



INTERNATIONAL TRAINING COURSE ON IMPLEMENTATION  
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SESSION 24: PROCEDURE FOR TAKING PHYSICAL INVENTORIES

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I. INTRODUCTION

Physical inventories are taken periodically to meet Company, State and IAEA requirements. Those physical inventories may be verified by IAEA and/or State inspectors. This presentation describes in an introductory but detailed manner the approaches and procedures used in planning, preparing, conducting, reconciling and reporting physical inventories for the Model Plant.

Physical inventories are taken for plant accounting purposes to provide an accurate basis for starting and closing the plant material balance. Physical inventories are also taken for safeguards purposes to provide positive assurance that the nuclear materials of concern are indeed present and accounted for.

II. GENERAL

The plant inventory is taken over a two-three day period by inventory teams. The inventory is taken by material control area (MBA or ICA) with one or more teams assigned to a material control area. The inventory teams are two-person teams. One person on each team is from the custodial organization (e.g., Operations or Shipping & Receiving) and one from an independent organization.

Physical inventory taking is a major undertaking in terms of manpower and lost production costs. It is important that it is carefully planned and that preparations are made well in advance.

At the Model Plant, a detailed action plan is followed for each inventory. This plan is in the form of a checklist which is arranged in the chronological order in which the tasks are to be completed. As each task is completed, the date of completion is noted on the checklist and the name of the person carrying out the task is also noted on the list by the person's signature.

Because of the number of tasks and organizational components involved in taking a physical inventory, overall responsibility for inventory taking is assigned to an inventory coordinator. It is the responsibility of the coordinator to oversee all preparations, provide necessary training to the inventory teams, and lead the effort of inventory taking, reconciliation, and assembling the results into a reportable form.

The overall inventory program is illustrated in Table I, and a detailed description follows.

TABLE I  
NUCLEAR MATERIALS PHYSICAL INVENTORY PROGRAM

RULES AND REGULATIONS

FEDERAL REGULATIONS (IAEA)  
LICENSING REQUIREMENTS  
COMPANY REQUIREMENTS

RESPONSIBILITY

INVENTORY COORDINATOR  
MATERIAL CUSTODIANS  
INVENTORY TEAMS

PLANNING

PRE-INVENTORY REVIEW MATERIAL LOCATIONS  
TIME SCHEDULE  
MANPOWER ASSIGNMENTS (TWO MAN TEAMS)  
WRITTEN INVENTORY PROCEDURES  
INVENTORY LISTINGS, SHEETS AND TAGS  
DETAILED CHECKLISTS  
TRAINING

PHYSICAL INVENTORY PROCESS

RECORDING AND VERIFYING DATA  
SEAL INTEGRITY  
OBSERVING ACTIVITIES  
PROBLEM SOLVING

RECONCILIATION

ACCOUNTABILITY PHYSICAL INVENTORY STICKERS  
AUDITING INVENTORY DATA  
MAKING APPROPRIATE CORRECTIONS  
FINALIZING INVENTORY RESULTS

REPORTS

NRC (IAEA)  
MANAGEMENT

### III. PHYSICAL INVENTORY PROGRAM

#### A. Planning and Preparation

1. Selection of an Inventory Coordinator. The inventory coordinator should be designated several months before the time of the inventory.

2. Schedule. The physical inventories for the Model Plant are taken near the end of March and near the end of September. The inventories are scheduled just before a normal production break, e.g., a weekend, to minimize material movement for the reconciliation process.

3. Announcement of Inventory Date. When the exact date of the inventory has been determined, the inventory coordinator formally announces the date to all affected organizational components. The announcement specifies any State and/or IAEA requirements that must be met (e.g., two person inventory teams or sealing requirements, etc.). Additionally, internal procedures for equipment cleanout, measurements, sealing procedures, and general inventory counting instructions are given.

