

Chapter 10

The IAEA's "93+2" Programme: Possibilities for Lessons and Applications in Regional Verification

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This paper examines the International Atomic Energy Agency's (IAEA) "93+2" proposals for strengthening its safeguards under the Non-Proliferation Treaty (NPT), with a particular focus on the Korean peninsula as a region of application. The IAEA proposals have weaknesses as well as strengths. They may not adequately address some issues on the peninsula, but for others they could make a positive contribution. For some purposes, application of the techniques covered in the "93+2" programme could be carried out by the Agency itself. In other cases, however, it might be desirable for regional or bilateral structures to use these techniques or to complement Agency activities with their own.

The Situation on the Korean Peninsula

The Korean peninsula is an unforgiving environment for the paradoxes and dilemmas of verification. Verification lags behind as well as it builds trust. Absent trust, the inevitable imperfections of any verification system become more significant, yet the means of strengthening the system may become more politically unacceptable. The political, much less the military, significance of any violation or ambiguity may be increased, while the cost of transparency may be feared more than its benefits are valued.¹ Absolute assurances may be demanded where only a degree of confidence can actually be provided, and that will be affected by estimates of the costs and risks of misplaced trust on the one hand and the credibility of the system on the other. The dangers of relying extensively on information provided by a verified party will be stressed, yet often significant information may be available no other way. There may be a preference for an adversarial - even accusatorial - style of verification, capable of identifying and pursuing violations immediately. Verification often means, however, the clarification of ambiguities through interrogation and explanation, and this takes time.

Under these circumstances, a gradualist approach may be advisable, slowly building trust to the point where more meaningful and more intrusive verification measures may be tolerated. Trying too much, too fast, could be disastrous. But sometimes a better answer may be to do more rather than to do less. This would not be a reckless forging ahead on inadequate foundations, but rather would be

¹ Shannon Selin, "Asia Pacific Arms Buildups, Part Two: Prospects for Control," *Working Paper No. 7* (Vancouver: Institute of International Relations, University of British Columbia, November 1994), pp. 25-26.

based on a recognition that verification might have a pulling or “bootstrapping” effect. Failure to verify clear and significant obligations adequately may erode trust, or prevent it from developing. Sometimes, then, it may be better to push forward on verification, to provide a basis for trust, rather than to wait on trust to provide a basis for verification.

This paper will not try to address issues of political feasibility, but rather will simply try to note some more technical possibilities. Speculation may have benefits if it suggests other, more feasible steps, or sensitizes us to opportunities as they arise.

The Republic of Korea (ROK) and the Democratic People’s Republic of Korea (DPRK) have obligations under the NPT to forego nuclear explosives, as well as obligations going beyond it. Under the August 12 and October 21, 1994 US-DPRK agreements, the DPRK is to freeze work on or shut down, and then to dismantle, its graphite-moderated reactors and related facilities, and to forego reprocessing of spent fuel. The IAEA will monitor this obligation, as well as facilities not affected by the freeze. (It is not clear what facilities beyond the reactors and reprocessing plants are affected by the freeze and dismantling obligations.) Before the contract for replacement Light Water Reactors is completed, the DPRK is to take all steps deemed necessary by the IAEA, in consultation with it, to establish the accuracy and completeness of its initial report on all nuclear material in the DPRK.

Under the terms of the January 20, 1992 Joint Declaration of the Denuclearization of the Korean Peninsula, the two states agree not to have uranium enrichment or reprocessing facilities. If a US-DPRK agreement for peaceful nuclear cooperation should be signed, it may also contain requirements and measures beyond the NPT and the IAEA’s associated safeguards.

Regardless of their modification by the US-DPRK agreements, and regardless of how they are affected by the “93+2” programme, we might ask how the Agency’s strengthened safeguards can contribute to security on the Korean peninsula. The IAEA seems well able to monitor the freeze and shut-down provisions, by itself or in conjunction with other verification measures.² Some of the techniques it has deployed or proposes to use in its strengthened system may also be applicable, whether applied by the IAEA or by some other body, for the additional obligations of the parties. The Joint Declaration proposed the creation of a Joint Nuclear Control Commission, though its meetings have been suspended since December 1992.³ At least in theory, therefore, a bilateral structure for verification could exist.

