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**Session 1: US-ROK Nuclear Nonproliferation Cooperation**  
*“The Role of ROK in the Context of Global Nonproliferation Efforts and  
the Bilateral Nuclear Nonproliferation Cooperation Issues”*

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**The Role of Korea in Global Nonproliferation Efforts**

*Proliferation threats and responses*

The proliferation of WMD and their delivery means continues to represent a pre-eminent threat to international peace and security.<sup>1</sup> The effective and efficient nonproliferation regime at the global, regional and national level is crucial to counter the spread of these most lethal weapons. Today, the proliferation challenges became more diffuse and less tangible, and those involved in the proliferation activities are an increasingly diverse set of players, who are highly adept at concealment and deception. To a certain degree, the proliferation system is evolving faster than the nonproliferation regime. Confronting such complex proliferation, the nonproliferation regime should remain agile and adaptable to the changing realities.

For a dozen years, the global nuclear nonproliferation regime has been under severe duress. Several countries have breached their obligations set out in the Nuclear Nonproliferation Treaty (NPT), a centerpiece of the regime. North Korea declared the withdrawal from the Treaty and tested nuclear bombs. Iran has been strenuously pursuing a dubious nuclear program in defiance of the international calls for restraint. In 2008, the

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<sup>1</sup> Statement by the President of the UN Security Council (S/23500, 31 January 1992); UN Security Council Resolution 1540 (S/RES/1540, 28 April 2004); UN Security Council Resolution 1887 (S/RES/1887, 24 September 2009).

Syrian nuclear issue was added to the agenda of the IAEA Board of Governors.

The revelation of an extensive, clandestine nuclear procurement network operated by A.Q. Khan exposed a loophole in the current nonproliferation regime, and served as an alarm bell for the real danger of nuclear goods and technologies falling into rogue states and terrorists. The investigations into the remnants of the network are still continuing by the relevant states and the IAEA to obtain a full picture of its worldwide operation.

The potential nexus between nuclear weapons and terrorism added a new dimension and urgency to global security, and the fight against nuclear terrorism should be put high on any national security agenda.

In response to these proliferation threats, the international community has redoubled its efforts to reinforce and strengthen the nuclear nonproliferation regime. Existing tools in the nonproliferation toolbox are being re-examined for further improvement, and new tools added. Granted the magnitude of the necessary work, these efforts will take some time to bear fruit. There is a need to muster a sustained political will and resources to support these endeavors.

### ***Korea's role***

Korea has an important place in the global fight to curb the spread of nuclear weapons, materials and technologies. Upholding the values of democracy, free-market economy and human rights, Korea has been a staunch supporter of the global nuclear nonproliferation regime<sup>2</sup>, and an

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<sup>2</sup> The concept of nonproliferation is often confused with that of counter-proliferation. According to the US "National Strategy to Combat WMD" of December 2002 which seems to still survive as the only public document articulating the US strategy against WMD, counter-proliferation (CP) is considered to be a separate concept from nonproliferation (NP).

NP is to prevent or contain the proliferation of WMD by means of diplomacy and multilateral regimes, while CP is to protect, through largely military means, against the use of WMD by hostile states and terrorists already in possession of WMD. CP, a

essential part of the intricate web of the international legally-binding treaties and conventions, the group of like-minded countries and the practical ad-hoc arrangements, all aimed at preventing and countering the nuclear proliferation. Apart from being a serious threat to global security, proliferation is a barrier to economic growth and stability, distorts trade and investment, and increases the costs of international business. Korea's advanced status in world trade and the huge volume of high-tech industrial goods and equipment it exports obligate Seoul to enhance vigilance against the potential misuse by rogue states and terrorists of its goods and

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set of measures of interdiction, deterrence, defense, and response, is employed in the case of failure of NP and as such complementary to NP.

However, some US experts view that all the measures currently contemplated under both NP and CP are categorized as CP (Ashton Carter, "Overhauling Counterproliferation," Statement before the Committee on Foreign Relations of the US Senate, 10 March 2004). Others say CP should be an element of a broader NP regime facing the threat of determined proliferators and non-state actors (Ralph Cossa, Pacific Forum/CSIS, remarks at the CSCAP meeting on Countering the Proliferation of WMD, Singapore, 26-28 May 2005).