#### 4. Preparation of Inventory Taking Material

a. Inventory Packages. Prior to the inventory, the inventory coordinator prepares a package for each inventory team to use in taking the inventory. The packages for teams doing the inventory of an MBA contain a set of inventory stickers and a set of physical inventory sheets. The packages for teams doing ICA's contain inventory stickers, a current computer listing of the ICA holdings, and an ICA Physical Inventory Write-In Form.

b. Inventory Stickers. In taking the inventory each inventory item (container, bin, stack) is physically tagged with an adhesive sticker which is uniquely numbered in a sequential order. For the Model Plant, an inventory is typically composed of between 20,000 and 25,000 items so the series of 0 through 25,000 is used in numbering the tags, allowing for some overage. In addition to the unique numbering, the stickers (also referred to as inventory tags) are color coded. One color is used for an inventory, the color is then changed for the succeeding inventory. For example, if a monthly physical inventory frequency is used, then yellow could be used in January, blue in February, orange in March, green in April, etc. This color coding provides traceability from one inventory to the next and helps avoid confusion when trying to determine if all containers have been inventoried at the time of counting.

The approximate number of items expected to be present in each control area is estimated before the inventory so that the proper sequence of inventory sticker numbers can be assigned to each area.

c. Physical Inventory Record Sheets. The packages for teams inventorying MBA's are supplied with a set of Physical Inventory Record Sheets (shown in Table II). The inventory sheets are prenumbered to correspond to the inventory sticker numbers assigned to that MBA. Thus, for each inventory sticker number in the inventory package there is a correspondingly numbered line on the inventory sheet.

d. ICA Physical Inventory Write-In Sheet. The inventory packages for teams inventorying ICA's are supplied with a set of ICA Physical Inventory Write-In Sheets (shown in Table III). These are not numbered and are used to record any containers which are not listed on the latest computer list of items in the ICA.

e. ICA Inventory Tag Reconciliation Form. Also placed into the ICA packages is one ICA Inventory Tag Reconciliation form. This form is completed at the time of inventory by the inventory team members and is used to reconcile the number of tags used to the number of container inventoried on the day of the count. The form is shown in Table IV.

5. Waste and Scrap Container Preparations. At the Model Plant, contaminated HEPA filters and barrels (drums) of solid waste are accumulated and stored in designated areas after they have been measured for uranium content and sealed. These containers have been entered into the accounting system as items for material accounting purposes. Because of the large number of these items, a subsystem of the primary accounting system has been developed which lists the filters and barrels in the row and sequential order in which they are stored. The row lists help to expedite the inventory of these items. It is necessary to update the sequential row lists by entering adjustments into the computer for additions to the inventory or possible shipments or rearrangements of the containers. The changes made to row lists are verified by pre-inventory checks of the area prior to the formal inventory.

The lists are separated by row and placed in marked packages together with the exact number of inventory stickers needed, an ICA Inventory Tag Reconciliation form, and ICA Physical Inventory Write-In Sheets. One miscellaneous package is prepared with tags and sheets to be used to inventory those containers not yet appearing on row lists but already entered into the accounting records. The computer listing for these recently added items will be printed and inserted into the package when the final computer lists of the ICA's are printed.

6. Fuel Rod Preparations. At the Model Plant, fuel rods are inventoried by location and in groups rather than as unique items. There are a number of storage locations for rods in fixed arrays with assigned compartment identifications. There are also designated in-process storage locations. The I02 Rod Inventory

TABLE II

**I** **PHYSICAL INVENTORY RECORD** **EXXON NUCLEAR COMPANY, Inc.** **NUCLEAR MATERIAL TRANSACTION**

INVENTORY TAG NO.	CONTAINER NO.	SEAL NO.	M T	NOMINAL ENRICHMT	PROJ. NO.	MATL. COMP.	GROSS WT.	TARE WT.	URANIUM FACTOR	LOT NO.
1							.	.		
2							.	.		
3							.	.		
4							.	.		
5							.	.		
6							.	.		
7							.	.		
8							.	.		
9							.	.		
10							.	.		
11							.	.		
12							.	.		
13							.	.		
14							.	.		
15							.	.		
16							.	.		
17							.	.		
18							.	.		
19							.	.		
20							.	.		
DATE (mo/ds/yr)	LOCATION	INVENTORIED BY				VERIFIED BY				

