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**L.13. Promoting Transparency:
The Korean National Inspection Experience**

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Promoting Transparency: The Korean National Inspection Experience

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Abstract

The Republic of Korea started the IAEA full-scope safeguards inspection with the TRIGA research reactor in 1976 when the nuclear industry was at its infancy. Over two decades of rapid economic growth was propelled by stable supply of electricity, substantially from nuclear energy. Today nearly half of the nation's electricity comes from sixteen operating nuclear power plants (12 LWRs + 4 OLRs). Total number of facilities under IAEA inspection reaches 30 where the Agency conducts about 400 PDIs annually. Within the last decade, nuclear transparency in Korea has transformed into the international norm primarily from the needs of rapidly expanding domestic nuclear program. In addition, possibility of North/South mutual inspection helped initiate the national inspection regime in addition to the IAEA inspection. The Technology Center for Nuclear Control was established at KAERI in 1994 in order to maintain the nation's nuclear verification expertise in support of the Korean government. National inspections have been carried out simultaneously with the IAEA inspection since 1997 with trial facilities, and all domestic facilities are being inspected from this year. Necessary legal framework and working procedures were developed and field-tried for LWRs, OLRs, fuel fabrication plants and research reactor facilities. Although the inspection equipment and technology along with the safeguards criteria are quite similar to those of the Agency, it is essential to maintain the independent conclusion capabilities between IAEA and the national authority. Substantial improvements in the IAEA safeguards inspection goal attainments since 1997 are credited to the increasing safeguards awareness among operators and SSAC. Further work is necessary to develop the evaluation criteria based on the field inspection results to meet the national inspection goals.

The Korean Government signed the Additional Protocol with IAEA on June, 1999 after much deliberation since it involves facilities without nuclear

materials. Ratification process is underway with amendment of appropriate laws and regulations. In preparation for the implementation stage of the Protocol in Korea, domestic facility operators are being organized to submit the expanded declaration and prepare for the complementary access if necessary. Main concern is the protection of commercially sensitive information. In line with the Integrated Safeguards concepts where the existing 153-type safeguards and the new 540-type Protocol are to be implemented in an integrated fashion, Korea is seeking active ways to enhance cooperation with IAEA. From the Agency's point of view, resource savings could be reached while maintaining the effectiveness when the SSAC is deemed credible. From the SSAC's point of view, the Agency inspection efforts could be reduced if the routine resource intensive interim inspections are substituted by the national inspection. Agency has limited experience on this type of resource sharing, only with the EURATOM's New Partnership Approach (NPA) up to now. However, onset of the Integrated Safeguards implementation is creating a proper environment for a wider application of NPA.



IAEA Safeguards for the 21st Century

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Promoting Transparency : The Korean National Inspection Experience

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ROK Nonproliferation Milestone

