

URAM
2009
IAEA, Vienna

**Safeguards Obligations
related to
Uranium/Thorium Mining and Processing**

**Akos Petoe
Division of Concepts and Planning
Department of Safeguards**



IAEA
International Atomic Energy Agency

Overview - Objectives

Purpose:

- raise awareness of proliferation concerns
- promote co-operation between State & Agency

Overview

- obligations to provide information
- how the information is used

Proliferation Concerns

Background

- increased interest in nuclear energy
- increasing demand for uranium resources
- availability of technology to recover U/Th from various resources
 - conventional
 - **unconventional (by-product, phosphates, etc.)**

Nuclear weapons program:

- limited amounts of material required
- costs are not a crucial factor

The Basis of IAEA Safeguards

Treaty on the Non-Proliferation of Nuclear Weapons

for non-nuclear weapons States:

- prohibits use of nuclear energy for weapons and explosive devices
- obligates the State to conclude safeguards agreement

IAEA Statute

- mandates the IAEA to set up and operate the safeguards system

Safeguards Agreements

- [INFCIRC/153 – Model Comprehensive Safeguards Agreement](#)
- [INFCIRC/540 – Model Additional Protocol](#)
- based on the NPT and the IAEA Statute
- describe applicable safeguards procedures



The Objective of Safeguards

INFCIRC/153 Article 28

“...the objective of safeguards is the *timely detection of diversion* of significant quantities of nuclear material... [from peaceful use to nuclear weapons, explosive devices, unknown purposes] ... *and deterrence of such diversion by the risk of early detection*”.

GOV/2784 (IAEA BoG March 1995)

“... *the safeguards system* for implementing comprehensive safeguards agreements should be designed to provide for *verification by the Agency of the correctness and completeness of States' declarations*, so that there is *credible assurance of the non-diversion of nuclear material from declared activities and of the absence of undeclared nuclear activities*.”



What Does Safeguards Do?

Under the safeguards system, the Agency has the **right** and the **obligation** to

- verify the **correctness** of a State's declaration to provide assurance on the **non-diversion of declared** nuclear material;
and
- verify the **completeness** of a State's declarations to provide credible assurance on the **absence of undeclared** nuclear material and activities.

Nuclear Material and Mining

IAEA Statute Article XX

Nuclear material is

- *special fissionable material (^{239}Pu , ^{235}U , ^{233}U)*
- *source material*
 - *natural uranium, depleted uranium, thorium*
 - *in metal, alloy, chemical compound, concentrate*

INFCIRC/153 Article 112

*“The term **source material** shall not be interpreted as applying to **ore or ore residue.**”*

INFCIRC/153 Article 33

*“**Safeguards** under this Agreement shall not apply to material in **mining or ore processing activities.**”*



Procedures Applying to Nuclear Material

Safeguards procedures

- export/import reporting (including mining/milling products)
- detailed nuclear material accountancy
- physical (quantitative) verification

Accountancy and verification procedures **do not apply to**

- natural uranium and thorium in
 - nature
 - **mining, milling, ore processing**
 - final product: ore concentrate for non-nuclear purposes

Accountancy and verification procedures **do apply to**

- material in the next stage of the fuel cycle
 - feed to next stage: **ore concentrate** for nuclear purposes
 - conversion, enrichment, fuel fabrication

Provisions for Mining & Ore Processing

INFCIRC/153 Article 34(a)

When any material containing uranium or thorium which has not reached the stage of the nuclear fuel cycle described in paragraph (c) is directly or indirectly exported to a non-nuclear-weapon State, the [State] shall inform the Agency of its quantity, composition and destination, unless the material is exported for specifically non-nuclear purposes;

INFCIRC/153 Article 34(b)

When any material containing uranium or thorium which has not reached the stage of the nuclear fuel cycle described in paragraph (c) is imported, the [State] shall inform the Agency of its quantity and composition, unless the material is imported for specifically non-nuclear purposes

Provisions for Mining & Ore Processing

INFCIRC/153 Article 34(c)

When any nuclear material of a composition and purity suitable for fuel fabrication or for being isotopically enriched leaves the plant or the process stage in which it has been produced ... the nuclear material shall become subject to the other safeguards procedures specified in the Agreement;

Provisions for Mining & Ore Processing

INFCIRC/540 Article 2a(v)

Information specifying the location, operational status and the estimated annual production capacity of uranium mines and concentration plants and thorium concentration plants, and the current annual production of such mines and concentration plants for [State] as a whole...

INFCIRC/540 Article 2a(vi)

Information regarding source material...(i.e. ore concentrates)

a) The quantities, the chemical composition, the use or intended use... whether in nuclear or non-nuclear use, for each location in [State] (if more than 10 t of U or 20 t of Th)

Provisions for Mining & Ore Processing

INFCIRC/540 Article 2a(vi)

Information regarding *source material*...

b) The quantities, the chemical composition and the destination of each *export out of [State]... for specifically non-nuclear purposes*...

INFCIRC/540 Article 2a(vi)

Information regarding *source material*...

c) The quantities, the chemical composition current location and use or intended use of each *import into [State]... for specifically non-nuclear purposes*...

if more than 10 t of U or 20 t of Th

Summary of Reporting Obligations

Declaration of

- mining activities (INFCIRC/540)
- stocks of source material (INFCIRC/540)

Reporting of exports (imports) of U/Th bearing resources (conventional or unconventional; unprocessed or processed) for

- nuclear purposes (INFCIRC/153)
- non-nuclear purposes (INFCIRC/540)

Contents of Reports/Declarations

Information to be provided for each shipment

- quantity, composition
- origin/destination
- date of shipment/receipt

INFCIRC/153 + Small Quantities Protocol (SQP) Paragraph (2)

The information to be reported pursuant to paragraphs (a) and (b) of Article 33 of the Agreement may be consolidated and submitted in an annual report;



Nuclear Purpose - Non-nuclear Purpose

How can the exporting State judge if or ensure that the material is used for non-nuclear purpose in the receiving State?

- nuclear use is technologically not feasible
- receiving State does not have technology
- request assurance of receiving government

Exports reported to the Agency are followed-up in the receiving State

INFCIRC/153 – export/import for nuclear purpose

INFCIRC/540 – export/import for non-nuclear purpose

States with no AP in force may report voluntarily

How the Information is Used

Agency evaluates State nuclear activities

- inherent consistency of State reports/declarations
- consistency of State declared nuclear activities
- consistency of information
 - provided by State
 - derived by the Agency from open sources
 - received from other sources

Inconsistencies

- trigger follow-up actions
- might indicate undeclared activities
 - reported export not confirmed by receiver, or vice versa
 - receiving State does not have declared nuclear facility



Proliferation Concerns

Exports not declared by shipper States make it possible for receiver States **not to declare imports**

Undeclared imports make it possible to use material as feed to **undeclared activities**

If exports are declared, the Agency can follow-up in the receiving State and ensure that **safeguards are applied** as/if required

Summary

Safeguards **obligations** related to mining and ore processing are **limited** but the **information** to be provided is **important**

Efficient and effective control of mining and ore processing activities is

- in the interest of the State
- essential for the non-proliferation regime

Provision of the required information is indispensable for an effective and efficient Agency safeguards