² For monitoring shut-downs of reprocessing and enrichment plants, see, e.g., Thomas E. Shea, “Verifying a Fissile Material Production Cut-off: Safeguarding Reprocessing and Enrichment Plants: Current and Future Practices,” presented at a seminar on “Verifying Nuclear Non-Proliferation and Disarmament Pledges: Future Directions for IAEA Safeguards,” Vienna, November 16-17, 1995, pp. 2-3.

³ Republic of Korea, *Defense White Paper, 1995-1996*, (Seoul: Ministry of National Defense, 1996), pp. 145-146.

The "93+2" Programme⁴

The crucial weaknesses of IAEA safeguards revealed in the case of Iraq were its concentration on verifying the accuracy of state declarations of nuclear material, as opposed to their completeness, and its related inability to deal with undeclared activities that did not impinge on flows of nuclear material subject to safeguards. The Agency depended on other, national, monitoring systems to deal with the clandestine threat in the case of such separate, clandestine activities. Its "93+2" programme is an effort to address these weaknesses, though cost-effectiveness considerations are also a major factor in shaping it.

The "93+2" programme consists of three general sets of measures, divided into two parts. The Agency argues that Part One measures can be implemented under the existing authority of INFCIRC/153 agreements. These are now being implemented. Part Two measures require additional authority, probably through an extra protocol. These are still under discussion, and so the extent and detail of their implementation is not yet clear. The final shape of the improved safeguards system which will emerge from the "93+2" programme is therefore still tentative.

The three groups of measures cover **information**, **access** and the **optimization** of the current safeguards system. With the exception of measures which would simplify the inspector designation process, the **optimization** measures all fall within Part One. They would increase the use of unattended equipment, thus reducing the intrusiveness of safeguards and cutting costs, and increase cooperation with State Systems of Accounting and Control where possible, again a cost-cutting measure. There could also be changes in the technical parameters of the safeguards system, which could either increase or reduce demands on the system.⁵ The inspector designation proposal, together with multiple-entry visas, would address a major resource limitation on the Agency, but also would facilitate no-notice inspections. It would thus contribute as well to the effectiveness of the access proposals.

The **information** measures cover an expanded declaration by states, environmental sampling, and improved information analysis. Information which could be required in an expanded declaration under Part One includes data on past nuclear activities, routine design, accounting and operating records, description of the fuel cycle, and of fuel-cycle related activities at facilities where nuclear material is present, and the early provision of design information. Part Two measures, however, would seek information on nuclear-related activities at facilities even where nuclear material was not reported present, on uranium and thorium deposits and mines, on some manufacturing capabilities, and other information currently reported voluntarily. It would also include future fuel cycle plans and R&D activities. The reference to nuclear-related facilities could be an opening to extend

⁴ For a presentation of the "93+2" programme see *IAEA, GC(39)/17*, August 22, 1995.

⁵ Reducing the size of the significant quantity to be detected by the system would increase costs. Extending detection times—if credible assurances against the existence of clandestine facilities could be given—could reduce costs by reducing inspection frequency in certain facilities.

Agency activities to cover weaponization activities that do not directly involve nuclear material. Bunn and Timerbaev suggest that such activities could come under safeguards under the NPT.⁶ Others, however, may resist this interpretation.

The Agency claims the right, under Part One, to engage in environmental monitoring wherever it has a right of ad hoc, routine or special inspection, and for design verification. Environmental monitoring promises to be a very powerful tool.⁷ Nuclear activities may be detectable several kilometers from their source, and both past as well as present nuclear activities, and some detail about some of those activities may also be detected. At present, however, only local, rather than wide-area, monitoring methods seem contemplated.

The information analysis measures are entirely within Part One, though some of the information they could use would be made available through Part Two measures. They are based on the comparison of information derived from various sources, including the verified state's declaration, reports from Agency inspectors and its non-safeguards information, "open literature" and reports received from other states, including but also going beyond export reports.⁸ This approach reduces the existing dominance of materials accounting in Agency practice, by increasing the stress on qualitative information as opposed to materials accounting reports. Information received from a verified state may be checked for internal consistency, but also may be checked against information from other sources. The data received may be compared to a "proliferation critical path" analysis, which lists and groups indicators of various nuclear activities. Both inconsistencies in information received and troubling patterns relative to the path analysis may lead the Agency to request explanations from a state subject to verification. Information from a third party figured prominently in the DPRK case, arousing predictable outrage from the DPRK.⁹ The use particularly of satellite imagery has also led to concern by others, including in other contexts, about possible bias, abuse of such information, and the need for objectivity and transparency.¹⁰