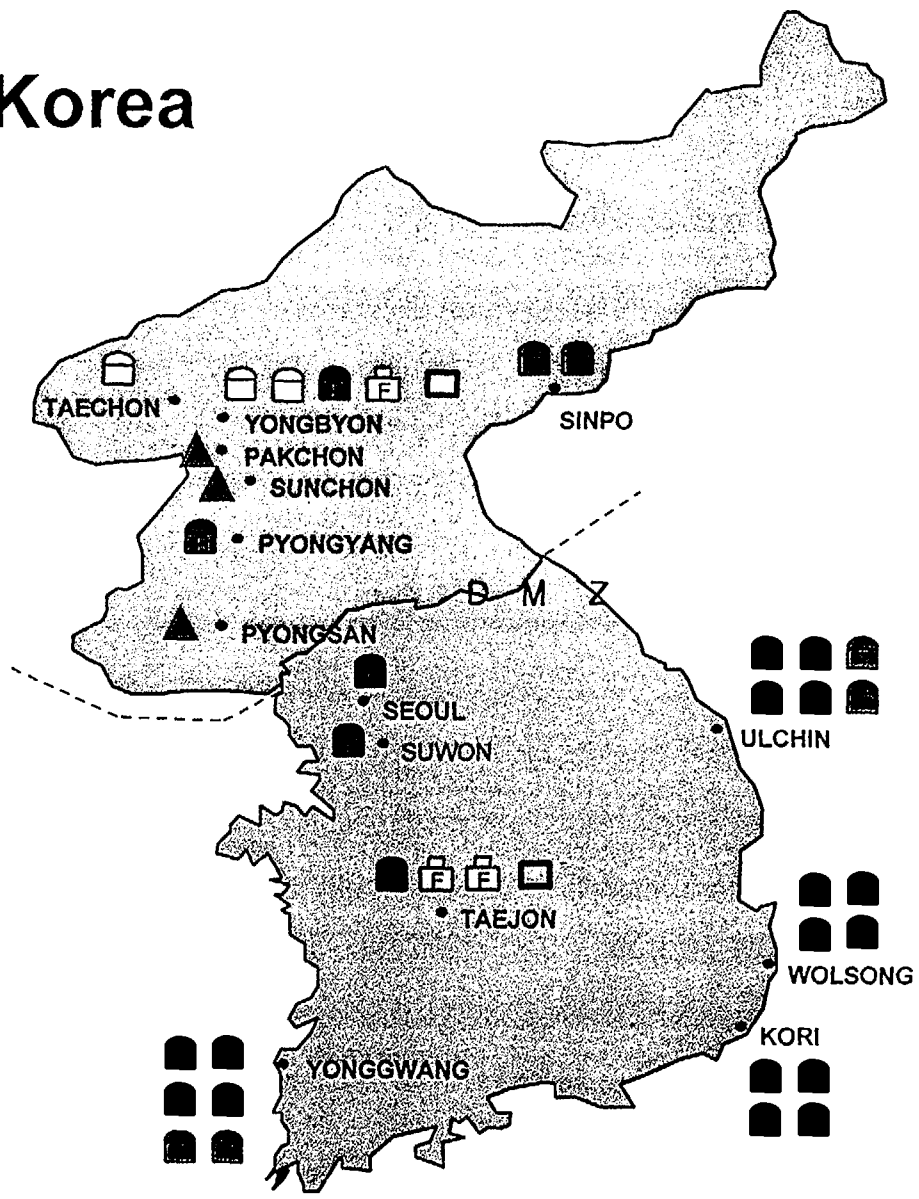
- 1975** NPT ratified, INFCIRC/153 type signed with IAEA (INFCIRC/236)
- 1991** Declaration of denuclearization in the Korean Peninsula (North/South)
First annual ROK/IAEA Safeguards Review Meeting
- 1992** North/South Korea's mutual inspection committee
MOST Nuclear Control Division established
- 1994** KAERI-TCNC(Technology Center for Nuclear Control) established
DPRK/USA Agreed Framework signed
- 1995** Atomic Energy Act revised - SSAC and National Inspection promulgated
NSG/Zangger Committee membership
- 1997** First national inspection(initial inventory verification) on 7 facilities conducted
- 1999** National Inspection extended to all facilities
Additional Protocol signed
CTBT ratified

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Nuclear Facilities in Korea

LEGEND	
	NPP(Shut down)
	NPP(In Operation)
	NPP(Under Construction)
	Research Reactor
	Uranium Mine
	Fuel Fabrication
	Hot Cell



Inspection PDIs in 1998

Type of Facility	Number of Facilities	IAEA PDI	TCNC PDI
<i>Nuclear Power Plant</i>	16	252	408
<i>R&D Facility</i>	7	56	34
<i>Fuel Fabrication Facility</i>	3(4 MBAs)	51	46
<i>LOFs</i>	1	0	0
<i>Industrial Facility</i>	1	1	2
Total	28	360	490

