ANL-89/44
Rev. 1

PC-DYMAC: Personal Computer – DYnamic Materials ACcounting

by B. Gail Jackson

Argonne National Laboratory, Argonne, Illinois 60439
operated by The University of Chicago
for the United States Department of Energy under Contract W-31-109-Eng-38

This report has been reproduced from the best available copy.

Available from the
National Technical Information Service
U.S. Department of Commerce
5285 Port Royal Road
Springfield, VA 22161

Price: Printed Copy A08
Microfiche A01

Distribution Category:
Nuclear Materials Security
and Management (UC-515)

ANL-89/44
Rev. 1

ANL--89/44-Rev.1

DE90 013541

ARGONNE NATIONAL LABORATORY
9700 South Cass Avenue
Argonne, Illinois 60439

PC-DYMAC:
PERSONAL COMPUTER - DYNAMIC MATERIALS ACCOUNTING

by
B. Gail Jackson

Automated Materials Control and Accountability System
EBR-II Fuels and Materials Department
Argonne National Laboratory - West

June 1990

TABLE OF CONTENTS

TABLE OF CONTENTS (cont'd)

LIST OF FIGURES

LIST OF FIGURES (cont'd)

PC-DYMAC:
PERSONAL COMPUTER - DYNAMIC MATERIALS ACCOUNTING

by

B. Gail Jackson

ABSTRACT

This manual was designed to provide complete documentation for the computer system used by the EBR-II Fuels and Materials Department, Argonne National Laboratory-West (ANL-W) for accountability of special nuclear materials (SNM). This document includes background information on the operation of the Fuel Manufacturing Facility (FMF), instructions on computer operations in correlation with production and a detailed manual for PC-DYMAC operation.

I. INTRODUCTION

This document provides a description of the computer-based system, PC-DYMAC, that is used for accountability of special nuclear materials under jurisdiction of the EBR-II Fuels and Materials Department. PC-DYMAC was developed by the Safeguards Systems Group (N-4)[1] at Los Alamos National Laboratory (LANL) under contract from the Department of Energy (DOE). PC-DYMAC originated from the Los Alamos MASS[2] accounting system in use at LANL.

The applicable DOE regulations are also summarized along with the agreements in effect with the DOE Chicago Operations Office (DOE-CH) on how conformity with these regulations is to be achieved. A description of the fuel fabrication process is given with emphasis placed on the physical form of the uranium and uranium alloys, and points in the process where measurements are taken to support the material accountability. This is followed by an account of the PC-DYMAC system procedures relating to the fuel fabrication process.

II. BACKGROUND

The EBR-II Fuels and Materials Department is responsible for fabricating uranium-zirconium driver fuel for the EBR-II reactor as well as fuel for special experiments irradiated in EBR-II. Some of the special experiments contain plutonium in the form of U-Pu-Zr metallic fuel. The fuel that contains plutonium is fabricated in the Experimental Fuels Laboratory (EFL). All the U-Zr fuel is fabricated in the Fuel Manufacturing Facility (FMF). A metallic driver fuel element consists of a U-Zr fuel slug(s) that is encapsulated in a stainless steel jacket as shown in Figure 1. At full production approximately 18,000 fuel slugs are cast per year in the FMF. This document

deals only with the fabrication process in FMF, and as such, will describe the accountability practices followed for uranium.

III. MATERIAL BALANCE REQUIREMENTS

To maintain accountability for the special nuclear material handled during the fuel fabrication process, all material "in" and "out" at each step is weighed to be able to detect any loss. The inventory difference is calculated as the difference between feed materials in and product and byproducts out. A materials balance equation is, in fact, a conservation of mass equation written for a materials balance area (MBA). The equation must include all material crossing the MBA boundary, either input transfers or output transfers over the accounting period, and all material residing within the MBA boundary at the beginning and end of the accounting period. The materials balance (MB) equation is often written as:

MB = sum of beginning inventory + sum of input transfers - sum of ending inventory - sum of output transfers.

IV. DOE ORDER 5633.3

The PC-DYMAC nuclear material accounting system is designed to satisfy the requirements of DOE Order 5633.3, "Control and Accountability of Nuclear Materials." Specifically, when used in conjunction with EBR-II Fuels and Materials nuclear material accountability documents, the PC-DYMAC system fulfills the requirements of the following sections of the Order:

"DOE Order 5633.3 - Control and Accountability of Nuclear Materials

Chapter II Materials Accounting

2. Accounting Systems

(2) Each Facility shall have a system that provides a database for tracking nuclear material inventories; for documenting nuclear material transactions; issuing periodic reports; and for verifying, detecting, and evaluating loss detection elements ...

2.b. Account Structures

(2) The Material Balance Account Structure shall provide the capability to localize inventory differences and provide a system of checks and balances for verifying the accuracy of the accountability data and records.

2.c. Records and Reports

(2) Nuclear materials records shall be updated only by authorized personnel, and the records system shall provide an audit trail for all transactions affecting the nuclear materials database.

(3) The Material Balance Area record system shall be capable of being updated daily for Category IA and IB materials, and monthly for all other nuclear materials. In addition for Materials Balance Areas possessing Category I nuclear materials, the records system shall be capable of generating book inventory listings within 3 hours ..."

In addressing the requirements of DOE Order 5633.3 listed above, the PC-DYMAC system provides the automated component of nuclear material control in the FMF located at ANL-W and operated under the direction of the EBR-II Fuels and Materials Department.

All nuclear material movements or transfers within the facility are entered into the computer database. These movement or transfer transactions contain information regarding who, what, where, and when. This information becomes part of the PC-DYMAC system and is available for generating near real-time nuclear material inventories and accessory documents. The system also provides the means whereby inventory differences may be determined rapidly and accurately. Access to the PC-DYMAC system is password-controlled to prevent unauthorized use. All transaction records include information identifying the

password used to access the system. The PC-DYMAC system, utilizing input data and transaction records, can supply book inventory listings, if necessary, within three (3) hours. The system is updated daily.

V. THE FUEL FABRICATION PROCESS

Figure 2 is a simplified flow diagram of the fuel fabrication process that takes place in the FMF. This section proceeds step-by-step through the process describing the fuel casting, fuel manufacturing, and subassembly construction operations with emphasis on critical points for accountability data collection.

A. Fuel Casting

The fuel casting operation, which is the first step, starts with receipt of the feed materials in the FMF and is considered complete when the product and byproducts of the casting are transferred to the next step, the fuel manufacturing operation. The fuel slugs are considered the cast product, and the residual U-Zr heel, the crucible, and the tantalum stirrer as byproducts. Additional byproducts are created after the casting when the glass molds are broken, and the fuel slugs are removed and sheared to length. The alloy composition routinely fabricated is U-10 wt% Zr. The U-235 enrichments in special experiments may vary depending upon the end-use of the fuel. The standard driver fuel for EBR-II is 67% nominal.

1. Receiving Feedstock and Preparing the Crucible Charge

The feed materials may be a combination of any of the following:

a. Fresh feedstock from Oak Ridge National Laboratory (ORNL) as shown in Figure 3. The U-235 enrichment of this

material is determined at ORNL and verified by mass-spectrometer isotopic analysis at the ANL-W Analytical Laboratory.

b. Depleted uranium also procured from ORNL is shown in Figure 4. This is used to adjust the enrichment and composition of the crucible charge.

c. Heel pieces left over from previous FMF castings where the "heel" is the residue that remains in the bottom of the crucible after the casting operation. A heel is shown in Figure 5.

d. "Slug/fines," small pieces of U-Zr alloy which are the sheared ends of slugs and chopped "reject slugs" from previous castings as shown in Figure 6.

e. Zirconium, which is added as a feed material to attain the specified alloy composition. The form of the zirconium is shown in Figure 7.

All feed materials are weighed prior to placement in the crucible. When feed material must be cut or broken to accumulate the proper alloy charge, both the material used in the crucible and the material remaining, plus any dust and fragments left as a result of cutting or breaking, must be weighed.

During the casting operation, some quantity of the U-Zr alloy will adhere to the crucible, molds, and the tantalum stirrer that is dipped into the melt. Therefore, the coated glass molds, crucible, and stirrer must be weighed prior to the casting operation.

When the recorded weights of all the casting materials that make up the total crucible charge are entered into the computer, preparation for the casting operation is considered complete. Figure 8 shows a coated crucible loaded with the feed materials just before the furnace door is closed for the casting operation.

2. The Casting Operation

In the casting operation the U-Zr alloy in the graphite crucible is heated to a molten state, and either mixed (1) with the tantalum stirrer shown in Figure 9 or (2) magnetically by varying the frequency of the furnace power. The tantalum stirrer is also used as a mold catching device. The stirrer is placed underneath the filled molds after they have been retracted from the crucible to catch any molds that may break and fall. If the glass molds fall into the crucible and become stuck in the heel they are very difficult to remove.

3. Processing the Cast

After the furnace cools, generally overnight, the pallet containing the quartz molds, as shown in Figure 10, is removed from the furnace to a hood, shown in Figure 11. The cast slugs are taken from the molds and sheared to the specified length for fabrication into fuel elements, see Figure 12. A "sample" fuel slug is selected for chemical analysis. The sample slug, as shown in Figure 13, is sampled at three places - top, center, and bottom - to determine alloy composition, U-235 enrichment, and impurities of the cast batch.

The fuel slug sample is sent to the Analytical Chemistry Laboratory for evaluation. A total chemical analysis is conducted to determine the uranium, zirconium, and impurity concentrations. An isotopic analysis is done to confirm the U-235 enrichment. This information is transferred to the computer and serves the following purposes:

1. Confirmation of U-235 enrichment for accountability assessment and reactor reactivity calculations.

2. Confirmation of chemical composition for accountability assessment and product specification as well as use of the heels and slug/fines in future castings.

3. Confirmation of impurity levels for product specification and production control.

The sheared fuel slugs are placed in a numbered bandolier during fuel slug processing. Each fuel slug is individually weighed, measured, and assigned a slug number. Maintaining the slug's identity becomes necessary from this point on. Figure 14 shows a fuel slug being processed in the fuel casting area. Fuel slugs are either accepted or rejected at the time of slug processing.

Fuel slugs must meet certain specifications to be considered "accept slugs." Reject slugs are chopped and combined with existing slug/fines. The canned slug/fines and heel are stored in the FMF Vault 65 until chemistry results are confirmed. Slug/fines and heels from previous castings can be remelted if chemistry values are acceptable. If the chemistry values are not acceptable, the items are shipped to Idaho Chemical Processing Plant (ICPP) for reprocessing. Only experimental fuel slugs require radiography. This procedure detects any internal defects that may cause the slug to be rejected. Data on accept slugs are transferred to the computer and assigned a unique serial number. The serial number, like the slug number, is important in maintaining the slug's identity. Accept slugs are placed in a container called a birdcage, shown in Figure 15, for transfer and storage. The construction of birdcages provide the separation required to prevent criticality accidents. All transfers from the production areas to the Vault (zone 12), Radiography (zone 13), and Nondestructive Assay (NDA) (zone 11) require computer entries and computer-generated transfer documents see Figure 16.

The broken glass from the broken molds is collected in a tray as shown in Figure 17. Any identifiable small pieces of alloy are removed

from the glass and collected as "fine/fines." The glass pieces, with as much alloy as possible removed manually, are collected and classified as "glass/dust." This glass/dust is assumed to retain accountable U-Zr alloy. The fine/fines could also contain small pieces of alloy that result from removal of the heel from the crucible, see Figure 18. This U-Zr residue is canned and stored until chemistry results confirm composition and enrichment. If the chemistry analysis of the heel meets specifications, it is returned to fuel casting for remelt. The wiping cloths and plastic material used for contamination control are also assumed to contain some U-Zr alloy and are collected as "soft waste." All byproducts are weighed after the casting operation and the weights recorded and entered into the computer for subsequent balance calculations.

4. Calculating the Inventory Difference

The alloy weight into the fuel fabrication process is easily identifiable as the weight of the crucible charge. The fuel slugs, heel, sample, slug/fines, and alloy on the stirrer are also easy to identify. When the weights of the product and byproducts are subtracted from the feed material charged to the crucible, it must be assumed until confirmed by NDA, that the glass/dust, crucible, fine/fines, and soft waste contain the remaining alloy.

After this confirmation, the inventory difference for the casting operation is calculated and compared to the expected difference. In most cases there will be an inventory difference due to weighing uncertainties and process hold-up. The objective is to minimize this difference and look at variations in the difference from past experience.

5. Transferring the Product and Byproducts

The fuel slug sample which was transferred to the Analytical Chemistry Laboratory is not returned to the FMF MBA, but remains in the Analytical Chemistry Laboratory MBA. A computer entry is required to transfer the fuel sample out of the FMF MBA. The transfer document generated by Special Materials (SPM) is shown in Figure 19.

The cast byproducts are transferred to the vault for disposal. The glass/dust and fine/fines are sent to the ICPP for reprocessing, while the used crucible, soft waste, and glass/dust from fuel casting go to the Radioactive Waste Management Complex (RWMC). Accountability methods used for these off-site transfers are covered in a later section.

B. Fuel Manufacturing

Fuel manufacturing, the second step in the fuel fabrication process, begins when the accept slugs are received from fuel casting and ends with the transfer of the accept fuel elements out of the FMF.

1. Accepting the Fuel Slugs from Fuel Casting

The accept slugs from the fuel casting area are transferred to the glove box located in the southeast corner of the FMF, shown in Figure 20, for element fabrication. Simultaneously, the computer data pertaining to each slug are transferred by floppy disk from the fuel casting inventory. Chemistry values for the isotopes U-234, U-236, U-238, and zirconium are enter into the computer. These numbers become part of the fuel slug's unique data. If the cast contains plutonium, values for those isotopes are entered also.

2. Fabricating Fuel Elements

Sodium loading, slug loading and settling, jacket welding, and the stripping of reject elements are tasks performed in the glove box. First,

stainless steel jackets stamped with a unique number are loaded with a predetermined quantity of sodium, see Figure 21. A fuel slug is then put into each jacket as shown in Figure 22. This "jacketed fuel slug" is defined as a fuel element. The unique jacket number becomes part of the data associated with the fuel slug. The jackets are heated in a furnace to melt the sodium and settle the slug before an end cap is welded on the top.

After the fuel element is welded shut, it is subjected to a number of inspections. Closure welds and sodium levels are verified by Radiography and a final inspection is performed by Quality Assurance personnel completing the element fabrication process. Reject elements are stripped from their jackets inside the glovebox and returned to Fuel Casting for reprocessing, see Figure 23. Accept elements are transferred to Special Materials (SPM) for storage until loaded into a subassembly.

C. Subassembly Construction

The final step in the fuel fabrication process occurs when, in response to reactor demand, fuel elements are transferred from SPM storage to the subassembly construction area and assembled into a subassembly. The completed subassembly is then transferred back to SPM storage until needed.

1. Assigning Grid Positions

A standard driver subassembly is constructed of 61 fuel elements as shown in Figure 24. Each fuel element has a predetermined position inside the subassembly grid. This position and the subassembly number are added to the existing data for each fuel element.

2. Transferring Subassembly Data for Physics Calculations

The data for the completed subassembly are transferred to a common disk file at ANL-E for use by both ANL-E and ANL-W staff in reactor physics calculations.

3. Shipping the Finished Subassembly to Vault 65

The completed subassembly is transferred to Vault 65 by SPM for temporary storage until it is installed in the reactor, see Figure 19.

VI. THE PC-DYMAC SYSTEM

Individual flowcharts are used in this section to show those points at which the automated PC-DYMAC system interfaces with the steps of the fuel fabrication process. The following subjects will be discussed in detail using these flowcharts as a guide:

1. Computer screens, menu options, and submenu commands for each phase of the operation.
2. How data are entered and results are calculated using specific menu options created for a particular procedure.
3. Reports and computer listings generated by the system.

A. Receiving Feedstock and Preparing the Crucible Charge

The first phase of the casting operation shown in Figure 25 consists of receiving the material, weighing the material, loading the crucible, and placing the loaded crucible in the furnace. The flowchart (Figure 25) emphasizes the points at which feed materials are weighed and the data entered into the PC-DYMAC system.

PC-DYMAC is a menu-driven system consisting of prompts displayed on the screen which are used to select the appropriate submenu option. The Fuel Casting (FC) main menu displaying the submenu options is shown in Figure 26. By selecting FC main menu option (2), 'PREPARING THE CAST BATCH,' actions will be triggered to combine all components of the cast batch into a single item called a "cast batch."

The 'PREPARING THE CAST BATCH' submenu display showing the steps in the procedure is Figure 27. Submenu step (2), 'Receive material (no floppy disk),' is used to receive the material into the fuel casting inventory. The feedstock is weighed to verify the weights supplied by SPM. Any excess is re-canned, weighed, and transferred to NDA for material balance verification. The excess feedstock is stored in Vault 65 for future castings.

Submenu step (3), 'Add the crucible to the cast batch,' instructs the technician to begin the procedure of combining the material for the crucible charge. First, the combined weight of the coated crucible and the thermocouple (TC) well is entered into the computer. Submenu step (4), 'Add material to the cast batch,' is a command to add the weights of all the alloy material used for the injection cast. Submenu step (5), 'Add net weight of glass/molds,' indicates the net weight of the coated glass/molds is to be entered. This weight is determined by subtracting the total weight of the pallet and coated glass/molds from the weight of the empty pallet. At submenu step (6), 'Add stirrer to the cast batch,' the actual weight of the stirrer is entered. The difference in the weight of the stirrer is entered. The difference in the weight of the stirrer before and after the cast will determine the amount of alloy material that adhered to the stirrer during casting. This continuous buildup (and possible depletion) of material must be accounted for throughout the life of the stirrer. Submenu step (7), 'Add more material to the cast batch,' allows the operator to add feed materials as necessary.

At completion of step (7), the "cast batch" item has been created with its own unique serial number. Its weight is the combined weights of the coated crucible, stirrer, coated glass/molds, TC well, and alloy material.

These components are weighed again, and an inventory difference is calculated. The next phase, Processing the Cast, discusses the procedure of weighing the product and byproducts after casting and the menu options applicable to this phase.

B. Processing the Cast

Flowcharts for the second phase are shown in Figures 28, 29, and 30. Figure 28 covers unloading the furnace, transferring the cast batch to the hood, weighing the cast product and byproducts, shearing each slug, processing the slugs, and selecting and cutting the slug sample. Transfer of the crucible, soft waste, glass/dust, and fine/fines to NDA and to their final destinations, RWMC and ICPP, are included in Figure 29. Figure 30 incorporates the tasks of chopping reject slugs, canning the heel and slug/fines, and transferring the slugs to Fuel Manufacturing for element fabrication.

When the injection cast is finished, the cast batch is removed from the furnace and transferred to the hood. To begin processing the cast, the operator selects FC main menu option (3), 'PROCESSING THE CASTING,' and follows the procedure shown in steps (2) through (7) shown in Figure 31. Submenu step (2) 'Clean up and weigh crucible,' indicates the crucible used in the cast is to be cleaned by removing all traces of alloy material and any "dust" left from the coating put on the crucible prior to casting. The crucible is then weighed and the difference between the weight of the crucible before and after casting is attributed to dust. This dust becomes part of the glass/dust byproduct. At submenu step (3), 'Enter final stirrer weight,' the operator enters the final stirrer weight which permits the computer to calculate the amount of alloy material on the stirrer by subtracting the weight of the stirrer before the cast from the value just entered. When the glass molds

are broken, and the broken glass is collected in a tray, the alloy, uranium, and U-235 net weight for each can of glass/dust collected. It is entered into the computer as zero under submenu step (4) 'Split glass/dust into cans,' until NDA results are received by the FMF MBA Custodian. Entering the NDA-measured values for glass/dust is discussed later in this section.

Submenu step (5), 'Split slugs, slug/fines, fine/fines, heel, sample', directs the operator to enter weights for the remaining product and byproducts. Slug number identification is maintained from the time the slugs are sheared to the specified length and then placed into a numbered bandolier. All the slugs are weighed together and this total weight is entered into the computer. The slug/fines, fine/fines, and heel are all canned and weighed, and their weights are fed into the computer. When one slug is selected and predetermined sections are cut from the top, center, and bottom of this sample slug, these weights are keyed into the computer. Submenu step (6), 'Send remainder of cast batch to (Process Holdup Difference) PHD', is used to transfer the amount left in the cast batch to the PHD account associated with that particular batch.

Each slug is weighed and measured by a process called "Dimensional Inspection" using a laser profilometer. The resulting information which includes the length, weight, maximum, minimum, and average diameter of each slug, is transferred to a Hewlett Packard computer and stored on a floppy disk. The data are then moved to the PC-DYMAC system under FC main menu option (6), 'PROCESSING SLUGS,' and submenu step (2) 'Add profilometer results and put slugs in birdcage,' (see Figure 32). This new information supplied by the Hewlett Packard becomes part of the computer database.

Periodically, a difference is noted between the total weight of the slugs after shearing and the total weight of the slugs after the dimensional inspection. Submenu step (3), 'Send remainder in slug account to PHD', is used to transfer any difference, positive or negative, to the PHD account at this time.

During the fuel casting operation, material transfers to NDA for material verification and to off-site areas for fuel storage and recovery are necessary. Computer entries are required for all types of material transfers. Zone to zone transfers simply move the material by container from one zone to another (material moves to NDA, Vault 65, and Radiography are all considered zone transfers). When material is transferred out of the FMF MBA it is deleted from the inventory. However, the option of copying these material transactions to a floppy disk for retention is available.

After the glass/dust is returned from NDA, the NDA values can be assigned the U-235 weight. FC main menu option (8) 'PROCESSING GLASS/DUST', and submenu step (4) 'Enter new value of glass/dust from NDA', Figure 33, direct the operator to enter the new values. The assigned U-235 weight is entered for each can of glass/dust along with the composition and enrichment for the cast batch. PC-DYMAC calculates the uranium weight by dividing the U-235 weight by the cast batch enrichment and the alloy weight by dividing the uranium weight by the cast batch composition. These new values become part of the computer database.

Information is transferred from one computer station to another by means of a floppy disk. After the slugs have been accepted, they are placed in a container for shipment. FC main menu option (7) 'CONTAINER AND ZONE CHANGES', and submenu step (2) 'Put items in a container', Figure 34, in-

structs the technician to put items that are in consecutive serial number into a designated container. FC main menu option (5) 'SHIP - RECEIVE - DELETE ITEMS', and submenu step (1) 'Ship container to another room (floppy disk)', Figure 35, will initiate the floppy disk transfer of the affected items. The disk must then be read at the appropriate computer stations. The PC-DYMAC Users Manual Section 5.2 describes the PC-DYMAC system floppy disk transfers.

At this time all cast product and byproducts have an assigned serial number, alloy weight, and a calculated uranium and U-235 weight. These calculations were determined by using the composition and enrichment of the individual cast batch and cannot be altered without the MBA Custodian's permission. Alteration could be required should the slug sample sent to Analytical Chemistry not meet specifications.

The next section discusses element fabrication, final inspection, and the transfer of accept elements to SPM, see Figure 36.

C. Fabricating Fuel Elements

The amount of sodium used in loading the stainless steel jackets depends upon the type of fuel element to be produced. The computer generates a listing of fuel slugs and an average sodium load for each cast batch. Two commands are available to produce these listings. One, submenu step (5), Figure 37, under Fuel Manufacturing (FM) main menu option (2), Figure 38, is for single slug elements. The submenu step (6) is for multiple- or paired--slug elements. The majority of the fuel slugs produced by the FMF are approximately 13.5-in. long. Occasionally, fuel slugs are produced which, when sheared, are shorter than the required length. Pairing slugs to make up one full-length slug allows use of these shorter slugs.

