Testimony of Dr. Lawrence Scheinman, Monterey Institute of International Studies, James Martin Center for Nonproliferation Studies Before the Senate Committee on Foreign Relations on S. 1138: A Bill To enhance nuclear safeguards and to provide assurances of nuclear fuel supply to countries that forgo certain fuel cycle activities. July 31, 2007

Safeguards are a central feature of the nuclear non-proliferation regime and of the era introduced with President Eisenhower's December 1953 Atoms for Peace initiative at the United Nations. Their importance to a viable and effective international non-proliferation regime cannot be exaggerated. They are for all intents and purposes a condition *sine qua non* for cooperative development of civil nuclear energy and practicable international nuclear commerce. There is no identifiable and acceptable substitute short of some form of international ownership and control of the nuclear fuel cycle, a formulation --based on the judgment of the Acheson-Lilienthal Report that a system of inspection superimposed on an otherwise uncontrolled exploitation of atomic energy by national governments will not be an adequate safeguard and could not ensure effective separation of civil and military uses of nuclear energy -- advanced by the United States in 1946 at the onset of the nuclear age as the Baruch Plan. This approach is being revisited today in the form of initiatives for multilateral/multinational fuel cycle arrangements for enrichment and reprocessing as the international community grapples with the challenges raised by (i) the disappearance of the disciplines imposed on proliferation by the superpowers during the Cold War, (ii) the increasing spread of nuclear knowledge, (iii) the diversification of sources of supply of nuclear materials,

equipment, and technology including the emergence of a nuclear black market, which, according to recent reports appears to be alive and well; (iv) the prospect of states in regions of tension developing fuel cycle capabilities that puts them in a position to quickly proliferate if the political decision to do so is taken, and (v) the rising threat of non-state actors including apocalyptic terrorists acquiring nuclear explosives or the means to produce them which was an important stimulant to the passage of UN Security Council Resolution 1540.

Viable institutional arrangements such as multinational enterprises may provide additive stability and security to international nuclear activity, but safeguards are and will remain the core constituent of an effective and credible non-proliferation regime. The statute of the IAEA, created as an outcome of Atoms for Peace was charged with two missions: to promote the peaceful uses of atomic energy, and to ensure, as far as it is able, that assistance provided by the agency, or under its supervision and control, not be used to further any military purpose. To this end the IAEA was authorized to establish and administer safeguards which it did over the course of the 1960s. That experience made it the logical choice to administer safeguards required by the 1968 NPT of all non-nuclear weapon states party to the Treaty. Many of these states were prepared to foreswear the acquisition of nuclear weapons and accept international safeguards on their peaceful nuclear activities, even though nuclear weapon states were not so required, but not prepared to accept an extension of that discrimination to the civil nuclear field, even for a limited time – hence the insistence on Article IV providing for an "inalienable right" to develop nuclear energy for peaceful purposes; and for standing up a safeguards regime

that minimized intrusion and maximized the opportunity to develop nuclear energy for peaceful purposes while at the same time standing the test of credibility and providing the necessary level of confidence regarding non-proliferation. Among their principal concerns were: protecting proprietary and commercial interests such as being able to compete on equal footing with the weapon states in the civil nuclear marketplace,, limiting the intrusiveness of on-site inspections (in particular capping the frequency of inspections), minimizing the discretionary authority of the international inspectorate, and protecting sovereign prerogatives in general.

The comprehensive safeguards system concentrated on the flow of nuclear material; limited on-site inspections under normal or routine circumstances to pre-agreed "strategic points" where inspectors could conduct independent verification activities, while providing for special inspections, which could be carried out anywhere in the state, if the Agency were unable to meet its verification responsibility through routine inspections. Material accountancy, complemented by containment and surveillance, was the heart of the system based on a reciprocal obligation of the state and right and obligation of the IAEA to apply safeguards on all source and special fissionable material in all peaceful activities to verify non-diversion. In practice the emphasis on material accountancy during the 1970s and 1980s meant focused attention on the correctness of state declarations and less on whether the declarations were complete, and this became the **culture** of the inspectorate as time went on. It is important to bear in mind that in law, as distinguished from practice, safeguards extend to all nuclear material whether or not

declared, and access to any place may be had under the IAEA's special inspection authority to verify full accountability.