LOFs: Location Outside Facilities

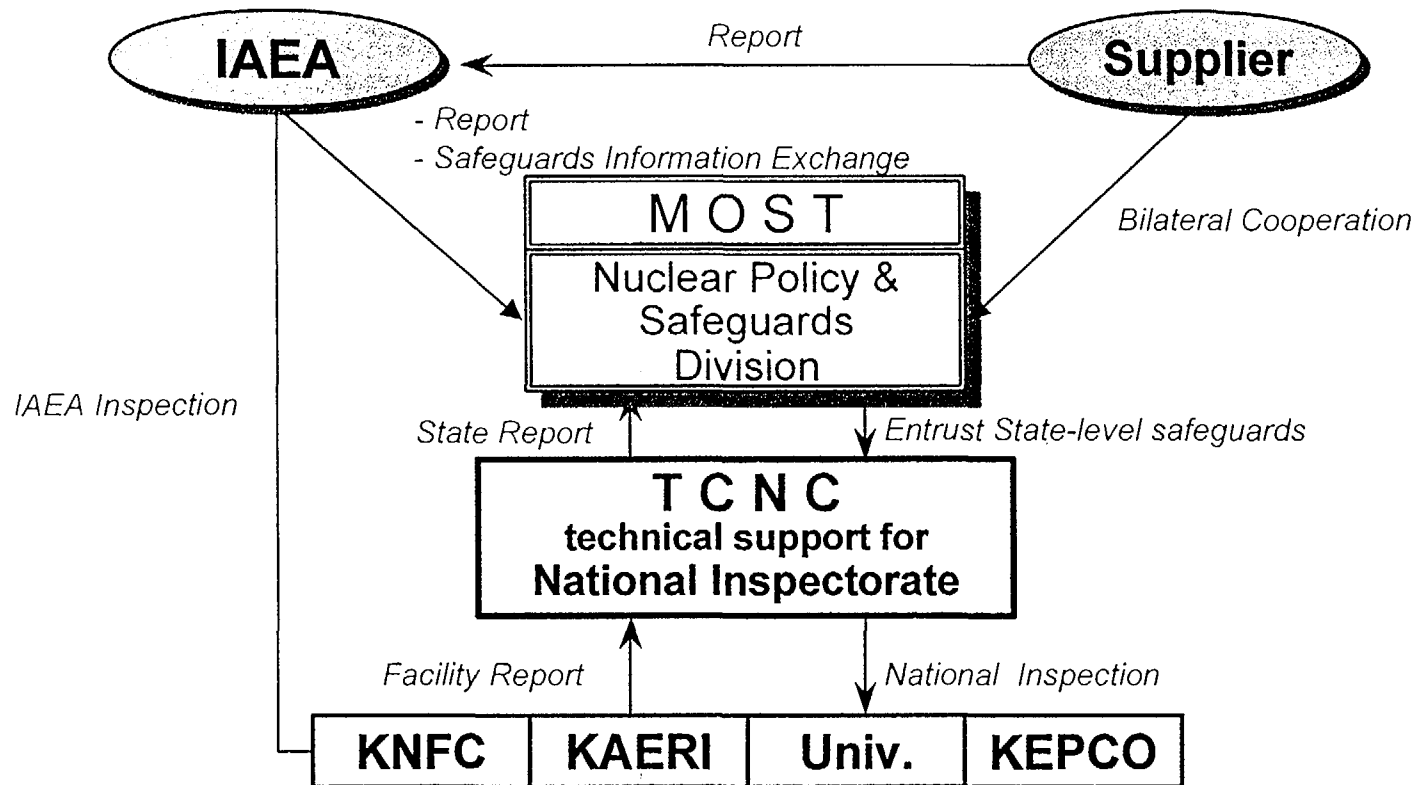
PDI: Person Day Inspection

MBA: Material Balance Area

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Present SSAC in Korea



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Safeguards Legal Framework

- Material Accountancy
 - Comprehensive Safeguards Agreement between ROK and IAEA(INFCIRC/236)
 - ***entered into force on November 14, 1975***
 - Atomic Energy Act
 - ***Article 15.2 : Material accounting and control & physical protection***
- Export Control
 - Zangger Committee(ZC) and Nuclear Suppliers Group(NSG)
 - ***joined in 1995***
 - Trade Act
 - ***Article 21 : Export license for strategic items/technology***
- Physical Protection
 - Physical Protection Convention(INFCIRC/274)
 - ***joined in 1987***
 - Atomic Energy Act
 - ***Article 15.2 : Material accounting and control & physical protection***



Regional/National Inspection Regimes

EURATOM

- Established in 1957 among 15 EU countries (2 NWS + 13 NNWS)
- Missions : to secure nuclear fuel supply
to assure absence of undeclared activities
- Conducts routine safeguards inspections

ABACC

- Established in 1994 with quadrapartite agreement
- Conducts mutual cross inspections between Brasil and Argentina

Japan

- STA established NMCC in 1977 as the Designated Data Treatment Center
- Will conduct national inspection from 2000

Korea

- MOST established TCNC in 1994 as the technical support center
- Conducts national inspection from 1997