FM main menu option (2) and submenu step (1) 'Pair half slugs and calculate Na load', are used to calculate the amount of sodium loaded into jackets when two slugs are used. The computer pairs the slugs by selecting two slugs with a combined length not greater than 13.5-in. Submenu step (8), 'Calculate Na load for single-slug element,' is used with full-length slugs.

After the sodium is loaded, fuel slug(s) are inserted, and an end plug is welded onto the stainless steel jacket. Each jacket is stamped with a unique number to identify the jacket. This number is entered into the computer and is associated with the fuel slug's serial number and slug number. This takes place under submenu step (4), 'Add jacket numbers to inventory.' Once the fuel slugs are encapsulated, they are referred to as fuel elements.

Accept elements are transferred to SPM for storage until they are manufactured into a subassembly. Reject elements are transferred back to the glovebox for stripping where the fuel slug, along with all traces of sodium, is removed from the jacket and returned to the fuel casting inventory for remelting.

D. Constructing the Subassembly

Accept elements are transferred temporarily to the FMF MBA from the SPM MBA for subassembly manufacturing. Reactor demand controls both the type of subassembly built and the schedule of construction, see Figure 39.

The Subassembly (SA) main menu is shown in Figure 40. Selecting SA main menu option (3), 'SUBASSEMBLY MANUFACTURING,' brings up the display as shown in Figure 41. Submenu step (1), 'Build a subassembly,' directs the collection of fuel elements to be used in the subassembly. It also assigns grid positions 1 through 61 to the fuel elements. A grid position can be reassigned if necessary. Submenu step (2), 'Print all elements in a sub-

assembly,' generates a complete list of all 61 elements. Included are the isotopic values associated with each fuel element. This information on the subassembly is needed for subsequent reactor physics calculations. The subassembly is transferred back to the SPM MBA and stored until it is shipped out for loading into EBR-II.

E. The Material Weight Calculation

Figure 42 illustrates the method used to calculate the uranium, U-235, and the other isotopic values used by Fuel Manufacturing. Example A is used if the alloy weight, composition, and enrichment are known. The alloy weight is the physical weight of the alloy material. The composition is the percent uranium and the enrichment is the percent of U-235 in the material. The uranium weight is calculated by multiplying the alloy weight by the composition and dividing by 100. The uranium weight is multiplied by the enrichment and divided by 100 to find the U-235 weight.

Example B is used to calculate the enrichment and composition, if the weights of the alloy, uranium, and U-235 are known. Starting with the U-235 weight and dividing it by the uranium weight yields the enrichment value. The composition value is obtained by dividing the uranium weight by the alloy weight.

The other isotopic weights of the alloy material (i.e., U-234, U-236, U-238) and the weights of the plutonium isotopes, if the material contains plutonium, are calculated by entering the chemistry values supplied by Analytical Chemistry. The weight for zirconium is calculated by entering the weight percent that is added when preparing the cast batch.

These chemistry calculations are performed after the accept slugs are transferred to the fuel manufacturing inventory. Submenu step (1),

'Adjust chemistry values (U-234, U-236, U-238, Zr),' under FM main menu option (7), 'CHEMISTRY,' uses chemistry values to calculate the isotopic weights, see Figure 43. These newly-calculated values become part of the database for each fuel slug.

F. Reports and Computer Listings

A variety of reports, listings, and screen displays are available to view computer output. Several reports and printouts are customized and apply only to a certain computer station and its inventory. For example, listings pertaining to fuel slugs can only be obtained from the Fuel Casting computer, and reports for fuel elements are only produced at the Fuel Manufacturing computer station. Some reports and listings are available at all computer stations (e.g., printing a container tag or generating a zone inventory report).

The majority of the report and listing options for all computer stations are found under the computer's main menu option (1) 'QUERIES'. The Central and Vault 65 computers have a second main menu option for reports and printouts, Main Menu Option (2), 'EXTRA QUERIES.'

The PC-DYMAC Users Manual discusses in detail each computer menu option or function, its location, and the output provided.

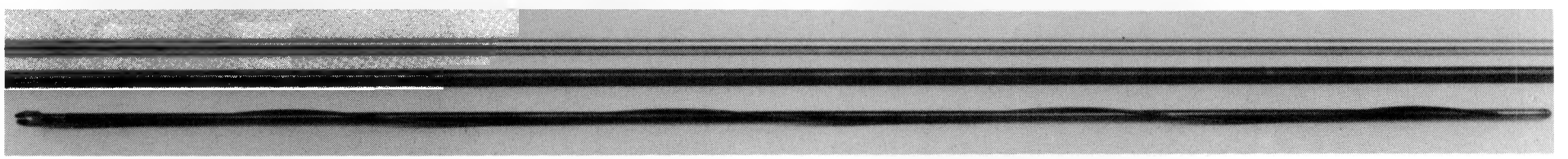


Fig. 1. Encapsulated Stainless Steel Jacket

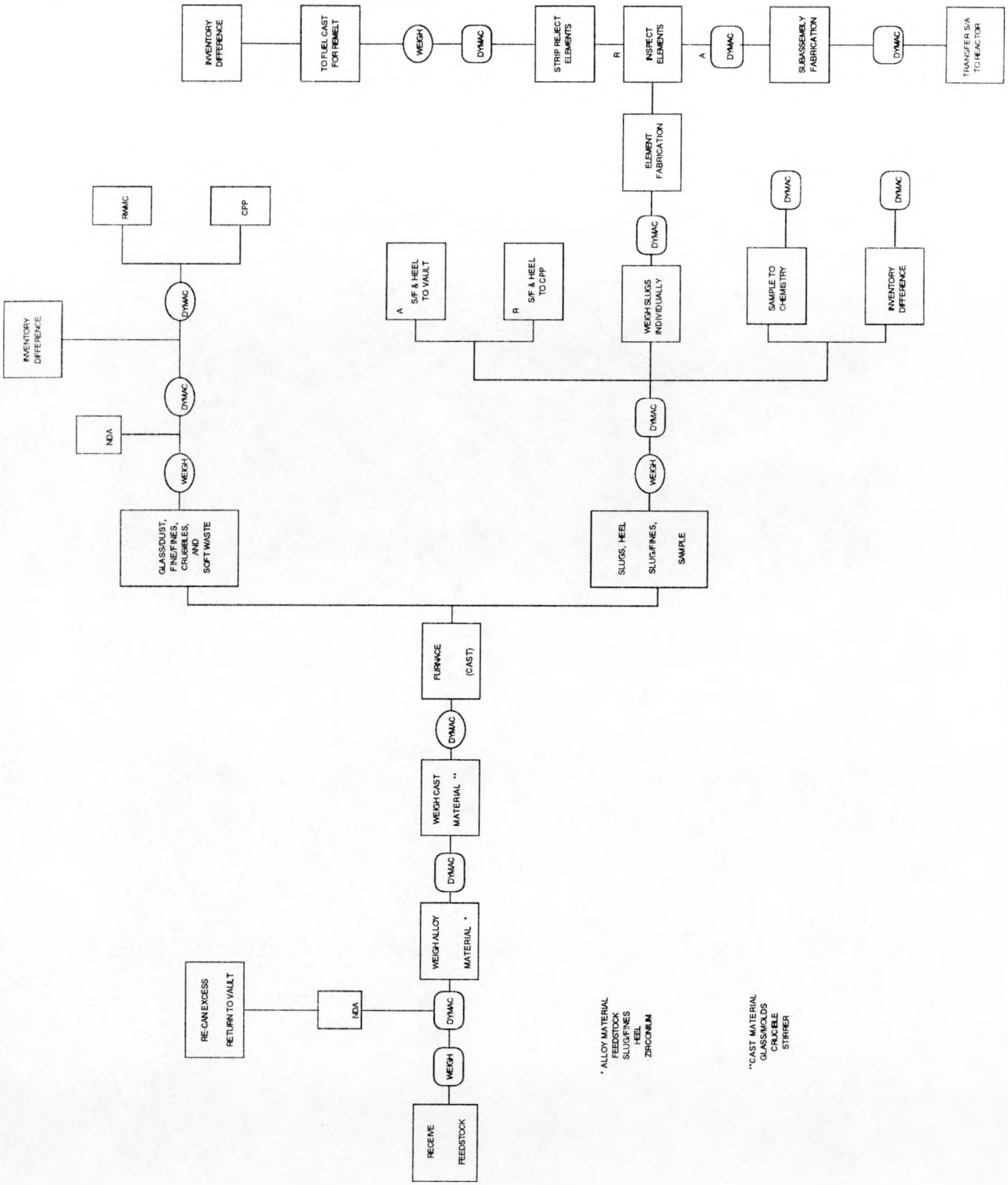


Fig. 2. FMF Fuel Fabrication Process

Fig. 3. Fresh Feedstock from Oak Ridge National Laboratory (ORNL)

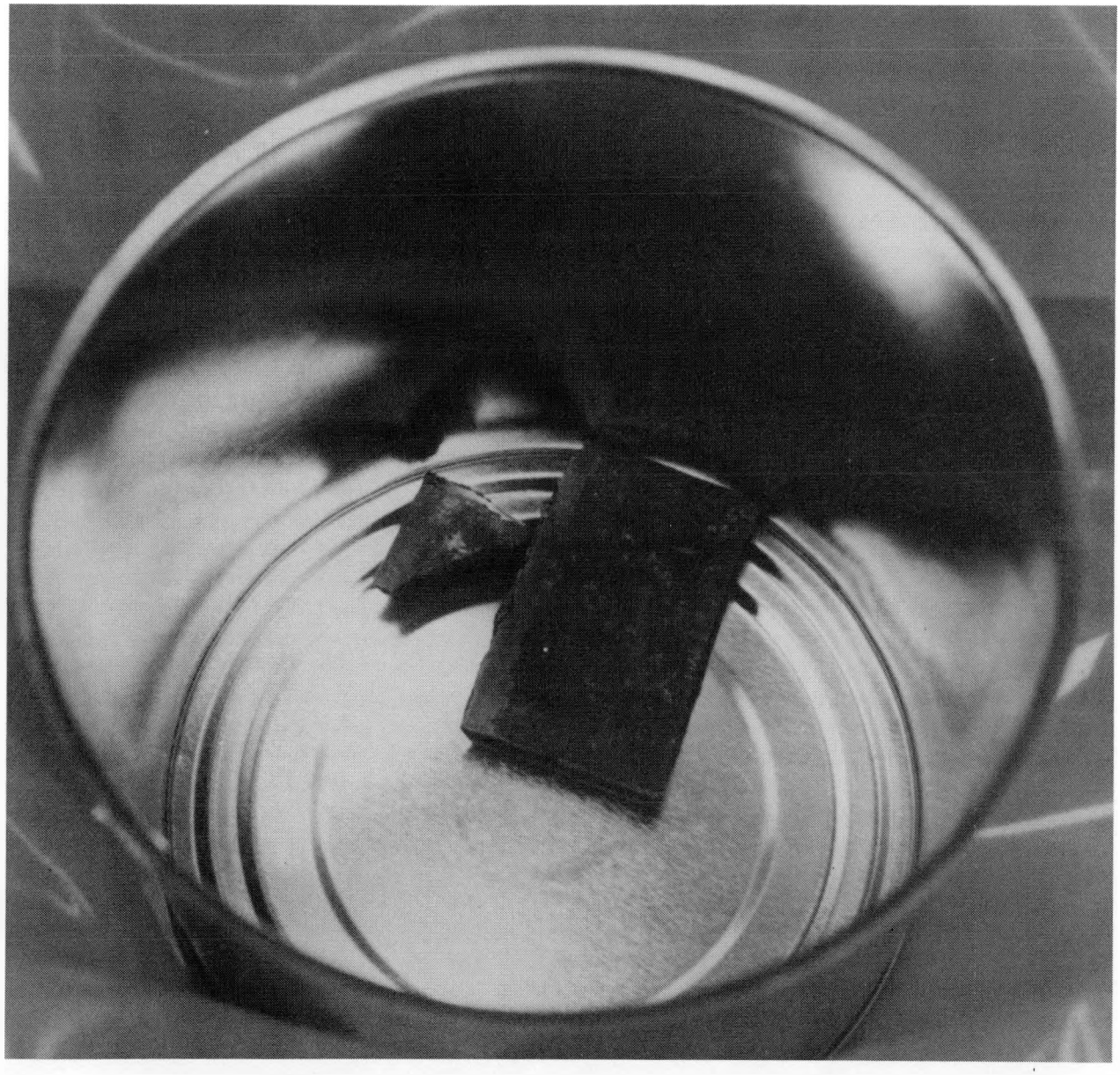


Fig. 4. Depleted Uranium from ORNL

Fig. 5. Heel Residue Left Over from Previous FMF Castings

Fig. 6. Slug/Fines
Small Pieces of U-Zr Alloy Sheared from Slugs and Chopped Reject Slugs

