



Introduction to Korean SSAC and Application of RMS for IAEA Safeguards

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Contents



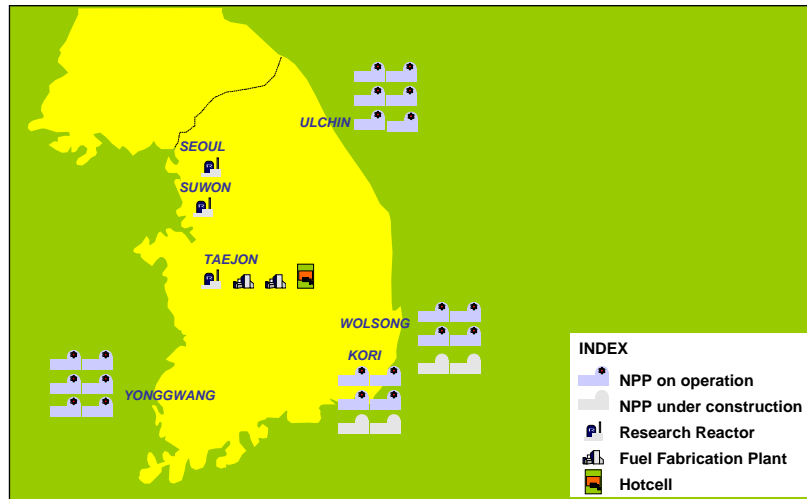
- **Introduction to Korean SSAC**
 - Includes Korea nonproliferation history, nuclear facilities, and introduction to NNCA
- **RM**
 - Includes background, systems, networks, experiences, cost savings and applications.

Introduction to Korean SSAC

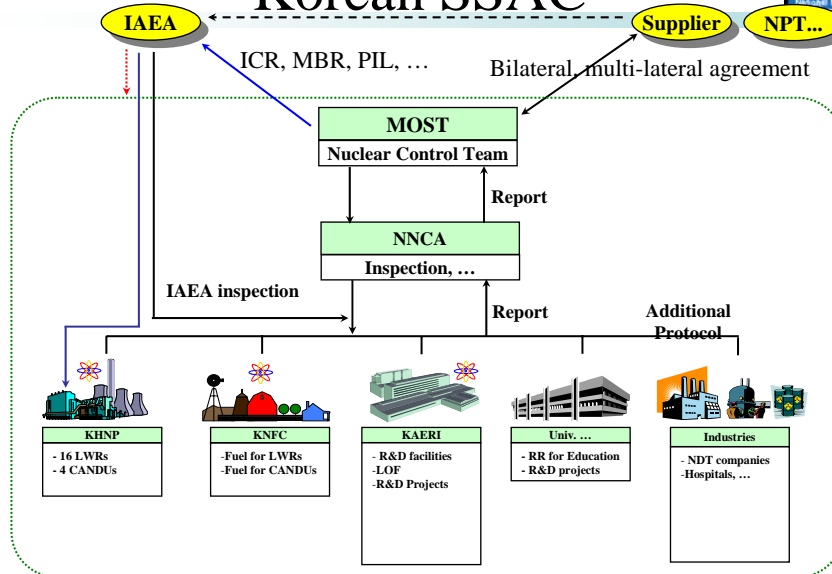
ROK Non-proliferation History

- 1957 joined IAEA
- 1975 EIF of NPT/IAEA SG Agreement
- 1992 declared De-nuclearization of Korean Peninsula
- 1994 established TCNC
- 2004. 2 EIF of Additional Protocol
- 2004. 8 Initial declaration
- 2004. 9 declared Four Principles in the Peaceful Use of Nuclear Energy in ROK
- 2004.10 established NNCA

Nuclear Facilities



Korean SSAC



NNCA



Background

- TCNC started national inspection for nuclear control in 1997.
 - TCNC was one of the division at KAERI (independency issue).
- IAEA found out that a few R&D projects at KAERI failed to report the use of nuclear material in a timely manner(2004).
 - ➔ Korean government decided to establish new, strong and independent national nuclear control regulatory body.
 - ➔ NNCA established

Goal

- Monitor the non-diversion of nuclear material
- Commit international obligations and regulations on non-proliferation
- Improve transparency through the cooperation
- Encourage the peaceful use of nuclear energy

IAEA BOG Chair's Conclusion on Nuclear Matter in Korea



- The Board took note of, and expressed appreciation for, the Director General's report contained in document GOV/2004/84.
- The Board shared the Director General's view that given the nature of the nuclear activities described in his report, the failure of the Republic of Korea to report these activities in accordance with its safeguards agreements is of serious concern.
- At the same time, the Board 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.
- The Board welcomed the corrective actions taken by the Republic of Korea, and the active cooperation it has provided to the Agency.
- The Board encouraged the Republic of Korea to continue its active cooperation with the Agency, pursuant to its Safeguards Agreement and Additional Protocol.
- The Board requested that the Director General report as appropriate.



