

THE PROCEDURES OF ABACC FOR AUDITING RECORDS

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ABSTRACT

Early when the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) began operating, it started to establish its own inspection procedures, including the examination of records and their comparison with reports. The Nuclear Material Accounting Area of ABACC is responsible for the implementation of these procedures and also for the evaluation and follow-up of discrepancies. The methodology was developed taking into consideration that the majority of the inspectors do not work permanently for ABACC, but for nuclear organizations in Argentina or Brazil. The inspectors, (around thirty-five from each country) are convoked whenever necessary only for the inspection period (Brazilian inspectors carry out inspections in Argentina and Argentinean inspectors conduct inspections in Brazil). It was also considered that the staff of inspectors comprises persons with different background. This include safeguards experts who usually carry out inspections at a national level applying different auditing procedures, and experts in several areas of safeguard's (NDA, DA, operations and design of various types of facilities, etc.), having little experience in records auditing and accounting reports. Consequently, the procedures were defined to comply with the following requirements: a) to be applicable to records kept either in paper or in electronic form avoiding any action by the inspectors over the operators ledgers; b) to use working papers easy to complete and evaluate; c) to check the consistency between the accountancy database (from reports data) and the auditing database (from inspection data); d) to receive from the Operator/National Authority a declaration on the value of the Book Inventory as of the date of the inspection and, e) to be completely performed during the inspection in order to provide a preliminary summary of the results on books auditing to the Operator/National Authority at the end of the inspection and to limit to a minimum the need to consult the inspectors out of the inspection period. The procedure developed consists of three working papers named VR-A (summary form), VR-B (comparison form) and VR-C (updating form). A more detailed description of the method and the forms used are presented in the paper.

1. INTRODUCTION

In December 1991 the Agreement between Brazil and Argentina for the Exclusively Peaceful Uses of Nuclear Energy (The Bilateral Agreement) [1] entered into force. The agreement, inter alia, determines the control over all nuclear materials in all nuclear activities in both countries. To verify this commitment, the Common System of Accounting and Control of Nuclear Materials (SCCC) was established and the Brazilian-Argentine Agency for Accounting and Control of Nuclear Materials (ABACC) was created to administer and apply the SCCC [2].

The Quadripartite Agreement, signed among Argentina, Brazil, the International Atomic Energy Agency (IAEA) and ABACC, entered into force on 4 March 1994 [3].

The Secretariat of ABACC started its operations in July 1992 and immediately began to establish its inspection procedures including the auditing of records and its comparison with the reports. ABACC's Accounting Area is responsible for the implementation of these procedures, its evaluation and follow-up of discrepancies.

The inspections began in March 1993 and, as of June 1994, almost all inspections have been carried out jointly by ABACC and the IAEA [4,5].

Also it is important to point out that the majority of the inspectors (around thirty-five inspectors

from each country) does not work permanently for ABACC, but for nuclear organizations of Brazil or Argentina. They are convoked by ABACC whenever necessary only for the inspection period (Brazilian inspectors carry out inspections in Argentina and Argentinean inspectors conduct inspections in Brazil). The staff of inspectors includes:

- safeguards experts who usually carry out inspections at a national level, but apply different procedures,
- experts on several areas of safeguard's interest (NDA, DA, operation and design of various types of facilities, etc.), but with little experience in records auditing and accounting reports.

2. NUCLEAR MATERIAL ACCOUNTING

It is possible to define the nuclear material accounting as the set of activities and procedures carried out in order to establish the quantities of nuclear material present within defined Material Balance Areas (MBAs). The system is composed of three types of documents:

1. the book or ledger where the operator records all transaction that involve the transfer or changes in the amount of nuclear material present in the MBA,
2. the support or source documents (that include the operational records whenever necessary) that validate every entry in the ledger ,
3. the accounting reports that are sent to ABACC:
 - the Inventory Change Reports (ICRs)
 - the Material Balance Report (MBRs)
 - the Physical Inventory Listing (PILs)

The first two types are documents at the facilities level to which ABACC has access only during the inspections.