Fig. 7. Zirconium Feed Material Added to Attain Specified Alloy Composition

Fig. 8. Coated Crucible Loaded with Feed Material

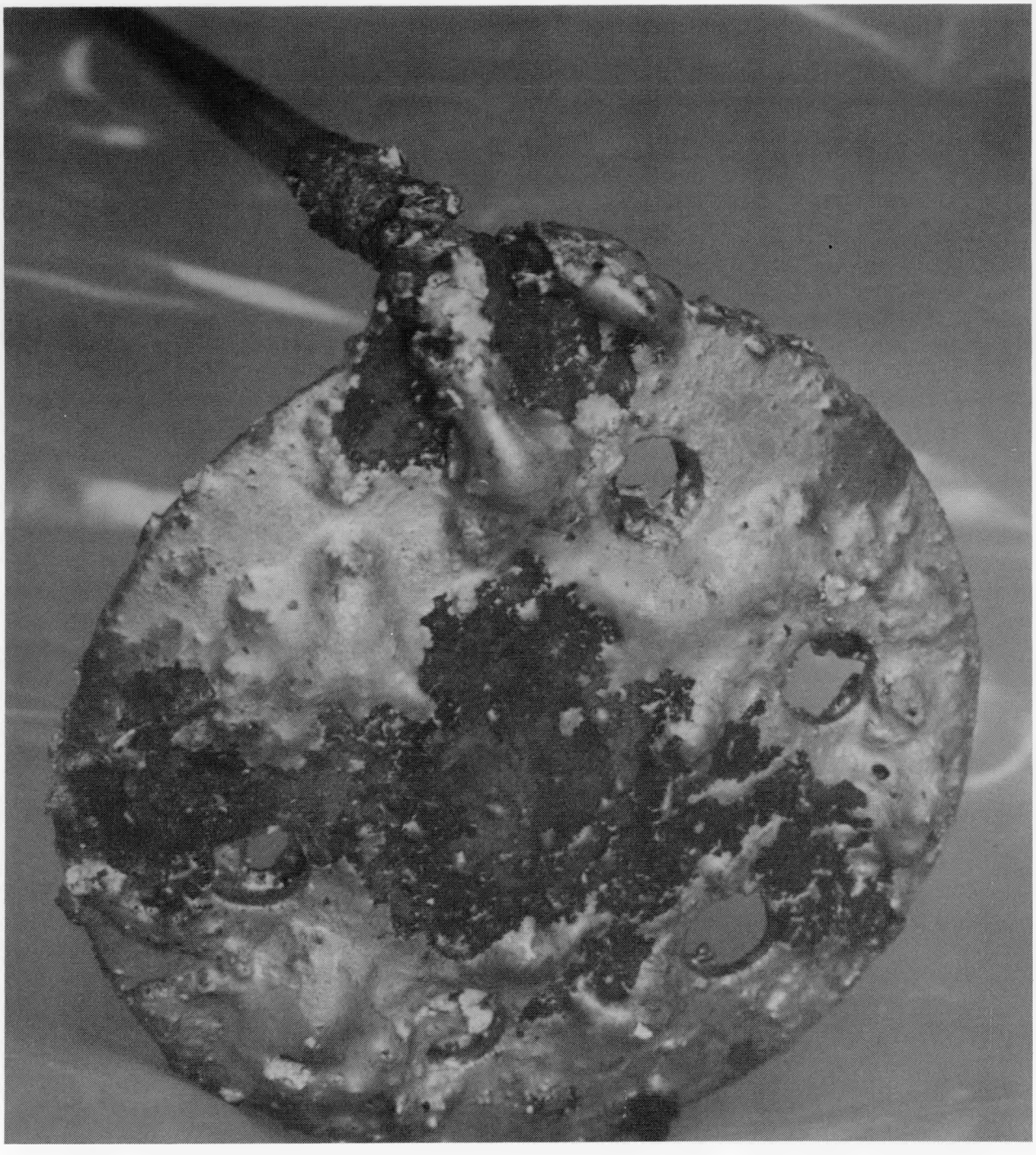


Fig. 9. Tantalum Stirrer

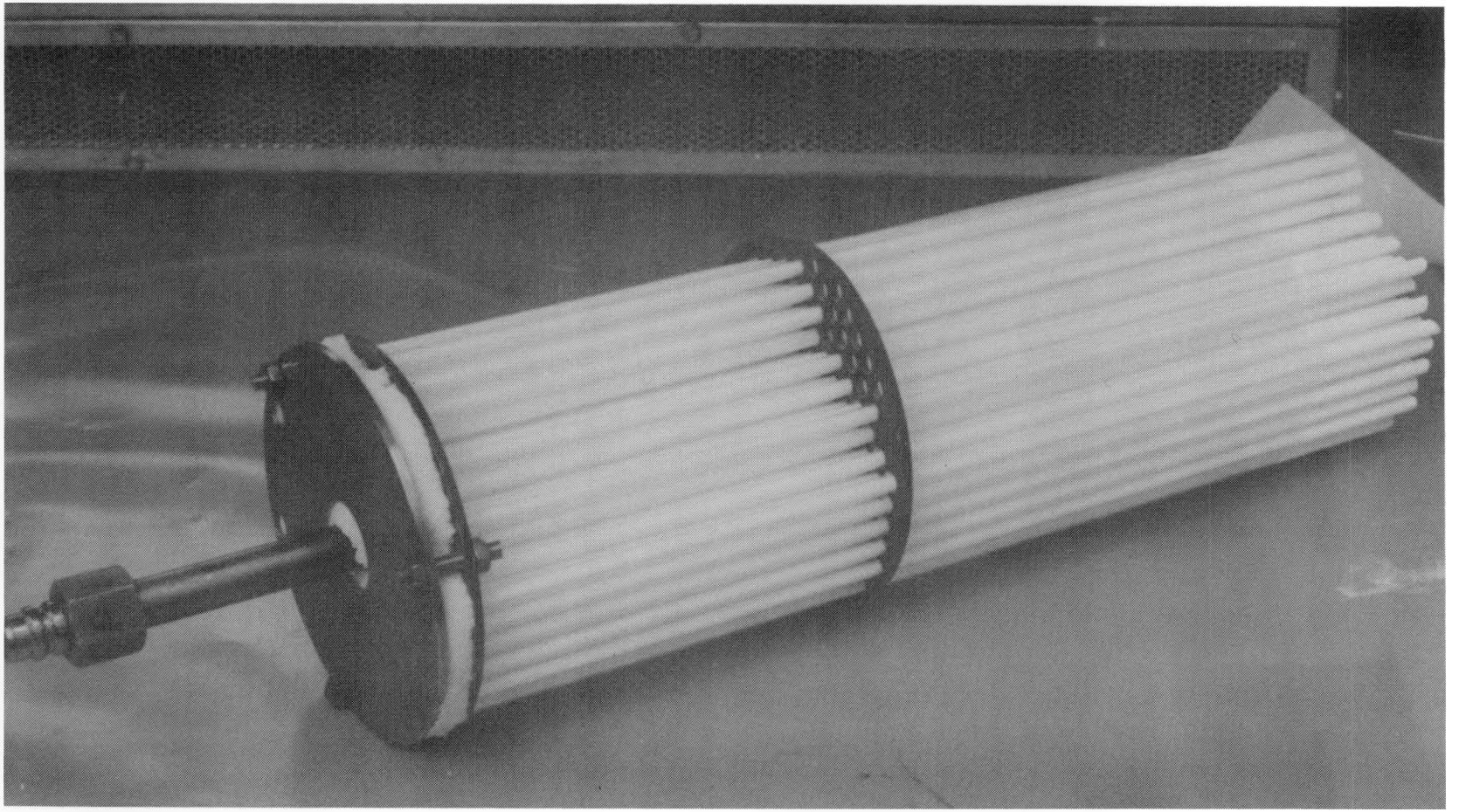


Fig. 10. Quartz Molds
U-Zr Alloy is Injected into the Molds

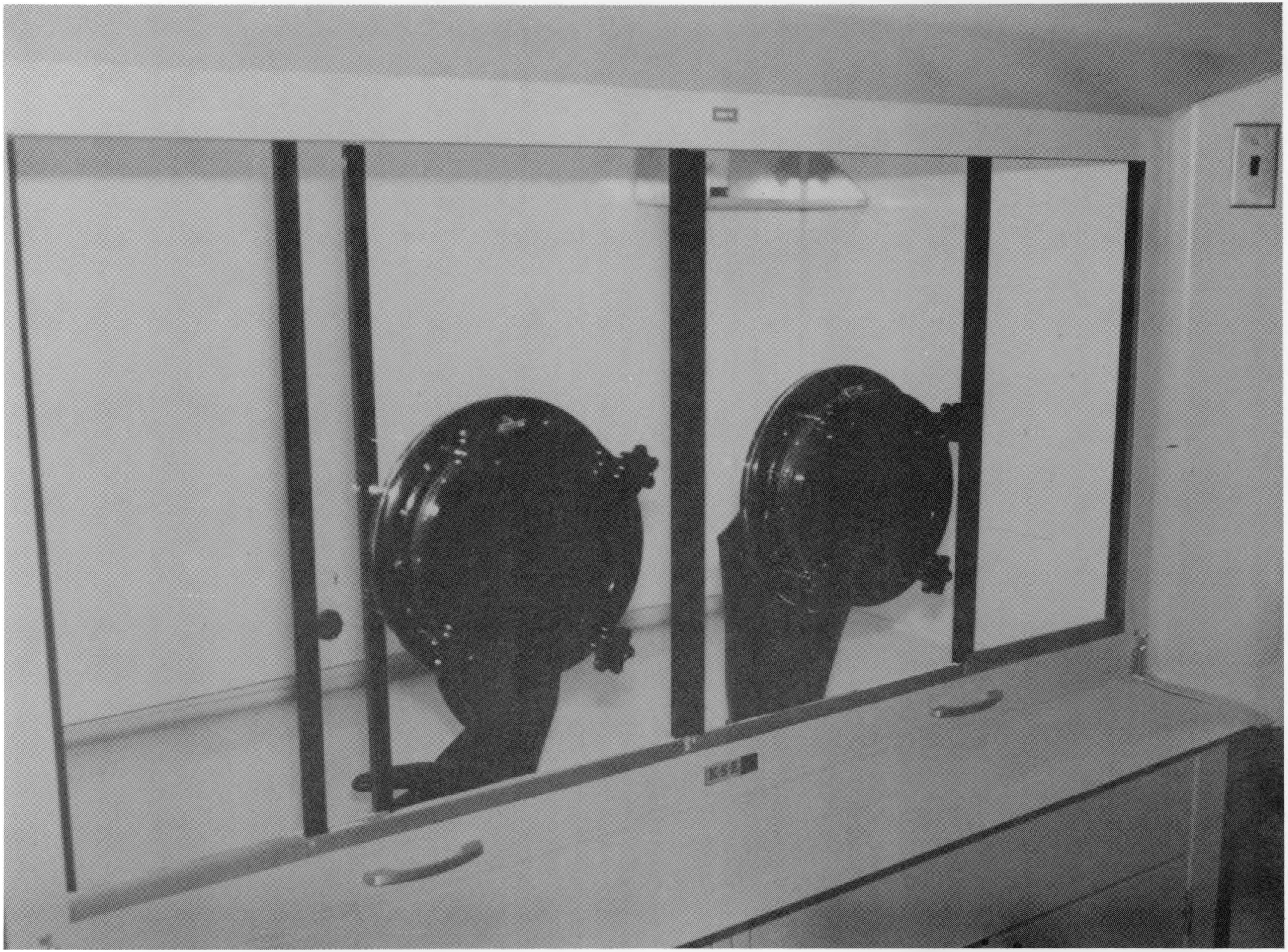


Fig. 11. Demolding and Shearing Hood

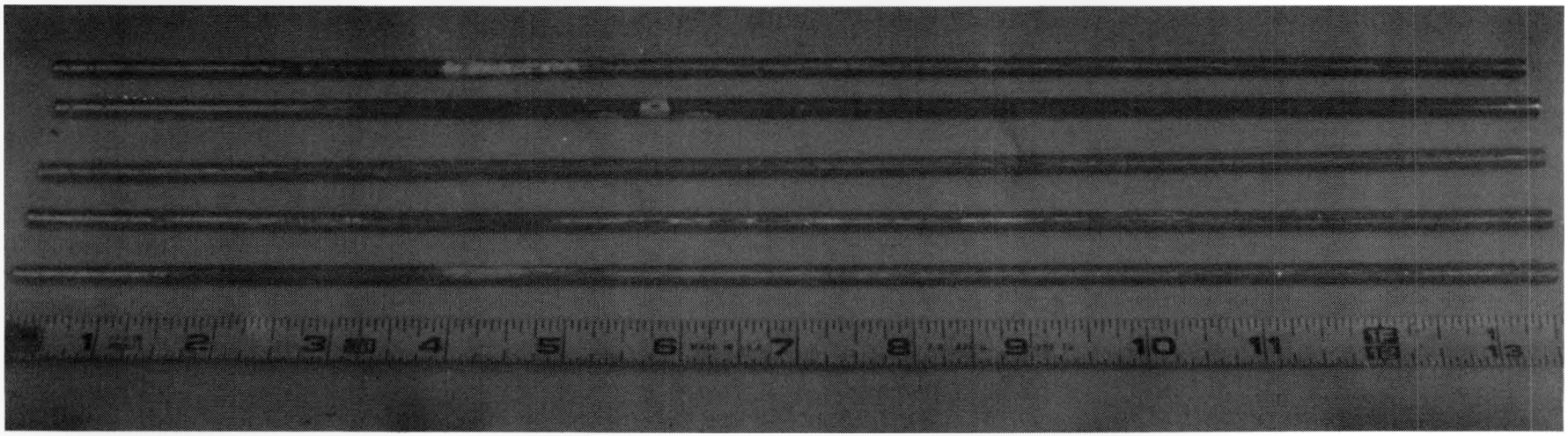


Fig. 12. Sheared Fuel Slugs

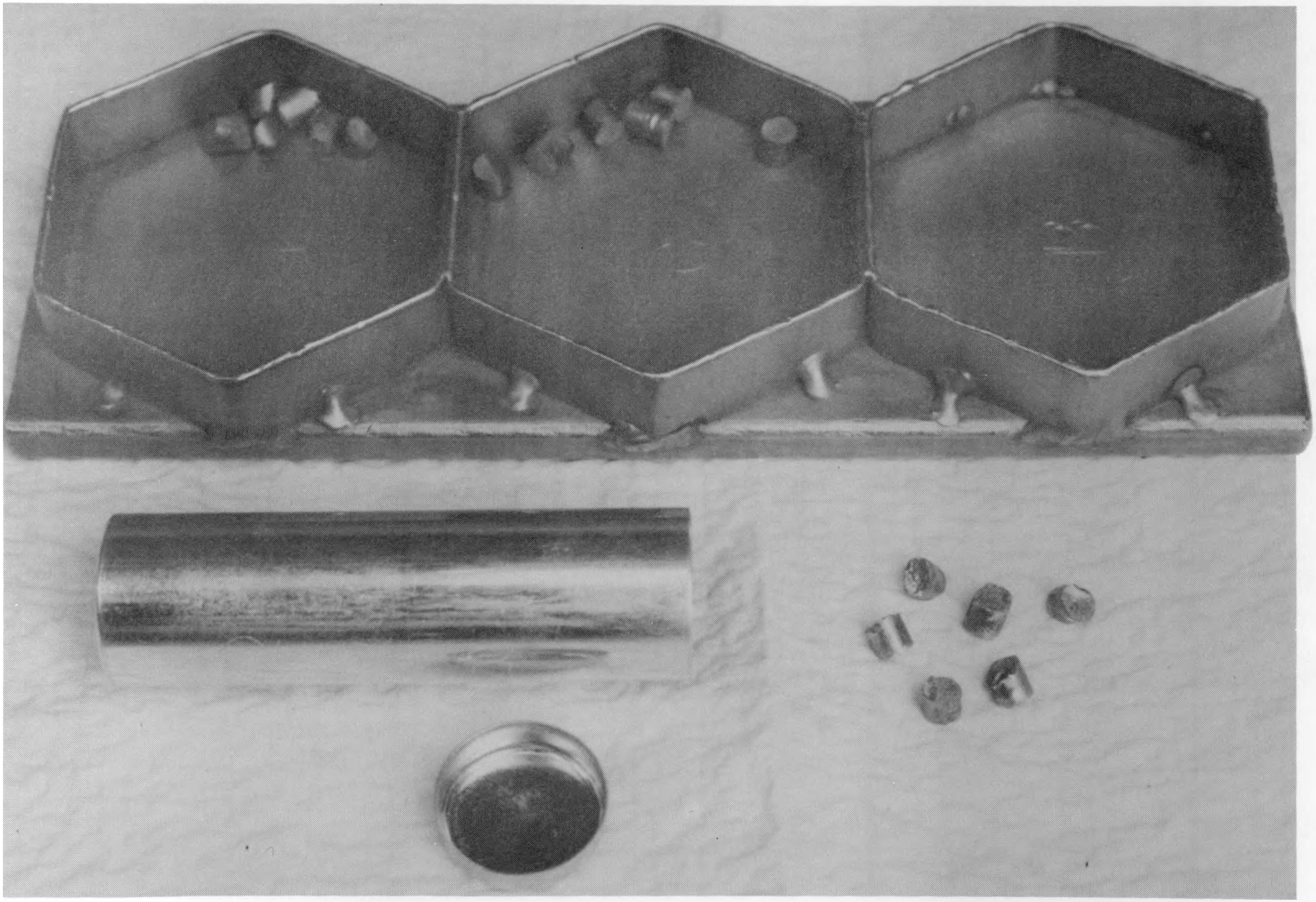


Fig. 13. Fuel Slug Samples

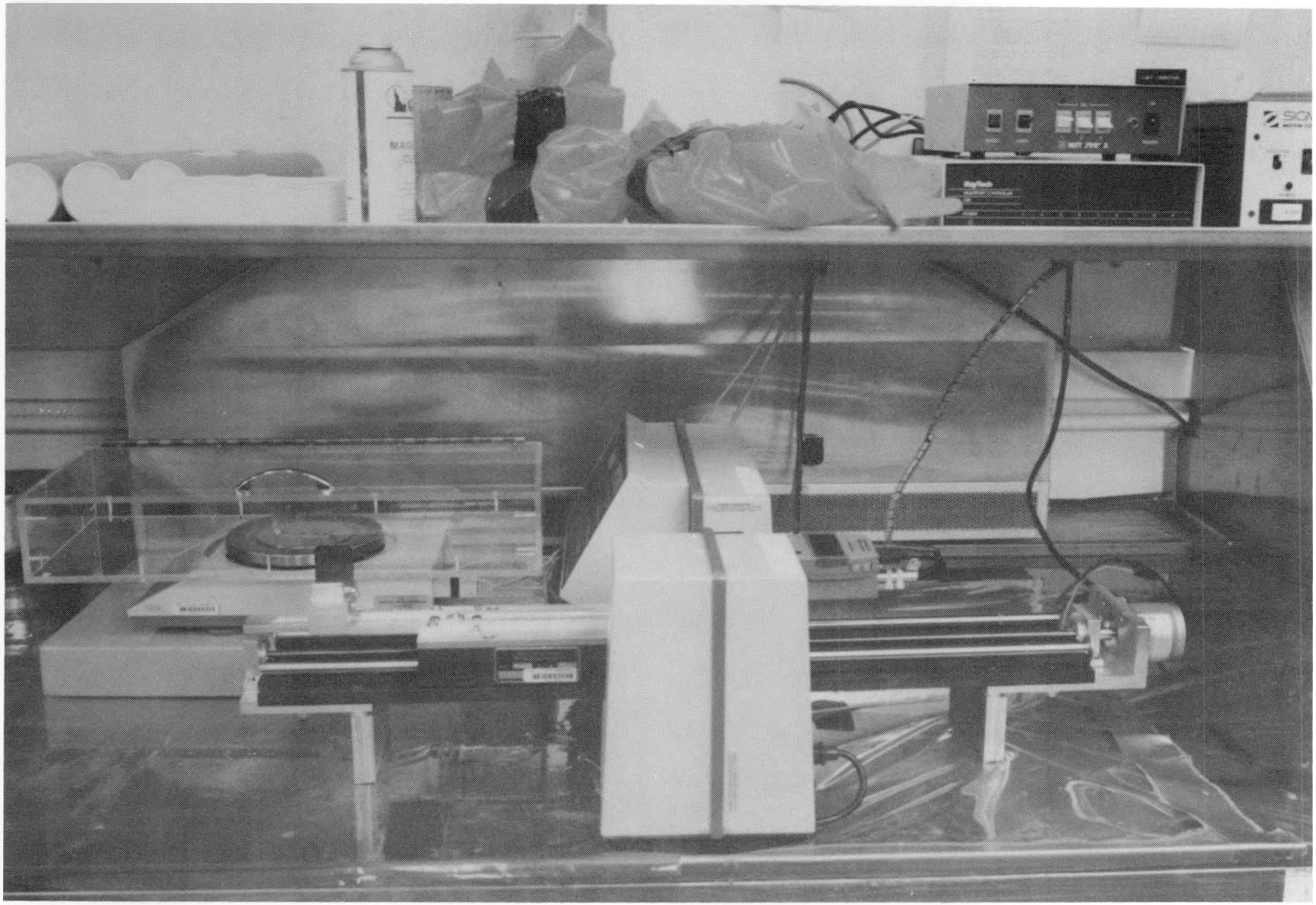


Fig. 14. Fuel Slug Processing

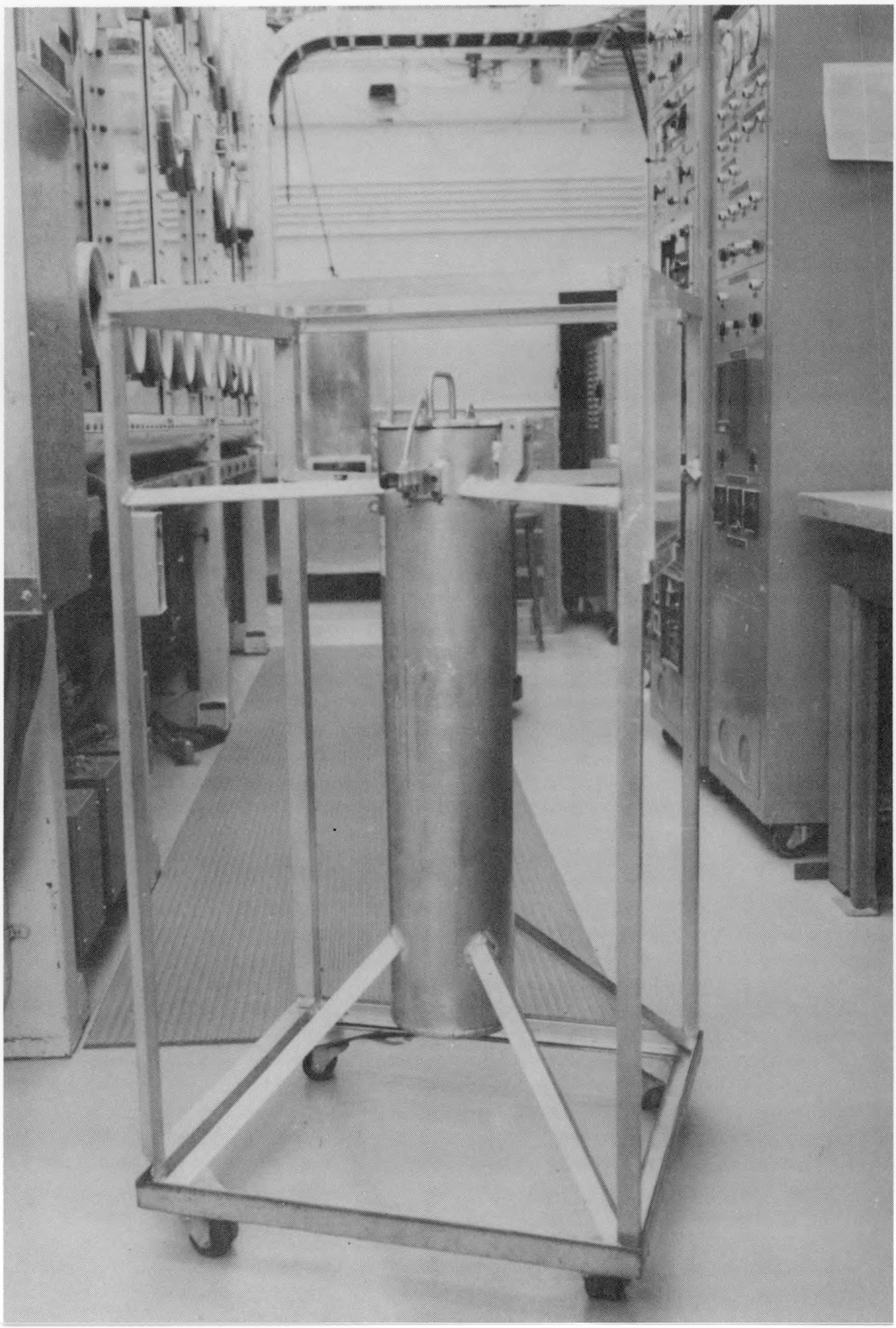


Fig. 15. Birdcage

FMF MAA TRANSFER SHEET

TRANSFER#: 11/16/89 09:38:15 FC
REQUESTOR: G.JACKSON
RECEIVER:
MOVED FROM: ZONE2 FC
MOVED TO: ZONE12 FC
CONTAINER SPM-CON

SPM BATCH#	DESCRIPTION	COUNT	ALLOY	URAN	U-235	Pu	Pu-Iso	Du	Du-235
189-020-60009-00000	C/ELEMENT/MKIIC-F-IC018	7	316.95	284.97	222.59	0.00	0.00	0.00	0.00
189-020-60009-10000	C/ELEMENT/MKIIC-F-IC018	3	136.03	122.30	95.54	20.00	10.00	0.00	0.00

TRANSFER TOTALS

PIECE
COUNT 10

ALLOY: 452.98
URAN: 407.27
U-235: 318.13
Pu: 20.00
Pu_Iso: 10.00
Du: 0.00
Du-235: 0.00

TRAN MADE BY: _____ 11/16/89 09:38:19

MBA CUSTODIAN: _____ 11/16/89 09:38:20

Fig. 16. Computer Generated Transfer

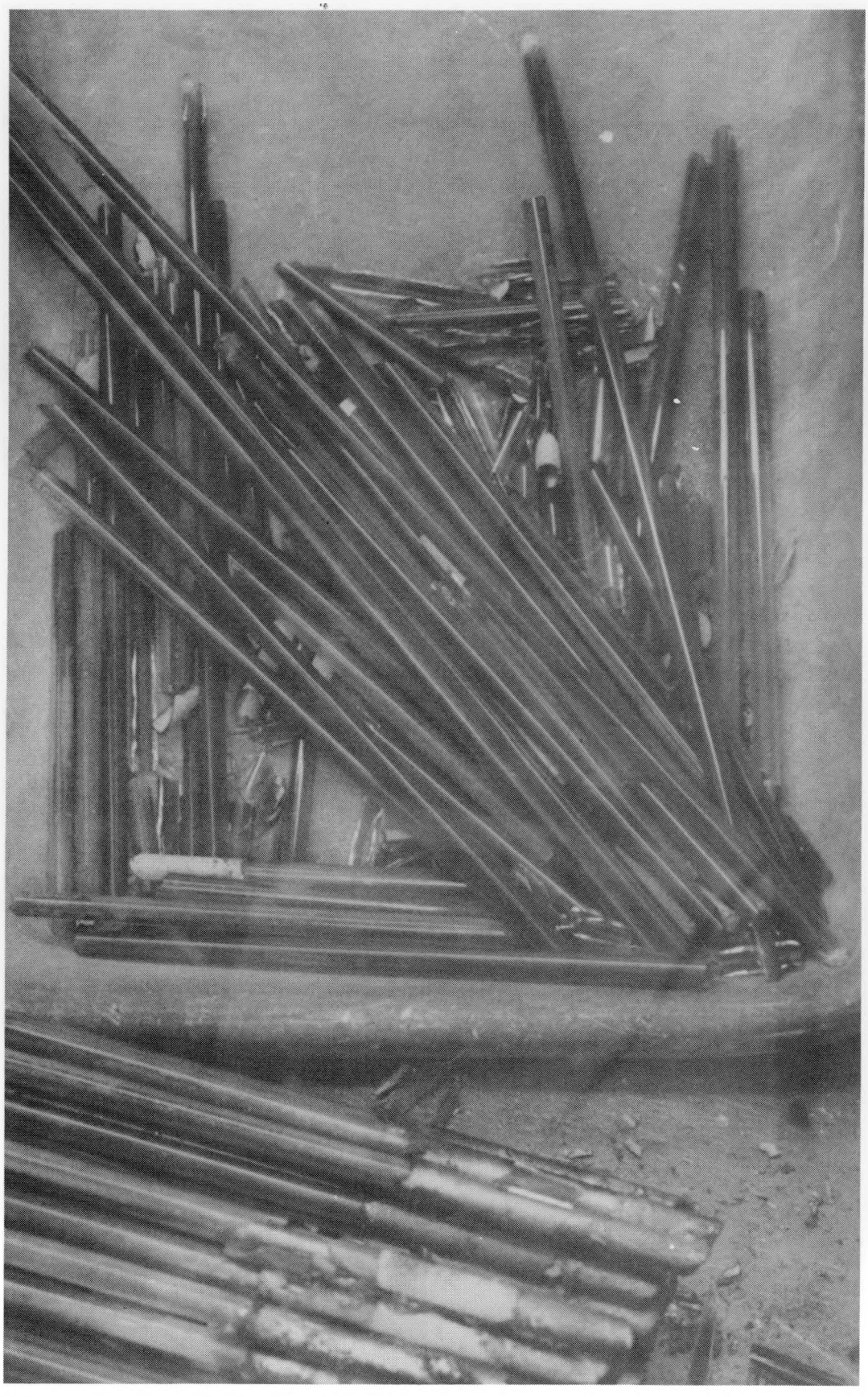
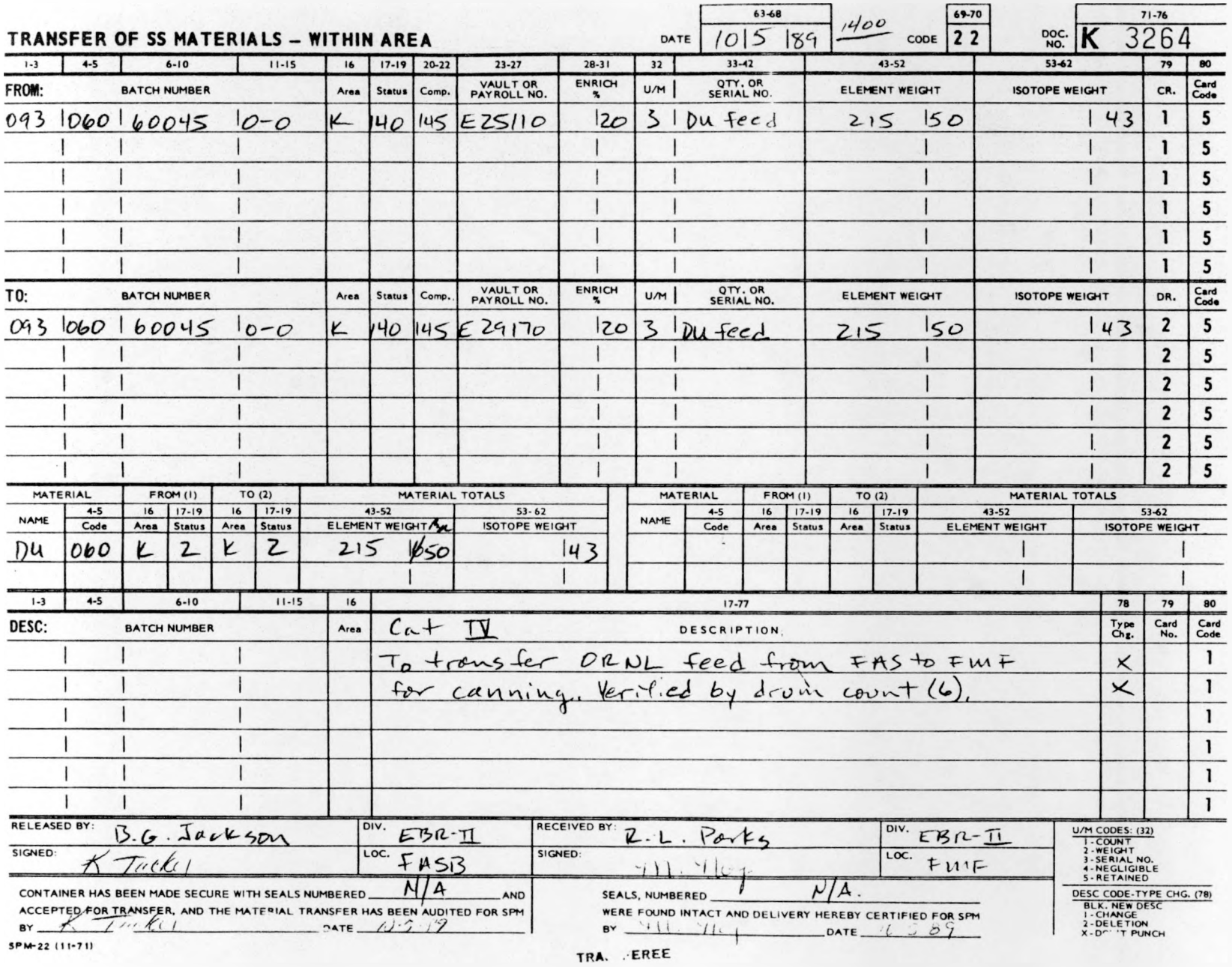


Fig. 17. Glass/Dust
Broken Glass from Quartz Molds After Demolding

Fig. 18. Fine/Fines
Small Pieces of Alloy Removed from the Broken Glass Molds After Demolding



