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The Status of IAEA Safeguards on Domestic Bulk-handling Facility

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Introduction

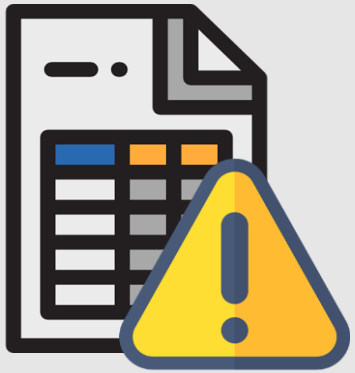
Based on INFCIRC/236

Safeguards Agreements

- Maintaining the records for data of nuclear material accountancy and control
- Reporting on inventory change of the material to IAEA

KEPCO Nuclear Fuel

- The only domestinc bulk-handling facility In Korea
- Manufacturing and supplying the fuel for domestic nuclear power plants (3 heavy water reactors, 21 light water reactors)



In KEPCO Nuclear Fuel

A mount of nuclear material : about 2 ton-U/day

- It is very difficult
  - To record and report the all inventory change
  - To track the history of nuclear material during a specific material balance period(MBP)

Currently, KEPCO NF

Mailbox System

- The concept of a daily 'transactions' for inventory changes in major storage of nuclear material
- Submits the daily report of mailbox system to KINAC/IAEA

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Mailbox system

- KEPCO NF operates a mailbox system with the concept of a daily inventory change report for SNRI(Short-Notice Random Inspection)
- Daily Declaration includes batch ID, a mount of nuclear material, MBA and weight of the nuclear material container, etc.. Transactions for nuclear material are indicated in the IAEA as Arrival, Birth, Death, Return, etc.

Abbreviation		Definition
A	Arrival	
B	Birth	Powder received or fuel assembly produced
D	Death	Powder went into process or fuel assembly is packed for shipment
R	Return	Powder returned from process or fuel assembly returned into process
S	Shipment	

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SNRI & PIV

	SNRI (Short Notice Random Inspection)	PIV (Physical Inventory Verification)
Subject	nuclear materials on **5 main storages**	**All nuclear materials** on facility
Period/Frequency	2 days, 4 times/year in average	6 days, 1 time/year
Date of Inspection	Notification 2 hours in advance	Shutdown period in the summer time
Activities of IAEA	Book examination, Item counting(100%) Verification based on NDA methods, and Sampling	Design Information Verification(DIV) and the same activities as SNRI.

IAEA uses CIOSP, IAEA's on-site software package,
To conduct book examination of accumulated data from the daily declaration(mailbox system) and a list of nuclear materials
To perform 100% of item counting of nuclear material in storage or all nuclear materials
To verify nuclear material based on NDA and sampling for precision analysis

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IAEA software for Inspection : CIOSP

Common Inspection On-site Software Package

The IAEA utilizes CIOSP when inspecting domestic bulk-handling facilities.
The IAEA conducts **a review of the consistency** of the accumulated mailbox declaration, general ledger, inventory change reports and physical inventory list submitted by facility.

❖ Features of CIOSP

- Being able to reflect the characteristics of various nuclear facilities.
- Having highly scalable software package with structure of individual plug-ins
- calculating the sample size and list of nuclear materials to be verified among the provided PILs

Function of CIOSP
facility configuration : MBA, Verification parameter, Stratification rule
Inventory verification : Verification listing and Verification details
Book examination of General Ledger
Comparison of records and reports
Editing the inspection data
Sampling size calculation
Sample Random Selection

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Development status of other institutions

European Atomic Energy Community (EURATOM)

- **ENMAS(EURATOM Nuclear Material Accountancy System)**
- **VARO(Validation of Accountancy Records of Operators)**

  VARO is a mobile version that supports the synchronization of on-site necessary data through data transmission to the headquarters and performs consistency check of accounting records, book examination and item selection for nuclear material verification. VARO is co-operation with the IAEA by exchanging inspection data, results through VPN channel.

Pacific Northwest National Laboratory(PNNL)

Pacific Northwest
NATIONAL LABORATORY

- **PIE-IS(Precision Information Environment for International Safeguards)**

  a mobile information platform, to provide information, data analysis, technical and logistics support related safeguards to IAEA inspection.

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The Status of Program for Safeguards Implements

As mentioned on the previous page,
many countries have attempted and developed their own programs to support inspection activities.

❖ In Korea,

KINAC has developed and used a program called KSIS, and conducts evaluation and examination of regulation of nuclear material accountancy and control in accordance with domestic laws.

However, There is **no independent program related to verification of nuclear material** like CIOSP. They borrows CIOSP and performs sample size calculations together with the IAEA during the IAEA inspections, and checks whether the IAEA is performing inspections properly.

In particular, if a field-type inspection program for complex domestic bulk-handling facilities is developed, it is believed that **the independence of IAEA inspections and the ability to inspect national inspections can be improved.**

This study will be considered development and research of program.

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Conclusions

- KEPCO Nuclear Fuel, a domestic bulk-handling facility, is regularly inspected by IAEA.
- The IAEA is conducting an inspection using **CIOSP, Common Inspection On-site Software Package**, for examination of inventory change reports and general ledger, and calculating the sample size and list of nuclear materials to be verified among the provided PILs.
- Many countries have attempted and developed their own programs to support inspection activities
- If the research is carried out the **development of on-site inspection support program for domestic bulk-handling faciliry, we will be able to improve the independence of IAEA inspections and the ability to inspect national inspections** because we don't have independent support program such as CIOSP.

Thank you for your attention