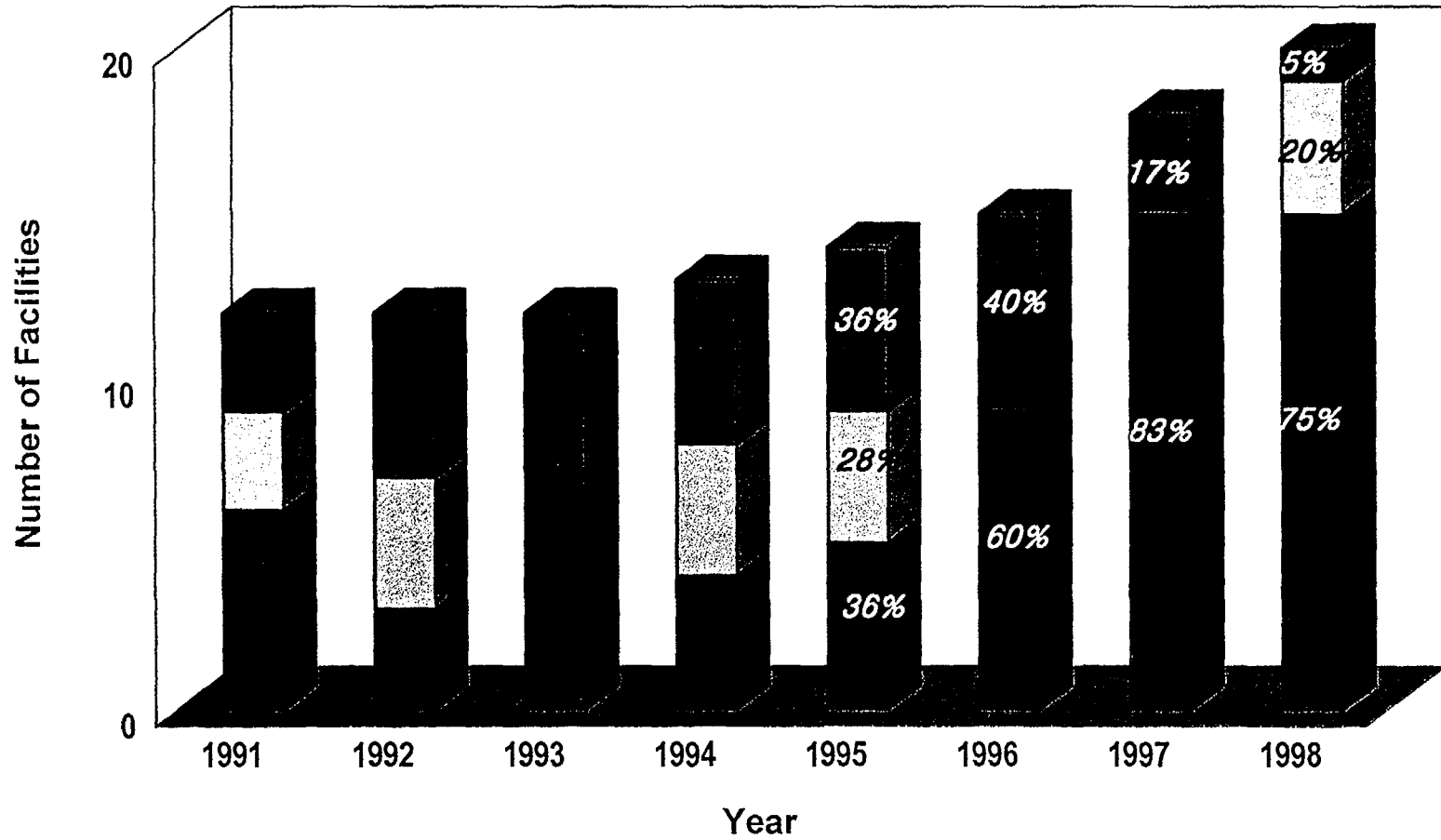


Korean National Inspection Experience

- **Gradual approach adopted to ease introduction**
 - 1997 - 7 facilities (one from each site)
 - 1998 - 13 facilities (one from each type + NPP station)
 - 1999 - 26 facilities (all)
- **General safeguards awareness established**
 - Safeguards training courses for operators, inspectors
 - INMM-Korea Chapter established in 1996
 - Operator deficiencies resolved with TCNC support
- **Annual safeguards performance improved (SIR review meeting)**
 - High goal attainment results since 1997
- **Safeguards R&D results gaining acceptance**
 - Special NDA equipment developed for CANDU SF



IAEA Inspection Goal Attainment in ROK



■ Pass ▨ Partial ■ Fail

Enhanced Cooperation with IAEA

- **Levels of cooperation with credible SSACs**
- **Joint use of equipment pursued**
 - Sharing of raw data, maintaining indep. conclusion
- **Encourage information exchange through safeguards seminars, training courses**
 - Need to improve quality of national inspectors
- **Member State Support Program initiated**
 - No. 1 MSSP : Remote monitoring on Yonggwang Unit 3 LWR ('98)
 - No. 2 MSSP : Remote monitoring on dry storage at Wolsong OLR ('99)
- **First implementation of the Integrated Safeguards on LWRs**
 - CSA states with the Additional Protocol in place
 - Sizable number of LWRs in operation
 - Information evaluation on state-as-a-whole without inconsistencies