TRANSFER OF SS MATERIALS – WITHIN AREA

DATE 10/5/89 1400 (63-68) CODE 22 (69-70) DOC. NO. K 3264 (71-76)

1-3	4-5	6-10	11-15	16	17-19	20-22	23-27	28-31	32	33-42	43-52	53-62	79	80
FROM:		BATCH NUMBER		Area	Status	Comp.	VAULT OR PAYROLL NO.	ENRICH %	U/M	QTY. OR SERIAL NO.	ELEMENT WEIGHT	ISOTOPE WEIGHT	CR.	Card Code
093	060	60045	0-0	K	40	145	E25110	20	3	DU feed	215 50	43	1	5
													1	5
													1	5
													1	5
													1	5
													1	5
TO:		BATCH NUMBER		Area	Status	Comp.	VAULT OR PAYROLL NO.	ENRICH %	U/M	QTY. OR SERIAL NO.	ELEMENT WEIGHT	ISOTOPE WEIGHT	DR.	Card Code
093	060	60045	0-0	K	40	145	E29170	20	3	DU feed	215 50	43	2	5
													2	5
													2	5
													2	5
													2	5
													2	5

MATERIAL NAME	MATERIAL Code (4-5)	FROM (1) Area (16)	FROM (1) Status (17-19)	TO (2) Area (16)	TO (2) Status (17-19)	MATERIAL TOTALS ELEMENT WEIGHT (43-52)	MATERIAL TOTALS ISOTOPE WEIGHT (53-62)
DU	060	K	2	K	2	215 50	143

MATERIAL NAME	MATERIAL Code (4-5)	FROM (1) Area (16)	FROM (1) Status (17-19)	TO (2) Area (16)	TO (2) Status (17-19)	MATERIAL TOTALS ELEMENT WEIGHT (43-52)	MATERIAL TOTALS ISOTOPE WEIGHT (53-62)

1-3	4-5	6-10	11-15	16	17-77	78	79	80
DESC:		BATCH NUMBER		Area	DESCRIPTION	Type Chg.	Card No.	Card Code
					Cat IV			1
					To transfer ORNL feed from FAS to FMF	X		1
					for canning. Verified by drum count (6).	X		1
								1
								1
								1
								1

RELEASED BY: B.G. Jackson — DIV. EBR-II — LOC. FAS3 — SIGNED: K Tucker

RECEIVED BY: R.L. Parks — DIV. EBR-II — LOC. FMF — SIGNED: [illegible]

CONTAINER HAS BEEN MADE SECURE WITH SEALS NUMBERED N/A AND ACCEPTED FOR TRANSFER, AND THE MATERIAL TRANSFER HAS BEEN AUDITED FOR SPM

BY K Tucker DATE 10-5-89

SEALS, NUMBERED N/A. WERE FOUND INTACT AND DELIVERY HEREBY CERTIFIED FOR SPM

BY [illegible] DATE 10-5-89

U/M CODES: (32)
1 - COUNT
2 - WEIGHT
3 - SERIAL NO.
4 - NEGLIGIBLE
5 - RETAINED

DESC CODE-TYPE CHG. (78)
BLK. NEW DESC
1 - CHANGE
2 - DELETION
X - DOUBLE PUNCH

SPM-22 (11-71)

TRANSFEREE

Fig. 19. SPM Permanent Transfer Document

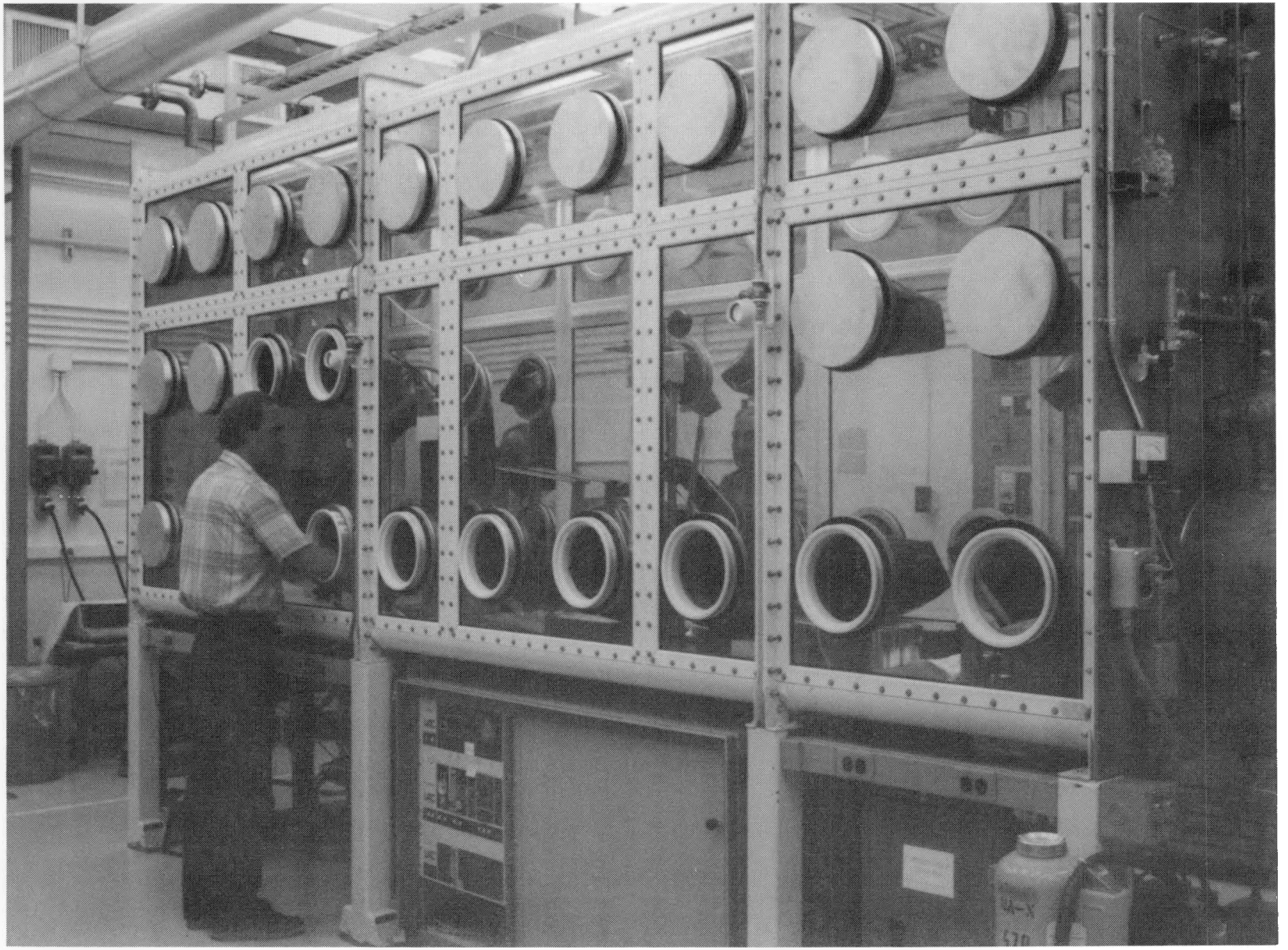


Fig. 20. Element Fabrication Glove Box

Fig. 21. Sodium Loading

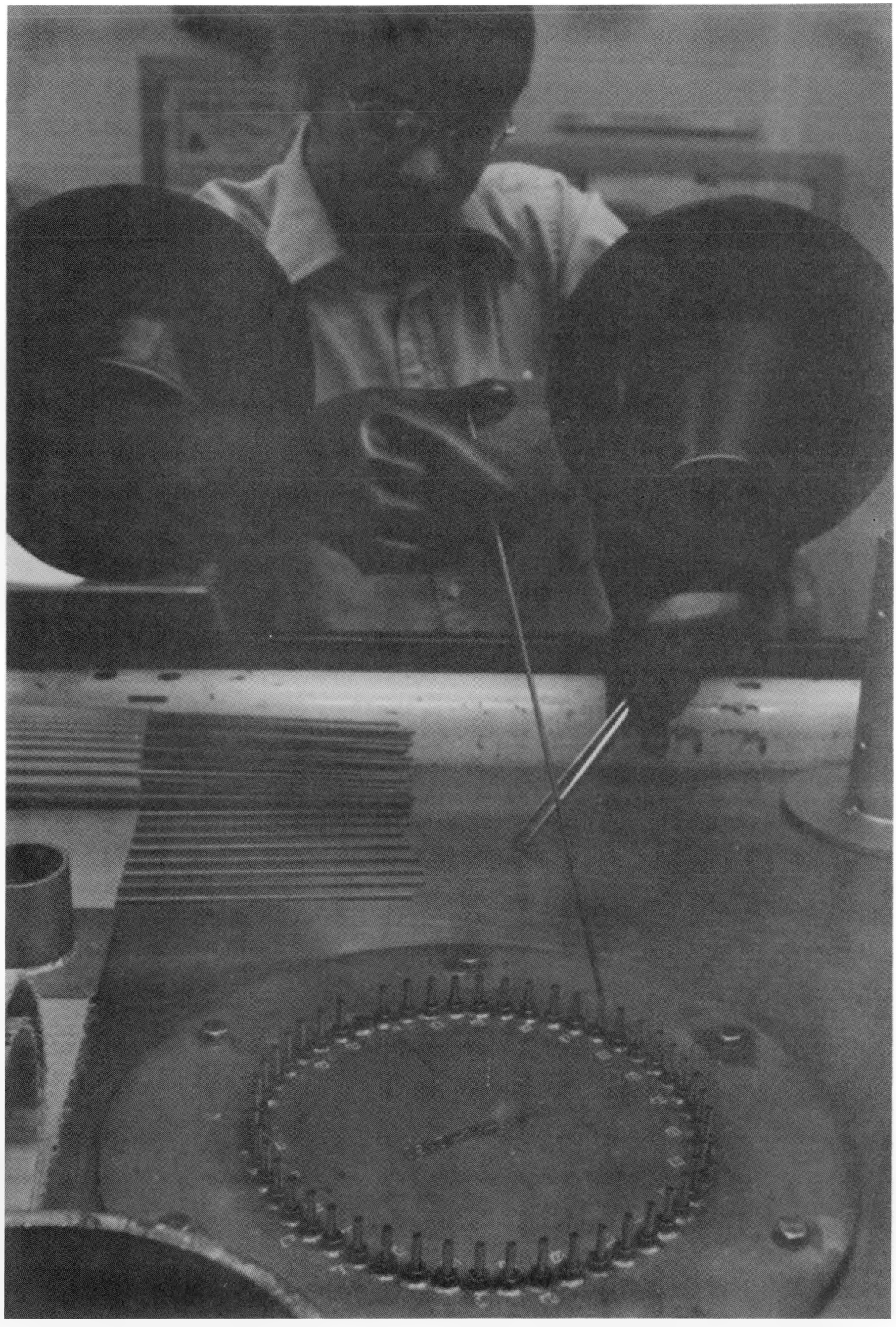


Fig. 22. Loading Fuel Slug into Jacket

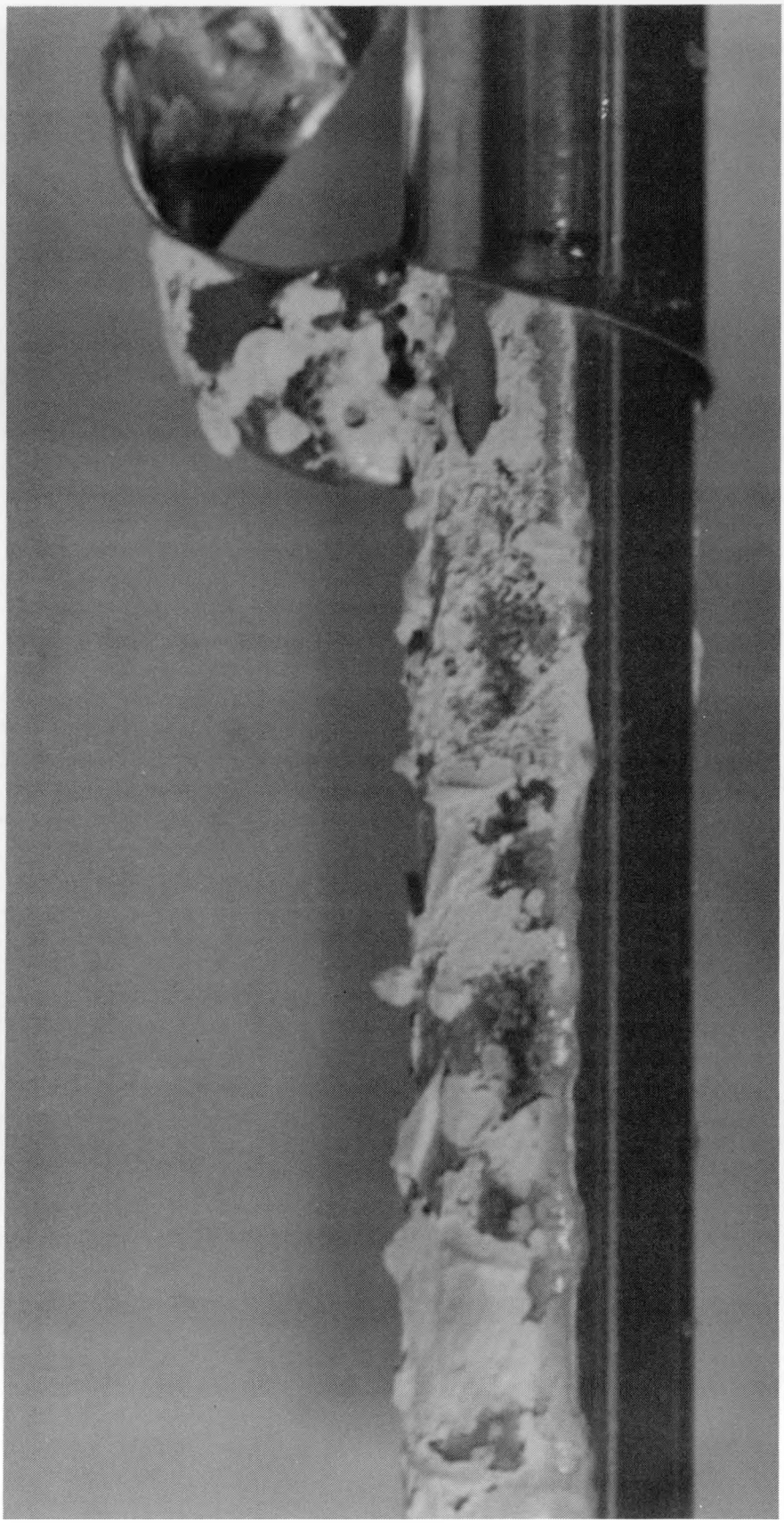


Fig. 23. Stripping a Reject Element

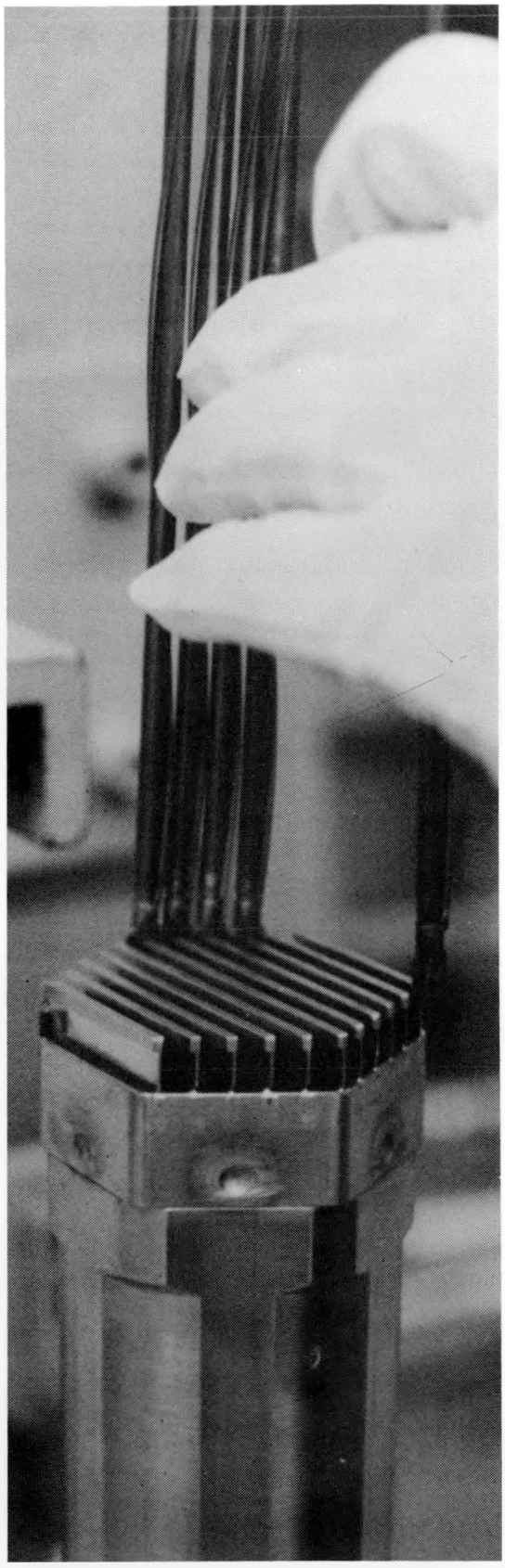


Fig. 24. Subassembly Manufacturing

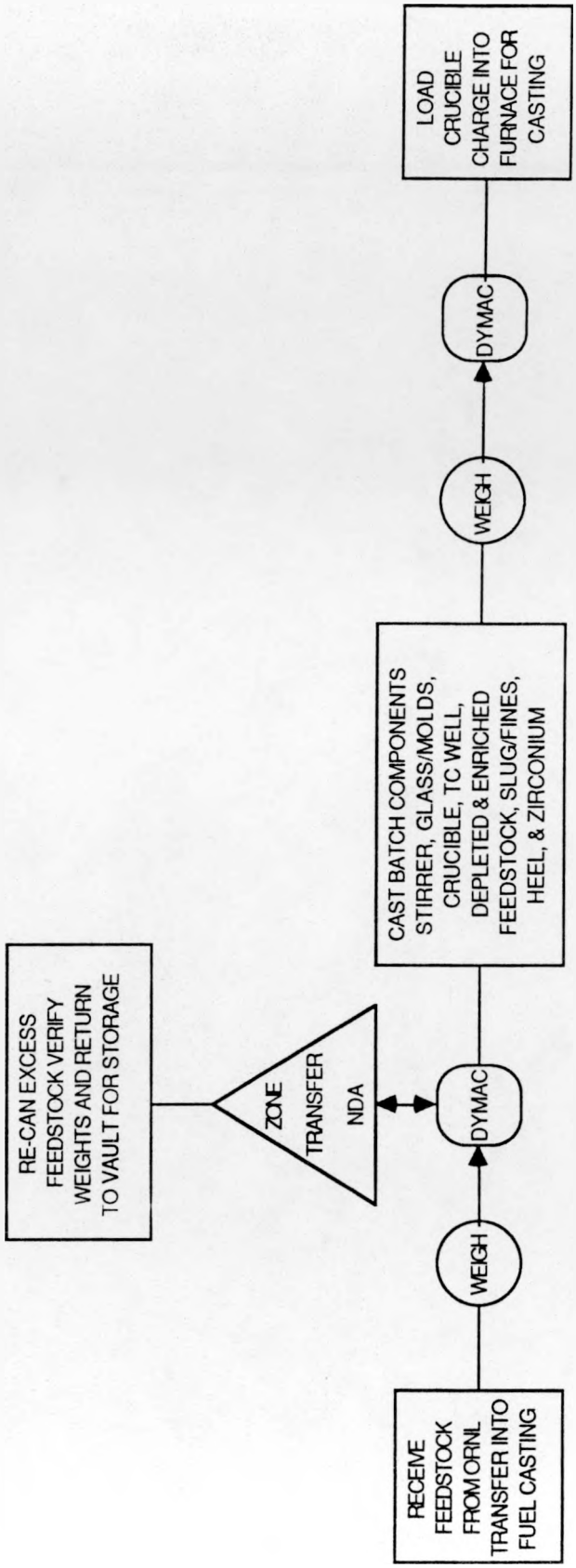


Fig. 25. Receive Feedstock and Preparing the Crucible Charge

```
                    <<< MAIN MENU >>>
              FC      COMPUTER VERSION 3.31     10/05/87

1) QUERIES                              (QMENU)

2) PREPARING THE CAST BATCH

3) PROCESSING THE CAST BATCH

4) DAILY ACTIVITIES

5) SHIP - RECEIVE - DELETE ITEMS

6) PROCESSING SLUGS

7) CONTAINER AND ZONE CHANGES

8) PROCESSING GLASS DUST

9) SPECIAL OPTIONS

          Enter option 1-9
```

Fig. 26. FC Main Menu

PREPARING THE CAST BATCH
FC COMPUTER VERSION 3.31 10/05/87

1) Print an inventory for SLUG PRODUCTION ZONE 2

2) Receive material (no floppy disk)

3) Add the crucible to the cast batch

4) Add the material to the cast batch

5) Add net weight of glass/molds

6) Add stirrer to the cast batch

7) Add more material to the cast batch

8)

9)

Enter option 0-9

Fig. 27. FC Submenu
Preparing the Cast Batch

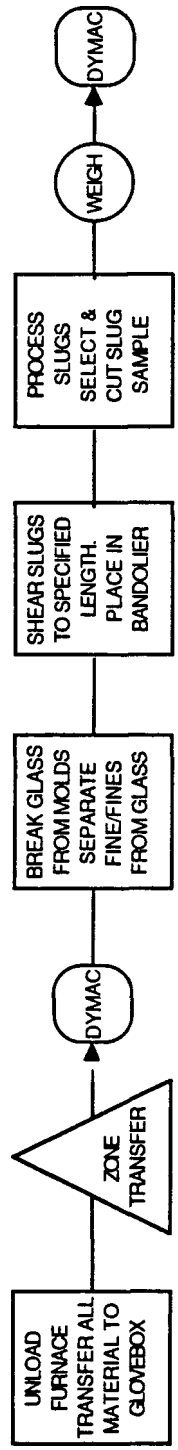


Fig. 28. Processing the Cast

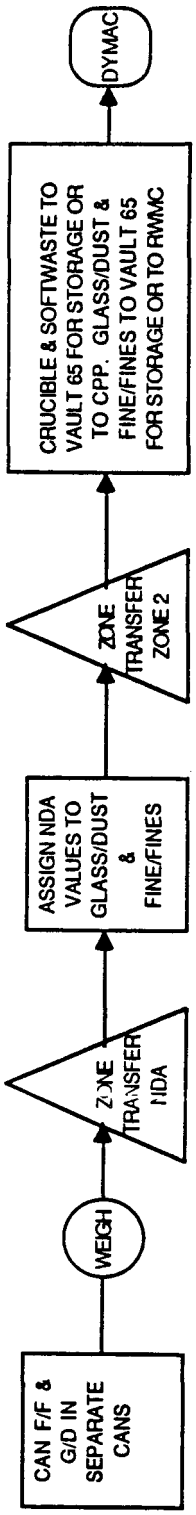


Fig. 29. Processing the Cast

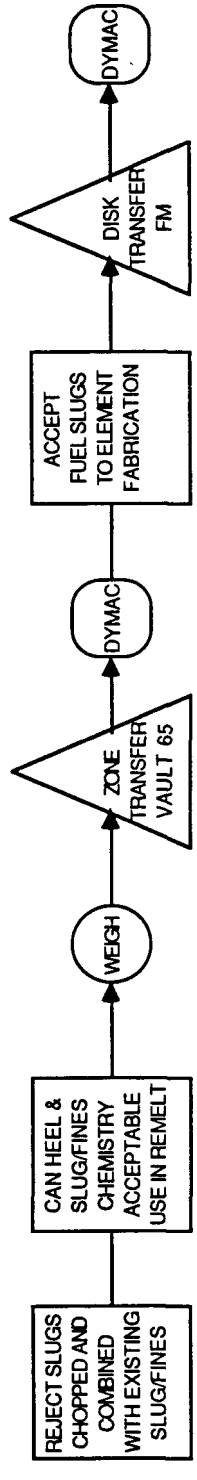


Fig. 30. Processing the Cast

PROCESSING THE CAST BATCH
FC COMPUTER VERSION 3.31 10/05/87

1) Print zone inventory

2) Clean up and weigh crucible

3) Enter the final stirrer weight

4) Split glass/dust into cans

5) Split slugs, slug/fines, fine/fines, heel, sample

6) Send remainder of cast batch to PHD

7) Put items into a container

8) Split out Fine/Fines

9)

