

IMPLEMENTATION OF SAFEGUARDS SYSTEM AT IPEN-CNEN/SP

IPEN-DOC-

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Abstract

In order to adequate our Institute to the National and International Safeguards Agreements under effect in Brazil, it was implemented a Safeguards System of Accounting for and Control of nuclear material in which the physical inventory of all nuclear materials and the transformations involved are daily corrected for actual values.

Due the quantity of nuclear materials involved and the complexity of their control, it was necessary to develop an informatized system having specific documentation and accurate methodology of account for and control these nuclear materials.

1. Introduction

Every nuclear facility in operation must have a credible safeguards system as well an aim of accounting for and control of nuclear material, with a reasonable degree of accuracy. All material involved has to minimize the material loses and to avoid its diversion.

Since 1988 the Safeguards System at IPEN had attended the international agreements (INFICIRC 110 and 237) signed with the International Atomic Energy Agency. These agreements are concerned with the enriched nuclear material involved with the fuel fabricaton (MTR) for research reactors.

Since the end of 1988 up to now, it had begun the implementation of a Safeguards System following the directions of the Nuclear Federal Authorities (Brazilian Nuclear Energy Commission).

2. Safeguards System Informatization

Some of the IAEA procedures were adapted for a better implementation of the Safeguards System.

At the beginning it was made a initial inventory of all nuclear material that came into IPEN from 1968 to 1990 as shown in Fig 1, based on documentations, veryfing them and which areas were involved.

The next step was to define and classify the Accounting Areas as Areas I and II depending of the quantities of nuclear material stored and involved.

At this way IPEN was divided in Accounting Areas in order to control individually all of such nuclear materials in a easier way.

To attend the increase and the complexity of the Safeguards System due the agreements with Argentina and IAEA our system has been informatized. We are adapting all of the documents involved in these agreements.

The first informatized document was the "Physical Inventory List by Item (PIL)" shown in Fig 2. It describes all the Nuclear Material into the Accounting Areas. It represents our control of the nuclear materials since the initial inventory.

The next informatized document was the "Nuclear Material Transfer Authorization - NMTA" as shown in Fig 3.

It describes any transfer of nuclear material that could be realized into areas. In case of enriched uranium it must be declared the agreement number.

Following next document was the "Nuclear Material Transfer - NMT" as shown in Fig 4.

It describes when and where occurs any transfer of nuclear material in the Accounting Areas involved.

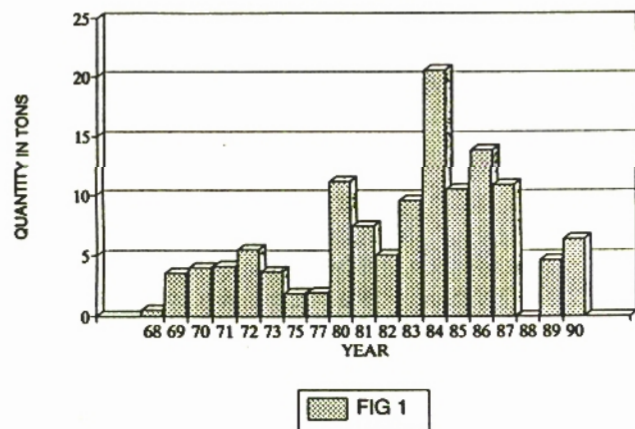
Finally, the "Material Balance Report - MBR" Fig 5 is a periodically (monthly, annually or bi-annually) report depending the quantity of material, enrichment and agreement. It describes all changes in the inventory occurred during that period.

3. Conclusion

The Safeguards System Implementation at IPEN resulted in a better control and enough to minimize the errors and possible deviations.

Also it contributed to a better nuclear handling and processing due to the new techniques for samples control, in the equipment calibration and in the personal training.