Access measures in Part One include access beyond strategic points for design verification and ad hoc visits, and no-notice routine inspections. States may also

⁶ George Bunn and Roland M. Timerbaev, "Nuclear Verification Under the NPT: What Should It Cover—How Far May It Go?" *PPNN Study Five* (Southampton: Mountbatten Centre for International Studies, University of Southampton, for the Programme for Promoting Nuclear Non-Proliferation, April 1994).

⁷ See U.S. Congress, Office of Technology Assessment, *Environmental Monitoring for Nuclear Safeguards*, OTA-BP-ISS-168 (Washington, D.C.: U.S. Government Printing Office, September 1995).

⁸ Mark H. Killinger, "Improving IAEA Safeguards through Enhanced Information Analysis," *The Nonproliferation Review*, Vol. 3, No. 1 (Fall 1995), pp. 43-48.

⁹ Byung Chul Koh, "Confrontation and Cooperation on the Korean Peninsula: The Politics of Nuclear Nonproliferation," *Korean Journal of Defense Analysis*, Vol. 6, No. 2 (Winter 1994), p. 60.

¹⁰ Pakistan, China, Algeria and Cuba have expressed some concern about "third party information" in the context of "93+2." *IAEA, GC(39)/17*, August 22, 1995, Annex 3, pp. 19, 24, 26-27, and Annex 6, p. 15. In regard to the use of National Technical Means (NTMs), China and Pakistan, and the Group of 21 have noted their concerns in the CTBT context. *Disarmament Diplomacy*, No. 2, Part 3, (February 1996), <http://www.gn.apc.org/dfax>; Lisbeth Gronland, David Wright and Yong Liu, "China and a Fissile Material Production Cut-off," *Survival*, Vol. 37, No. 4 (Winter 1995-96), p. 157.

volunteer access to the Agency for other locations of interest to it. Under Part Two, access for routine inspections would also be permitted beyond strategic locations, and access would also be gained to all locations listed in the expanded declaration (including those with nuclear-related activities though without nuclear material). No-notice rights in routine inspections under Part Two would also be expanded to include access beyond strategic points, and there would be no-notice rights for the expanded locations list as well. This broadened access would not mean frequent inspections beyond facilities handling nuclear material, but it could be the basis for another category of inspections. This would be broader, more flexible and less restricted than routine inspections, but would not carry the same political baggage as the Agency's special inspection rights.

Although not highlighted in the "93+2" programme, a matter of note is a degree of shift in "Agency culture." Where previously it has been criticized by some as not being sufficiently aggressive in pursuing possible violations, this could change. Training in observational skills and systematic debriefing of inspectors can help break out of a possible tendency to a ritualization of the inspection performance. This ritualization tendency has been encouraged by the stress on materials accounting, but also by the ability of states subject to verification to restrict and define inspection routines. Greater scope for routine inspections and the development of a category of inspection activity falling neither within routine nor special inspections could help escape this. More aggressive pursuit by the Agency could now follow as well from its more diverse information sources and its analysis of this information. These changes in "culture," however, depend on states' willingness to tolerate a somewhat higher level of discomfort, and the IAEA's willingness to cause it.

Applying "93+2" Measures in the Korean Context

How would "93+2," taken as a set or in terms of individual techniques, contribute to verification of nuclear obligations by the ROK and the DPRK? The measures would have a beneficial effect, but they also have some weak points.

The improvements in access, design verification (and re-verification) and the use of local environmental monitoring will strengthen the application of safeguards to declared activities, as will some of the optimization measures. Wider access during routine inspections, together with local environmental monitoring, will also give increased leverage against at least some undeclared but co-located activities. This effect would be further extended with the access to additional locations listed in the expanded declarations. Such an extension would also give some indirect leverage against some undeclared activities separate from current declared facilities, by forcing non-complying states to situate them apart from locations on the expanded list. The apparent restriction of environmental monitoring techniques to local methods, however, restricts the use of this technique by the Agency as a means of detecting and locating undeclared and separate activities.