Enter option 0-9

Fig. 31. FC Submenu
Processing the Cast Batch

PROCESSING SLUGS
FC COMPUTER VERSION 3.31 10/05/87

1) Add profilometer results and put slugs in birdcage

2)

3)

4)

5)

6)

7)

8)

9)

Enter option 0-9

Fig. 32. FC Submenu
Processing Slugs

PROCESSING GLASS DUST
FC COMPUTER VERSION 3.31 10/05/87

1) Put items into a container

2) Move container with glass/dust to a new zone

3) Enter new value of glass/dust from NDA

4) Write off a PHD to Waste Account

5)

6)

7)

8)

9)

Enter option 0-9

Fig. 33. FC Submenu
Processing Glass Dust

CONTAINER AND ZONE CHANGES
FC COMPUTER VERSION 3.31 10/05/87

1) Print zone inventory

2) Put items into a container

3) Empty a container

4) Move container to a new zone

5) Move items to new container (enter consecutive serial#s)

6) Print all containers in a room

7) Print a tag for a container

8)

9)

Enter option 0-9

Fig. 34. FC Submenu
Container and Zone Changes

SHIP - RECEIVE - DELETE ITEMS
FC COMPUTER VERSION 3.31 10/05/87

1) Ship container to another room (floppy disk)

2) Ship container out of FC (no floppy disk)

3) Receive a container from another room (floppy disk)

4) Receive items into FC (no floppy disk)

5) Delete a container from FC (floppy disk)

6)

7)

8)

9)

Enter option 0-9

Fig. 35. FC Submenu
Ship - Receive - Delete

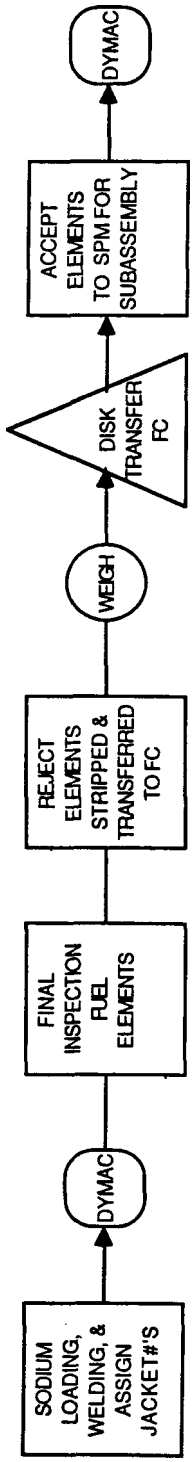


Fig. 36. Element Fabrication

ELEMENT FABRICATION
FM COMPUTER VERSION 3.31 10/05/87

1) Pair half slugs and calculate Na Load

2) Put multiple slugs into jackets

3) Edit jacket file (floppy disk)

4) Add jacket numbers to inventory

5) Print Element Report (single-slug elements)

6) Print Element Report (multiple-slug elements)

7) Modify an element (stripping, changing jacket#, etc.)

8) Calculate Na Load for single-slugs element

9)

Enter option 0-9

Fig. 37. FC Submenu
Element Fabrication

<<< MAIN MENU >>>

FM COMPUTER VERSION 3.31 10/05/87

1) QUERIES

2) ELEMENT FABRICATION

3) CONTAINER AND ZONE CHANGES

4) SHIPPING OR LOADING MATERIALS

5) DELETE ITEMS SHIPPED FROM FM

6) RECEIVE ITEMS AND CONTAINERS

7) CHEMISTRY

8) DAILY ACTIVITIES

9) SPECIAL OPTIONS

Enter option 1-9

Fig. 38. FM Main Menu

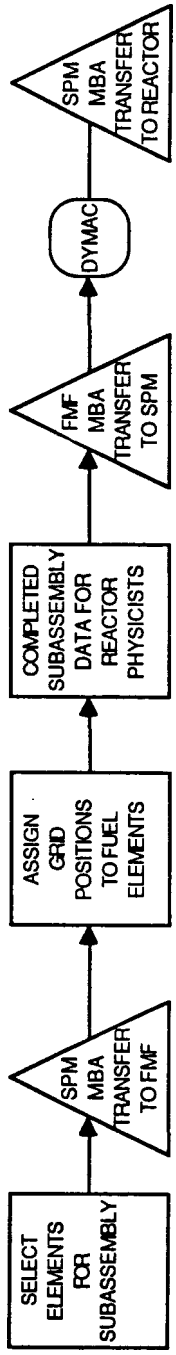


Fig. 39. Subassembly Manufacturing

```
                    <<< MAIN MENU >>>
              SA    COMPUTER VERSION 3.31    10/05/87

1) QUERIES

2) EXTRA QUERIES MENU

3) SUBASSEMBLY MANUFACTURING

4) SHIP - RECEIVE - DELETE ITEMS

5) BUILD DUMMY ELEMENTS / MODIFY AN ELEMENT (JACKET#S, ETC.)

6) CHEMISTRY

7) CONTAINER AND ZONE CHANGES

8) SPECIAL OPTIONS

9)

          Enter option 1-9
```

Fig. 40. SA Main Menu

SUBASSEMBLY MANUFACTURING
SA COMPUTER VERSION 3.31 10/05/87

1) Build a subassembly

2) Print a Subassemlby Report (all types)

3) Edit a jacket number and/or grid position

4)

5)

6)

7)

8)

9)

Enter option 0-9

Fig. 41. SA Submenu
Subassembly Manufacturing

EXAMPLE A:

ALLOY WEIGHT = 4630.10

COMPOSITION = 89.91 %

ENRICHMENT = 78.18 %

(4630.10 * 89.91 %) / 100 = 4162.92 (URANIUM WEIGHT)

(4162.92 * 78.18 %) / 100 = 3254.57 (U-235 WEIGHT)

EXAMPLE B:

ALLOY WEIGHT = 4630.10

URANIUM WEIGHT = 4162.92

U-235 WEIGHT = 3254.57

(3254.57 / 4162.92) * 100 = 78.18 %

(4162.92 / 4630.10) * 100 = 89.91

Fig. 42. Material Weight Calculations

CHEMISTRY
FM COMPUTER VERSION 3.31 10/05/87

1) Adjust chemistry values (U-234, U-236, U-238, Zr)

2) Adjust chemistry values (Uranium, U-235 MBA CUST. APPROVAL)

3)

4)

5)

6)

7)

8)

9)

Enter option 0-9

Fig. 43. FM Submenu
Chemistry

VII. PC-DYMAC USERS MANUAL

A. Introduction

This manual describes in detail the necessary steps for operating the computer system used for Material Control & Accountability (MC&A) in FMF and FASB. The manual is written in relation to the fuel fabrication process. Each menu option is shown as it is on the PC-DYMAC menu for a particular computer station, it is followed by the location of the menu option (e.g., CC1,1 is the central computer main menu 1, submenu 1).

B. Notational Conventions

The following terms and conventions are used throughout this manual.

Keynames - The names of keys are spelled out in this manual and appear in capital letters (e.g., ESCAPE, ENTER, CONTROL). On the keyboard, the key caps are abbreviated. The ESCAPE key is labeled Esc, the CONTROL key is labeled Ctrl, and the Page Down key is labeled Pg Dn.

Single Quotes - Words appearing inside a single quote indicate a command as it will actually appear on the computer screen.

Bold Print - Indicates words or characters you type as a response to a command from the computer screen.

C. Operating Instructions

1. Receiving Feedstock and Preparing the Crucible Charge

1.1 This section provides instructions for the user on the necessary steps for bringing feedstock into the fuel casting area and how to prepare the crucible charge.

1.1.1 Select FC Main menu option (2) 'PREPARE THE CAST BATCH' by pressing number 2.

1.1.2 Press the ENTER key.

1.1.3 The submenu 'Preparing the Cast Batch' will be displayed.

1.1.4 Press (2) 'Receive material (no floppy disk)'. This is used to receive the material into the fuel casting inventory.

1.1.5 Screen display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

1.1.6 The screen display, 'IS THE ITEM IN A CONTAINER (Y/N)'.

1.1.6.1 A YES answer will request the name of the container.

1.1.6.2 A NO answer will display the screen, 'IS THE ITEM A COLLECTION (Y/N)'.

1.1.6.2.1 A YES answer requests the name of the collection.

1.1.6.2.2 A NO answer displays a series of prompts regarding the item being received.

1.1.6.3 Enter the information

1.1.6.4 Press the ENTER key to display the next screen.

1.1.6.5 ENTER ZONE — Enter the zone the item will be in. DO NOT LEAVE BLANK.

1.1.6.6 BATCH NUMBER — Enter the casting batch number. If one does not exist enter some form of number that will help identify the item. DO NOT LEAVE BLANK.

1.1.6.7 SLUG NUMBER — If the item is a slug enter the number. If not, press the ENTER key.

1.1.6.8 SLUG STATUS — If the item is a slug or an element enter the status (A,I,R), or press the ENTER key.

1.1.6.9 PRODUCT DESCRIPTION — The description of the item, SLUG, ELEMENT, FEEDSTOCK, etc. The product description must be an acceptable one (see the PC-DYMAC Glossary for a list of all acceptable product descriptions.)

1.1.6.10 TRANSFER# — Enter the transfer number from the SPM transfer document. If a number is not available enter the date of transfer.

1.1.6.11 JACKET# — Enter the jacket number if the item is an element. If not press the ENTER key.

1.1.6.12 SEAL NO — Press the ENTER key.

1.1.6.13 SPM NO — Enter the SPM BATCH NUMBER from the SPM transfer document.

1.1.6.14 REMARKS — Enter any useful remarks that may pertain to the item.

NOTE: Weights of an item can be entered two ways; by the actual weight or by percentages. The actual weights are preferred.

1.1.7 The screen will display, 'Do you want to enter actual weights (Y/N)'.

1.1.8 A YES answer displays a list of all weights to enter.

1.1.9 A NO answer displays a list of percentages to enter.

NOTE: When entering zirconium both the alloy weight and net amount weight must be entered. When entering the stirrer, crucible, and glass molds, enter only the net amount weight.

1.1.10 Enter the necessary weights or percentages.

1.1.11 Press the ENTER key after entering each weight or percentage.

1.1.12 The screen will display, 'XFER REMARKS'. Enter remarks pertaining to the origin of the item, (e.g., feedstock from SPM).

1.1.13 The screen will display, 'IS THIS TRANSACTION OK'. Check all the information entered for accuracy. If an error is found answer NO. The transaction will not be processed and the submenu will be displayed. A YES answer processes the transaction and returns to the submenu.

1.1.14 Select submenu (3) 'Add the crucible to the cast batch'. This begins the process for combining the material for the crucible charge.

1.1.15 The screen will display, 'CRUCIBLE FOR CAST BATCH (serial number)'. This gives the serial number for the newly created cast batch.

NOTE: RECORD THE CAST BATCH SERIAL NUMBER FOR FUTURE REFERENCE.

1.1.16 The screen will display, 'ENTER SERIAL NO'. Enter the serial number of the crucible stock account.

1.1.17 Press the ENTER key.

NOTE: The crucible stock account serial number is available from a computer generated zone inventory (See Section C-5.2 Reports and Computer Listings).

1.1.18 The item belonging to the serial number entered will be displayed on the screen. Displayed at the bottom of the screen is the prompt 'IS THIS THE ITEM YOU WANT (Y/N)'.

1.1.19 A NO answer displays the screen, 'ENTER SERIAL NO'.

1.1.20 A YES answer displays the screen, 'ENTER CAST BATCH NUMBER'. Enter the cast batch number for the cast batch, (e.g., MKIII-F-IC001).

1.1.21 Press the ENTER key.

1.1.22 The screen will display, 'SPM NO'. Enter the SPM Batch Number assigned to the cast batch by SPM.

1.1.23 Press the ENTER key.

1.1.24 The screen will display, 'INSTRUMENT ID'. Enter B, for the instrument identification number.

1.1.25 Press the ENTER key.

1.1.26 The screen will display, 'WT OF CRUCIBLE + TC WELL + WASH'. Enter the combined weight of the coated crucible and the TC well.

1.1.27 Press the ENTER key.

1.1.28 The screen will display, 'XFER REMARKS'. Enter remarks pertaining to the operation being performed.

1.1.29 Press the ENTER key.

1.1.30 The screen will display, 'IS THE TRANSACTION OK? (Y/N)'.

1.1.31 A NO answer does not process the transaction and returns to the submenu.

1.1.32 A YES answer processes the transaction and returns to the submenu.

1.1.33 Select submenu (4) 'ADD MATERIAL TO THE CAST BATCH'. This adds all the alloy material to the injection cast.

1.1.34 The screen display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

1.1.35 The screen will display, 'CAST BATCH SERIAL NUMBER'. Enter the serial number for the cast batch. This number was assigned by the computer when the weight of the coated crucible was entered.

1.1.36 Press the ENTER key.

1.1.37 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)',

1.1.38 A NO answer returns the screen to select another item.

1.1.39 A YES answer displays on the screen, 'METAL TO BE ADDED TO CAST BATCH - ENTER SERIAL NUMBER'. Enter the serial number of the material to be added to the cast batch.

1.1.40 Press the ENTER key.

NOTE: Serial numbers for the material to be added are available from a computer generated zone inventory (see Section C-5.2 Reports and Computer Listings).

1.1.41 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

1.1.42 A NO answer returns the screen to select another item.

1.1.43 A YES answer displays the screen, 'INSTRUMENT ID'. Enter B, for the instrument identification number.

1.1.44 Press the ENTER key.

1.1.45 The screen will display, 'TRANSFER AMOUNT - WEIGHT OF METAL TO BE ADDED'. Enter the alloy weight of the material being added to the cast batch.

1.1.46 Press the ENTER key.

1.1.47 The screen will display, 'TO ITEM INFORMATION - REMARKS'. Enter **CAST BATCH.**

1.1.48 Press the ENTER key.

1.1.49 The screen will display, 'SPM NO'. Enter the SPM Batch Number assigned to the cast batch by SPM.

1.1.50 Press the ENTER key.

1.1.51 The screen will display, 'XFER REMARKS'. Enter information pertaining to the transaction.

1.1.52 Press the ENTER key.

1.1.53 The screen will display, 'IS THE TRANSACTION OK? (Y/N)'.

1.1.54 A NO answer does not process the transaction and returns to the submenu.

1.1.55 A YES answer processes the transaction and returns to the submenu.

1.1.56 The screen display, 'DO YOU HAVE MORE TO COMBINE (Y/N)'.

1.1.57 A NO answer exits the combining option and returns to the submenu.

1.1.58 A YES answer repeats steps 1.1.33 through 1.1.53.

1.1.59 Select the submenu (5), 'Add Net Weight of Glass/Molds'. This adds the weight of the glass/molds.

1.1.60 Press the ENTER key.

1.1.61 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

1.1.62 The screen will display, 'CAST BATCH - SERIAL NUMBER'. Enter the serial number of the cast batch.

1.1.63 Press the ENTER key.

1.1.64 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

1.1.65 A NO answer returns the screen to select another item.

1.1.66 A YES answer displays on the screen, 'GLASS MOLDS STOCK ACCOUNT'. Enter the serial number for the glass/molds stock account.

NOTE: The glass/molds stock account serial number is available from a computer generated zone inventory (See Section C-5.2 Reports and Computer Listings).

1.1.67 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

1.1.68 A NO answer returns the screen to select another item.

1.1.69 A YES answer displays on the screen, 'INSTRUMENT ID'. Enter **B** for the instrument identification number.

1.1.70 Press the ENTER key.

1.1.71 The screen will display, 'TRANSFER AMOUNT WEIGHT OF GLASS/MOLDS ONLY'. Substract the weight of the pallet from the total weight of the coated glass/molds and pallet. Enter only this weight.

1.1.72 Press the ENTER key.

1.1.73 The screen will display, 'TO ITEM INFORMATION REMARKS'. Enter **CAST BATCH.**

1.1.74 Press the ENTER key.

1.1.75 The screen will display, 'SPM NO'. Enter the SPM batch number assigned to the cast batch.

1.1.76 Press the ENTER key.

1.1.77 The screen will display, 'XFER REMARKS'. Enter information pertaining to the transaction, (e.g., glass/molds MKIII-F-IC001).

1.1.78 Press the ENTER key.

1.1.79 The screen will display, 'IS THE TRANSACTION OK? (Y/N)'.

1.1.80 A NO answer does not process the transaction and returns to the submenu.

1.1.81 A YES answer processes the transaction and returns to the submenu.

1.1.82 Select the submenu (6), 'ADD STIRRER TO THE CAST BATCH'. This adds the actual weight of the stirrer to the cast batch.

1.1.83 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

1.1.84 The screen will display, 'CAST BATCH - ENTER SERIAL NO'. Enter the serial number of the cast batch.

1.1.85 Press the ENTER key.

1.1.86 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

1.1.87 A NO answer returns the screen to select another item.

1.1.88 A YES answer displays on the screen, 'STIRRER TO BE USED WITH THIS CAST BATCH - ENTER SERIAL NO'. Enter the serial number of the stirrer to be used.

1.1.89 Press the ENTER key.

1.1.90 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

1.1.91 A NO answer returns the screen to select another item.

1.1.92 A YES answer displays on the screen, 'INSTRUMENT ID'. Enter B for the instrument identification number.

1.1.93 Press the ENTER key.

1.1.94 The screen will display, 'ENTER WEIGHT OF STIRRER'. Enter the actual weight of the stirrer.

1.1.95 Press the ENTER key.

NOTE: The difference in the weight of the stirrer before and after the cast determines the amount of alloy material that adheres to the stirrer during a cast. This continuous buildup (and possible depletion) of material must be accounted for throughout the life of the stirrer.

1.1.96 The screen will display, 'TO ITEM INFORMATION - REMARKS'. Enter **CAST BATCH.**

1.1.97 Press the ENTER key.

1.1.98 The screen will display, 'SPM NO'. Enter the SPM batch number assigned to the cast batch.

1.1.99 Press the ENTER key.

1.1.100 The screen will display, 'XFER REMARKS'. Enter information pertaining to the transaction.

1.1.101 Press the ENTER key.

1.1.102 The screen will display, 'IS THE TRANSACTION OK? (Y/N)'.

1.1.103 A NO answer will not process the transaction and returns to the submenu.

1.1.104 A YES answer processes the transaction and returns to the submenu.

NOTE: At completion of step 1.1.104 the 'CAST BATCH' has been created with its own unique serial number. Its weight is the combined weights of the coated crucible, stirrer, coated glass/molds, TC well, and alloy material. These weights must agree with the weights from the Process Data Sheet for Slug Manufacturing.

2. Processing the Cast

2.1 This section provides instructions for the user on the necessary steps to split out the product and byproducts from the crucible charge.

NOTE: A computer generated zone inventory printout is necessary to process the cast batch (see Section C-5.2 Reports and Computer Listings).

2.1.1 Select FC Main menu option (3), 'PROCESSING THE CAST' by pressing the number 3.

2.1.2 Press the ENTER key.

2.1.3 The submenu 'Processing the Cast', will be displayed.

2.1.4 Submenu (2), 'Clean up and weigh crucible'. This is used to enter the weight of the cleaned crucible.

2.1.5 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

2.1.6 The screen will display, 'CRUCIBLE ACCOUNT NO. - ENTER SERIAL NUMBER'. Enter the serial number of the crucible used in the cast batch.

2.1.7 Press the ENTER key.

2.1.8 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

2.1.9 A NO answer returns the screen to select another item.

2.1.10 A YES answer displays on the screen, 'CAST BATCH - ENTER SERIAL NO'. Enter the serial number of the cast batch.

2.1.11 Press the ENTER key.

2.1.12 The item belonging to the specific serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

2.1.13 A NO answer returns the screen to select another item.

2.1.14 A YES answer displays on the screen, 'INSTRUMENT ID'. Enter B, for the instrument identification number.

2.1.15 Press the ENTER key.

2.1.16 The screen will display, 'ENTER WEIGHT OF CLEANED CRUCIBLE'. Enter the weight of the crucible after cleaning.

2.1.17 Press the ENTER key.

2.1.18 The screen will display, 'TO ITEM INFORMATION - REMARKS'. Enter information pertaining to the transaction.

2.1.19 Press the ENTER key.

2.1.20 The screen will display, 'SPM NO'. Enter the SPM batch number assigned to the cast batch by SPM.

2.1.21 Press the ENTER key.

2.1.22 The screen will display, 'XFER REMARKS'. Enter remarks pertaining to the operation being performed.

2.1.23 Press the ENTER key.

2.1.24 The screen will display, 'IS THE TRANSACTION OK (Y/N)'.

2.1.25 A NO answer does not process the transaction and returns to the submenu.

2.1.26 A YES answer processes the transaction and returns to the submenu.

2.1.27 Select submenu (3), 'Enter the final stirrer weight'. This permits the computer to calculate the amount of material on the stirrer.

2.1.28 Press the ENTER key.

2.1.29 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

2.1.30 The screen will display ,'STIRRER USED IN THIS CAST BATCH - ENTER SERIAL NUMBER'. Enter the serial number of the stirrer used in the cast batch.

2.1.31 Press the ENTER key.

2.1.32 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

2.1.33 A NO answer returns the screen to select another item.

2.1.34 A YES answer displays on the screen, 'CAST BATCH - ENTER SERIAL NUMBER'. Enter the serial number of the cast batch.

2.1.35 Press the ENTER key.

2.1.36 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

2.1.37 A NO answer returns the screen to select another item.

2.1.38 A YES answer displays on the screen, 'INSTRUMENT ID'. Enter **B**, for the instrument identification number.

2.1.39 Press the ENTER key.

2.1.40 The screen will display, 'XFER AMOUNT - ENTER WEIGHT OF STIRRER AFTER CLEANING'. Enter the weight of the stirrer after all possible material has been removed.

2.1.41 Press the ENTER key.

2.1.42 The screen will display, 'TO ITEM INFORMATION - REMARKS'. Enter **STIRRER**, plus the number originally assigned to the stirrer (e.g., Stirrer#15).

2.1.43 Press the ENTER key.

2.1.44 The screen will display, 'SPM NO'. Enter the SPM batch number assigned the cast batch by SPM.

2.1.45 Press the ENTER key.

2.1.46 The screen will display, 'XFER AMOUNTS'. Enter **CLEAN STIRRER.**

2.1.47 Press the ENTER key.

2.1.48 The screen will display, 'IS THE TRANSACTION OK (Y/N)'.

2.1.49 A NO answer does not process the transaction and returns to the submenu.

2.1.50 A YES answer processes the transaction and returns to the submenu.

2.1.51 Select submenu (4), 'Split glass/dust into cans'. This enters only the net weight of each can. Uranium and U-235 values are entered as zero until NDA results are received by the FMF MBA Custodian.