In the early 1990s, the traditional nonproliferation policy centered on the IAEA safeguards failed to detect a nuclear weapons program in Iraq. This resulted in the IAEA introducing the strengthened safeguards in the form of the Additional Protocol and the United States launching a more active policy of counter-proliferation. The North Korean nuclear dilemma added urgency to these undertakings.

Since 1993, the Defense Department has been developing doctrinal, organizational, and operational capabilities to build an effective CP. Following the 2003 Iraq War, CP appears to increasingly carry an aura of aggressive military action.

technologies. Relying on the international trade and investment for its economic prosperity, the country has everything to lose and nothing to gain when the global nonproliferation regime fails significantly.

Having been under the constant North Korean nuclear menace over the two decades, the Seoul government foremost seeks to disarm North Korea of all nuclear weapons and existing nuclear programs, and rejects any attempts to develop or possess nuclear weapons elsewhere in the world. By taking a firm stance against the potential break-out cases worldwide, Korea often had to weather the substantial fallouts from defending the nonproliferation regime.

For example, in November 2003 when Korea actively participated in the informal consultations on the draft resolution which strongly deplored Iran's past failures and breaches of its safeguards obligations and later supported its adoption at the IAEA Board, Iran singled out a few countries including Korea, blacklisted their companies working in Iran and warned of halting the business dealings with these countries.

Again in August and September 2005 when the IAEA Board adopted two successive resolutions that found Iran in noncompliance and then reported the Iran's case to the UN Security Council, Iran angrily reacted by expressing its concern and displeasure to Seoul. Moreover, it delayed for an extended period the issuance of permit for the Korean companies working in the country to import critical goods, which did substantial damage to the companies' business interests (as reported in the 29 September 2005 IRNA and other Iranian media). As such, Korea sustained its principled position to uphold and underpin the nonproliferation regime and appreciates that it has the responsibility to share in order to make the world secure.

Based on its experiences with the nuclear power development for the past thirty years, Korea believes that the full transparency achieved through full compliance with the nonproliferation obligations and the international confidence generated thereupon are critical in ensuring the continued benefits from peaceful nuclear use. In the former IAEA Director General's words, "the whole of nonproliferation, of verification, is about

transparency.”<sup>3</sup>

Following its ratification of the Additional Protocol in February 2004, Korea submitted the initial declaration to the IAEA in August of that year in which it informed the Agency of the lab-scale uranium enrichment experiments using AVLIS (atomic vapor laser isotope separation) that had been carried out in early 2000. Later, Korea further informed the Agency about the unreported uranium conversion activities in the 1980s that produced about 154kg of natural uranium metal, 3.5kg of which was used in the said AVLIS experiments. At the same time, a plutonium chemical experiment that was conducted in 1982 at the TRIGA Mark-III research reactor and not reported by that time was also explained to the IAEA.<sup>4</sup>

As regards AVLIS, only about 200mg of enriched uranium were produced, after which the experiments were terminated and the experiment facility dismantled. Concerning the plutonium chemical experiment, the quantity of the plutonium couldn't be measured exactly because it remained dissolved in the solution and was not separated, but was expected to be less than 40mg.<sup>5</sup>

On the basis of the result of Agency investigations, the IAEA Board meeting in November 2004 expressed serious concern about the failure to report these past activities, but at the same time “noted that the quantities of nuclear material involved have not been significant, and that to date there is no indication that the undeclared experiments have continued.”<sup>6</sup> The Board welcomed Korea's corrective actions and active cooperation with the Agency. With this verdict, the IAEA Board closed the case once and for all. Amidst this situation, the Korean government announced “Four Principles for the Peaceful Use of Nuclear Energy” in September 2004, highlighting

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<sup>3</sup> Mohamed ElBaradei, Comments made at the end of the Board of Governors' discussions on agenda items of the DPRK and Iran, 17 June 2009, p.5.

<sup>4</sup> IAEA, “Implementation of the NPT Safeguards Agreement in the Republic of Korea,” GOV/2004/84, 11 November 2004.

<sup>5</sup> Ibid.

<sup>6</sup> “Chairman's Conclusion,” IAEA Board of Governors, 26 November 2004.

its commitments not to developing or possessing nuclear weapons, abiding by nuclear nonproliferation norms and transparency, and expanding the peaceful nuclear use based on international confidence.