3. ABACC's RECORDS AUDITING

3.1 Objectives

The purpose of accounting inspection activities is to verify the correctness of the documents at the facility level and the consistency between the operator accounting records and

- source documents
- accounting reports

in order to assure the validity of the information utilized in the analysis of possible diversions of nuclear material.

3.2 Requirements

The auditing activities were established taking into account the special characteristics of the inspectorate and considering the experiences obtained by ABACC in their inspections before the Quadripartite Agreement entered into force. Consequently, the procedures were defined to comply with the following requirements:

1. to use working papers easy to complete and to evaluate and with self consistency error detection,
2. to be applicable to records kept either in paper or in electronic form avoiding any action by the inspectors over the operator's ledgers,
3. to check the consistency between the accountancy database (from reports data) and the auditing database (from inspection data) ,
4. to avoid unnecessary overlapping between inspection,
5. to receive from the operator/National Authority a declaration of the value of the Book Inventory,

6. to be completely performed during the inspection in order to provide a preliminary summary of the results on books auditing to the operator/National Authorities at the end of the inspection and to limit to a minimum the necessity of consulting the inspectors out of the inspection period.

3.3 Auditing Period

The auditing period was defined as the period comprised between the day following the day of the previous inspection (Date0) and the day of present inspection. This auditing period is divided in:

- the reporting period: the period for which the inventory changes were reported to ABACC,
- the updating period: the period for which the inventory changes have occurred but were not yet reported to ABACC.

This definition avoids the overlapping between periods, except if there is an entry correction corresponding to a previous auditing period in which case it is necessary to verify this entry.

3.4 Procedures

Taking into account the previous consideration, the procedures were established and three working papers were designed:

- **VR-A**: the summary form
- **VR-B**: the reporting form,
- **VR-C**: the updating form.

Figure 1, shows the Record Auditing Scheme adopted by ABACC specifying the relationship between the forms, the periods and the dates. The procedures are slightly different if it is an interim inspection or an inspection for Physical Inventory Verification (PIV). In the last case the VR-A form has two additional entries.