2.1.52 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

2.1.53 The screen will display, 'TRANSFER AMOUNT - ENTER NET WEIGHT OF CAN'. Enter net weight of the can of glass/dust.

2.1.54 Press the ENTER key.

2.1.55 The screen will display, 'TO ITEM INFORMATION - REMARKS'. Enter **GLASS/DUST CAN#** (enter the number of the can, e.g., Can#1).

2.1.56 Press the ENTER key.

2.1.57 The screen will display, 'SPM NO'. Enter the SPM batch number assigned the cast batch by SPM.

2.1.58 Press the ENTER key.

2.1.59 The screen will display, 'XFER AMOUNTS'. Enter **GLASS/DUST.**

2.1.60 Press the ENTER key.

2.1.61 The screen will display, 'IS THE TRANSACTION OK (Y/N)'.

2.1.62 A NO answer does not process the transaction and returns to the submenu.

2.1.63 A YES answer processes the transaction and returns to the submenu.

2.1.64 To enter more cans of glass/dust repeat steps 2.1.51 through 2.1.61.

2.1.65 Select submenu (5), 'Split slugs, slug/fines, fine/fines, heel, sample'. This splits out these weights from the cast batch.

2.1.66 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

2.1.67 The screen will display, 'CAST BATCH - ENTER SERIAL NO'. Enter the serial number of the cast batch.

2.1.68 Press the ENTER key.

2.1.69 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

2.1.70 A NO answer returns the screen to select another item.

2.1.71 A YES answer displays on the screen, 'ITEM TO BE SPLIT OUT OF CAST BATCH - ENTER PRODUCT DESCRIPTION'. Enter the correct product description of the item being split from the cast batch.

2.1.72 Press the ENTER key.

NOTE: The PC-DYMAC Glossary lists all acceptable product descriptions.

2.1.73 The screen will display, 'ENTER DESTINATION'. Enter FC.

2.1.74 Press the ENTER key.

2.1.75 The screen will display, 'TO ITEM INFORMATION - REMARKS'. Enter information pertaining to the item being split from the cast batch.

2.1.76 Press the ENTER key.

2.1.77 The screen will display, 'SLUG#'.

2.1.78 Press the ENTER key.

2.1.79 The screen will display, 'JACKET#'.

2.1.80 Press the ENTER key.

2.1.81 The screen will display, 'BATCH NO'. Enter the cast batch number assigned to the cast batch by the Fuel Casting Supervisor.

2.1.82 Press the ENTER key.

2.1.83 The screen will display, 'INSTRUMENT ID'. Enter B for the instrument identification number.

2.1.84 Press the ENTER key.

2.1.85 The screen will display, 'TRANSFER AMOUNT - ALLOY WEIGHT OF ITEM SPLIT OUT OF THE BATCH'. Enter the alloy weight of the item being split from the cast batch.

2.1.86 Press the ENTER key.

2.1.87 The screen will display, 'XFER REMARKS'. Enter information pertaining to the transaction.

2.1.88 Press the ENTER key.

NOTE: Record the serial number and all weights of the item split from the cast batch, for future reference.

2.1.89 The screen will display, 'IS THE TRANSACTION OK (Y/N)'.

2.1.90 A NO answer does not process the transaction and returns to the submenu.

2.1.91 A YES answer processes the transaction and returns to the submenu.

2.1.92 The screen will display, 'DO YOU HAVE MORE TO SPLIT (Y/N)'.

2.1.93 A NO answer exits the splitting option and returns to the submenu.

2.1.94 A YES repeats steps 2.1.65 thru 2.1.89.

2.1.95 Select submenu (6), 'Send remainder of cast batch to 'PHD'. This transfers the amount left in the cast batch to the Process Hold-Up Difference (PHD) account associated with that particular batch.

2.1.96 Press the number 6.

2.1.97 Press the ENTER key.

2.1.98 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

2.1.99 The screen will display, 'CAST BATCH'. Below this the screen will display 'ENTER SERIAL NUMBER'. Enter the serial number of the cast batch to be written off to the PHD.

2.1.100 Press the ENTER key.

2.1.101 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

2.1.102 A NO answer returns the screen to select another item.

A YES answer displays on the screen, 'PHD FOR CAST BATCH IS ____'. The PHD serial number will be the last two or three digits of the cast batch. Enter the serial number.

2.1.103 The screen will display, 'GROSS WEIGHT OF MATERIAL TRANSFERRED IS _____'. Enter the gross weight.

2.1.104 Press the ENTER key.

2.1.105 The screen will display, 'IS THIS TRANSACTION OK'. Check all the information entered for accuracy. If an error is found, answer NO. The transaction will not be processed and the submenu will be displayed.

2.1.106 A YES answer processes the transaction and returns to the submenu.

2.1.107 Select FC main menu option (6) 'PROCESSING SLUGS'. Press submenu (2), 'Add profilometer results and put slugs in birdcage',

NOTE: See the Fuels and Materials Department, Fuel Manufacturing Operating Procedure, OM-FC-4 "SLUG PROCESSING DIMENSIONAL AND STRAIGHTNESS INSPECTION", 4.7 - 4.7.48 for setup and data transmission between the IBM and Hewlett Packard.

2.1.108 Each slug is assigned a serial number by the computer. This number along with the dimensions of the slug are stored in the database. The display on the screen will be a scrolling list of the slug data.

2.1.109 When the last slug is stored in the database the submenu will be displayed.

2.1.110 Select FC main menu (8), 'PROCESSING GLASS/DUST'. Press submenu (4) 'Enter new value of glass/dust from NDA'. This enters the new values assigned each can by NDA.

2.1.111 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

2.1.112 The screen will display, 'ENTER SERIAL NUMBER FROM FIRST CAN'. Enter the serial number of a can of glass/dust.

2.1.113 Press the ENTER key.

2.1.114 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

2.1.115 A NO answer returns the screen to select another item.

2.1.116 A YES answer displays on the screen, 'ENTER THE PHD SERIAL NUMBER'. Enter the serial number of PHD assigned to the cast batch.

2.1.117 Press the ENTER key.

2.1.118 The item belonging to the serial number entered will be displayed on the screen. The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

2.1.119 A NO answer returns the screen to select another item.

2.1.120 A YES answer displays on the screen, 'INSTRUMENT ID'. Enter **B** for the instrument identification number.

2.1.121 Press the ENTER key.

2.1.122 The screen will display, 'TRANSFER AMOUNT - ENTER THE U-235 WEIGHT'. Enter the U-235 weight assigned to the can of glass/dust by NDA.

2.1.123 Press the ENTER key.

2.1.124 The screen will display, 'TO ITEM INFORMATION - REMARKS'. Enter **GLASS/DUST.**

2.1.125 Press the ENTER key.

2.1.126 The screen will display, 'TO ITEM INFORMATION - ENTER ZONE. Enter **2.**

2.1.127 Press the ENTER key.

2.1.128 The screen will display, 'TO ITEM INFORMATION - PRODUCT DESCRIPTION'. Enter **GLASS/DUST.**

2.1.129 Press the ENTER key.

2.1.130 The screen will display, 'TO ITEM INFORMATION - SPM Batch Number'. The SPM batch number is displayed on the screen. Verify that the number is correct. If so press the ENTER key. If not, correct the number and press the ENTER key.

2.1.131 The screen will display, 'TO ITEM INFORMATION - XFER REMARKS'. Enter **ADD NDA RESULTS TO G/D#** (enter the can#).

2.1.132 Press the ENTER key.

2.1.133 The screen will display, 'IS THE TRANSACTION OK (Y/N)'.

2.1.134 A NO answer does not process the transaction and returns to the submenu.

2.1.135 A YES answer processes the transaction and returns to the submenu.

3. Fabricating Fuel Elements

3.1 This section provides instructions for the user on the necessary steps for calculating the sodium load, pairing multiple slugs, and assigning jacket numbers to accept slugs.

3.1.1 Select FM main menu (2), ELEMENT FABRICATION', by pressing the number 2.

3.1.2 Press the ENTER key.

NOTE: Two menu options exist that will calculate sodium load. Step 3.1.4 is used for multiple or paired slugs. Step 3.1.7 is used for full length slugs. Steps 3.1.8 through 3.1.37 are used for both options.

3.1.3 The submenu, 'Element Fabrication', will be displayed.

3.1.4 Press (1) 'Pair half slugs and calculate Na load'. This is used to pair half slugs and calculate the sodium load for each slug.

3.1.5 Press the ENTER key.

3.1.6 Press (8) 'Calculate Na load for single-slug element'. This is used for calculating the sodium load for single slugs.

3.1.7 Press the ENTER key.

3.1.8 The screen will display, 'ENTER PASSWORD'. Enter your password. DO NOT PRESS THE ENTER KEY.

3.1.9 The screen will display, 'WHICH SLUGS ARE TO BE SELECTED?'. Below this the screen will display, 'ENTER BATCH NUMBER'. Enter the cast batch number assigned to the slugs for the elements to be fabricated.

3.1.10 Press the ENTER key.

NOTE: All the slugs will be listed on a printout generated by the computer. Included in the listing will be the average sodium load for each element. Elements that fall out of the average sodium limit will be printed separately.

3.1.11 Select submenu (2), 'Put multiple slugs into jackets'. This allows the user to assign jacket numbers to each element.

3.1.12 Press the number 2 key.

3.1.13 Press the ENTER key.

3.1.14 The screen will display, 'ENTER PASSWORD'. Enter your password. DO NOT PRESS THE ENTER KEY.

NOTE: A formatted floppy disk is required to complete the element fabrication process. It must be a 1.44 mb high density double sided disk. A screen display will indicate when to insert the floppy disk into the A drive (top floppy drive).

3.1.15 The screen will display, 'ENTER JACKET NUMBER'. Enter the jacket numbers assigned each element.

NOTE: The slug number will also appear on the screen. A check should be made to verify the slug number agrees with the jacket number.

3.1.16 Press the ENTER key.

NOTE: When the ENTER key is pressed step 3.1.14 will be repeated. After the last entry is made the submenu is displayed.

NOTE: Steps 3.1.17 through 3.1.28 allow editing of the floppy disk. If editing is not required, skip to step 3.1.29, submenu (4), 'Add jacket numbers to inventory'.

3.1.17 Submenu (3), 'Edit jacket file (floppy disk)'. This allows editing of the floppy disk before any changes are made to the permanent inventory file.

3.1.18 Press the number 3 key.

3.1.19 Press the ENTER key.

3.1.20 The screen will display, 'ENTER PASSWORD'. Enter your password. DO NOT PRESS THE ENTER KEY.

3.1.21 The screen will display, 'ENTER BATCH NO'. Enter the cast batch number of the element or elements to edit.

3.1.22 Press the ENTER key.

3.1.23 The screen will display, 'ENTER A ZERO SERIAL 1 TO DELETE A RECORD'.

NOTE: By entering a zero (0) in the shaded area adjacent the 'SL1' the record will be deleted.

3.1.24 The screen will display:

'SER - #1'
'SL1 ____'
'SL2 ____'
'SER - #2'
'JACK ___'

The first element will be displayed on the screen. If editing is required type over the information displayed.

3.1.25 Press the ENTER key.

3.1.26 Press the ENTER key to view the next screen.

3.1.27 If the element does not require editing press the ENTER key.

3.1.28 A listing will be generated showing the edited elements. Completion of the printout displays the submenu.

3.1.29 Select submenu (4), 'Add jacket numbers to inventory'. This reads the data stored on the floppy disk and updates the inventory database.

3.1.30 Press the number 4 key.

3.1.31 Press the ENTER key.

3.1.32 The screen will display, 'ENTER PASSWORD'. Enter your password. DO NOT PRESS THE ENTER KEY.

3.1.33 The screen will display, 'PUT THE FLOPPY IN THE A DRIVE'. Put the floppy disk that has the correct jacket information for the cast batch in the A drive (top drive).

3.1.34 Press the ENTER key.

NOTE: Do not remove the floppy disk until the submenu is displayed.

3.1.35 The screen will display, 'WHAT CONTAINER WILL RECEIVE THE JACKETED SLUGS'. Enter the name of the container the elements will be stored in.

3.1.36 Press the ENTER key.

3.1.37 Completion of step 3.1.36 returns the screen to the submenu.

4. Constructing the Subassembly

4.1 This section provides instructions for the user on the necessary steps for constructing a subassembly. This includes selecting the elements for the subassembly, assigning grid positions, and generating reports.

4.1.1 SA main menu (3) 'SUBASSEMBLY MANUFACTURING' and submenu (1), 'Build a Subassembly', collects accepted elements by their serial number and assigns a grid position.

4.1.2 Press the number 1 key.

4.1.3 Press the ENTER key.

4.1.4 The screen will display, 'ENTER PASSWORD'. DO NOT PRESS THE ENTER KEY.

4.1.5 The screen will display, 'Get a Set of Records'. This display consists of several items that can be entered from the screen. The more items entered, the tighter the search (e.g., enter the batch number and the container name). Only items in that container with that particular batch number will be selected.

NOTE: The quickest method is to enter the smallest and largest serial number. The records selected will be between and including these 2 serial numbers.

4.1.6 Enter the necessary information to collect the records needed.

4.1.7 Press the ENTER key until you have exited the screen.

NOTE: Press the Pg Dn key to exit the entire screen.

4.1.8 The screen will display, 'You Have Now Collected ___ Records'. The number of records will appear.

4.1.9 Verify this to be sure the correct numbers were collected.

4.1.10 The screen will display, 'Do You Want More Records for Assembly, Y/N'.

4.1.11 A YES answer displays the 'Get a Set of Records' screen.

4.1.12 A NO answer displays the serial number for the subassembly.

4.1.13 Press the ENTER key.

NOTE: Repeat step 4.1.11 until all the records have been collected.

4.1.14 The screen will display, 'Name for Collection Number'. Enter the name of the subassembly, (e.g., X-481, B-2948Y).

4.1.15 Press the ENTER key.

4.1.16 The screen will display, 'Change Fields in Collection Record'. The zone the subassembly is in will be displayed. If corrections are needed type over the data displayed on the screen.

4.1.17 Press the ENTER key.

4.1.18 If no corrections are needed press the ENTER key.

4.1.19 The screen will display, 'Enter Product Description'. Enter **SUBASSEMBLY.**

4.1.20 Press the ENTER key.

4.1.21 The screen will display, 'To Remarks'. Enter the subassembly name (e.g., X-481, B-2948Y).

4.1.22 Press the ENTER key.

4.1.23 The screen will display, 'Enter SPM Number'. Enter the SPM number assigned to the subassembly by SPM.

4.1.24 Press the ENTER key.

4.1.25 The screen will display, 'Xenon Tag'. Enter the xenon gas tag number if one has been assigned to the elements.

4.1.26 Press the ENTER key.

4.1.27 The screen will display, 'Transfer Remarks'. Enter remarks pertaining to the operation being performed.

4.1.28 Press the ENTER key.

NOTE: A series of screen displays will appear. These do not require any input but are only to inform the user.

4.1.29 The screen will display, 'Position, Jacket Number, Slug Number'. This will appear in a vertical column for all records collected. If necessary, the grid position can be edited. Move the cursor with the up and down arrow keys. Place the cursor on the jacket number of the grid position to edit. Type in the correct jacket number.

4.1.30 Press the ENTER key.

NOTE: Unless you are replacing a jacket number with a new one, it is necessary to make two changes for each grid position edited.

4.1.31 When editing is complete, press the Pg Dn key to exit the screen. If no editing is necessary, press the Pg Dn key to exit the screen.

4.1.32 The screen will display, 'Working on _____'. The screen will scroll showing the record number being worked on.

4.1.33 When scrolling stops the submenu screen is displayed.

NOTE: It is extremely important that all weight values of each element are correct. For this reason, the subassembly printout must be reviewed by personnel from Operational Safety and Conformance. If the printout is correct, it is returned to the Subassembly Supervisor for distribution. If an error is found, corrections will be made before the report is distributed and the data sent to WYLBUR.

4.2 COPY COMPLETED S/A TO FLOPPY FOR DATA TRANSMISSION (SA8,8)

A completed subassembly is copied to a floppy disk and then transferred to a common network for use by other departments for reactor calculations. A formatted double sided, double density 5 1/4" floppy disk is used. After the data is copied, the floppy disk is given to the Material Safeguards Coordinator or Alternate for data transfer.

NOTE: The subassembly data is usually copied at the time it is manufactured. This menu option is used if changes were made to the subassembly data and needs to be recopied.

4.2.1 Press the appropriate number key.

4.2.2 Press the ENTER key.

4.2.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

4.2.4 The screen will display, 'Collection Name'. Enter the name of the subassembly (e.g., X-481 - B2945Y).

4.2.5 Press the ENTER key.

4.2.6 The subassembly data is copied to the floppy disk. Messages are displayed on the screen when to insert a floppy disk and when to remove it. After the data is copied, the submenu is displayed.

4.3 PRINT SUBASSEMBLY REPORT (ALL TYPES)
(SA1,2 SA3,2)

This report is used for all subassembly types. The report includes totals for the subassembly by cast batch number and SPM batch number. The chemistry percentages used for calculating the isotopic values are listed. The U-235 limit for the subassembly is also listed. The report is printed on large paper.

4.3.1 Press the appropriate number key.

4.3.2 Press the ENTER key.

4.3.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

4.3.4 The screen will display, 'Collection Name'. Enter the name of the subassembly (e.g., X-481 - B2945Y).

4.3.5 Press the ENTER key.

NOTE: The next step copies the subassembly to a floppy disk. The data is transferred to a common network file for use by other departments for reactor calculations.

4.3.6 The screen will display, 'Make an ASCII File of the S/A Y/N?'.

4.3.7 A NO answer begins printing the report.

4.3.8 A YES answer copies the report to a floppy disk and then prints the report.

NOTE: Several menu options can be used to obtain an element listing as described below:

4.4 PRINT ALL ITEMS IN A BATCH
(SA2,2)

A casting batch number is entered and all items with that cast batch number are printed. Totals are listed at the bottom of the report.

4.4.1 Press the appropriate number.

4.4.2 Press the ENTER key.

4.4.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

4.4.4 The screen will display, 'Enter Batch Number'. Enter the batch number of the items to be printed.

4.4.5 Press the ENTER key.

4.4.6 All items with the selected batch number will be printed.

4.4.7 After printing is complete, the submenu will be displayed.

4.5 PRINT SELECTED ITEMS (includes totals)
(SA1,9)

Selected items can be printed for a customized report. Consecutive serial numbers are used to select items. If necessary, more items can be added by repeating the option.

4.5.1 Press the appropriate number key.

4.5.2 Press the ENTER key.

4.5.3 The screen will display, ENTER PASSWORD. Enter your assigned password. DO NOT PRESS ENTER.

4.5.4 The screen will display, 'Get a Set of Records'. Enter smallest and largest serial number. If these are not known, enter information that will collect the desired records.

4.5.5 Press the Pg Dn key to exit the screen.

4.5.6 The screen will display, 'You have Collected___ Records'. Verify the number of records collected is correct.

4.5.7 The screen will display, 'Do You Want to Collect More Records, Y/N?'.

4.5.8 A NO answer prints the report.

4.5.9 A YES answer repeats steps 4.5.4 thru 4.5.7 allowing more records to be collected.

4.5.10 After printing is complete, the submenu is displayed.

4.6 PRINT ELEMENT REPORT (MULTIPLE SLUG ELEMENTS) (SA1,4)

This option generates a report for multiple-slug elements. The report includes totals.

4.6.1 Press the appropriate number key.

4.6.2 Press the ENTER key.

4.6.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

4.6.4 The screen will display, 'Get a Set of Records'. Collect the records desired by entering the smallest and largest serial number. If these are unknown, enter other information that will collect the correct records.

4.6.5 Press the Pg Dn key to exit the screen.

4.6.6 The screen will display, 'You Have Collected _____ Records'. Verify the number of records collected.

4.6.7 The screen will display, 'Do You Have More Records to Add Y/N?'.

4.6.8 A NO answer exits the routine to collect records.

4.6.9 A YES answer repeats step 4.6.4 thru 4.6.7.

4.6.10 The screen will display, 'Enter Page Title'. Enter the title of the report (e.g., Element Report for MKIII-F-IC001).

4.6.11 Press the ENTER key.

4.6.12 The completion of the report returns the screen to the submenu.

4.7 PRINT ELEMENT REPORT (Single - slug elements)
(SA1,3)

This menu option generates a report listing all elements in a desired cast batch.

4.7.1 Press the appropriate number key.

4.7.2 Press the ENTER key.

4.7.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

4.7.4 The screen will display, 'Enter Batch Number'. Enter the cast batch number of the elements to be listed.

4.7.5 Press the ENTER key.

4.7.6 The report is generated after collecting the correct data. When printing is complete the submenu is displayed.

5. REPORTS AND COMPUTER LISTINGS

5.1 Most reports and listings are available at all computers. Some have been customized for a particular function or operation performed at that computer. Described first are the reports and listings common to all computer stations followed by customized reports. Each menu option is shown as it is on the menu for that computer station. It is followed by the location of the menu option (example: VL1,1 is VAULT65 main menu 1 submenu 1). A sample of each report is attached as the figure number indicates. These can be found at the end of this manual.

5.1.1 DISPLAY AN INVENTORY ITEM
(VL1,1 - CC1,1 - FM1,1 - FC1,1 - SA1,1)

This allows several consecutive serial numbers to be entered and displayed individually on the computer.

5.1.2 Press the appropriate number key.

5.1.3 Press the ENTER key.

5.1.4 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.1.5 The screen will display, 'Get a Set of Record'. Enter information that will locate the desired record(s). (e.g.,

enter the cast batch number and the container the items are in. The items collected will be only the selected cast batch in the container named).

NOTE: Entering the smallest and largest serial number is the best way to locate records.

5.1.6 Press the Pg Dn key to exit the screen.

5.1.7 The screen will display, '___ Have Been Selected for Processing - Do You Want to See Them, Y/N?'.

5.1.8 A YES answer displays the first record.

5.1.9 The screen will display, 'Display the Next Record, Y/N?'.

5.1.10 A YES answer displays the next record.

5.1.11 A NO answer begins printing each record selected.

NOTE: To avoid printing each record, press the Esc key and the submenu will be displayed.

5.1.12 After printing or displaying is complete, the submenu will be displayed.

5.2 PRINT ZONE INVENTORY (Fig. 44)
(VL1,4 & 5,1 - CC1,3 & 5,1 - FM1,2 & 3,1 & 4,1 - FC1,2 & 2,1 & 3,1 & 7,1 SA2,1)

This option generates a listing of zone totals and criticality limits. It also prints container totals and individual items not in containers.

5.2.1 Press the appropriate number key.

5.2.2 Press the ENTER key.

5.2.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.2.4 The screen will display, 'Zone Number for Printout'. Enter the zone to be listed (e.g., Zone2).

NOTE: Do not put a space between the word zone and the number.

5.2.5 The screen will display, 'Gathering Data for Printout Please Stand By'. The computer is collecting data to be printed and is performing various calculations. Do not press any keys while the computer is collecting data.

5.2.6 When the computer has finished performing the necessary calculations. The information will be printed. When the

5.5.1 Press the appropriate number key.

5.5.2 Press the ENTER key.

5.5.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

5.5.4 The screen will display, 'Items to Print Labels For'. Below this the screen will display, 'Get a Set of Records'. Enter the smallest and largest serial number of the items to print.