24-5

TABLE III

ICA PHYSICAL INVENTORY WRITE-IN SHEET

CONTAINER NO.	SEAL NO.	TAG NO.	PROD. NO.	NOMINAL ENRICHMENT	PAYL. COMP.	GROSS WT.	TARE WT.	NET COUNT	REPORT NO.	DATE
1										1
2										2
3										3
4										4
5										5
6										6
7										7
8										8
9										9
10										10
11										11
12										12
13										13
14										14
15										15
16										16
17										17
18										18
19										19
20										20
DATE (mo/da/yr)		ICA CODE	INVENTORIED BY				VERIFIED BY			

TABLE IV

ICA \_\_\_\_\_ INVENTORY TAG RECONCILIATION  
\_\_\_\_\_ PHYSICAL INVENTORY

NUMBERS OF CONTAINERS

- 1. Listed on computer printout (PHIL) \_\_\_\_\_
- 2. Listed on Write-in sheet \_\_\_\_\_
- 3. Subtotal \_\_\_\_\_
- 4. Deduct containers listed but not tagged ( \_\_\_\_\_ )
- 5. Total Containers \_\_\_\_\_

INVENTORY TAGS

- 6. Numbers assigned (from \_\_\_\_\_ thru \_\_\_\_\_) \_\_\_\_\_
- 7. Deduct numbers not used (from \_\_\_\_\_ thru \_\_\_\_\_) ( \_\_\_\_\_ )
- 8. Deduct voided tags (#'s \_\_\_\_\_, \_\_\_\_\_, \_\_\_\_\_) ( \_\_\_\_\_ )
- 9. Net tags assigned \_\_\_\_\_
- 10. Variance (Line 5 minus Line 9) \_\_\_\_\_

ANALYSIS OF VARIANCE

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Prepared By \_\_\_\_\_ Date \_\_\_\_\_

Physical Count Sheet is used to record the rod inventory (Table V). In preparing for the inventory, the rod inventory count sheets are numbered to coincide with the appropriate sticker assignments for the rod inventory and where possible the bin number or storage location identification is pre-inserted on the form. The count sheets, stickers and tag reconciliation form are included in the inventory package. The I02 Rod Inventory Physical Count Sheet is shown in Table V.

7. Inventory Tag Control Log. As sticker assignments are made to the various MBA's and ICA's, the sequence of numbered tags designated for use is listed on the Inventory Tag Control Log (shown in Table VI). This log serves as the master control for reconciling tag use in the inventory.

8. Cleanouts, Measurements, and Tamper-Safing. Progress of the pre-inventory cleanouts, MBA container weight and enrichment verifications and tamper-safing of containers is monitored as the inventory date approaches. Additionally, sampling with analytical determination of uranium element and isotope content is required for all items which were not previously measured.

For the Model Plant, a full cleanout of process equipment, vessels, plenums, and ductwork is required to achieve a "completely measured" material balance. Material removed during the cleanout is placed in containers and sampled, weighed, and sealed. Also, any filters removed during the cleanout and any solid waste drums resulting from cleanout must also be measured to be included in the inventory.

Many of the items present at inventory time were measured at the time they were created. Those which could be sealed at time of measurement were sealed so that they could be included in the inventory at the previously measured values. The contents of the items which could not be sealed at the time of the original measurement, such as pellets in open sintering boats, are verified at time of inventory by remeasurement of one or more properties to be included in the inventory. Similarly, items with broken seals must be verified by remeasurement. Also, in preparing areas for the inventory, previously measured items which were not tamper-safed are verified by remeasurement and either tamper-safed or placed in tamper-safed containers. Pellets on trays are verified by reweighing and placed in sealed bins prior to the inventory. Fuel rods are item identified, counted and placed in sealed storage bins. These activities facilitate the efficiency and safeguards effectiveness of inventory taking.

9. Personnel Assignments and Training. Personnel assignments are made by the inventory coordinator from lists of available personnel provided by management. An inventory team is made up of two people. One normally from the custodial organization and one from a separate (independent) organization.

