Annex C
International Atomic Energy Agency (IAEA)

Arms Control Problem: Nuclear
Verification Methods: On-Site Collateral Analysis

Created in 1957, the IAEA has as its primary purpose to facilitate the peaceful use of atomic energy by providing technical assistance to states. An additional function pertaining to the process of verification was in accordance with the statute of the IAEA:

> To establish and administer safeguards designed to ensure that special fissionable and other materials, services, equipment, facilities, and information made available by the Agency or at its request or under its supervision or control are not used in such a way as to further any military purpose; and to apply safeguards, at the request of the parties, to any bilateral or multilateral arrangement, or at the request of a state, to any of that state's activities in the field of atomic energy.

Application of safeguards (a system of technical measures within the framework of international non-proliferation policy entrusted to the IAEA in its statute and by the NPT) took second place to the primary role until the entry into force of the Non-Proliferation Treaty (NPT) in 1968. The NPT requires that member non-nuclear states will accept a set of safeguards on peaceful nuclear material, including periodic inspections and audits, thus discouraging their diversion to military purposes. These safeguards must be directly negotiated with, and are administered by, the IAEA.

The broad objective of IAEA safeguards is to play their part in the international endeavours aimed at deterring the proliferation of nuclear weapons. The IAEA's safeguards activities encompass, among other things, the sum of the measures taken to verify that safeguards obligations assumed by states under agreements with the IAEA are fulfilled.

Nuclear materials are essential for the production of nuclear weapons or other nuclear explosives, and may be used for military purposes other than nuclear weapons. Under NPT agreements, IAEA safeguards focus on verifying that no nuclear material is diverted from peaceful activities. Also, certain non-nuclear materials may be essential for producing nuclear material suitable for use in nuclear weapons or other nuclear explosives. Such materials are required to be safeguarded under certain non-NPT type agreements.

IAEA safeguards agreements define conditions under which safeguards will be applied in nuclear installations. Nuclear installations are divided into "facilities" and "other locations" for safeguards purposes. In addition, nuclear equipment may be subject to safeguards under non-NPT agreements, at the request of IAEA Member States.

Nuclear material accountancy within the framework of IAEA safeguards begins with the nuclear material accounting activities that are undertaken by or on behalf of facility operators in response to requirements set by the SSAC (State Systems of Accounting for, and Control of, Nuclear Material), arising from obligations defined in agreements between the IAEA and a state. These activities and the corresponding accounting information generated are verified through independent IAEA inspection. These inspection activities, after evaluation, provide one of the means of detecting diversion and of deterring diversion by the risk of early detection. They also make it possible to determine the degree of assurance provided by the safeguards measures.

Nuclear-material accountancy depends very much on procedures, methods and techniques for the sampling and measurement of nuclear matter. Physical standards are required to calibrate measurement methods and provide a basis for determining the accuracy of measurements. A good quantitative system and control programme is essential for adequate nuclear-material accountancy.

Nuclear matter must be measured to determine the amounts to be accounted for, and the accounts are therefore subject to uncertainty due to measurement errors which are inherently associated with all quantitative systems. Statistical concepts and methods are used to estimate measurement errors and to determine the level of quantitative uncertainty associated with each nuclear-material account; they are