5.5.5 Press the Pg Dn key to exit the screen.

5.5.6 The screen will display, 'Put Labels in Printer'. This is a reminder to load the labels before printing and to verify the correct printer is on line.

5.5.7 Press the ENTER key.

5.5.8 Information pertaining to the item is displayed on the screen. Two prompts appear at the bottom of the screen. If this information is known, enter it, otherwise press the ENTER key.

NOTE: Each item selected for labelling will be displayed.

5.5.9 After printing stops, the submenu will be displayed.

5.6 PRINT A TAG FOR A CONTAINER (Fig. 48)
(VL1,8 & 5,7 - CC1,7 & 5,6 - FM1,5 & 3,7 - FC1,7 & 7,7 - SA1,8)

To print a tag for a container enter the container name. Information about the container and the items in the container are printed. Totals are included in the report.

5.6.1 Press the appropriate number key.

5.6.2 Press the ENTER key.

5.6.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.6.4 The screen will display, 'Container Name'. Enter the name of the container to be listed.

5.6.5 Press the ENTER key. The computer will be busy collecting the items that are located in that container.

NOTE: Do not press any keys while computer is working.

printout is complete, remove the printout. The submenu will be displayed.

5.3 PRINT ALL ITEMS FOR A SELECTED SPM NUMBER (Fig. 45)
(VL1,6 - CC2,4 - FM1,7 - FC1,3)

Generates a report of all items for the selected SPM number.

5.3.1 Press the appropriate number key.

5.3.2 Press the ENTER key.

5.3.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.3.4 The screen will display, 'Enter SPM#'. Enter the SPM number to be printed.

5.3.5 Press the ENTER key.

5.3.6 All items with the selected SPM batch number will be printed. After the printout is complete, the submenu will be displayed.

5.4 PRINT ALL ITEMS IN A BATCH (Fig. 46)
(VL1,5 - CC1,4 - FM1,3 - FC1,5 - SA2,2)

A casting batch is entered and all items with that casting batch number are printed.

5.4.1 Press the appropriate number.

5.4.2 Press the ENTER key.

5.4.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.4.4 The screen will display, 'Enter Batch Number'. Enter the cast batch number of the items to be printed.

5.4.5 Press the ENTER key.

5.4.6 All items with the selected batch number will be printed. The printout also includes totals.

5.4.7 After printing is complete, the submenu will be displayed.

5.5 PRINT A LABEL (Fig. 47)
(VL1,7 - CC1,6 - FM1,4 - FC1,6 - SA1,7)

This option is used primarily at FC and Vault65 for labeling cans. These two computer stations have dedicated printers for label printing. If labels are needed at other computer stations they can be loaded into the printer.

5.6.6 The screen will display:

'Enter Moderator'
'Enter Moderator Weight'
'Enter Initials'

5.6.7 Enter the moderator and moderator weight if any. If not, press the ENTER key.

5.6.8 Enter your initials (these are printed on the tag showing who generated the tag).

5.6.9 Press the ENTER key.

5.6.10 The printer will print the totals associated with the container.

5.6.11 The screen will display, 'Print all Items Y/N?'.

5.6.12 A NO answer exits the program and returns to the submenu.

5.6.13 A YES answer will print each item in the container, totals of the container, and totals by SPM batch number.

5.6.14 When printing is complete, the submenu is displayed.

5.7 PRINT SELECTED ITEMS (includes totals) (Fig. 49)
(VL1,2 - CC1,2 - FM1,6 - FC1,9 - SA1,9)

Selected items can be printed for a customized report. Consecutive serial numbers are used to select items. If necessary, more items can be added by repeating 5.7.4 through 5.7.7.

5.7.1 Press the appropriate number key.

5.7.2 Press the ENTER key.

5.7.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.7.4 The screen will display, 'Get a Set of Records'. Enter smallest and largest serial number. If these are not known, enter information that will collect the desired records.

5.7.5 Press the Pg Dn key to exit the screen.

5.7.6 The screen will display, 'You have Collected _____ Records'. Verify the number of records collected is correct.

5.7.7 The screen will display, 'Do You Want to Collect More Records, Y/N?'.

5.7.8 A NO answer prints the report.

5.7.9 A YES answer repeats 5.7.4 through 5.7.7 and allows more records to be collected.

5.7.10 After printing is complete, the submenu is displayed.

5.8 PRINT ALL TRANSACTIONS BY SPM NUMBER AND DATE (Fig. 50)
(VL1,9 - CC1,9 - FC1,8)

An SPM batch number and a beginning and ending date are entered. All transactions with the selected SPM batch number and the correct range of dates are printed.

5.8.1 Press the appropriate number.

5.8.2 Press the ENTER key.

5.8.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.8.4 The screen will display, 'Enter SPM Number'. Enter the desired SPM number, press the ENTER key.

5.8.5 The screen will display, 'Enter Beginning Date - Enter Ending Date'. Enter the beginning and ending date. This will print all transfers created between the two dates.

5.8.6 After the computer collects the data, the report is printed. After printing is complete, the submenu is displayed.

5.9 PRINT ALL CONTAINERS IN A ROOM (Fig. 51)
(VL1,3 & 5,5 - SA2,3 - FC7.6 - FM3,6 - CC5,7)

This option displays the containers and their totals on the screen. A printout is available.

5.9.1 Press appropriate number key.

5.9.2 Press the ENTER key.

5.9.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.9.4 The screen will display, 'Enter Room'. Enter the location of the computer station (e.g., FC, FM, Vault65, etc.).

5.9.5 Press the ENTER key.

5.9.6 After the computer collects the correct data, the container information is displayed.

The screen will display:

'Cont Room Station SSTot Seal1 Seal2'

5.9.7 The screen will display, 'Printout Y/N?'.

5.9.8 A NO answer returns to the submenu.

5.9.9 A YES answer prints the same information displayed on the screen.

5.9.10 After printing is complete, the submenu is displayed.

5.10 PRINT AN ELEMENT LISTING (Fig. 52)
(VL2,4 - CC2,1 - FM2,5)

This menu option will print all elements in a desired cast batch.

5.10.1 Press the appropriate number key.

5.10.2 Press the ENTER key.

5.10.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.10.4 The screen will display, 'Enter Batch Number'. Enter the cast batch number of the elements to be listed.

5.10.5 Press the ENTER key.

5.10.6 A report is generated after collecting the correct data. When printing is complete, the submenu is displayed.

5.11 PRINT ACCEPT ELEMENT REPORT (Fig. 53)
(VL2,2 - CC2,2 - SA1,5)

This report includes all accept elements. An option exists to print only totals or print all elements.

5.11.1 Press the appropriate number key.

5.11.2 Press the ENTER key.

5.11.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.11.4 The screen will display, 'Gathering Data'. The computer is collecting the necessary data for the report.

NOTE: Do not press any keys while the computer is collecting data.

5.11.5 The screen will display, 'Print all Items Y/N?'.

5.11.6 A NO answer prints only totals.

5.11.7 A YES answer prints each element. Totals are listed at the end of the report.

5.11.8 Press the ENTER key.

5.11.9 Completion of the report returns the screen to the submenu.

5.12 PRINT ACCEPT SLUG REPORT (Fig. 54)
(VL2,3 - CC2,3 - SA1,6)

This report includes all accept slugs. An option exists to print only totals or print each slug with totals at the end of the report.

5.12.1 Press the appropriate number key.

5.12.2 Press the ENTER key.

5.12.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.12.4 The screen display, 'Print All Items Y/N?'.

5.12.5 A NO answer prints only totals.

5.12.6 A YES answer prints each slug with totals at the end of the report.

5.12.7 Press the ENTER key.

5.12.8 Completion of printing returns the screen to the submenu.

5.13 PRINT ELEMENT REPORT (MULTIPLE SLUG ELEMENTS) (Fig. 55)
(FM2,6 - SA1,4)

This menu option generates a report for multiple-slug elements which includes total weights.

5.13.1 Press appropriate number key.

5.13.2 Press the ENTER key.

5.13.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.13.4 The screen will display, 'Get a Set of Records'. The most efficient way to collect the desired records is to enter smallest and largest serial number. If these are unknown, enter other information that will collect the correct records.

5.13.5 Press the Pg Dn key to exit the screen.

5.13.6 The screen will display, 'You Have Collected ___ Records'. Verify the number of records collected.

5.13.7 The screen will display, 'Do You Have More Records to Add Y/N?'.

5.13.8 A NO answer exits the routine to collect records.

5.13.9 A YES answer repeats 5.13.4 through 5.13.7.

5.13.10 Press the ENTER key.

5.13.11 The screen will display, 'Enter Page Title'. Enter the title of the report (e.g., Element Report for MKIII-F-ICOO1).

5.13.12 Press the ENTER key.

5.13.13 Completion of the report returns the screen to the submenu.

5.14 PRINT ZONE12 EXCEPTION REPORT (Fig. 56)
(VL2,1 - CC7,4)

This report is used for daily audits. It prints items not located in Zone12.

5.14.1 Press the appropriate number key.

5.14.2 Press the ENTER key.

5.14.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.14.2 Completion of report returns the screen to the submenu.

5.15 PRINT SPM REPORT (Fig. 57)
(VL2,6 - CC7,2)

Items are totaled by their SPM batch number and listed in that order with totals.

5.15.1 Press the appropriate number key.

5.15.2 Press the ENTER key.

5.15.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.15.4 Completion of the printout returns the screen to submenu.

5.16 PRINT AUDIT PRINTOUT (Fig. 58)
(VL2,7 - CC7,3)

This report contains all items in the FMF MBA. Items are listed by computer unit and zone. Items in the containers are listed and totaled. Items not in containers are listed separately.

5.16.1 Press the appropriate number key.

5.16.2 Press the ENTER key.

5.16.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

NOTE: The computer will take several minutes to collect the data. Do not press any keys while the computer is collecting data.

5.16.4 Completion of the printout returns the screen to the submenu.

5.17 PRINT ALL SLUGS IN A CAST BATCH (Fig. 59)
(FC1,4)

This menu option will print all accept slugs in a cast batch.

5.17.1 Press the appropriate number key.

5.17.2 Press the ENTER key.

5.17.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.17.4 The screen will display, 'Enter Batch Number'. Enter the cast batch number of the slugs to be printed.

5.17.5 Press the ENTER key.

5.17.6 Completion of the printout returns the screen to the submenu.

5.18 PRINT SUBASSEMBLY REPORT (ALL TYPES) (Fig. 60)
(SA1,2 SA3,2)

This report is used for all subassembly types. It includes totals for the subassembly (totals by cast batch number and totals by SPM batch number). All isotopes are listed. The report requires large paper.

5.18.1 Press the appropriate number key.

5.18.2 Press the ENTER key.

5.18.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

5.18.4 The screen will display, 'Collection Name. Enter the name of the subassembly (e.g., X-481 - B-2945Y).

5.18.5 Press the ENTER key.

NOTE: The next step will copy the subassembly data to a floppy disk. The data is transferred to a common network file for use by other departments for reactor calculations.

5.18.6 The screen will display, 'Make an ASCII File of the S/A Y/N?'

5.18.7 A NO answer begins printing the report.

5.18.8 A YES answer will copy the report to a floppy disk and print the report.

6. NORMAL OPERATIONS

6.1 This section provides instructions for normal operations performed on a regular basis by technicians in FMF, but are not considered part of the casting operation or element fabrication. It includes instructions for moving a container to a new zone, putting items into a container, emptying a container, etc.

6.1.1 MOVE A CONTAINER TO A NEW ZONE
(FC7,4 & 8,2 - VL5,4 - CC5,4 - SA7,1 - FM3,2 & 4,2)

Enter the name of the container and the new zone number. The container and the items in the container are moved to the new zone.

6.1.2 Press the appropriate number key.

6.1.3 Press the ENTER key.

6.1.4 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

6.1.5 The screen will display, 'Container to be Moved'. Enter the name of the container to be moved.

6.1.6 Press the ENTER key.

6.1.7 The screen will display, 'New Zone for the Container'. Enter the zone number the container is being moved to.

6.1.8 Press the ENTER key.

6.1.9 The screen will display, 'Print Transfer,Y/N?'. A YES answer prints a transfer listing the items in the container and their weights.

6.1.10 A NO answer exits the option and displays the submenu.

NOTE: These transfers are used only for material transfers to and from Zone12.

6.2 PUT ITEMS INTO A CONTAINER
(FM3,4 & 4,2 - SA7,2 - CC5,3 - VL5,3 - FC3,7 & 7,2)

Put items into a container using the screen, 'Get a Set of Records'. The most efficient way uses largest and smallest serial number. If unknown, enter other information that will locate the correct items.

6.2.1 Press the appropriate number key.

6.2.2 Press the ENTER key.

6.2.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

6.2.4 The screen will display, 'What Container are You Filling'. Enter the name of the container (e.g., BDCG001).

6.2.5 Press the ENTER key.

NOTE: Seven spaces are allowed for the container. When naming, all seven must be used.

6.2.6 The screen will display, 'That Container Already Has Some Items in it in Loc _____. Do You Want to Proceed, Y/N?'

6.2.7 A NO answer exits the option and returns to the submenu. None of the items will be put into the container.

6.2.8 A YES answer displays on the screen, 'Get a Set of Records'. Enter the information needed to collect the desired records.

6.2.9 Press the Pg Dn key to exit the screen.

6.2.10 The screen will display, 'Adding Record _____'. The items will now be put into the container. The information will scroll on the screen, displaying which record it is completing.

6.2.11 When scrolling is complete, the submenu will be displayed.

6.3 EMPTY A CONTAINER
(FC7,3 - VL5,2 - CC5,2 - FM3,5)

This option empties all or part of a container.

6.3.1 Press the appropriate number key.

6.3.2 Press the ENTER key.

6.3.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

6.3.4 The screen will display, 'What Container Are You Emptying'. Enter the container name.

6.3.5 Press the ENTER key.

6.3.6 The screen will display, 'Do You Want to Empty Out all Items, Y/N?'

6.3.7 A YES answer empties out all items.

6.3.8 A NO answer displays on the screen, 'Get a Set of Records'. Enter the necessary information to collect the desired records.

6.3.9 Press the Pg Dn key to exit the screen.

6.3.10 After the items are removed, the submenu is displayed.

6.4 MOVE ITEMS TO A NEW CONTAINER (ENTER CONSECUTIVE SERIAL NUMBERS) (FM3,3 - CC5,5 - VL5,6 - FC7.5)

To move items from one container to another, enter the lowest and highest consecutive serial numbers. Also enter the original container name and new container name.

6.4.1 Press the appropriate number key.

6.4.2 Press the ENTER key.

6.4.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

6.4.4 The screen will display:

'Lowest Serial Number _____ Highest Serial Number _____

Original Container _____'

NOTE: All items must be in consecutive serial number order.

6.4.5 Enter the lowest serial number.

6.4.6 Press the ENTER key.

6.4.7 Enter the highest serial number.

6.4.8 Press the Enter key.

6.4.9 Enter the original container name. If none - leave blank.

6.4.10 Press the ENTER key.

6.4.11 The screen will display, 'New Container'. Enter the name of the container the items are being transferred to.

6.4.12 Press the ENTER key.

6.4.13 The screen will display, 'Xfer Remarks'. Enter remarks pertaining to the operation being performed.

6.4.14 Press the ENTER key.

6.4.15 After the container location is changed for each item, the submenu is displayed.

6.5 EDIT SPM BATCH NUMBER (ENTER CONSECUTIVE SERIAL NUMBER)
(FC9,1 - V9,1 - C9,1 - SA8,3 - FM9,3)

An SPM batch number can be entered or edited for a range of records. Items must be in consecutive serial number order.

6.5.1 Press the appropriate number key.

6.5.2 Press the ENTER key.

6.5.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

6.5.4 The screen will display, 'Enter Smallest Serial Number - Enter Largest Serial Number '. Enter the smallest and largest consecutive serial number of the records to be changed.

6.5.5 Press the ENTER key.

6.5.6 The screen will display, 'You Now Have Collected _____'. Verify the number of records collected.

6.5.7 The screen will display, 'Do You Want More Records to Change Y/N?'.

6.5.8 A YES answer repeats steps 6.5.4 through 6.5.7.

6.5.9 A NO answer displays the screen, 'SPM NUMBER'. Enter the new SPM batch number.

6.5.10 Press the ENTER key.

6.5.11 The screen will scroll through the records.

6.5.12 After scrolling is complete, the submenu is displayed.

6.6 MODIFY AN ITEM (NO WEIGHT VALUES MODIFIED)
(SA8,4 - CC3,7 - VL9,5 - FC9,4 - FM2,7)

Allows certain fields in a record to be modified.

6.6.1 Press appropriate number key.

6.6.2 Press the ENTER key.

6.6.3 The screen will display, 'ENTER PASSWORD'. Enter your password. DO NOT PRESS ENTER.

6.6.4 The screen will display, 'Items to Modify', and then it will display, 'Get a Set of Records'.

6.6.5 Enter the necessary information (e.g., serial number, batch number, etc.) to collect the correct records.

6.6.6 Press the Pg Dn key to exit the screen.

6.6.7 A series of screens pertaining to the item being modified will appear.

6.6.8 If the data is correct press the ENTER key.

6.6.9 If editing is required, type over the existing data and press the ENTER key.

NOTE: Each record selected for modification is displayed separately.

6.7 SPLIT AN ITEM
(FC9,6 - FM9,6 - VL9,7 - CC3,9)

This option splits an existing item into a new item. The new item is assigned a new serial number.

6.7.1 Press the appropriate number key.

6.7.2 Press the ENTER key.

6.7.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

6.7.4 The screen will display, 'Item to Split-Enter Serial Number'. Enter the serial number of the item to be split.

6.7.5 Press the ENTER key.

6.7.6 Several screen displays will appear to enter information for the new item. If a screen display does not pertain to the item or the information is not available, press the ENTER key.

6.7.7 The screen will display, 'Do You Have More to Split From This Item, Y/N?'.

6.7.8 A YES answer repeats steps 6.7.4 thru 6.7.7.

6.7.9 A NO answer exits the option and displays the submenu.

6.8 COMBINE AN ITEM
(CC3,8 - VL9,8 - FC9,7)

This option allows existing items to be combined.

6.8.1 Press the appropriate number key.

6.8.2 Press the ENTER key.

6.8.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

6.8.4 The screen will display, 'Item Into Which Will Combine - Enter the Serial Number'. Enter the serial number of the item which the other item or items will be combined into.

6.8.5 Press the ENTER key.

6.8.6 The screen will display, 'From Item for Combine - Enter Serial Number'. Enter the serial number of the item that is to be combined.

6.8.7 Press the ENTER key.

6.8.8 The following screen displays information about the combined items. If the information is correct press the ENTER key. If changes are needed type over the data and press the ENTER key.

6.8.9 The screen will display, 'New Item to Add - Do You Have More to Combine, Y/N?'.

6.8.10 A YES answer repeats steps 6.8.4 thru 6.8.9.

6.8.11 A NO answer exits the option and displays the submenu.

7.0 OPERATIONAL SAFETY AND CONFORMANCE

This section contains menu options used by Operational Safety and Conformance personnel only.

7.1 POST UPDATE DISKS FROM PERIPHERAL COMPUTERS (CC3,1)
POST TRANSFER DATA DISK FROM PERIPHERAL COMPUTER (CC7,1)

Both these menu options use the same computer program and instructions.

7.1.1 Press the appropriate number key.

7.1.2 Press the ENTER key.

7.1.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.1.4 The screen will display, 'Put Container Floppy in the A Drive'. Put the floppy disk in the top drive.

7.1.5 Press the ENTER key.

7.1.6 The screen will display, 'There are _____ Items to Post'. This message informs the user how many records will be posted.

NOTE: Allow approximately 5 - 7 seconds per record for posting.

7.1.5 The screen display will scroll, displaying the record number it is posting. After scrolling is complete, the submenu is displayed.

7.2 RECONCILE PLATTERS (COMPARE CENTRAL AND PERIPHERALS) (C3,2)

Compares the Central Computer Inventory to the peripheral computer inventory. Any differences between the two inventories are printed out.

7.2.1 Press the appropriate number key.

7.2.2 Press the ENTER key.

7.2.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY

7.2.4 The screen will display, 'THIS PROGRAM MAY ONLY BE RUN FROM THE CENTRAL COMPUTER'.

7.2.5 The screen will display, 'Put the Working Floppy Disk That You Want to Check into the A Drive' (top Floppy Disk Drive). Put the copy of the peripheral inventory in the top floppy drive. Press any key to continue.

7.2.6 The screen will display, 'ENTER NAME OF THE PERIPHERAL, (e.g., FM,FC, VAULT65)'. Enter the name of the room.

7.2.7 Press the ENTER key.

7.2.8 Several screen messages appear as the computer is comparing the two inventories. If any descrepancies between the two inventories are found, they are printed out. After the program is complete the submenu is displayed.

7.3 ENTER OR EDIT A PASSWORD
(C3,4 - V9,2 - FC9,2 - FM9,2 - SA8,2)

Enter a new password or edit an old one.

7.3.1 Press the appropriate number key.

7.3.2 Press the ENTER key.

7.3.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.3.4 The screen will display, 'DO YOU WANT TO DELETE A PASSWORD RECORD, Y/N?'.

7.3.5 A NO answer will delete your password and disallows access to all menu options.

7.3.6 A YES answer displays on the screen, 'ADD A NEW PASSWORD RECORD OR CHANGE AN OLD ONE - ADD A NEW RECORD, Y/N?'.

7.3.6.1 A YES answer allows you to add a new password and displays on the screen, 'ENTER PASSWORD TWICE'. Enter the password you have selected.

7.3.6.2 Press the ENTER key.

7.3.6.3 Enter the same password

7.3.6.4 Press the ENTER key.

7.3.6.5 A NO answer displays on the screen, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

7.3.7 The screen will display, 'NAME OF PERSON'. Enter your initials and last name.

7.3.8 Press the ENTER key.

7.3.9 The screen will display, 'CHANGE PERMISSIONS,Y/N?'.

7.3.10 A YES answer displays a list of options on the screen.

7.3.11 Select which ones the new user will be allowed access. To grant access, change the F (false) to T (true).

7.3.12 Press the ENTER key.

7.3.13 A NO answer exits the option.

7.3.14 The screen will display, 'Insert the rooms the user will have access to separated by commas', and also place a comma at the end. For example:

'RM20,FASB,OUTSIDE,'

7.3.15 The screen will clear and the submenu will be displayed.

7.4 MODIFY LOCATION RECORDS (CC3,5 - SA8,6 - VL9,6 - FM9,4)

Create or change a location record.

7.4.1 Press the appropriate number key.

7.4.2 Press the ENTER key.

7.4.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.4.4 The screen will display, 'DO YOU WANT TO DELETE A LOCATION RECORD, Y/N?.