Any residual questions could be followed up within the context of wide-ranging monitoring and verification activities by the Agency to confirm the information contained in the national declarations annually submitted pursuant to the Additional Protocol. The verification required by the Protocol was a broad one including the nuclear fuel-cycle R&D activities across the country. After about four years of verification, the Agency came to reach the so-called Broader Conclusion on Korea in its annual “Safeguards Implementation Report for 2007,” stating that “all nuclear material remained in peaceful activities in Korea.”<sup>7</sup> In technical terms, the Broader Conclusion meant that there was no indication of the diversion of declared nuclear material from peaceful activities in Korea and no indication of undeclared nuclear material and activities in the country. The Conclusion is renewed annually by the Agency; if there was a violation, it would be rescinded.

Being granted the Broader Conclusion, Korea has completely shaken off any residual doubts relating to its past experiments, enhanced its reputation as a faithful adherent to the safeguards obligations and the wider nuclear nonproliferation norms, and is better positioned to prod others to comply with their nonproliferation commitments.

Finally, it was recently reported that Korea was selected as the preferred bidder by Jordan to build the country’s first nuclear research reactor in the amount of \$170 million and later chosen as a main supplier of four nuclear power reactors in the UAE. As Korea increasingly expands its share of the global nuclear reactor market, there would be a higher expectation that Korea should further strengthen nonproliferation conditions on its transfer of nuclear items. It is a valuable advice that should be heeded. In fact, the country is already a major nuclear supplier, whose sales are governed by the NSG Guidelines and national export control regulations. Over time, it

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<sup>7</sup> IAEA, “Safeguards Implementation Report for 2007,” GOV/2008/14, 7 May 2008, p. 9.

has exported steam generators and other key nuclear equipment to the United States and other countries; the Korean nuclear industry is therefore familiar with the NSG procedures and criteria for nuclear supply. However, Seoul should and will exercise additional vigilance in its nuclear plant exports for a nonproliferation cause.

### ***Korea's contributions to the nuclear nonproliferation efforts***

#### **• *NPT***

Korea firmly believes that promoting and strengthening the overall nonproliferation regime is the best deterrent to the current pressing challenges and that the NTP is the fundamental basis to uphold the global nuclear nonproliferation architecture. The full, balanced implementation by the states parties of the core obligations contained in the Treaty, namely the three pillars (nuclear disarmament, nuclear nonproliferation and the peaceful uses of nuclear energy), is pre-requisite to making it credible and efficient.

Through the NPT review process, Korea reaffirmed its firm commitment to the Treaty and the nonproliferation regime at the very high government level. In the run-up to the 2010 NPT Review Conference in New York this May, Korea is conducting consultations with the United States and other countries to find a common ground that could form the basis of consensus at the May meeting. For example, at the November 2009 conference that Korea co-hosted with the UN, serious discussions were held on how to make the Review Conference a success. At the same time, facing a great difficulty in amending the Treaty itself, Korea shares with the international community the necessity to complement and reinforce it by creating various practical steps (which would be discussed later in this paper).

#### **• *IAEA safeguards***

The nuclear safeguards regime, with the IAEA at its center, has played a key role in verifying that all states parties are in compliance with the NPT nonproliferation obligations. The assurances of full compliance by all states parties could foster a more favorable environment for the expanded use of nuclear energy in the 21<sup>st</sup> century.

Korea views that it is essential to universalize the comprehensive safeguards agreement and the Additional Protocol. The country supports the Additional Protocol as the standard of nuclear verification and a condition of nuclear supply, and this position has been clearly articulated at the successive meetings of the NSG, which unfortunately has not yet reached a consensus on this matter. Seoul recognizes the imperative of further developing the IAEA's safeguards authority, technology, and mechanism. The Korean government has made continued in-kind contributions to that end as a member of the IAEA MSSP (Member States Support Program) through the joint development of specific safeguards equipment of which the Agency is in need. Korea also contributed to establishing "the Asia-Pacific Safeguards Network" (APSN) that came into existence last October, which would serve as a vehicle for the participating governments to exchange information on safeguards issues and support the building and sustainability of national nuclear safeguards capability.