Safeguarding declared facilities and coping with undeclared but co-located activities are thus still the primary foci of the "93+2" programme. While it might receive information from third parties about separate undeclared activities, or might suspect their existence on the basis of its own information, the Agency is still significantly dependent on national monitoring to deal with this threat. However, its information measures give some leverage here as well, in so far as the wider array of information sources and the greater amount of information from a state subject to verification may increase the chances of finding inconsistencies between that state's activities and its declarations. These measures may thus increase pressure on undeclared activities of all sorts, and at least start to give some institutionalized recognition to the possibility of exploiting verification synergies.¹¹

The political difficulties associated with the use of third party information have been noted above, but other problems also exist in the wider array of information sources. Especially under Part Two, there is a danger of getting too much information that is too ambiguous, flooding the analysis with "noise." Dependence on third parties and open literature also risks information fragmentation, based in part on the reluctance of states to share information with the IAEA. The technical limitations as well as the possibilities associated with the use of satellite imagery must also be recognized.¹² While export information could give leverage on states whose weapons programmes require outside technologies, the DPRK case demonstrates the ability of a state to design and carry out a programme with little foreign dependence, and thus reduce the risk of detection by this means. More developed states could do even better with indigenous capabilities.¹³

Reports of high-explosives testing in the DPRK¹⁴ suggest that it may be desirable to include weaponization activities within the safeguards system. However, if weaponization activities are included in Agency concerns, this has information as well as other implications. It would increase still further the demand for information, with the attendant problem of ambiguity. It would increase the scope of access requirements. It would also require inspectors to have some knowledge of nuclear weapons.

The "93+2" programme does not seem to contain any explicit reference to improvements in special inspection procedures, beyond the claim to the right to use of environmental monitoring. The problems of consultation—a political problem,

¹¹ Patricia Bliss McFate, Sidney N. Graybeal, George Lindsey and D. Marc Kilgour, "Constraining Proliferation: The Contribution of Verification Synergies," *Arms Control Verification Studies No. 5* (Ottawa: Non-Proliferation, Disarmament and Arms Control Division, Department of External Affairs and International Trade, March 1993).

¹² Vipin Gupta, "New Satellite Images For Sale," *International Security*, Vol. 20, No. 1 (Summer 1995), pp. 94-125; Leonard S. Spector, "Monitoring Nuclear Proliferation," in Michael Krepon et al. (eds.), *Commercial Observation Satellites and International Security* (New York: St. Martin's Press, 1990), pp. 125-141; David A. Kay, "Iraqi Inspections: Lessons Learned," *Eye on Supply*, No. 8 (Winter 1993), pp. 91.

¹³ Joel Ullom, "Enriched Uranium Versus Plutonium: Proliferant Preferences in the Choice of Fissile Material," *The Nonproliferation Review*, Vol. 2, No. 1 (Fall 1994), p. 13.

¹⁴ Darryl Howlett, "Nuclearization or Denuclearization on the Korean Peninsula?" *Contemporary Security Policy*, Vol. 15, No. 2 (August 1994), p. 181.

legalities notwithstanding—and thus also of delay, have not been overcome. The Agency has not developed a right of “challenge” inspections, despite the Part Two access measures of “93+2.”

Let us assume that declared, and co-located but undeclared, activities are reasonably covered by “93+2.” Ignoring weaponization, the Korean case still leaves at least certain kinds of undeclared facilities in more problematic condition: enrichment, reprocessing and attendant production and storage activities. Since both states have committed themselves to forego enrichment and reprocessing, the complications which would be created by ongoing, legitimate activities in these areas at least are avoided¹⁵), and their co-location with other, declared activities becomes more vulnerable to detection by the safeguards procedures. But how might separate, undeclared activities in these areas be handled?

Wide-area environmental monitoring is not covered within “93+2.” These methods may only be of value, in any event, for very general locating activities, whether upwind or upstream of sampling stations, though more precise possibilities could exist if sampling equipment were airborne. In any case, close and more effective use of environmental monitoring would likely require access to national territory. Imaging techniques, and other information sources might detect and locate suspicious sites, but inspection may be needed to follow-up and to establish site characteristics more definitely.¹⁶ Unless undeclared activities impinge on a flow of safeguarded nuclear material, the IAEA will still be significantly dependent on information beyond the verified state and its own safeguarding activities. The willingness of states to provide this information is not yet fully established, and the problems and limits associated with its supply and use are not yet fully overcome. Unless the Agency gets, or gets access to, an autonomous capability for at least some of this information, it may therefore still be very significantly, if conditionally, limited in dealing with separate, undeclared activities.