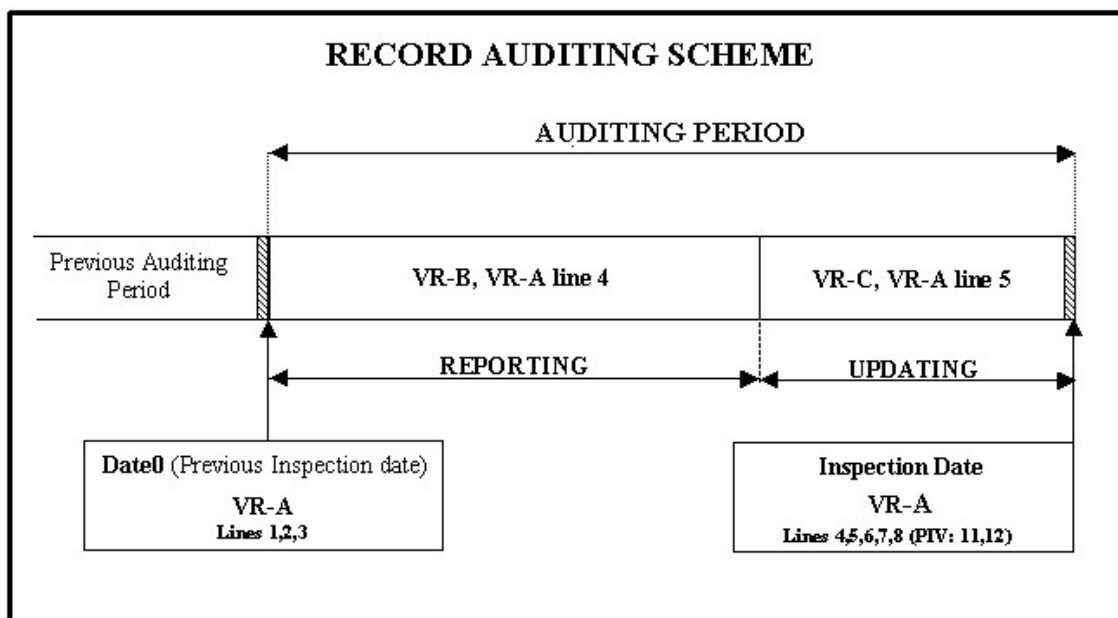


Figure 1

The procedure was implemented in Fox Pro for Windows. The software automatically generates the working papers and checks the consistency between the accountancy database and the auditing database.

4. AUDITING ACTIVITIES

The auditing activities performed during the inspection can be divided in 6 steps (See figure 2):

- step 1: Checking the correctness of the supporting and operational documents and its consistency with the ledgers data in the facility, and, if necessary, requesting the appropriate corrections to the books before beginning step 2,
- step 2: Verifying the closing of books of the last inspection, that means checking that the book inventory value verified on the date of the previous (Date0) inspection was not changed (VR-A form, lines 1,2 and 3),
- step 3: Making a comparison between the ICRs sent to ABACC and the accountancy data in the ledger of the operator after Date0 (VR-B form and VR-A form line 4),
- step 4: Updating the information with the accounting data that were not sent to ABACC, including corrections to entries in the book, having a date previous to Date0 (VR-C form and VR-A form line 5),
- Step 5:
 - calculating the value of closing book inventory on the date of inspection, based on data computed during the inspection (VR-A line 6), and comparing with the ledger value recorded by the operator (VR-line 7 and 8),
 - filling in the discrepancy table,
 - for physical inventory verification inspections, the lines 11 and 12 of VR-A must be completed with the values of BA (Book Adjusted), PE (Physical Ending) and the PIT date.
- Step 6: receiving the VR-A forms with operator/National Authority (NA) signature and give them a copy of this form. This step complies with the requirements 5 and 6.