**NUCLEAR MATERIAL RECEIPT
1968 - 1990**



INSTITUTO DE PESQUISAS ENERGETICAS E NUCLEARES - IPEN
 COMISSAO NACIONAL DE ENERGIA NUCLEAR - CNEN/SP
 SERVIÇO DE SALVAGUARDAS - S S
 PHYSICAL INVENTORY LISTING (P I L)

ACCOUNTING AREA : MATERIAL : AGREEMENT : UNIT :

LIN	MATERIAL DESCRIPTION PHYSICAL AND CHEMICAL FORM.	TYPE	CAP	TAR	ID.	QUANTID. DE MATERIAL			
						COMP.	I	ELEM.	I R
1									
2									
3									
4									
5									
OBSERVATIONS :					SUBTOT.				
					TOTAL				

FIG 2 PHYSICAL INVENTORY LISTING BY ITEM - (P I L)

COMISSAO NACIONAL DE ENERGIA NUCLEAR SERVIÇO DE SALVAGUARDAS - S S NUCLEAR MATERIAL TRANSFER AUTHORIZATION (N M T A)						NMTA NUMBER: 		
FROM				TO				
FACILITY :				FACILITY :				
ACCOUNTING AREA :				ACCOUNTING AREA :				
						EXPECTED DATE / /		
						VALIDITY		
LINE	MATERIAL DESCRIPTION	QUANT. (ITENS)	UNIT WEIGHT	ENRICHME	COMPOUN	ELEMENT	ISOTOPE	AGREEME
1								
2								
3								
4								
5								
OBSERVATIONS								

FIG 3 NUCLEAR MATERIAL TRANSFER AUTHORIZATION - (N M T A)

COMISSAO NACIONAL DE ENERGIA NUCLEAR - C N E N / S P NUCLEAR MATERIAL TRANSFER - NMT NUMBER:										
ACCOUNTING AREA SENDER						EXPECTED DATA:				
ACCOUNTING AREA DESTINATION						RECEIPT DATA:				
LINE	MATERIAL DESCRIPTION		UNID.	NUM.	WEIGHT			AGREEMENT		COD. MAT. / ENRICHMENT
	CHEMICAL	PHISICAL			WEIGHT	ITEMS	COMPOUN	ELEMENT	ISOTOPE	
1										
2										
3										
4										
5										
OBSERVATIONS:						NAME / SIGNATURE SENDER : DESTINATION :				

FIG 4 NUCLEAR MATERIAL TRANSFER - (N M T)

COMISSAO NACIONAL DE ENERGIA NUCLEAR - C N E N / S P SERVIÇO DE SALVAGUARDAS MATERIAL BALANCE REPORT (M B R) NUMBER:						
AGREEMENT :			PERIOD :			
ORIGIN :			MATERIAL :			
ACCOUNTING AREA :			UNIT :			
INPUTS		NUMBER OF ITEMS	COMPOUND	ELEMENT	ISOTOPE	DOCUMENT
1	- INITIAL (BEGINNING) INVENTORY					
2	- IMPORT					
3	- DOMESTIC RECEIPT					
4	- TRANSFER FROM OTHER ACCOUNTING AREA					
5	- NUCLEAR PRODUCTION					
6	- VOID EXEMPTION					
7	- MIXTURE					
8	- EXPORT					
9	- DOMESTIC SHIPMENT					
10	- TRANSFER TO OTHER ACCOUNTING AREAS					
11	- NUCLEAR LOSS					
12	- PROCESSING LOSS					
13	- RECOVERABLE WASTE					
14	- EXEMPTION					
15	- TERMINATION					
16	- OTHER LOSSES					
17	- ROUNDING ADJUSTMENTS					
19	- DIFFERENCE SENDER - DESTINATION					
20	- MATERIAL UNACCOUNTED FOR					
OBSERVATIONS						
RESPONSIBLE IN ACCOUNTING AREA NAME:			RESPONSIBLE IN FACILITY NAME:			
ASS: _____			ASS: _____			

FIG. 5 MATERIAL BALANCE REPORT - (M B R)