Strengthening and Complementing “93+2”

How might some of these weak points be shored up? A number of possibilities exist, whether with respect to the IAEA itself or if we look beyond it to complementary bilateral, regional or other initiatives, and if we overlook the question of political feasibility.

A strong version of “93+2,” applied by the IAEA, would certainly assist. Thus, one means of strengthening the “93+2” techniques is simply to implement them fully. For example, the effectiveness of environmental monitoring could be in-

¹⁵ This, at least, is a clear gain, since reprocessing and enrichment may still pose considerable safeguarding problems. Canada, *Verifying a Fissile Materials Cut-Off: An Exploratory Analysis of Diversion Scenarios* (Ottawa, December 1994); E.A.Hakkila et al., *The Safeguards Options Study, LA-12918-MS* (Los Alamos: Los Alamos National Laboratory, April 1995), pp. 69-111; U.S.Congress, Office of Technology Assessment, *Nuclear Safeguards and the International Atomic Energy Agency, OTA-ISS-615* (Washington, D.C.: U.S.Government Printing Office, June 1995), pp.111-129.

¹⁶ Verifying a Fissile Materials Cut-Off; The Safeguards Options Study.

creased or reduced depending on what techniques are permitted and on what sites. A restriction of access, whether within routine inspections or in access to locations on an expanded declaration, would reduce the usefulness of environmental monitoring against co-located undeclared activities. While efforts by states to restrict both lists of additional locations and terms of access to these are predictable, these would reduce the verification benefits of the Part Two information and access measures. Restriction of sampling techniques, e.g. to short-range methods, also reduces its usefulness.

While the use of satellite imagery is a controversial matter, the fact is that the DPRK's Yongbyon facilities were seen not only by national technical means but also by SPOT satellite imagery.¹⁷ Resort to commercial satellite imagery would neither remedy all the weaknesses in verification nor stop states from using national technical means. It could, however, be a less sensitive means of providing publicly-usable evidence.¹⁸ Problems of using such imagery for intelligence purposes would not be avoided, but such use is already possible. Making greater, more formal and more routinized use of the growing potential of commercial imagery would at least harness the verification benefits of a monitoring means already becoming more widely available. Restricting the structured use of satellite imagery would severely hamper the IAEA, but would not prevent concerned and technologically-capable states from using it.

A final possibility, assuming it is necessary but not already under way, is to assist the DPRK in developing its State System of Accounting and Control. This would make it better able to interact with the IAEA, and thus perhaps smooth a possible source of friction. It could also facilitate and speed the internalization of appropriate norms within the nuclear infrastructure of the DPRK.

Whatever the form of "93+2" implemented by the IAEA, states are free to work out additional and complementary arrangements, whether bilaterally or regionally. Just as they need not restrict themselves to NPT obligations but may move beyond these (as the ROK and DPRK have with respect to enrichment and reprocessing), they may also devise additional verification measures. Such measures could include a more expansive version of "93+2" than that which the IAEA eventually implements. Other, complementary activities would also present the possible advantage that they could be free of some of the restrictions imposed on the IAEA.

The JNCC presents, at least theoretically, a structure that could be exploited in this manner. This would require an expansive rather than a restrictive use of it. Some possibilities are as follows.

¹⁷ Tae-Hwan Kwak and Seung-Ho Joo, "The Denuclearization of the Korean Peninsula: Problems and Prospects," *Arms Control*, Vol. 14, No. 2 (August 1993), p. 67; Kim Byungki, "North Korea's Nuclear Policy in the Year 2000: Sources, Strategy, and Implications for the Korean Peninsula," *Journal of East Asia Affairs*, Vol. 7, No. 1 (Winter/Spring 1993), p. 46; Spector, pp. 130-132. The commercial imagery was not necessarily good enough to support concerns about the DPRK's activities, but this limitation is being reduced by advancing technology in commercial satellites.

¹⁸ Gupta, p. 112.

