

The Optimal Distribution of IAEA Inspection Effort

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1. Introduction

For many, the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) [11] is pre-eminent among the world's arms control treaties because of its central role in reducing the threat to peace posed by the most powerful and destructive of all weapons. Since the NPT came into force in 1970, there have been no instances of the use of nuclear weapons in hostilities — yet the degree of success of NPT safeguards against nuclear proliferation is quite controversial. The possible renewal of the NPT, and possible changes to its provisions, will be the main issues at the NPT Extension Conference to take place in 1995.

Under the NPT, the International Atomic Energy Agency (IAEA) has responsibility for implementing safeguards, which are measures carried out "with a view to preventing the diversion of nuclear material from peaceful purposes to nuclear weapons." ([11], Article III.1) Furthermore, each non-nuclear-weapon state is required to accept safeguards "on all source or special nuclear fissionable material ... for the exclusive purpose of verifying that such material is not diverted to nuclear weapons." [7] The mandate of the IAEA thus includes the inspection of *declared* facilities in non-nuclear-weapon states to confirm equipment and procedures and to verify self-reported data. As well, the IAEA's charge includes the detection of *undeclared* facilities and activities within these states.

Recently, both the effectiveness and the costs of safeguards have received much increased attention within the IAEA. Experience in Iraq has demonstrated that safeguards against undeclared nuclear weapons development programs need to be strengthened, yet at the same time concern has increased about the rising costs of safeguards programs, and the IAEA's diminishing reserves. [3]

The IAEA faces very difficult problems in organizing its safeguards operations. (For details, see [5].) It must carry out its NPT inspection activities in well over 100 non-nuclear-weapon states around the globe, using total resources that are clearly far short of what would be necessary to ensure immediate and certain detection of non-compliance. Moreover, it must divide its efforts between two quite different problems — the verification of non-diversion for nuclear material in declared facilities, and the timely detection of undeclared facilities and activities.