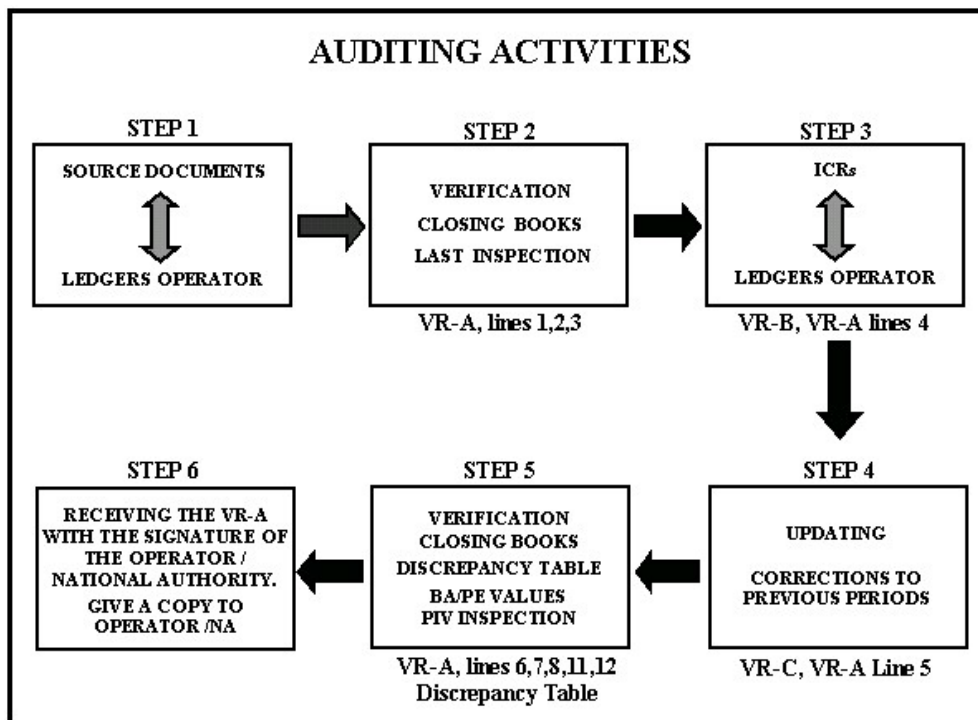


Figure 2

5. WORKING PAPERS

The working papers are generated automatically by the software with data retrieved from accounting and inspection databases. The inputs are the MBA code, the previous and the present inspection number (thus defining the auditing period), the type of inspection (interim or PIV) and the inspection date. This information is printed in all working papers and defines a unique set of parameters that characterizes the inspection. The letters X, Y, W and Z shown in the forms in bold and italic character, indicate data that are printed when the working paper is generated.

5.1 VR-A (SUMMARY) form

There is one VR-A form (See figure 3) for each element present in the MBA. The VR-A contains the preliminary summary of the results of the auditing (**validated** with the inspector signature) and the operator's declaration of the book value (**validated** with operator or National Authority representative signature).

VR-A FORM					
INSPECTION TO: ZZZZ					
TYPE: ZZZZZZZZ		FROM YY/YY/YY TO WW/WW/WW	NUMBER: ZZZ		
ELEMENT: X	L I N	WEIGHT ELEMENT	ISOTOPE		
BOOK INVENTORY VERIFIED ON YY/YY/YY	1	ZZZZ.ZZ ZZ	ZZ.ZZ G		
BOOK INVENTORY ON YY/YY/YY	2				
DIFFERENCE (1-2) [MUST BE EQUAL TO ZERO]	3				
TOTAL INVENTORY CHANGES VERIFIED (B.X)	4				
TOTAL INVENTORY CHANGES NOT REPORTED (C.X)	5				
BOOK INVENTORY CALCULATED (2+4+5)	6				
BOOK INVENTORY ON WW/WW/WW	7				
DIFFERENCE (6-7) [MUST BE EQUAL TO ZERO]	8				
ABACC BOOK INVENTORY ON YY/YY/YY	9	ZZZZ.ZZ ZZ	ZZ.ZZ G		
DIFFERENCE ABACC/BOOK ON YY/YY/YY (1-9)	10	ZZZZ.ZZ ZZ	ZZ.ZZ G		
BOOK ADJUSTED (BA)	11				
PHYSICAL ENDING (PE) [/ /]	12				
TOTAL DISCREPANCIES FOR ELEMENT: X VR-B and VR-C FORMS					
	1	2	3	4	5
N					
M					
N : Does Not Modify Inventory Values M : Modify Inventory Values 1 : Rounding 2 : Corrections 3 : Reports Not Delayed 4 : Reports Delayed 5 : Not Resolved					
INSPECTORS SIGNATURE			OPERATOR/NA SIGNATURE		
Observation: By signing the receipt of this form, the operators/NA agrees solely with values of lines 2 and 7.					

Figure 3

The value of the book inventory, verified in the previous inspection on Date0 and validated by the operator/AN representative is printed in line 1; line 2 must be completed with the book values on Date0 as verified in the present inspection and line 3 is the difference between these two lines. Line 3 must be equal to zero to assure the continuity in the values of the ledgers (Step 2).

The value of the book inventory on Data0, obtained from the accountancy reports, is printed in line 9 and the difference between lines 1 and 9 (consistency between the accountancy and the auditing database) is printed in line 10. When line 10 is not equal to zero, the inspectors receive particular instructions concerning the reason for this difference. As an example, this line would be different from zero if a correction to an entry having a date previous to Date0 have been reported after the last inspection. In this case, the inspector is instructed to verify the correction in the ledger and confirm the difference.

