

## **THE ROLE OF “SAFEGUARDS CRITERIA” IN AN EVOLVING SAFEGUARDS ENVIRONMENT**

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### **Abstract**

Since its inception the IAEA has sought to use objective criteria to justify the form, scale and intensity of its safeguards efforts at any given facility in any given state. These criteria became increasingly formalised over time until, in the late 1980s and early 1990s, the “Safeguards Criteria” or “91-95 Criteria” were produced. The safeguards criteria were used both to guide inspectors in the conduct of inspection activities and as the principal point of reference in the evaluation of those inspections. In effect the safeguards criteria served as the lynchpin of the traditional safeguards system - they served to hold the system together.

The implementation of additional measures under the existing legal authority of INFCIRC/153, combined with the new measures authorised under the Additional Protocol, moves the focus of the IAEA’s efforts away from the strictly quantifiable forms of safeguards towards measures that are more qualitative in nature. In some cases the new measures complement traditional measures, while in other cases they provide entirely new types of data that greatly exceed the value of anything that was available under traditional safeguards.

The strict criteria-driven system of traditional safeguards needs to adapt to the realities of strengthened and integrated safeguards – this paper addresses the issue of the types of adaptation/evolution that are necessary in the concept of “safeguards criteria” and the implications this evolution holds both for the performance of inspection activities and for the evaluation of safeguards effectiveness.

### **1. INTRODUCTION**

What are the “safeguards criteria”?

The IAEA has made use of some form of guidance for the conduct of inspections at every stage of safeguards development, dating back to the late 1950s. The guidance became increasingly formalised over time until, in the late 1980s and early 1990s, a standardized compilation of inspector guidance was produced as a consolidated manual. This manual was referred to as the “Safeguards Criteria” (or for those with long memories the “91-95 Criteria”). Under traditional safeguards the criteria served several purposes, being used in inspection planning, as guidance for inspectors in the conduct of inspection activities, and as the principal point of reference in the evaluation of inspections.

The safeguards criteria were intended to demonstrate non-discrimination by ensuring a high degree of uniformity in the application of safeguards. In effect the safeguards criteria served as the lynchpin of the traditional safeguards system - they served to hold the system together. Inspection plans were produced for every inspection, these plans stipulated the activities that were to be conducted by the inspectors on the inspection in terms of the requirements of the criteria. During the inspection all decisions with regard to stratification of the facility inventory, sampling plans applied and verification methods used were all made with reference to the criteria. When the inspection was completed the detailed (computerised) report of the inspection emphasised the steps taken during the inspection to

satisfy the requirements of the criteria. When the inspection was formally evaluated the criteria served as the basis of the evaluation – any deviation from the criteria gave rise to the definite risk of the inspection (and perhaps the facility) failing to meet its goal.

As a consequence of the strict application of the criteria for both the conduct and the evaluation of inspection activities, the potential for variation in inspection activities (either between equivalent facilities in different states or between inspections of equivalent facilities conducted by different inspectors) was minimised. There were both positive and negative aspects of the inspection uniformity imposed by the application of the safeguards criteria.

### **Positive aspects**

- personal judgement on the part of the inspectors could not be used to arbitrarily increase or decrease the intensity of inspection effort applied during any inspection;
- facility operators had a degree of certainty about the inspection measures that would be applied during any inspection;
- inspection reports could be subject to a simple form of quality control to ensure uniformity of quality;
- inspection activities were focussed on those areas that were considered most important for facilities of each general type;
- inspector preparation and planning time was reduced as similar preparation was made for all facilities of particular type.
- evaluation of goal attainment produced unambiguous results that could be communicated to the member states in simple terms; and
- the IAEA could point to strict uniformity of application of safeguards measures to counter any claims of discrimination.