Seoul places the utmost value on the full exercise of the right to the peaceful uses of nuclear energy. This right is indispensable to sustainable socio-economic development of the developing countries. Clearly, one of the determinants behind Korea's rapid economic growth was nuclear power, which provides now 40% of its electricity needs and will increase up to 60% by 2030. However, Korea believes that there should be effective safeguards against the potential abuse of this right. The same Article 4 of the NPT that governs the peaceful uses of nuclear energy conditions this right on the full compliance with nonproliferation and safeguards obligations set out in the preceding Articles.

• ***Export control, including ENR control***

Korea highly assesses the value of nuclear export control as a practical means of preventing nuclear proliferation, and as such is a faithful member of both the Zangger Committee and the NSG. The country views that the export control is consistent with the inalienable right to peaceful use of nuclear energy. Moreover, the robust export control system can even contribute to the expanded use of nuclear power by reducing the risk of proliferation and thereby fomenting international confidence. In recent

years, Korea has undertaken various steps to mainstream export control in its foreign and trade policy through regularly updating relevant laws and regulations, consolidating administrative apparatus and licensing process, and improving effective implementation and enforcement.

In particular, Korea recognizes the need to control the transfer of sensitive fuel cycle technologies and facilities (ENR), particularly to the countries of proliferation concern or those countries that have no legitimate needs for such technologies and facilities in terms of the economic feasibility and energy security criteria. Over the recent years, Seoul has supported the introduction into the NSG Guidelines of the strict objective criteria against which suppliers weigh on the possible transfer of ENR. The discussion is still going on at the Group. In fact, the reality is that despite whatever criteria the NSG would adopt, no supplier would be willing to sell ENR to any non-nuclear-weapon state.

On the other hand, credible fuel supply arrangements at a reasonable price could be one of the useful options to encourage states to rely on the international fuel market. Korea remains supportive of these efforts toward establishing multiple fuel assurance mechanisms, and has positively participated in the relevant debates at the IAEA Board which have been initiated since 2005. At the November 2009 meeting, the Board adopted a very important resolution to endorse the Russian fuel reserve in Angarsk. Korea co-sponsored and voted in favor of the resolution. Provided the voting result was divisive, Korea's affirmative vote was a significant force in getting the resolution adopted.

• ***Nuclear security against nuclear terrorism***

The objective of nuclear security is to prevent nuclear and radiological terrorism. President Obama stated that “we must ensure that terrorists never acquire a nuclear weapon. This is the most immediate and extreme threat to global security ... So today I am announcing a new international effort to secure all vulnerable nuclear material around the world within four years.”<sup>8</sup>

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<sup>8</sup> Remarks by President Barack Obama, Prague, April 5, 2009.

Korea emphasizes the importance of international cooperation in countering nuclear terrorism and supports various activities and efforts being made within the framework of the IAEA and the Global Initiative to Combat Nuclear Terrorism (GICNT) created in 2006. Being a member of GICNT, Korea hosted last April a nuclear terrorism seminar in Seoul under the auspices of GICNT and has been funding, almost every year, the IAEA's Nuclear Security Fund (NSF) that was established following the 9/11 terrorist attacks.

In 2004, the US launched Nuclear Smuggling Outreach Initiative (NSOI) to deter the illicit trafficking of nuclear and radioactive materials by engaging countries at greatest risk and developing priority assistance projects. Recognizing the significance of this new endeavor, Korea became a regular donor to support the Initiative since 2007.

Korea also intends to ratify within this year the amended Convention on Physical Protection of Nuclear Material and Facilities which would greatly upgrade the security against theft and sabotage by non-state actors. The Seoul government has been in consultation with the National Assembly about the requirements of the Convention and the ratification procedure.

• *New measures*

The global nonproliferation regime creates a web of formidable barrier to proliferators, but proliferation continues. The international community has redoubled its efforts to supplement existing tools with new tools that make proliferation more costly and difficult.

First, in order to keep the global nonproliferation regime valid and viable, the international community should put in place a mechanism to enforce the international norms on nonproliferation. The first line of defense against proliferation lies with multilateral norms and effective export control systems at the national and multinational levels. If and when norms and export controls fail, there is a need for the second line of defense - strong enforcement actions to interdict the movement of illicit shipments. Proliferation Security Initiative (PSI) is by far one of the most important enforcement tools. PSI has been gaining a solid ground with 95 countries

formally participating in it. Since the Initiative's inception in May 2003, it sought to prevent the transfer of WMD, their delivery systems and related materials by air, ground or sea to and from states and non-state actors of proliferation concern.