TABLE V

I-02 ROD INVENTORY  
PHYSICAL COUNT SHEET

	Tag No.	Bin No.	Seal No.	Type	No.								
1													
2													
3													
4													
5													
6													
7													
8													
9													
10													
11													
12													
13													
14													
15													
16													
17													
18													
19													
20													

INVENTORIED BY: \_\_\_\_\_ DATE \_\_\_\_\_

VERIFIED BY: \_\_\_\_\_ DATE \_\_\_\_\_

TABLE VI

AREA	MCA	CAPA- CITY	ASSIGNMENT TAG SEQUENCE			TOTAL	ACCOUNTED TAGS			TOTAL	TAG COLOR	VARIANCE FROM ASSIGNMENT	COMMENT	TO AUDITORS
			FROM	TO	ADDS		USED	RETURNED	VOID					
Conversion Scrap Recovery														
Pellet Preparation		M01												
Ceramic Operations		M02												
Rod Loading		M03												
Analytical Labs		M04												
Shipping/Receiving		I01												
Rod/Bunble Assembly		I02												
Powder Storage Room		I3A												
Radioactive Warehouse & Trailers		I3B-B												
Solid Waste Storage		I3K												
Tag Reconciliation														

It is desirable for at least one team member to be familiar with the assigned inventory area, including the materials, container types, measurements, and container locations.

The second member of the inventory team is not from the custodial group and it is his function to provide independence in the inventory. Accounting personnel have worked well in this role because of their recording accuracy and organizational independence.

After the inventory teams have been determined, the team members are notified of their assignments by letter. The letter identifies the schedule for conducting the inventory by inventory location and the date and time of the start of each inventory. Included in the notification letter are instructions to attend a pre-inventory meeting and the detailed procedures to be followed in taking the inventory.

Personnel not previously experienced in taking inventory may be given training in advance to familiarize them with recording procedures, assigned location of responsibility, as well as safety or radiation work procedures.

More than one team may be assigned to an inventory area to expedite its completion. In this case, a lead team is designated to assume responsibility for the area and supervision of other area teams. The lead team is responsible for the thorough taking of the inventory and for the collection of the inventory materials and completed inventory sheets.

10. Notification of Inventory Schedule to Computer Services. Computer Operations and keypunch personnel are notified by letter of the final inventory schedule and are given estimated work loads and required processing schedules as far in advance as possible so that they may plan personnel coverage. To handle the data processing workload, evening and weekend operations are scheduled for data processing personnel.

11. Final Computer Updates and Inventory List Preparations. Accounting collects all completed transaction, bundle assembly, and shipment/receipt documents late on the day before the physical inventory from the material custodians. These documents are processed into the accountability system to update the ICA computer lists in the Material Inventory Maintenance System (MIMS). ICA inventory listings are then printed from the PHIL program. The lists are separated by ICA and inserted into the inventory packages, along with the inventory stickers, write-in and tag reconciliation forms.

The part of the waste barrel and filter inventory computer report (WBILE) which shows the miscellaneous barrels and filters which are not in a row sequence is separated from a current (WBILE) report and placed in the inventory package.

The various computer programs used in conjunction with the taking, reconciling and booking of the inventory are shown in Table VII.

#### B. Taking the Physical Inventory

1. General. The Model Plant typically conducts the physical inventory by material control area (MCA) during a 2-3 day period. The order of inventorying MCA's is staggered to maximize the efficiency of the inventory and minimize the production outage. Frequently, the first day inventory includes some outside storage locations such as the waste barrels and filters, shipping and receiving, and some scrap storage locations. The UF<sub>6</sub> to UO<sub>2</sub> conversion area may also be inventoried on the first day, provided cleanout and inventory preparations have been completed. The remainder of the plant including the pelletizing, rod loading and storage areas are inventoried the second day to complete the inventory.

Inventory hold periods for material movements are strictly enforced once the inventory begins in a material control area. Movements of material may continue in and between areas which are to be inventoried on the second day so long as they do not interfere with the inventory and, of course, must be properly recorded.

After the inventorying of a material control area is completed to the satisfaction of the coordinator, it is released to a semi-hold status which allows limited internal material movements within the area but not between areas. These movements are minimized to aid in reconciliation.

