

(Mr. Imai, Japan)

as that for quality control in industrial production. I shall not go into further details of the mathematics of sample-taking, but would like to mention that the IAEA safeguards have arrived at an extensive application of this idea after considerable debate, and it now forms the basis of determining what is called the maximum frequency of routine inspection for different facilities. It might be useful in due course for us to arrange to look into its applicability in the case of our CW convention.

Another device which may find useful application in the CW case is an extensive use of tamper-proof, or more exactly, tamper-resistant automated mechanisms. These may be seals to ensure that no unauthorized withdrawal of material has taken place from a designated store. In this case, there is a choice of dispatching international inspectors every now and then to confirm the integrity of the seal. Or one may adopt a slightly more costly but overall more cost-effective way of remote sensing so that any violation of the seal would be known to the control centre, at the time of such violation. Introduction of on-line real-time remote sensors, connecting the objects to be verified with control centres through modern electronic devices is probably what Norbert Wiener once described as the "humane use of human beings" in that it will release a considerable number of human inspectors from the tedious chore of looking at seals and meters on-site, all day long, and enable them to turn to more creative and profitable work. One may note in passing that this is the basic concept for introduction of robots into various industrial processes. The idea of continual remote verification had already been introduced in our forum, for instance through CD/271 and other papers. What I am presenting today is an advanced version of such a concept which we have developed in Japan and have found useful in the case of IAEA safeguards.

The system as described in CD/619 is made of various devices which convert data into digital form and then transmit them either through ordinary telephone lines or through special satellite communication devices to the control centre. Advancement in sensor technology, in analog-to-digital convertors, and miniaturization of data transmission devices make it possible now to send: (a) readings from meters and other instrument panels; (b) still pictures; and (c) written messages, almost instantly, automatically and with a great deal of accuracy and reliability. It is thus possible to carry out a constant monitor of flow, temperature, or even chemical components, or to take intermittent time interval pictures of a premise from a distance. It is no surprise that high-speed, high-density communication through use of devices such as fibre-optics represent the most advanced of the so-called high technologies of today, so that the above-mentioned functions, if applied on a consistent scale, can be achieved without much of an additional cost.

The occasions where this technique may be applied are, for example: firstly, declared CW stockpiles, after initial verification to ensure against any unauthorized and unscheduled removal of the material in question; secondly, to ensure that the process of elimination or destruction at the declared dedicated facilities is taking place according to the schedule, and