### **Negative aspects**

- personal judgement on the part of the inspectors could not be used to increase or decrease the intensity of inspection effort applied during any inspection in response to circumstances noted at the facility by the inspector;
- facility operators had a degree of certainty about the inspection measures that would be applied during any inspection that potentially allowed them to take action to defeat these measures;
- uniformity in inspection reports made it difficult to determine which inspections had given rise to verification problems that were resolved in the field ;
- inspection effort and resources concentrated on the states with the greatest numbers of facilities rather than being available to address areas of immediate proliferation concern; and
- strict uniformity in the application of safeguards measures prevented the IAEA from differentiating between facilities and inspection situations that differed in detail.

With the advent of the strengthened safeguards system and the incremental introduction of integrated safeguards - the optimum combination of safeguards measures available to the IAEA under comprehensive safeguards agreements and additional protocols - on a state-by-state basis, it became increasingly clear that a strictly criteria-based approach to safeguards would result in substantial losses in safeguards effectiveness and efficiency, but it was also clear that no single part of the system could be changed in isolation. Changes in inspection conduct could only be viable if they were matched by equivalent changes in inspection planning, reporting and evaluation.

## **2. NEW SAFEGUARDS MEASURES**

The strengthened safeguards system introduced a range of new qualitative safeguards measures that provided the IAEA with information that was largely complementary to the quantitative information that characterised the traditional safeguards system. While these new sources of information provided the IAEA with increased assurance as to the **completeness** of states' declared inventories, they were difficult to evaluate in the strictly quantitative terms of the traditional safeguards system.

There were particular difficulties in evaluating much of this new information in terms of its effect upon the timeliness and quantity goals that were the key parameters in the criteria based evaluation of safeguards implementation. It is also important to note that, while there were elements of the safeguards criteria that were intended to address the entire state, the form and structure of the safeguards criteria forced the inspectors to consider material balance areas (MBA) as the fundamental unit of safeguards consideration.

The strengthened safeguards system has changed the focus of safeguards to ensure that states are the fundamental units of safeguards interest. This state-specific integrated safeguards approach is referred to as a State-Level Approach (SLA). Each SLA is based on safeguards verification objectives common to all states taking into account the features of the individual state's nuclear fuel cycle and other relevant state specific factors.

### 3. NEW INSPECTION PLANNING AND EVALUATION METHODOLOGY

Starting in 2004, the IAEA began a process of evaluating safeguards implementation in accordance with the state-level concept. Under this new concept there are four generic state-level safeguards objectives, common to every state with a comprehensive safeguards agreement:

- A. To be able to detect undeclared nuclear material or activities in the state as a whole;
- B. To be able to detect undeclared production or processing of nuclear material at declared facilities;
- C. To be able to detect diversion of declared nuclear material;
- D. To resolve anomalies, questions and inconsistencies.

The evaluation process judges the extent to which these state-level safeguards objectives have been achieved in a given year. The meeting of objectives B and C is directly related to the application of the standard safeguards measures that have been at the core of the safeguards system for more than 30 years (including the application of nuclear materials accountancy and reporting measures). The meeting of objective A is related to the successful application of state evaluation methodology and the production of a formalised "State Evaluation Report" (SER). Objective A can be met only when there are no outstanding significant safeguards issues, questions, inconsistencies or anomalies.

In the small (but growing) number of states subject to integrated safeguards, the basis for implementation and evaluation of safeguards effectiveness is set out in the SLA. On the basis of the SLA and taking into account any required follow-up activities to address safeguards issues, anomalies, questions and inconsistencies identified in the SER process, the IAEA develops an annual implementation plan (AIP) for the state concerned.

For integrated safeguards states the AIP covers a much larger set of issues than were covered by the safeguards criteria under traditional safeguards. The AIP details all of the measures that would be necessary to meet the goals of the SLA including (*inter alia*):

- details of inspection activities:

- inspection timing and frequency;
- inventory stratification and sampling plans;
- verification measures required;
- necessary pre- and post-inspection activities;
- complementary access plans:
  - the issues that complementary access is intended to address (noting that the planning and conduct of complementary access are not intended to be mechanistic); and
  - the measures (such as environmental sampling) that are to be used during complementary access to achieve these aims;
- design information verification activities; and
- questions, inconsistencies and anomalies that have to be followed up and resolved.