Future Plan

- Establish robust national SSAC system
 - New expanded NNCA to be established in July pursuant to revised Atomic Energy Act
- Encourage proliferation resistant R&Ds
- Strengthen non-proliferation related researches
- Enhance non-proliferation culture
 - Regular mandatory education on the non-proliferation and safeguards to the researchers



✌ Remote Monitoring System in Korean LWRs

Background



- IAEA Strengthened Safeguards System (1990's)
 - Expanded Declaration
 - Broader Access (Complementary Access)
 - Application of New technologies
 - Remote Monitoring, Environmental Sampling and Other Technologies
- IAEA Criteria (IIV for timely detection on LWR) can be achieved by the combination of
 - RM (C/S data)
 - Randomly selected interim inspection activities
 - ❖ IAEA SG Criteria Annex 12 (RM) in 2003

Responsibilities



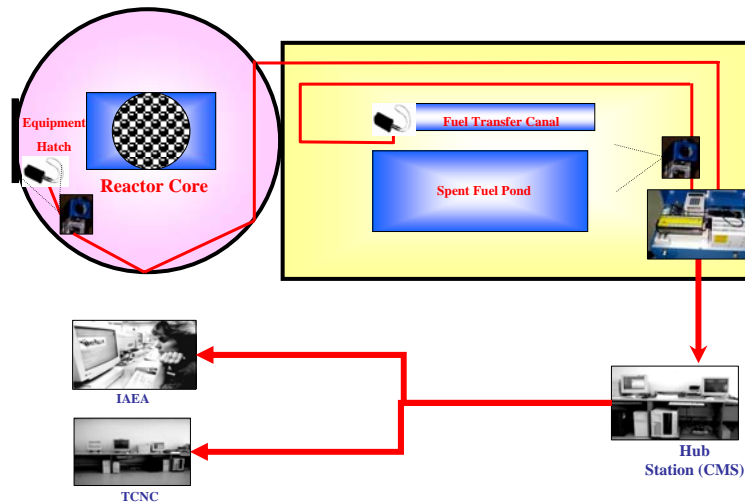
ROK

- Selection of equipment location (joint)
- Cable routing and design approval
- Conduit and splitter boxes
- UPS
- Installation of conduit and cables
- Space for IAEA CMS

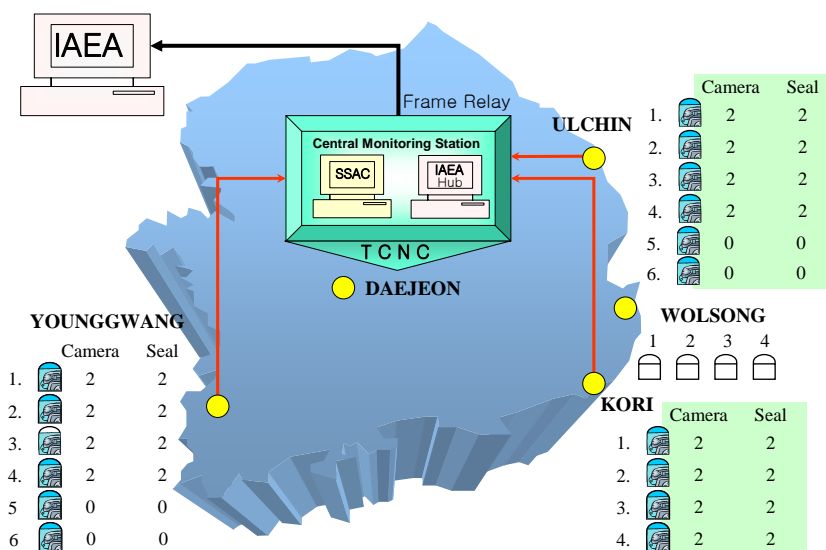
IAEA

- Equipment location (joint)
- SDIS server
- DCM-14 cameras and camera brackets
- VACOSS seals
- 5 or 7-wire cables
- Connection of cables to IAEA equipment
- CMS in Daejeon