Following the initial delay due to the consideration of the implications on the inter-Korean relations, Seoul formally joined PSI in May 2009. It should be noted that even before it subscribed to the Statement of Interdiction Principles, Korea has rendered cooperation to PSI by exchanging information with the participating governments and sending observers to various interdiction exercises. The country is also a vital partner in the US Container Security Initiative and the Megaports Initiative.

Second, Korea joined the G-8 Global Partnership against the Spread of Weapons and Materials of Mass Destruction (G8GP) that was established at the 2002 Kananaskies G-8 Summit. It committed G-8 countries to mobilize \$20 billion over the next 10 years until 2012 to largely respond to the threats stemming from the loose nukes in Russia. Since 2002, the GP has made tremendous progress, with 22 nations and the European Union in partnership. At the Hokkaido Summit in 2008 and again at the L'Aquila Summit in 2009, the G8 leaders agreed to pursue new geographic areas and projects for the Partnership, as well as seek new members on a global basis to more fully address global threats.

Korea joined the GP in 2005 with the firm conviction that cooperative threat reduction efforts would help remove the proliferation threat from its sources. Starting its financial contribution from 2005, initially with the annual budget of \$500,000, Seoul has doubled the annual funding to \$1 million since 2007 to support various GP programs. Korea's financial contributions were instrumental in eliminating the last three Russian plutonium production reactors in the Siberian cities of Zheleznogorsk and Seversk, dismantling some of the Russian decommissioned nuclear submarines, and supporting the Global Threat Reduction Initiative (GTRI) working on converting research reactors from HEU to LEU use, removing or disposing of excess nuclear and radiological materials, and protecting these materials at risk of theft and sabotage. Over the years, significant

financial contributions have also been disbursed to various projects run by the Moscow-based ISTC (International Science and Technology Center).

Third, Korea rendered full adherence to the UN Security Council resolution 1540 adopted in 2004 and renewed twice in 2006 and 2008, which closed an important gap in the existing nonproliferation regime created by non-state actors. In 2008, the Security Council called for the 1540 committee to consider a comprehensive review of the status of implementation of the resolution. The comprehensive review sought contributions from member states to assess the evolution of risks and threats, address unresolved critical issues, and identify new approaches for implementation. During September-October 2009, the committee hosted a general debate and interactive thematic sessions, and discussed the ways and means to make further progress in the implementation of the resolution.

Korea has reaffirmed its strong position, on various occasions, that the resolution is a significant tool to combat the new security threat emanating from the possible nexus of terrorists and nuclear devices. Seoul fully supports the resolution, incorporated its requirements into domestic laws and regulations, and submitted the relevant implementation reports to the 1540 committee in accordance with the terms of the resolution.

• *North Korea and Iran*

Korea believes that the early resolution of the DPRK nuclear issue is vital to securing lasting peace and prosperity on the Korean Peninsula and beyond, as well as to ensuring the integrity of the global nuclear nonproliferation regime. It has exerted strenuous efforts to achieve the verifiable denuclearization of the DPRK in a peaceful manner through the Six-Party Talks, which Korea firmly views as the most effective vehicle to tackle this issue. However, it is regrettable that despite these efforts, the DPRK carried out a long-range rocket launch and a nuclear test last year in contravention of the UN Security Council resolution 1718 (2006). These provocative acts triggered another Security Council resolution 1874 of 12 June 2009, and reacting to this, Pyongyang further threatened additional nuclear and missile tests. Korea will spare no efforts to make progress in the denuclearization process and highly values the continued unwavering

support of the international community to this end.

How to resolve the Iranian nuclear issue in a political manner remains a serious challenge to the international community. At the heart of Iran's nuclear issue lies the confidence deficit with its nuclear activities. In 2005, Iran was found in non-compliance with its safeguards obligations by the IAEA Board, and the UN Security Council demanded in its three resolutions that Iran suspend all enrichment-related, reprocessing, heavy-water-related activities as a confidence-building measure, which Iran has not yet adhered to. Korea supports every effort towards the diplomatic and negotiated solution of this intractable issue, and has worked hard at the multilateral institutions and cooperated with the concerned countries to ensure that the Iran's nuclear program remained for exclusively peaceful purposes.