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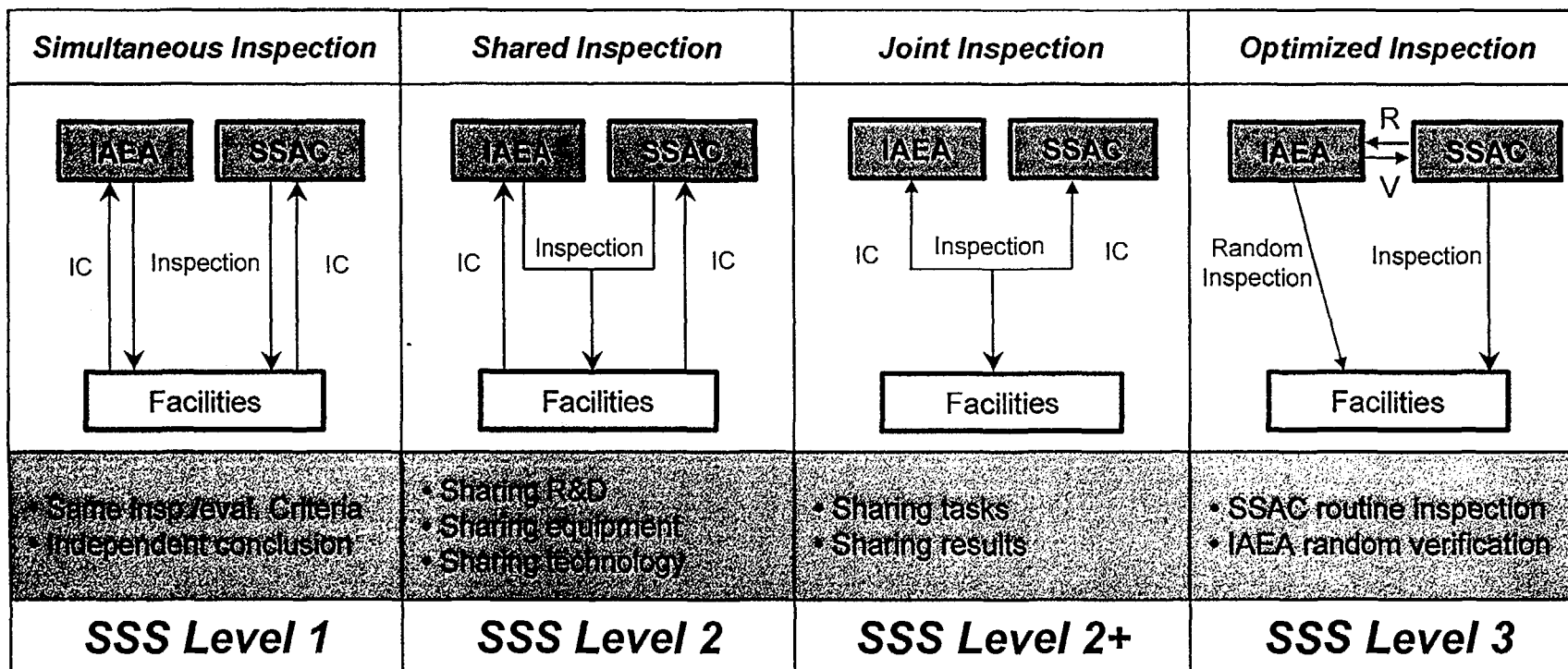
Preparation for the Strengthened Safeguards System

- **Environmental sampling field trials at KAERI hot cells**
 - Baseline data established ('94 - '95)
- **Remote monitoring field trial at Yonggwang LWR plant ('98 -)**
 - Simultaneous image data sharing by IAEA and TCNC
- **Technical consultation meetings on AP with IAEA ('98)**
 - Operators concerns addressed
- **Additional Protocol signed (June, '99)**
 - Domestic regulations amended before ratification
- **Policy study on “Integrated Safeguards Implementation in Korea” started (July, '99)**
 - Facility specific implementation program development
 - Close consultation with IAEA’s IS work plan in formation

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SSAC/IAEA Levels of Cooperation



IC : Independent Conclusion
 R : Report
 V : Verification

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Concluding Remarks

- **ROK's transition in safeguards culture**
 - First twenty years : passive support to IAEA
 - Last three years : national inspection simultaneously with IAEA
- **Enhanced cooperation with credible SSAC essential in the IS**
 - IAEA gains resource savings without losing effectiveness
 - SSAC gains the Agency inspection reduction with responsibilities
- **Increased transparency with the Additional Protocol in place**
 - Only way to peaceful use of fuel cycle activities