#### 2. Pre-Inventory/Final Instruction Meeting to Inventory Teams.

Inventory team members are assembled just prior to the start of the physical inventory. A check is made to assure all members are present and replacements are assigned if necessary.

The coordinator distributes the inventory packages to the assigned teams and explains their contents. Instructions are given emphasizing the importance of achieving a thorough and accurate inventory and the need to use a methodical and systematic approach. Requirements for verifying and sealing untamper-safed items are also reviewed.

Area closeout procedures are also explained, including the need to 1) do a post inventory search for untagged containers, and 2) consolidate multiple inventory listings if more than one team is used in the area.

3. MBA Physical Inventory Procedure. Following the instructions to systematically inventory the area, a team may first walk through the area and plan the inventory approach or divide the area into subareas if more than one team is to be used.

To record the inventory, one member of the team becomes the reader (normally the operations member who is familiar with the

TABLE VII  
COMPUTER PROGRAMS AND REPORTS USED  
FOR PHYSICAL INVENTORY

<u>PROGRAM/ REPORT</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>DATA BASE</u>
MIMS	Material Inventory Maintenance System	Primary material inventory maintenance system. Keeps element and isotope MBA material balances by area, by material type, project, and nominal enrichment accounts. Shows ICA inventories of individual containers with element and isotope quantities in project/enrichment sequence for each ICA. Lists daily transactions which update MBA totals and ICA listings.	Recorded material transfer documents and FACT.
PHIL	ICA Physical Inventory List	List of all items by ICA in a format conducive to verifying the ICA physical inventory. The items on the lists are sorted by container number.	MIMS
MPIS	MBA Physical Inventory List	MBA detailed summary and listings of items and quantities recorded by MBA physical inventory.	Recorded MBA Physical inventory record data and FACT.
INSUM	Inventory Summary	Consolidated summary of ending inventory (MBA and ICA) in quantities of element and isotope by material type, project, enrichment, and material composition.	MIMS and MPIS

TABLE VII  
(continued)

<u>PROGRAM/ REPORT</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>DATA BASE</u>
EIS	Ending Inventory Summary	Detailed summary and item listing of ending inventory in quantities of element and isotope by material type, composition, project and enrichment.	MIMS and MPIS
RODIN	ICA-2 Rod Inventory	Comparison of fuel rod book inventory to physical inventory by rod identification prefix.	I02 rod inventory physical count sheets and MIMS.
FACT	Element and Isotope Factor Table	Table of specific element and isotope factors by project.	Measurement data.
WEIT	Duplicate Container List	Lists containers with duplicate identifications listed on ending inventory records.	MIMS and MPIS
MBMUF	MBA MUF Calculation	Compares MBA book inventory to physical inventory and show the difference by MBA, project and enrichment.	MIMS-MBA book quantities and MPIS
TRAP	Transaction File List	Complete listing of all transactions effecting the NICS material balances and inventory listings. Includes shipments, receipts, project/enrichment changes, and MUF's. Sorts by MCA, project, enrichment, material type, and container ID. The material balance period produces several of these files.	Recorded material transfer documents

TABLE VII  
(continued)

<u>PROGRAM/ REPORT</u>	<u>TITLE</u>	<u>DESCRIPTION</u>	<u>DATA BASE</u>
SCRAP	Scrap Container Inventory Report	Summarizes scrap items by material composition.	MIMS and MPIS
WFILE	Waste Barrel/Filter Inventory Listing	Row sequence listings of waste barrels and HEPA filters. Also shows miscellaneous barrels and filters not in rows.	MIMS

area) and the other (independent or accounting staff member) becomes the recorder. The reader takes the inventory stickers provided, locates the first container to be inventoried and reads aloud to the recorder all the information on the container and on the material record card (attached to or by the container). The second team member records the data, including the container number, seal number, material type, nominal enrichment, project number, material composition, and gross and tare weights. The team will not know the uranium factor but should list the lot number when available. As the reader reports the seal number, he should check its integrity being careful not to break a paper seal. Lastly, the reader reports the adhesive inventory sticker number and affixes it to the container in a conspicuous location such as the lid or on the material record card. The recorder acknowledges his completion of the data line and indicates that the sticker number is the same as the number on the data sheet. The team then moves on to the next item, etc., until the inventory is complete.