The first model AIP was approved in September 2005. The plan consisted of safeguards activities grouped under the following three parts:

- NMA verification and DIV;
- complementary access; and
- headquarters activities<sup>1</sup>.

Each of the three parts of the AIP is intended to address one or more of the four generic state-level safeguards objectives. NMA verification and DIV addresses objectives B, C and D. Complementary access and headquarters activities are used to address objectives A, B and D.

Under the new evaluation model it is no longer simply a case of mechanically comparing the inspection reports to the inspection criteria and determining whether there is an appropriate tick in every required box at the end of the inspection year. While the AIP serves as the basis for evaluation of safeguards effectiveness, it does not achieve this via a simplistic comparison of plans and achievements.

At the beginning of the inspection year the AIP is evaluated against the specific SLA for the state concerned (taking into account any outstanding safeguards issues, anomalies, questions and inconsistencies). This pre-evaluation process is intended to make a preliminary determination as to whether the measures proposed would be able to satisfy the SLA and achieve each of the generic state-level safeguards objectives. This pre-evaluation process also serves to ensure that the measures proposed for the AIP provide a level of safeguards assurance that is at least comparable with, if not superior to, the assurance that could be derived from traditional measures alone.

Another important consideration is to ensure **consistency** in the standard of safeguards implementation across different areas of the Safeguards Department. This is not a matter of *uniformity*, but rather of ensuring that similar circumstances will be dealt with in a similar way. Peer review is an essential part of the IAEA's internal processes. So too are quality management processes. If the pre-evaluation process throws up any gaps in coverage the AIP is adjusted and re-evaluated until it satisfies all requirements.

At the end of the inspection year the safeguards activities conducted under each of the three parts of the AIP are evaluated against the AIP itself, the SLA and the generic state-level safeguards objectives. Differences between activities planned and activities conducted are evaluated against their effect on overall safeguards effectiveness rather than on the basis of whether they correspond to a tick in the

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1. Including analysis of additional protocol declarations, open source information analysis, satellite imagery analysis and SER production review and evaluation.

appropriate box. For example – if the AIP had forecast a requirement for three complementary accesses in order to resolve a certain set of safeguards issues – the basis for evaluation is no longer whether the correct number of complementary accesses was performed but whether the safeguards issues were addressed (either via complementary access or via other measures).

Such an approach is clearly a more rational use of safeguards resources and it should result in both a more effective safeguards system and substantial savings in safeguards resources. However, it may result in measures that are both harder to explain and to defend to Member States. The move to an AIP formalism for inspection planning, reporting and evaluation can also be expected to result in a more complex and nuanced form of reporting in the Agency's annual Safeguards Implementation Report.

For all states that have not yet qualified for integrated safeguards, the safeguards criteria continue to function as the principal form of guidance for the planning, conduct, reporting and evaluation of inspections. All states are now subject to the production of SERs and a form of SLA is being developed for every state (though the SLA will not result in the production of an AIP with the same effect as for a state subject to integrated safeguards).

All states with comprehensive safeguards agreements (whether they have an additional protocol in force or not) are evaluated against the same four generic state-level safeguards objectives – including objective A (to be able to detect undeclared nuclear material or activities in the state as a whole). It is clear that the IAEA has significant limitations in its ability to address objective A for states without an additional protocol – but regardless of these limitations an evaluation is made against all four objectives.

#### 4. CONCLUSION

The IAEA safeguards system is widely viewed by the international community as credible, impartial and successful. The safeguards criteria have served a historically useful role in the history of the safeguards system and are a key contributor to the broad acceptance the safeguards system has achieved. However, the usefulness of the safeguards criteria is coming to an end.

Replacing the safeguards criteria with the SLA, SER and AIP methodologies in an integrated quality management approach, incorporating all of positive aspects of the criteria, has the potential to substantially improve both the effectiveness and the efficiency of the safeguards system and to result in significant resources savings for the IAEA.