Line 4 and 5 represent, respectively, the total flow of the element X for the reporting and updating periods that were verified during the inspection. These values are obtained from VR-B and VR-C.

The value of line 6 is the sum of lines 2, 4 and 5 and represents the closing book inventory based on the inspection data. Line 7 must be completed with the ledger value recorded by the operator on the inspection date and line 8 is the difference between these two lines. Line 8 must be equal to zero to assure that there is neither error in the values verified by the inspector nor in the ledger values of the facility (self consistency error detection).

For PIV inspections, two additional lines (11 and 12) are printed, and must be completed with the PIT date and the values of BA and PE.

The discrepancy table is a summary of the discrepancies (defined as any difference between the accountancy value recorded by ABACC and the facility records) obtained from VR-B and VR-C. The inspector shall complete the table with the total number of discrepancies for the same code detected during the inspection for the element X. Discrepancies codes are described in table 1.

DISCREPANCIES CODES																					
It is mandatory to the inspector to fill in the corresponding field. Two characters form the code:																					
FIRST CHARACTER	SECOND CHARACTER																				
A letter that indicates if the discrepancy modifies or not the inventory value	A number that indicates the type of the discrepancy																				
<table border="1"> <thead> <tr> <th>CODE</th> <th>TYPE</th> </tr> </thead> <tbody> <tr> <td>M</td> <td>Modifies the inventories values</td> </tr> <tr> <td>N</td> <td>Not modifies the inventories values</td> </tr> </tbody> </table>	CODE	TYPE	M	Modifies the inventories values	N	Not modifies the inventories values	<table border="1"> <thead> <tr> <th>CODE</th> <th>TYPE</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Without discrepancy</td> </tr> <tr> <td>1</td> <td>Rounding</td> </tr> <tr> <td>2</td> <td>Correction</td> </tr> <tr> <td>3</td> <td>Report not Delayed</td> </tr> <tr> <td>4</td> <td>Report Delayed</td> </tr> <tr> <td>5</td> <td>Not Resolved</td> </tr> </tbody> </table>	CODE	TYPE	0	Without discrepancy	1	Rounding	2	Correction	3	Report not Delayed	4	Report Delayed	5	Not Resolved
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5	Not Resolved																				

Table 1

After completed and signed, a copy of the form is handed to the operator/NA representative and the original is kept with ABACC inspector.

5.2 VR-B (REPORTING) form

This form is used to compare the ICRs with the values in the operator's ledger (Step 3). The form is practically an image of the ICRs (see figure 4). Every valid inventory change reported having a date later than Date0 is printed in one line that is followed by a blank line. The line is identical to the

reported one except for the sign of the weight of element and isotope. Inventory changes that causes increases or decreases in the inventory of the MBA are considered respectively as positive or negative. If any discrepancy is found, the correct value must be filled in the field immediately bellow. Only the fields that have discrepancies must be completed although it is mandatory to complete the discrepancy code.

The inventory changes are sorted by date and grouped by element category. At the end of the list for each category, there is a table in which the total flow of element X (as reported to ABACC) is printed in the first line 1. In the second line of this table, the inspector must enter the value of the flow, taking into account all the discrepancies found and the line 3 is the difference between these two lines. Line 2 must be transcribed to line 4 of the VR-A form concerning that element.