If the team encounters an unsealed item or an item with a broken seal, the contents are verified by remeasurement following established verification procedures for each type of item, e.g., reweigh, SAM-2 enrichment check, or sample and assay.

When the inventory of the area has been completed, the team(s) goes through the area again to assure that no containers have been omitted or overlooked. Both team members sign and date each page of the inventory record sheets. All unused record sheets, inventory stickers, and completed inventory record sheets are returned to the coordinator. The team is released to return to regular work when the coordinator has satisfied himself of the completeness and accuracy of the inventory.

4. ICA Physical Inventory Procedure. Teams inventorying the ICA's use the same systematic approach as is used in the MBA's with the exception that they are verifying data already listed on the computer printout rather than recording the inventory data.

The team first completes items 1 and 6 on the Inventory Tag Reconciliation form (Table IV); identifying the number of items listed on the computer printout and the sequence and total number of inventory stickers assigned to the team.

They begin the inventory with the reader, stickers in hand, first identifying only the container number. The recorder finds and acknowledges the existence of that container number on the listing. The reader then proceeds to call out the inventory data exactly as it appears on the container and the attached material record card while the recorder checks that the data are the same as on the computer listing. The data include seal numbers, project number, material type, nominal enrichment, gross and tare weights.

If any of the listed data on the computer printout differs from the recorded information on the container, the data on the computer report is circled and the information shown on the container is written in next to it. The seal on the item is tested for integrity, and if broken or missing, the seal number on the computer printout is circled and the words "broken" or "missing" noted on the list. This identifies the item for verification by remeasurement.

After checking that all inventory data on the container are the same as on the computer list, the reader then calls out the first inventory sticker number and attaches it in a conspicuous location on the container. The recorder writes the reported sticker number in the space provided on the computer printout on the same data line as the container is listed. The team then proceeds to the next item and so on until the inventory is completed.

If the team encounters a container not listed on the computer printout, it is recorded on the ICA Physical Inventory Write-In Sheet (Table III) along with all the inventory data.

When the physical inventory has been completed in the area, the team goes through the area to assure that all containers have been tagged, and signs and dates the computer listing and write-in sheet. If multiple teams are inventorying the area, the inventory should be consolidated onto one of the computer printouts and this listing identified as the master list.

The ICA Inventory Tag (sticker) Reconciliation form (Table IV) is then completed by the teams. The inventory sticker variance (line 10) must equal zero or the discrepancy resolved before the inventory is complete.

The coordinator is notified that the inventory is complete and the teams return to their regular work. The teams turn in their unused inventory forms and stickers and completed inventory sheets and forms to the coordinator.

5. Waste Barrel and Filter Inventory Procedure. Inventory of the waste barrels and filters is identical to the other ICA's except that containers are row listed in the sequential order in which they are stored. The only data to be verified are the container and the seal number. If a container is found out of sequence, it is noted on the computer list for later correction but not as an inventory error.

As in other ICA's, the Write-In Sheet and Tag Reconciliation form must be completed to record the inventory.

6. Fuel Rod Inventory Procedure. At the Model Plant, the inventory of fuel rods is based on verifying by physical inventory that the total number of rods for each project, rod type, and enrichment agree with the computer-based book inventory. Once the physical presence of the rods has been proven by actual inventory, then the quantities of element and isotope are calculated by the computer by summing up the previously measured values for the element and isotope content of each fuel rod.

Each fuel rod is inscribed with a unique eight-character identification. The first three characters identify the project, rod type, and enrichment. The fuel rod inventory is taken by counting the total number of rods for each three-character prefix and comparing the count to the computer-based book inventory. Any discrepancies must be resolved by full identification and reconciliation of individual rods.

For the inventory, the teams count the number of rods with a given prefix at one location and record it on the IO2 Rod Inventory Physical Count Sheet (Table V). If the location is sealed, the count is taken from the material record card attached to the storage bin. For additional accuracy, both members of the inventory team count the rods to avoid error. More than one type of prefix may be found at one location. The inventory form provides for recording multiple prefixes and quantities counted for each type.