• *Contributions to the regional nonproliferation efforts*

Korea believes that the regional efforts to counter nuclear proliferation will be conducive to the strengthening of the global nonproliferation regime. In the Asia-Pacific region, there are two important mechanisms which can be utilized to combat proliferation challenges, namely the ASEAN Regional Forum (ARF) and the Asia-Pacific Economic Community (APEC), both of which Korea is a full member.

With regard to ARF, the Forum has been conducting wide-ranging activities in promoting confidence-building measures (CBM) in the region under the framework of its three-stage development strategy. At this time, it is evolving from this first stage of CBM to the second stage of preventive diplomacy. Considering the growing concern over proliferation challenges to regional peace and security, Korea continued to see merit in ARF engaging in various nonproliferation activities. Seoul therefore supported the ARF's adoption of the Chairman's Statement on Nonproliferation in 2004, and continues to help the region implement the provisions contained therein.

Since the 9/11 terrorist attacks, APEC has expanded discussions on security issues to cover counter-terrorism and human security. For the first time in

2004, specific nonproliferation issues became the subject of discussion at APEC which eventually resulted in the adoption at the Santiago Ministerial Meeting of two important documents: “APEC Key Elements for Effective Export Control System” and “APEC Guidelines on Control and Security of MANPADS.” Ministers also recognized in their statement that all APEC economies are implementing, have concluded, or aim to conclude the Additional Protocol with the IAEA by the end of 2005. Moreover, APEC leaders meeting in Korea in 2005 agreed to implement two important IAEA standards by the end of 2006, namely “the IAEA Code of Conduct on the Safety and Security of Radioactive Sources” and “the IAEA Guidance on the Import and Export of Radioactive Sources,” both of which Seoul already incorporated into domestic legislation. Korea believes that these discussions on security and nonproliferation issues within the framework of APEC are important contributions to reinforcing the global nonproliferation regime, in the sense that economic activities can be further advanced in the stable security environment and that terrorism and WMD proliferation pose a direct challenge to the basic principle of APEC for trade and investment liberalization.

Korea has also been actively participating in the CSCAP (Council for Security Cooperation in Asia and the Pacific) meetings on countering WMD proliferation and in its auxiliary working group aimed at strengthening export control in the region, both led by Pacific Forum/CSIS. The Council, comprising both the government officials and academia, provides a forum to exchange candid views about contemporary nonproliferation challenges and to forge regional nonproliferation and export control templates.

### **ROK-US Nuclear Nonproliferation Cooperation Issues**

#### ***Status of the bilateral nuclear nonproliferation cooperation***

As discussed above, Korea has a significant role to play in upholding and enhancing the global nuclear nonproliferation regime. In fact, the greater portion of Korea’s afore-mentioned contributions to the regime has been made in close cooperation with Washington or towards helping it achieve

broader nonproliferation goals across the globe. As a traditional ally and fully sharing the same goal of curbing the spread of nuclear weapons, Korea has spared no efforts in acting as an indispensable partner in the US fight against nuclear proliferation worldwide. Just to take a few examples:

- Korea is a key partner with the US in the Six-Party Talks to roll back the DPRK nuclear weapons program, and renders necessary assistance to addressing the Iranian nuclear issue, often accompanied by consequences.
- Korea has been closely coordinating with the US and other countries at the IAEA Board of Governors in tackling key nonproliferation issues. Also, at the US request, Korea has expressed unreserved support for the Assurance of Fuel Supply proposals by making positive statements at the past Board meetings. Seoul recently joined the co-sponsorship of the resolution that endorsed the Russian fuel reserve, the first of its kind, and voted in favor of it.
- The two countries enjoy close cooperation in strengthening national and international export control systems. Over time, different US agencies closely interacted with Korea's Foreign and Commerce Ministries. Korea, in cooperation with the US interagency teams, hosted a number of seminars and workshops that included sensitive commodity identification training for enforcement officers, end-use identification, and outreach to the industry and academia.
- Seoul is participating in the GICNT and has cooperated with the US on various projects within the Initiative's purview. Korea fully supports the US hosting of Nuclear Security Summit in April 2010.
- The Korean government cooperated with the DOE's NNSA to remove all of the US-origin HEU fuel from Korea which has been in storage under the IAEA monitoring since 1996. In September 2007, NNSA has transported out 11 fresh fuel assemblies containing 1.8 kg of 70% HEU that were originally intended for the two old research reactors in Korea. The US recognized that Korea was a key partner and that its

participation in the program demonstrated its strong commitment to the program goals.<sup>9</sup>

