater from a dye complex before discharge is underway. Electron beam flue gas treatment in industrial installations is also in operation in China and Poland, and purification of the flue gases from combustion of high sulfur lignite has been achieved in Bulgaria with high efficiency. This has been a win – win situation. The polluting flue gases have been substantially reduced, and the by-product of the process is Ammonium sulphate, a fertilizer for crop use.

Other nuclear technologies in industrial use act, albeit indirectly, in the protection of the environment, for example the examination of corrosion in pipelines that carry potential environmental pollutants in the event of leakage. By moving a gamma source on one side of the pipe and a detector on the other, precise analyses can be made of corrosion patterns and pipework repaired in good time.

I have tried, in a few minutes, to show that nuclear technologies work in many, and sometimes unique, ways in the service of humanity and also for the environment. The Agency is not a core environment agency within the UN family, as is UNEP, but our work does have significant contributions to make to the management and protection of the terrestrial and marine environments. We are happy to work in concert with Member States, international organisations and national institutions to bring the advantages and benefits of nuclear technologies to the collective efforts. The technologies are well proven and rapidly gaining wide acceptance. We look forward to fruitful results and continued collaboration with our many partners.

Thank you.