- First, the Joint Declaration provides that the JNCC shall “conduct inspections of the objects selected by the other side and agreed upon between the two sides, in accordance with the procedures and methods to be determined”. Instead of being a device to limit access on a case-by-case basis, it could be used to provide wider, pre-arranged access to locations on, or going beyond, the IAEA list, and possibly even to environmental monitoring stations.
- Second, interpreting the obligations of the parties in the Joint Declaration not to “test, manufacture, produce, receive, possess, store, deploy or use nuclear weapons” to include weaponization activities could deal with this problem in the Korean context without raising it as an issue in the broader NPT context.
- Third, rather than restricting information provided under the IAEA’s expanded declaration, the two parties could seek to increase it, thus increasing their transparency. As well, such information provided to the IAEA by a state is not available to others, under the Agency’s confidentiality rule. The two states could agree to at least some exchange of this data with each other.
- Fourth, on a bilateral or a regional basis, formalizing the use of commercial satellite imagery could be a step forward in developing a more co-operative verification regime,¹⁹ and might also be useful in developing common responses to non-traditional and shared security threats, such as pollution. Aerial overflights could be an alternative or a supplement to the use of satellite imagery. These could be carried out in either search (wide-area) or inspection (to monitor known locations) modes,²⁰ and could provide greater possibilities for the use of environmental sensors. Such overflights have been examined for the Korean peninsula and more generally in the North Pacific, but as yet without result.²¹
- Fifth, regarding the conduct of inspections, the JNCC can draw on many models other than of the IAEA, and thus might escape some of the constraints on the Agency. Managed access and challenge inspection procedures could be developed, in place of the IAEA’s special inspections. The CFE (Conventional Forces in Europe), INF (Intermediate Nuclear Forces) and CWC (Chemical Weapons Convention) might be of interest here. The last, for example, has improved inspector designation procedures as compared to the IAEA, multiple-entry visas, and a challenge inspection system.

¹⁹ See also Arian L. Pregenzer, Michael Vannoni and Kent L. Biringer, “Cooperative Monitoring of Regional Security Agreements,” presentation at the 1995 ROK-Canada Arms Control workshop, “North Pacific Arms Control: Confidence-Building at a Regional Level,” Seoul, June 7-9, 1995.

²⁰ See, e.g., U.S. Congress, Office of Technology Assessment, *Verification Technologies: Cooperative Aerial Surveillance in International Agreements, OTA-ISC-480* (Washington, D.C.: U.S. Government Printing Office, July 1991).

²¹ Selin, pp. 35-36.

Conclusion

The Korean Peninsula presents numerous technical and political challenges to the adequate verification of non-proliferation obligations. The political obstacles are very considerable, and could severely limit any verification machinery—whether the IAEA's, as has already been seen in the region, or bilaterally as in the case of the JNCC. Without discounting these problems, this paper has focused instead on some more technical issues, based on the IAEA's "93+2" programme to strengthen its safeguards. No purely technical programme can overcome all political obstacles, but a consideration of technical means may either suggest ways to deal with specific political objections or at least provide suggestions which might be taken up as the political climate improves. As well, the possibility of building trust on a foundation of verification - "verification pull"—should not be dismissed out of hand.

The IAEA's "93+2" proposals—particularly in Part Two—provide some means for strengthening verification of ROK and DPRK nuclear obligations, whether under the NPT or in other agreements. These proposals are not perfect, particularly in dealing with undeclared, separate activities. A regional or bilateral arrangement, political conditions permitting, could build on the Agency's proposals. Such a regional or bilateral arrangement would not contradict the Agency's efforts, but rather could implement them in a stronger form or undertake complementary activities.

This line of argument—beginning with "93+2" and then asking how its application could be strengthened in the Korean peninsula—has been developed without reference to regional limits of political feasibility. This paper is thus free to treat local arrangements as potential supplements to and complements of the Agency's proposals, filling in gaps and strengthening weaknesses within "93+2." If, much more plausibly, we see local political circumstances as not supporting such a line of development, we must then reverse field. If "93+2" cannot be strengthened by local arrangements, it becomes much more important that the Agency's proposals be developed and implemented in a strong form, precisely to compensate for regional problems. The best combination of global and local arrangements would be a mutually-reinforcing one. The worst would see the weaknesses of each compounding the weaknesses of the other.