- Korea joined the GNEP in 2007 at the request of the US. Though several aspects of the Partnership are being transformed in the new administration, its nonproliferation elements will continue to be underscored and supported by Korea.
- Seoul is a full member of the US-led Proliferation Security Initiative, and also of the Container Security Initiative and the Megaports Initiative.
- A big portion of the Korea's annual Global Partnership funding is spent to support several key projects sponsored by the US agencies; i.e. the DOE/NNSA's GTRI and EWGPP (Elimination of Weapons-Grade Plutonium Production) and the State Department's Nuclear Smuggling Outreach Initiative (NSOI).
- The Seoul government has been partnering with the US in ARF, APEC and other regional fora to raise regional awareness of nuclear nonproliferation.

Overall, the Korea-US bilateral cooperation for nuclear nonproliferation has been and remains solid, sound and steadfast.

### ***Bilateral Nonproliferation Cooperation Issues***

To be sure, nuclear nonproliferation is the contemporary imperative to secure a peaceful and stable world. It is an indispensable element of the three pillars buttressing the NPT by which non-nuclear-weapon states committed not to develop and possess nuclear weapons, and nuclear weapon states promised nuclear disarmament and to support the peaceful uses of nuclear energy of all countries. President Obama stated in Prague that "together we will strengthen the NPT as a basis for cooperation. The

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<sup>9</sup> NNSA, "NNSA Removes All U.S.-Origin Highly Enriched Uranium Fuel from the Republic of Korea," September 19, 2007.

basic bargain is sound: Countries with nuclear weapons will move toward disarmament, countries without nuclear weapons will not acquire them, and all countries can access peaceful nuclear energy.”<sup>10</sup> Secretary Clinton reaffirmed that “[w]e must continue to strengthen each of the three mutually reinforcing pillars of global nonproliferation – preventing the spread of nuclear weapons, promoting disarmament, and facilitating the peaceful use of nuclear energy.”<sup>11</sup> Korea, as a non-nuclear-weapon state party to the NPT, obviously hopes to see all of the Treaty’s objectives fully realized.

For Korea and the United States, the most salient part in the various correlations of the three pillars is how to enhance the nonproliferation while preserving the benefits from the civil use of nuclear energy. With the impeccable nonproliferation credentials underpinned by the IAEA Broader Conclusion, Korea as a significant nuclear power generator holds the expectation that its peaceful nuclear use would continue to be supported by the United States.

Behind the Korea’s remarkable nuclear achievements stood the decades-old US support for its nuclear programs. Seoul was one of the early beneficiaries of the Atoms for Peace Program that was launched by President Eisenhower through his historic speech at the UN General Assembly in 1953. Korea first encountered nuclear energy when the nation was struggling to overcome the devastation wrought by the 1950-53 Korean War. The development of the country’s nuclear energy all started with a letter from the US government addressed to the Korean President in 1954, which requested Korea to send a scientist to a US nuclear research institute. The first bilateral nuclear cooperation agreement was signed in 1955 to govern the US supply of nuclear technology, materials and information. Subsequently, Korea chose 100 KW TRIGA Mark-II as its first research reactor in 1958 to be followed by 2 MW TRIGA Mark-III in 1969. The nuclear power plant construction that began in the early 1970s

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<sup>10</sup> Remarks by President Barack Obama, Prague, April 5, 2009.

<sup>11</sup> Statement by Secretary Clinton before the US Institute of Peace, October 21, 2009.

was not possible without the US support.<sup>12</sup>

The United States has been the patron of Korea's nuclear power development, which, together with its long-standing powerful security and economic assistance, propelled the country's socio-economic miracle over the past half-a-century. Today Korea remains deeply grateful to the United States for the support.