System Installation



RM Network in Korea (1998-2004)



Experiences

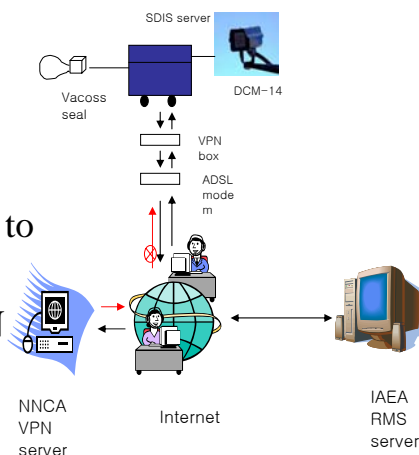


- **Remote Monitoring system**
 - PSTN (Public Switch Telephone Network) from the facility to the CMS
 - Frame relay of the surveillance data to Vienna
- **Experience on PSTN + Frame Relay**
 - PDI saving : 50 – 60 PDIs / yr (IAEA)
 - Telephone communication is secure
 - The line is relatively stable
 - However, it is costly
 - Site to Hub station (PSTN) : Apprx. \$ 50,000 / yr
 - Hub station to IAEA (Frame Relay) : Apprx. \$ 20,000 / yr
- **Internet is considered as a substitute for resource saving**
 - Internet is a public network, which means cheap but lack of data security
 - To resolve the security problem, VPN (Virtual Private Network) technology was used.

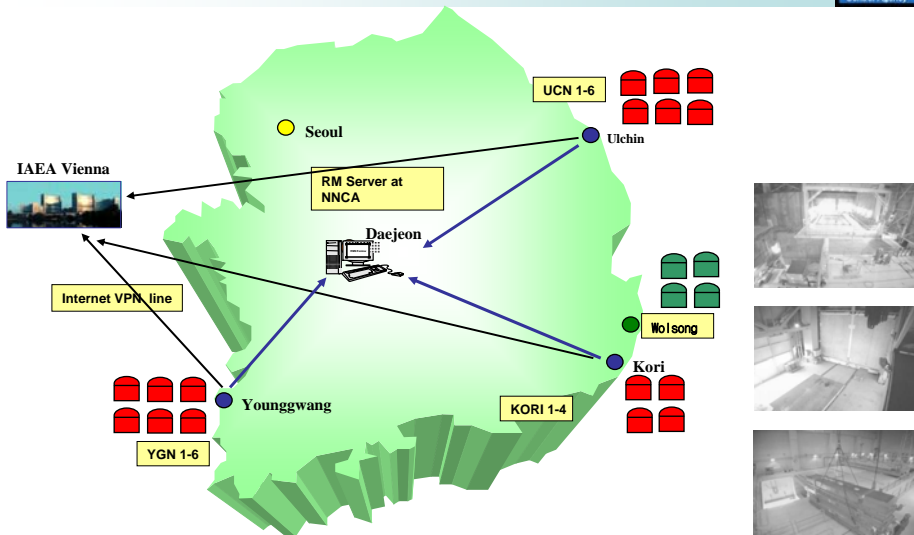
VPN Test



- **Phase 1 : Lab. Test and Penetration Test**
 - Internal Penetration test
 - External Penetration test
- **Phase 2 : application of VPN to a reference power plant**
- **Phase 3 : application of VPN on all LWRs**



RM Network in Korea (2003 -)



Cost Savings



	Phone Line (2003)	VPN (2004)
No. of Facilities	16	16
ROK share	\$48,000	\$18,332
IAEA share	\$19,788	

Broader Application of RM Experiences



- RMS on OLRs
 - Phase I : Installation of ADSLs and SOH data transmission of DMOS and VIFM
 - Phase II : Surveillance data transmission (DMOS and VIFM) by RM (Internet with VPN)
 - Phase III : Application of SG Criteria Annex 12(2003)
 - ❖ DMOS : Digital Multi-camera Optical Surveillance
 - ❖ VIFM : VXI Integrated Fuel Monitor
 - Data Sharing for regional Cooperation for transparency
 - INL (US), JAEA (Japan) and KAERI (ROK)
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