From the 1970s until the North Korean situation in 1993, insofar as the traditional comprehensive safeguards system is concerned no diversion of nuclear material under safeguards was ever detected. However, the revelations in the wake of the 1991 Gulf War of extensive undeclared nuclear activity and a significant clandestine nuclear weapons program in Iraq underscored the limitations of the safeguards system as it was practiced. In the wake of these revelations the Board of Governors, starting in 1992, took a number of decisions for which legal authority already existed including reaffirming the requirement that safeguards provide assurance about the completeness as well as the correctness of nuclear material declarations, reaffirming the right of special inspections (unfortunately with a caveat that it would be used rarely); environmental sampling at locations already accessible to inspectors, requiring states to present design information on new facilities or changes in existing facilities handling safeguarded nuclear material as soon as the decision to construct or modify is made (in lieu of the practice that developed that such information needed to be made 180 days before introducing nuclear material into a facility), introducing unattended and remote monitoring to detect movements of declared nuclear material, calling for voluntary reporting of imports and exports not only of nuclear material, but specified equipment as well, and using instruments and other techniques at strategic point to the extent present or future technology permits. Many of these measures relate to Section 204 of the legislation before us.

Of equal if not greater significance was agreement on a model Additional Protocol granting new authority related to information a state is required to provide to the Agency and complementary access aimed at ferreting out undeclared nuclear materials or activities: With an additional protocol in place the IAEA is better positioned to draw statewide conclusions regarding whether all nuclear material and activities has been declared and placed under safeguards, leading to the ability of the IAEA to draw broader safeguards conclusions. It is a case of more information and more access leading to more comprehensive understanding of a state's nuclear status; it raises the level of confidence in one's conclusions about a state but it is not absolutely indisputable.

To summarize: the traditional comprehensive safeguards system focused on verification of state declarations using quantitative measures supported by containment and surveillance. This system provided a high degree of confidence regarding the accountability of all declared nuclear material but did not answer the question of whether undeclared nuclear activity might be present on the territory or under the control of a safeguarded state, although the system incorporated the principle that safeguards extended to undeclared activity as well as declared. The strengthened safeguarded system, which is state-wide rather than facility-specific, builds out from that base and focuses on verifying not only the correctness of state declarations regarding nuclear material but also the absence of undeclared nuclear material and activities. To build a state nuclear profile the strengthened safeguard system puts much greater emphasis on qualitative measures including export and import information, on expanded declarations of nuclear and nuclear-related activities in the state, and on information analysis

supported by environmental sampling and quantitative indicators. As well, it provides broader access for inspections of declared and undeclared activities. Greater access to information and broader access to sites and locations in the state are accompanied by access to the UNSC in the event of non-compliance with safeguards undertakings. On its face the Additional Protocol, in conjunction with measures adopted earlier by the Board of Governors provides the basis for a robust verification system based on a comprehensive picture of a safeguarded state's nuclear fuel cycle, inventory of nuclear materials, material production capabilities, nuclear related infrastructure, and overall nuclear activities. The AP with its significantly increased information base and right of access, when fully implemented, offers greater transparency of nuclear assets and nuclear cooperation and a correspondingly greater insight into plans and intentions of safe-guarded states and to this extent contributes to increased credibility of and confidence in verification regime. An often overlooked caveat to this rather sweeping conclusion is that even under the comprehensive safeguards system rights of ad hoc inspections and special inspections where conditions warrant it provide significant access to locations anywhere in the state.

The strengthened safeguards system is a work in progress in several respects. The legal and technical requirements have been identified and agreed upon, and the foundations for both have been or are being put in place. Much remains to be done on both counts. For example 31 states party to the NPT still have not signed safeguards agreements despite the obligation to do so within 18 months of adherence, and the Agency has not pressed those states to fulfill their obligations. Without a safeguards agreement there is no basis

for carrying out verification activities Many states with safeguards agreements have Small Quantity Protocols that absolve them from some of the obligations in comprehensive safeguards agreements but many of these have not put in place State Systems of Accountancy and Control which would provide the legal and administrative mechanism to take actions that would help the governments develop means by which to ensure against the risk of non-state actors setting up shop in their jurisdiction and pursuing nuclear relevant activities without state knowledge that could undermine the regime.