VR-B FORM

INSPECTION TO: **ZZZZ** NUMBER: **ZZZ** FROM **YY/YY/YY** TO **WW/WW/WW**

RE PORT Nro	EN TRY Nro	C O N T	DATE OF INVENTORY CHANGE	MBA		IN VEN TO RY K M P	NAME OR NUMBER OF BATCH	NUM BER ITEMS IN BATCH	MATE RIAL DES CRIP TION	ACCOUNTANCY DATA		I S O T	M B C	CORRECTION TO		DISCRE PANCY CODE	
				FROM	TO					WEIGHT OF ELEMENT Kg	WEIGHT OF FISSILE ISOTOPE			REPORT Nro.	EN TRY Nro		
ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZZZZZ.ZZ	Z	ZZZZZ.ZZ	Z	Z	ZZZZ	ZZ
ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZZZZZ.ZZ	Z	ZZZZZ.ZZ	Z	Z	ZZZZ	ZZ
ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZZZZZ.ZZ	Z	ZZZZZ.ZZ	Z	Z	ZZZZ	ZZ
ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZZZZZ.ZZ	Z	ZZZZZ.ZZ	Z	Z	ZZZZ	ZZ
ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZZZZZ.ZZ	Z	ZZZZZ.ZZ	Z	Z	ZZZZ	ZZ
ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZZZZZ.ZZ	Z	ZZZZZ.ZZ	Z	Z	ZZZZ	ZZ
ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZZZZZ.ZZ	Z	ZZZZZ.ZZ	Z	Z	ZZZZ	ZZ
ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZ	Z	ZZZZZZZZ	ZZZZ	ZZZZ	ZZZZZZ.ZZ	Z	ZZZZZ.ZZ	Z	Z	ZZZZ	ZZ

TOTAL INVENTORIES CHANGES REPORTED	ZZZZZZ.ZZ	Z	ZZZZZ.ZZ	1	REF
TOTAL INVENTORIES CHANGES VERIFIED		Z		2	B.A [†]
DIFFERENCH(1-2)				3	

† This line must be transcribed to VR-A (line 4) for element X

Discrepancies Codes: N: Does Not Modify Inventory Values M: Modify Inventory Values
1: Rounding 2: Corrections 5: Not Resolved

Figure 4

5.3 VR-C (UPDATING) form

This form is used, essentially, to update the accounting data that was not sent to ABACC. As the VR-B, the form is practically an image of the ICR but only with blank lines (see figure 5). When there is an inventory change that was not reported to ABACC (including the Material Unaccounted For in PIV inspections) one line must be completed with its discrepancy code, normally M3/M4 for this form. Additionally, any correction to entries having a date previous to Date0, must be indicated in this form by means of 2 lines, the first referring to the entry to be corrected but with the opposite sign in the weights (to annulling that line) and the second one with the correct values.

A table with 6 lines (one for each element category) is included VR-C. In these lines the algebraic sum of the inventory changes for each element category recorded in this form must be fill out. These

Authority in the beginning of each month together with the timeliness of the reports sent to ABACC in the previous month. ABACC accounting sector is responsible for maintaining the list permanently updated with the information from the accounting reports and auditing activities. A pending action is removed from the list only when it is resolved. The list is available in the ABACC Intranet for consultation of the other technical areas of ABACC.

The numbers obtained for the year 2000 can be used to show the amount of information involved in the auditing and follow-up activities. In that year 74 interim and 56 PIV inspections were performed, generating 981 updating pending actions (863 from VR-C and 128 from VR-A) and 64 correction pending actions.

7. CONCLUSION

The procedure developed has shown to be highly satisfactory to fulfill the objective of ABACC as far as record auditing is concerned.

Furthermore, it is important to point out:

- the completion of the forms entails the resolution of all the discrepancies that can be solved in the field during the inspection,
- giving a copy of VR-A to the operator/NA has shown to be useful since this speed up the resolution of pending discrepancies,
- line 8 of VR-A has been useful to detect mistakes in the VR-B and VR-C forms during the inspection and, in some cases, to detect errors in the book of the operator.,
- The preparation each month of the list of accounting pending action has shown to be an effective method to make the follow up of the discrepancies.

Additionally, its also important to remark, that since 1996 the National Authority of Argentina began to use the ABACC's auditing procedures in their national inspection.

ACKNOWLEDGMENTS

I would like to thank L. Palhares, and A. Raffo for their comments and suggestions that have undoubtedly contributed to enrich the content of this paper.

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