Importing nearly all of its energy sources, Korea has relied on nuclear power for its socio-economic development during the past decades. Since the first nuclear power plant came online in 1978, Seoul has expanded substantially its nuclear electricity generation capacity to be the world's sixth largest nuclear power generator, with a total of 20 reactors in operation and eight more units under construction today. The new government plan envisages that the number of reactors will be doubled, and the share of nuclear power in the total electricity mix will increase to 60% by 2030, compared to the current 40%.

During the last thirty years of nuclear power generation, Korea's reactors have discharged roughly 10,000 tons of spent fuel that have been stored at the four reactor sites, with 700 tons generated every year. Below is the breakdown of the spent fuel inventory as of the end of 2008:

<b>Nuclear sites (unit)</b>	<b>Amount of spent fuel</b>	<b>Storage pool capacity</b>
Kori (4)	1,685 MT	2,253 MT
Yonggwang (6)	1,623 MT	2,686 MT
Ulchin (6)	1,294 MT	1,642 MT
Wolsong (4)	5,481 MT	5,980 MT

From the year 2016, starting from the Kori site, spent fuel storage pools will be saturated one-by-one. Moreover, by 2030 Korea must find space to store more than 30,000 tons of spent fuel that will be generated from its expanded reactor fleet. If the fuel cannot be removed from the pools by

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<sup>12</sup> Ministry of Education, Science and Technology & KAERI, *50 Years of Nuclear Energy, 50 Years of Prosperity*, April 2009, pp. 20-74.

2016, domestic nuclear regulations require that the reactors be shut down indefinitely for safety reasons. The spent fuel re-racking exercises in the pools to enlarge storage capacity are almost exhausted, and there will be considerable opposition from the local population in building dry casks at the reactor sites.

Since 1997, KAERI has been researching and developing the pyroprocessing technology to substantially reduce the volume, heat and radiotoxicity of spent fuel by extracting a mix of plutonium and other transuranics. The final product will be “burned” in the Generation-IV fast reactors which have also been under development since 1992.

There are pros and cons in relation to the nature and proliferation-resistance of pyroprocessing in the United States.<sup>13</sup> Some nonproliferation advocates view that pyroprocessing is none other than the PUREX-type reprocessing which should not be developed and deployed. The wholesale discount of the merit of the spent-fuel treatment and conditioning technologies could effectively bar the necessary technology development in support of nuclear power generation combating climate change, and close off the chance of finding a solution for the cumulative spent fuel problem facing the United States and Korea. Practically, pyroprocessing is not considered reprocessing under US regulations, statutes and agreements, which ban US assistance to foreign reprocessing efforts, and this was formally agreed by the Departments of Energy and State in 2002 and 2007.<sup>14</sup>

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<sup>13</sup> For the details of these arguments in the US, see Richard Garwin (“Reprocessing isn’t the Answer,” *Bulletin of the Atomic Scientists*, 6 August 2009), William Hannum et al. (“Reprocessing is the Answer,” *Bulletin of the Atomic Scientists*, 31 August 2009), Edward Lyman and Frank von Hippel (“Reprocessing Revisited: the International Dimension of the Global Nuclear Energy Partnership,” *Arms Control Today*, April 2008); see also Seongwon Park (“Why South Korea needs Pyroprocessing,” *Bulletin of the Atomic Scientists*, 26 October 2009).

<sup>14</sup> Miles Pomper, “Concerns Raised as South Korea Joins GNEP,” *Arms Control Today*, January/February 2008.

The Korea-US bilateral nuclear cooperation agreement of 1974 stipulates that the US holds prior consent rights over the use of all US-origin nuclear material in Korea. Specifically, Article VIII(F) states that when any special nuclear material received by Korea from the US requires reprocessing, or when any irradiated fuel elements containing fuel material received from the US are to be altered in form or content, such reprocessing or alteration shall be performed in facilities acceptable to both parties upon a joint determination of the parties. The above terms of the bilateral agreement make both Korea and the United States co-responsible for resolving Korea's growing spent fuel problem.

I believe that the continued close cooperation on the pyroprocessing technology development between the United States and Korea within the framework of the nonproliferation norms, backed up by the enhanced IAEA safeguards, will provide the key to the spent fuel dilemma in which both countries are locked. /end/