State willingness to adopt and incorporate **new verification technologies** depends on a balance of considerations about effectiveness, intrusiveness and expense. This relates to environmental sampling; remote and unattended monitoring devices; satellite imagery; and, if ultimately approved by the Board of Governors, wide area environmental sampling. For some it's a question of redistribution of resources relieving some of the effort devoted to material accounting which weighs most heavily on states with substantial nuclear activities, e.g. Canada and Japan.

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This brings me to the legislation on safeguards in S. 1138, in particular Section 104: Safeguards Technology Development Program. The provisions in section 104 are laudable and pointed in the right direction. But it reads as an unfunded mandate and without the authorization and appropriation of resources it cannot move forward at the level and with the energy necessary for there to be an impact on the safeguards system.

As I understand it, there is only a modest amount of research going on at the present time although training and development continue. Twenty or even fifteen years ago substantial resources were deployed to national laboratories for research and development relevant to international safeguards. It has been said that notwithstanding bilateral activities with particular states there has not really been a significant research activity in place since the early 1990s. Since that time, technology made available to the IAEA is based on research done at that time and if that were to continue we would be transferring 20 year old technology to new reactor and fuel cycle designs. Through the POTAS program assistance (this year on the order of $14 million) is provided to the Agency. The question is more one of how we, in the United States are organized and funded to keep at the cutting edge of technological developments that can be deployed when needed.

The importance of timely and properly directed technology research and development can be seen in the case of the Japanese Rokkasho reprocessing facility which raises daunting challenges in terms of verification. Here, the development and use of containment and surveillance, unattended radiation monitors, process monitors, were necessary to keep tabs on the operation and integrity of the facility; material accountancy alone would not yield results n which one would have great confidence. The same is true for Candu-type on load reactors where radiation monitors and camera system including real time monitoring systems are crucial to addressing timeliness issues, and hence the degree of confidence one can have in the safeguards applied at the facility.

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A good deal of the influence that the US has had on the safeguards system has come from the safeguards technology that we provided to the Agency; that has not been the case in recent years and others, such as France and Japan with their vibrant nuclear industries are gaining increasing influence in IAEA affairs according to some observers. To ensure that we do not lose our influence and that the safeguards system remains credible and effective we should recapture our earlier role in developing safeguards technology. The provisions in section 104 of the legislation point in the right direction; what needs to be done is to fund the base technical capability here in the United States that the IAEA has for many years been reliant. With the end of the cold war and downsizing of the US weapons complex coupled and with the moribund state of civil nuclear activities in the 1990s, what used to be a robust R&D program diminished substantially, with only modest funding from diverse agencies and departments, and an apparent absence of overall coordinated strategy.. Some have noted that at relevant national laboratories at the same time as retirements are taking place quality young staff members are moving away from international safeguards because they do not see pursuing it as leading to a promising career. With the prospect of a surge of nuclear energy development in the years ahead involving new reactor and facility types implying a need for programs to address probable new challenges the trend line in our human and financial resource base is moving exactly in the wrong direction. Action and particularly commensurate resources need to be put behind well meaning words.

So, the bottom line is that if Congress is serious about this issue, as I am sure that it is, then it needs to consider funded mandates and call for a program of action for technology

development that engages the laboratories and the IAEA in an interactive relationship wherein the agency identifies needs in terms of its programmatic development and the United States government, through it laboratories responds in a targeted way. It also should encourage the Administration to develop a comprehensive plan with coordinated and mutually reinforcing activity on the part of the agencies and departments that would be involved. Given our considerable stake in a strong and reliable nonproliferation regime and our historic leadership in this field it is incumbent on the US (bringing others in a position to do so along) to work to strengthen IAEA safeguards to deal with current and with future challenges arising from a potential significant rise in nuclear spread and use, flow and accumulation of nuclear materials, and the like. Compliance with treaty undertakings which we have strongly asserted as an imperative need is a legitimate concern and we are right to pursue it. But emphasis on providing the most effective tools for IAEA to meet its inspection goals is no less important. Our focus should be on considering how the United States can continue to help strengthen the IAEA safeguards system and prepare for future challenges by providing technology, tools and expertise.

Thank You.

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