The inventory sticker is placed in a conspicuous location at the storage location. Care is taken to match the sticker to the correct inventory location recorded on the inventory sheet because some preassignment of stickers to storage bins is made in advance. All designated storage bins are inventoried. If a bin is empty, it is noted on the inventory sheet.

When completed, the teams date and sign all inventory sheets. The teams are released to return to regular work by the coordinator when he is satisfied that the inventory is complete and correct.

1. Reconciliation of ICA Inventories. Inventory materials are returned to the coordinator. He records the number of inventory stickers used or returned on the Inventory Tag Control Log (Table VI). Necessary reconciliations are made to the inventory based upon collected transactions which were recorded between the last computer system updating of the ICA book inventories which was used to produce the inventory lists and the start of physical inventory.

Lists are prepared for each ICA showing containers, 1) listed on the computer printout but not found by physical inventory, 2) found during the inventory but not on the computer listing, 3) with broken or missing seals, and 4) for which the information on the material record card and container does not agree with the information on the computer listing. A description of the data variance is noted on the list.

Missing inventory items must be located or evidence of their disposition found. Transaction documents are recorded and processed reflecting the results of these reconciliations. Write-ins are also recorded as transfers into the ICA. Seal and other inventory data variances are resolved by the ICA custodian and the necessary transaction documents recorded and processed to update the computer data base (MIMS). The ICA reconciliation is judged to be complete when there are no missing containers, unresolved write-ins, or seal, project, enrichment and weight variances from the recorded physical inventory.

2. Reconciliation of the Fuel Rod Inventory. Data recorded on the IO2 Rod Inventory Physical Count Sheets are processed and submitted into the computer program RODIN. The report from this program identifies the differences, by prefix, between the book and physical inventories.

These differences, together with a full listing of all rods, are returned to the rod custodian for resolution of the variances. Reinventory of some rod locations may be necessary to reconcile the counts. If differences remain, a complete reinventory may be required or a rod-by-rod verification to resolve variances using the full rod listing from the book inventory. Reported differences for a rod prefix must be resolved before finalizing the inventory. A difference in one rod prefix cannot be used to offset a difference in another prefix.

3. Reconciliation of the MBA Inventories. Collected MBA Physical Inventory Record sheets are inspected by the coordinator for recording errors then processed into data entry format. They are entered into the MPIS program which makes edits for mistakes in projects and enrichments and in gross and tare weights. After correction, the program produces a report listing and summarizing the MBA inventory items. The report is examined by the coordinator and suspected errors in weights or enrichments are checked by comparison to the inventory record or by remeasurement of the item. Unsealed items are listed and it is the responsibility of the area custodian to see that verification measurements have been made and the data reported to the coordinator.

4. Other Reconciliation Activities. As a part of the reconciliation the computer reports WEIT and SCRAP are printed. WEIT lists any container identifications duplicated in the inventory. All duplications are resolved before closing the inventory. The SCRAP report lists all containers identified as scrap by material composition. The uranium element factors for all items requiring unique analysis (certain scrap items) are checked to assure they have been sampled and element factors applied. Items requiring unique determination of uranium content cannot be included in the ending inventory at a temporary or average factor.

Before finalizing the inventory, specific enrichment factors are calculated for each project-enrichment (as needed) and applied to inventory items by the computer.

5. Calculation of Inventory Difference. After reconciliations of the ICA and MBA inventories, the ending physical inventory for the entire plant is summarized by the computer on the report EIS. This report shows the element and isotope quantities for each item in the inventory and summarizes the quantities by material type.

The ending physical inventory for the plant is then compared to the ending book inventory to determine the MUF for the Model Plant.

6. Reporting Inventory Results. Reports are prepared and distributed as required to meet State and IAEA requirements. Management type reports are prepared to inform company management of the inventory quantities and the results of the inventory.

All source documents and ending inventory reports are retained as prescribed in the accounting procedures.

Inventory notes or comments are preserved for future reference and revisions to the Inventory Progress Checklist are noted to assist in taking the succeeding physical inventory.