7.4.5 A YES answer displays the screen:

'ENTER LOCATION OF RECORD TO DELETE'
'ROOM'
'ZONE'

7.4.6 Enter the room number to be deleted. Press the ENTER key.

7.4.7 Enter the zone number to be deleted. Press the ENTER key.

7.4.8 A NO answer displays the screen:

'ADD A NEW LOCATION RECORD'
'ROOM'
'ZONE'
'SUPERVISOR'
'SSLIM'
'COUNTLIM'
'CAGELIM'

7.4.9 Enter the new room number. Press the ENTER key.

7.4.10 Enter the new zone number. Press the ENTER key.

7.4.11 Enter the supervisor for the new area. Press the ENTER key.

7.4.12 Enter the U-235 limit for the zone. Press the ENTER key.

7.4.13 Enter the count limit for the zone. Press the ENTER key.

7.4.14 Enter the birdcage limit for the zone. Press the ENTER key.

7.4.15 After the computer records the new data, the submenu is displayed.

7.5 MODIFY AN ITEM (REQUIRES 2 PASSWORDS)
(VL9,4 - FM9,5 - CC3,6 - SA8,5)

This option requires two passwords to be granted access. The first password is the MBA Custodian or Alternate, the second is the Materials Safeguard Coordinator or Alternate. All fields in the database may be modified including weights for each item.

7.5.1 Press the appropriate number key.

7.5.2 Press the ENTER key.

7.5.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.5.4 The screen will display, 'Get a Set of Records'. Enter smallest and largest serial number. If unknown enter information that will collect the desired records.

7.5.5 Press the Pg Dn key to exit the screen.

7.5.6 A series of screen displays will appear. Press the ENTER key to exit each one.

7.5.7 If the data is to be changed, type over the existing data and press the ENTER key.

NOTE: Each record to be modified is displayed separately.

7.6 SHIP CONTAINER OUT OF THE CENTRAL COMPUTER (FLOPPY DISK)(CC4,1)
SHIP CONTAINER TO ANOTHER ROOM (FLOPPY DISK)(VL4,1)
SHIP CONTAINER TO ANOTHER ROOM (FLOPPY DISK)(SA4,2)
SHIP CONTAINER TO ANOTHER ROOM (FLOPPY DISK)(FC5,1)
SHIP CONTAINER TO ANOTHER ROOM (FLOPPY DISK)(FM4,4)

This option moves a container and all its items to another room. Transferring a container begins with this option. It is necessary to complete the other required steps to guarantee the container and its items are transferred correctly.

NOTE: The main databases are backed up prior to generating the floppy disk used for the transfer. A message is displayed regarding the backing up of files.

The floppy disk used must be a clean formatted double sided, high density floppy disk.

7.6.1 The screen will display, 'PUT THE CONTAINER FLOPPY IN THE A DRIVE'. Put the floppy disk in the top floppy disk drive.

7.6.2 The screen will display, 'CONTAINER TO BE SHIPPED - CONTAINER NAME'. Enter the name of the container to be shipped to another room.

7.6.3 Press the ENTER key.

7.6.4 The screen will display, 'XFER REMARKS'. Enter information pertaining to the container being shipped.

7.6.5 Press the ENTER key.

NOTE: The computer generated transfer is for transfers within the MBA only. It is not to be used for SPM permanent transfers.

7.6.6 The screen will display, 'PRINT A TRANSFER SHEET, Y/N?'.

7.6.7 A YES answer generates a transfer sheet and then copies the transfer files to the floppy disk.

7.6.8 A NO answer does not generate a transfer sheet but copies the transfer files to the floppy disk.

NOTE: Messages are displayed as the files are copied to the floppy disk.

7.6.9 The screen will display, 'Remove floppy from the disk drive, and place in folder'. Remove the floppy disk and place it in a protective folder.

7.6.10 The screen will display:

'TO COMPLETE THE TRANSFER PROCESS THIS FLOPPY DISK MUST BE POSTED IN THIS ORDER'.

1. CENTRAL COMPUTER
2. PERIPHERAL COMPUTER (where the material is transferred to)
3. CENTRAL COMPUTER
4. PERIPHERAL COMPUTER (where the material is transferred from)'

NOTE: The computer checks each floppy disk to make sure it is being read at the correct computer.

7.6.11 After the above message is cleared, the submenu is displayed.

7.7 SHIP CONTAINER OUT OF THE FMF MBA (NO FLOPPY) (CC4,2)
SHIP CONTAINER OUT OF VAULT65 (NO FLOPPY) (VL4,2)
SHIP CONTAINER OUT OF FC (NO FLOPPY) (FC5,2)
SHIP CONTAINER OUT OF SA (NO FLOPPY) (SA4,1)

This section deletes a container and its contents from inventory. Items can be copied to a floppy disk for record retention prior to deletion.

NOTE: The items to be shipped out must be in a container.

7.7.1 Press the appropriate number key.

7.7.2 Press the ENTER key.

7.7.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.7.4 The screen will display, 'WHAT CONTAINER IS TO BE SENT EXTERNAL'. Enter the name of the container to be shipped out.

7.7.5 Press the ENTER key.

7.7.6 The screen will display, 'TRANSFER#'. Enter the transfer number from the transfer document.

7.7.7 If one does not exist, enter the date of the transfer.

7.7.8 Press the ENTER key.

7.7.9 The screen will display, 'ENTER DESTINATION'. Enter the destination of the container (e.g., FASB, OUTSIDE, CPP).

7.7.10 Press the ENTER key.

NOTE: The transaction will be displayed on the screen. The amounts displayed should agree with the totals on the transfer document.

7.7.11 The screen will display, 'IS THIS TRANSACTION OK? Y/N'.

7.7.12 A NO answer does not process the transaction and returns to the submenu.

7.7.13 A YES answer processes the transaction and returns to the submenu.

7.7.14 The screen will display, 'COPY RECORDS TO FLOPPY FOR RECORD RETENTION, Y/N?'

7.7.15 A YES answer displays on the screen, 'PUT CLEAN FORMATTED FLOPPY IN THE A DRIVE - FILE NAME YOUR DATA IS STORED IN IS NEWFILE YOU MAY RENAME THIS LATER IF YOU WISH'. Insert a clean formatted floppy in the top floppy drive. The records will be copied to the disk and then deleted from inventory.

7.7.16 A NO answer does not copy the files.

7.7.17 The screen will display, 'PRINT A TRANSFER SHEET'.

7.7.18 A YES answer prints a transfer sheet and returns the screen to the submenu.

7.7.19 A NO answer does not print a transfer sheet and displays the submenu.

7.8 RECEIVE ITEMS OR CONTAINER FROM ANOTHER MBA (NO FLOPPY) (CC4,3)
RECEIVE A CONTAINER OR ITEMS INTO FM (NO FLOPPY) (FM6,1)
RECEIVE CONTAINER OR ITEMS INTO SA (NO FLOPPY) (SA4,4)
RECEIVE ITEMS INTO FC (NO FLOPPY) (FC5,4)
RECEIVE ITEMS INTO VAULT65 (NO FLOPPY) (VL4,3)

This option receives an item into an accounting inventory control. The computer assigns the new item a serial number. All other information is entered manually by the user.

7.8.1 Press the appropriate number key.

7.8.2 Press the ENTER key.

7.8.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.8.4 The screen will display, 'IS THE ITEM IN A CONTAINER Y/N?'.

7.8.5 A YES answer asks for the name of the container.

7.8.6 A NO answer displays on the screen, 'GET INFO ON WHAT THE NEWLY CREATED ITEM WILL BE'.

7.8.7 The screen will display, 'IS THE ITEM A COLLECTION,Y/N?'.

7.8.8 A YES answer displays on the screen "COLLECTION NAME'. Enter the name of the collection and press the ENTER key. The collection name will be displayed on the screen.

7.8.9 A NO answer displays on the screen, 'INFORMATION ABOUT ITEM AS RECEIVED'. A series of screen displays allows information about the item to be entered.

7.8.10 If information does not apply, press the ENTER key to exit the screen.

7.8.11 'ENTER ZONE' Enter the zone the item will be in. DO NOT LEAVE BLANK.

7.8.12 'BATCH NUMBER' Enter the casting batch number. If one does not exist, enter some form of number that will help identify the item. DO NOT LEAVE BLANK

7.8.13 'SLUG NUMBER' If the item is a slug, enter the number. If not, press the ENTER key.

7.8.14 'SLUG STATUS' If the item is a slug or an element, enter the status (A,I,R), else press the ENTER key.

7.8.15	'PRODUCT DESCRIPTION'	Description of the item, SLUG, ELEMENT, FEEDSTOCK, etc. Product description must be an acceptable one (see the PC-DYMAC Glossary for a list of all acceptable product descriptions.)
7.8.16	'TRANSFER#'	Enter the transfer number from the SPM transfer document. If a number is not available, enter date of transfer.
7.8.17	'JACKET#'	Enter the jacket number if the item is an element. If not press the ENTER key.
7.8.18	'SEAL NO'	Press the ENTER key.
7.8.19	'SPM NO'	Enter the SPM BATCH NUMBER from the SPM transfer document.
7.8.20	'REMARKS'	Enter any useful remarks that may pertain to the item.

NOTE: Weights of an item can be entered two ways, by the actual weight or by percentages. ACTUAL WEIGHTS ARE PREFERRED.

7.8.21 The screen will display, 'Do you want to enter actual weights, Y/N?'.

7.8.22 A YES answer displays a list of all weights to enter.

7.8.23 A NO answer displays a list of percentages to enter.

7.8.24 Press the ENTER key after entering all the necessary weights.

7.8.25 The screen will display, 'XFER REMARKS'. Enter remarks pertaining to the origin of the item (e.g., Feedstock from SPM)

7.8.26 The screen will display, 'IS THIS TRANSACTION OK'. Check all the information entered for accuracy.

7.8.27 If an error is found, answer NO. The transaction will not be processed and the submenu will be displayed.

7.8.28 A YES answer processes the transaction and returns to the submenu.

7.9 RECEIVE CONTAINER FROM FC, FM, OR VAULT65 (FLOPPY DISK) (CC4,4)
RECEIVE FROM ANOTHER ROOM (FLOPPY DISK) (FM6,2)
RECEIVE CONTAINER FROM FM (FLOPPY DISK) (SA4,3)
RECEIVE CONTAINER FROM ANOTHER MBA (FLOPPY DISK) (FC5,3)
RECEIVE CONTAINER FROM ANOTHER ROOM (FLOPPY DISK) (VL4,4)

The data needed to receive a container from another room is stored on a floppy disk. The disk is read and the information is transferred to the receiving inventory.

7.9.1 Press the appropriate number key.

7.9.2 Press the ENTER key.

7.9.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.9.4 The screen will display, 'PUT CONTAINER FLOPPY IN THE A DRIVE'. Place the floppy disk in the A drive (top floppy drive).

NOTE: The computer will verify the floppy disk is in the correct computer. Several messages will appear on the screen while the files on the floppy disk are copied to the receiving inventory.

7.9.5 The screen will display, 'WHAT ZONE WILL RECEIVE THE CONTAINER'. Enter the zone number that will store the container.

7.9.6 Press the ENTER key.

7.9.7 The screen will display, 'COPYING CONTAINER TRANSACTION TO FLOPPY'

'TO COMPLETE THE TRANSFER PROCESS THIS FLOPPY DISK MUST BE POSTED IN THIS ORDER'

1. CENTRAL COMPUTER
2. PERIPHERAL COMPUTER (where the material is transferred to)
3. CENTRAL COMPUTER
4. PERIPHERAL COMPUTER (where the material is transferred from)'

NOTE: The computer checks each floppy disk to make sure it is being read at the correct computer.

7.9.8 After the above message is cleared, the submenu is displayed.

7.10 RECEIPT FOR CONTAINER SHIPPED FROM CENTRAL (FLOPPY DISK) (CC6,1)
DELETE A CONTAINER FROM VAULT65 (FLOPPY DISK) (VL4,5)
DELETE A CONTAINER FROM FC (FLOPPY DISK) (FC5,5)
DELETE A CONTAINER FROM SA (FLOPPY DISK) (SA4,5)
DELETE A CONTAINER FROM FM (FLOPPY DISK) (FM5,1)

This option will delete or post a receipt for a container shipped from that system's inventory. This is the final step when transferring data using a floppy disk.

7.10.1 Press the appropriate number key.

7.10.2 Press the ENTER key.

7.10.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.10.4 The screen will display, 'PUT ITEM FLOPPY IN THE A DRIVE'. Place the transfer floppy in the A drive (top floppy drive).

7.10.5 The computer will delete the items from the inventory and return the screen to the submenu.

7.11 ADJUST CHEMISTRY VALUES (URANIUM, U-235 MBA CUSTODIAN APPROVAL) (CC8,1 - FM7,2 - FC9,8 - VL6,1)

This option will adjust uranium and U-235 plus all the other isotopes. Because of this, it requires approval from the MBA Custodian. The values to use will be supplied by the MBA Custodian.

7.11.1 Press the appropriate number key.

7.11.2 Press the ENTER key.

7.11.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.11.4 The screen will display, 'ENTER BATCH NUMBER'. Enter the cast batch number of the batch to adjust.

7.11.5 Press the ENTER key.

7.11.6 The screen will display, 'ENTER PHD SERIAL#'. Enter the serial number of the PHD associated with the cast batch.

7.11.7 Press the ENTER key.

NOTE: All products associated with the cast batch will be displayed on the screen. The MBA Custodian may or may not want to adjust all of the products. The option

exists to delete products or to adjust part or all products.

7.11.8 The screen will display, 'PRESS ESCAPE TO KEEP THE REST'.

7.11.9 The screen will display, 'WHICH PROD DESC DO YOU WANT TO DELETE'. Enter the number adjacent to the product description to delete that product description.

7.11.10 When the list is correct or if all the products are to be adjusted, press the Esc key.

7.11.11 The screen will display, 'ANALYSES OF _____'

'URAN' 'PCT U234'
'U-235'
'PCT U236'
'PCT U238'
'PCT PU'
'PCT PU239'
'PCT PU240'
'PCT PU241'
'PCT PU242'
'PCT ZR'
'PCT RU'
'PCT SI'
'PCT TA'
'PCT MO'
'PCT PD'
'PCT RH'
'OTHER'
'DENSITY'
'POSITION'

7.11.12 Enter the percent weight amounts. Press the ENTER key after each entry.

7.11.13 Press the Pg Dn key to exit the screen.

7.11.14 After each record is adjusted, the submenu will be displayed.

7.12 ADJUST CHEMISTRY VALUES (U-234, U-236, U-238, ZR)
(CC8,2 - VL6,2 - FC9,9 - SA6,1 - FM7,1)

This option is used for every cast batch including slugs manufactured in EFL. The U-235 value is not adjusted, but the remaining isotopes are. The adjustment is usually made after the accept slugs have been transferred to the FM computer unit. This option is also available at the other computer units.

7.12.1 Press the appropriate number key.

7.12.2 Press the ENTER key.

7.12.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.12.4 The screen will display, 'ENTER BATCH NUMBER'. Enter the cast batch number of the batch to adjust.

7.12.5 Press the ENTER key.

7.12.6 The screen will display, 'ENTER PHD SERIAL#'. Enter the serial number of the PHD associated with the cast batch.

7.12.7 Press the ENTER key.

NOTE: All products associated with the cast batch will be displayed on the screen. The MBA Custodian may or may not want to adjust all of the products. The option exists to delete products or to adjust part or all products.

7.12.8 The screen will display, 'PRESS ESCAPE TO KEEP THE REST'.

7.12.9 The screen will display, 'WHICH PROD DESC TO YOU WANT TO DELETE'. Enter the number adjacent to the product description to delete that product description.

7.12.10 When the list is correct, or if all the products are to be adjusted, press the ESCAPE key.

7.12.11 The screen will display, 'ANALYSES OF _____'

'URAN'
'PCT U234'
'U-235'
'PCT U236'
'PCT U238'
'PCT PU'
'PCT PU239'
'PCT PU240'
'PCT PU241'
'PCT PU242'
'PCT ZR'
'PCT RU'
'PCT SI'
'PCT TA'
'PCT MO'
'PCT PD'
'PCT RH'
'OTHER'
'DENSITY'
'POSITION'

7.12.12 Enter the percent weight amounts. Press the Pg Dn key to exit the screen.

7.12.13 Press the ENTER key after each entry.

7.12.14 After each record is adjusted, the submenu will be displayed.

7.13 ENTER FMF CHEMISTRY VALUES (REPORT ONLY) (C8,3)
ENTER EFL CHEMISTRY VALUES (REPORT ONLY) (C8,5)

These two options are used to enter chemistry values for a cast batch into a database. The screen display for the two options differ because of the impurities. Instructions for entering the chemistry values are the same.

7.13.1 Press the appropriate number key.

7.13.2 Press the ENTER key.

7.13.3 The screen will display, 'ENTER PASSWORD'. Enter your password. DO NOT PRESS THE ENTER KEY.

7.13.4 The screen will display, 'ENTER BATCH#'. Enter the cast batch number.

7.13.5 Press the ENTER key.

NOTE: If the cast batch is located, a message is displayed with an option to proceed or not. If the cast batch is not found a message 'CAST BATCH NOT FOUND', is displayed and the program continues.

7.13.6 All the uraniums, isotopes, and impurities for the top, center, and bottom sample will be displayed. Enter the percent weight value for each.

7.13.7 Press the ENTER key.

7.13.8 The screen will display, 'PRINT CHEMISTRY VALUES, Y/N?'.

7.13.9 A YES answer generates a report of the chemistry values entered and then returns the screen to the submenu.

7.13.10 A NO answer exits the option and returns to the submenu.

7.14 EDIT FMF CHEMISTRY VALUES AND/OR PRINT REPORT (CC8,4)
EDIT EFL CHEMISTRY VALUES AND OR PRINT REPORT (CC8,6)

These two options are used to edit or generate a printout for existing chemistry values. The cast batch number and the date from the original chemistry data sheet are entered. The chemistry values are displayed on the screen. If editing is necessary, type over the values with the correct information.

7.14.1 Press the appropriate number key.

7.14.2 Press the ENTER key,

7.14.3 The screen will display, 'ENTER PASSWORD'. Enter your password. DO NOT PRESS THE ENTER KEY.

7.14.4 The screen will display, 'ENTER BATCH#'. Enter the cast batch number.

7.14.5 Press the ENTER key.

7.14.6 The screen will display, 'ENTER DATE FROM CHEMISTRY SHEETS FOR THIS BATCH'. Enter the date from the original chemistry sheets.

NOTE: If the cast batch is located all the chemistry data is displayed. If the cast batch is not found a message, 'CAST BATCH NOT FOUND', is displayed and then the submenu is displayed.

7.14.7 The screen will display, 'PRINT CHEMISTRY VALUES Y/N?'.

7.14.8 A YES answer will generate a report of the chemistry values entered and return the screen to the submenu.

7.14.9 A NO answer exits the option and returns to the submenu.

7.15 ENTER A NEW MENU ITEM
(CC9,2 - FM9,2 - SA8,1 - FC9,3 - VL9,3)

New menu options can be entered or existing ones edited. The main menu number is entered and then the submenu number. The database is displayed on the screen. New information or editing is done on this screen. Press the Pg Dn key to exit the screen.

7.15.1 Press the appropriate number key.

7.15.2 Press the ENTER key.

7.15.3 The screen will display, 'ENTER PASSWORD'. Enter your password. DO NOT PRESS THE ENTER KEY.

7.15.4 The screen will display, 'ENTER MENU YOU WANT - ENTER 1 - 9'. Enter the main menu number.

7.15.5 Press the ENTER key.

7.15.6 The screen will display, 'WHICH OPTION DO YOU WANT TO EDIT - USE ZERO IF YOU WANT TO CHANGE MAIN HEADER'. Enter the submenu number.

7.15.7 Press the ENTER key.

7.15.8 The database will be displayed. You may enter new information or edit the existing data.

7.15.9 Press the Pg Dn key to exit the screen and return to the submenu.

7.16 UPDATE CENTRAL AT END OF DAY (VL3,1 - FM8,1 - FC4,1)

This option enables you to copy the unposted transactions at the peripherals to a floppy disk. The floppy disk is read at the Central Computer and the transactions are used to update the Central Computers' database. This is done daily after all nuclear fuel is stored or when a real-time inventory is required.

7.16.1 Press the appropriate number key.

7.16.2 Press the ENTER key.

7.16.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS THE ENTER KEY.

7.16.4 The screen will display, 'PUT THE UPDATE DISK IN THE A DRIVE'.

7.16.5 Place a formatted double side high density floppy disk in the upper disk drive.

7.16.6 The screen will display, 'Press the ENTER Key When Ready'.

7.16.7 Insert the floppy disk into the A Drive (top drive) and lock the latch.

7.16.8 Press the ENTER key.

7.16.9 Several files are copied to the floppy disk. When copying is complete, a message is displayed to remove the floppy disk and take the disk to the Central Computer for posting. See Section C-7.1 POST UPDATE DISKS FROM PERIPHERAL COMPUTERS.

7.16.10 The screen clears and displays the submenu.

7.17 COPY COMPLETED S/A TO FLOPPY FOR RECORD RETENTION (SA8,8)

Completed subassembly data is copied to a floppy disk for record retention. The subassembly data is then deleted from the active inventory. To exit the program, press the Esc key.

7.17.1 Press the appropriate number key.

7.17.2 Press the ENTER key.

7.17.3 The screen will display, 'ENTER PASSWORD'. Enter your assigned password. DO NOT PRESS ENTER.

7.17.4 The screen will display, 'Collection Name'. Enter the name of the subassembly (e.g., X-481 - B-2945Y).

7.17.5 Press the ENTER key.

7.17.6 The screen will display, 'COPYING SUBASSEMBLY TO TEMPORARY FILE'. The subassembly data is copied to a temporary file.

7.17.7 The screen will display, 'INSERT CLEAN FORMATTED FLOPPY IN B DRIVE (BOTTOM DISK DRIVE)'. Insert a clean formatted floppy disk in the B drive.

7.17.8 Press any key to copy the subassembly data to the floppy disk.

7.17.9 The screen will display, 'WHEN RED LIGHT IS OFF REMOVE FLOPPY DISK FROM B DRIVE'. Remove the floppy disk from the B drive.

7.17.10 The screen will display, 'DELETING SUBASSEMBLY FROM INVENTORY'. The subassembly data will be deleted from the active inventory file. The submenu will be displayed.

7.18 WRITE OFF A PHD TO WASTE ACCOUNT
(FC8,4)

With approval from the MBA Custodian, PHD's which cast batches have been either balanced or reconciled may be written off to a waste account using this option.

7.18.1 Press the appropriate number key.

7.18.2 Press the ENTER key.

7.18.3 The screen will display, 'ENTER PASSWORD'. Enter your password. DO NOT PRESS ENTER.

7.18.4 The screen will display, 'INFO ABOUT WASTE-ENTER SERIAL NUMBER', Enter the serial number of the waste account.

7.18.5 Press the ENTER key.

7.18.6 The item belonging to the entered serial number will be displayed on the screen.

7.18.7 The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

7.18.8 A NO answer returns the screen to select another item.

7.18.9 A YES answer displays on the screen, 'INFO ABOUT PHD TO BE WRITTEN OFF - ENTER SERIAL NUMBER'. Enter the serial number of the PHD to be written off.

7.18.10 The item belonging to the entered serial number will be displayed on the screen.

7.18.11 The screen will display, 'IS THIS THE ITEM YOU WANT (Y/N)'.

7.18.12 A NO answer returns the screen to select another item.

7.18.13 A YES answer displays on the screen, 'ENTER THE FINAL VALUES OF THE FROM ITEM'. The values of the PHD are shown on the left. Enter the values to be written off.

7.18.14 The screen will display, 'GROSS WEIGHT OF MATERIAL TRANSFERRED IS _____'. The gross weight of the material transferred will be displayed on the screen.

7.18.15 Press the ENTER key to continue.

7.18.16 The screen will display, 'IS THIS TRANSACTION OK (Y/N)'. Check all the information entered for accuracy.

7.18.17 If an error is found answer NO. The transaction will not be processed and the submenu will be displayed.

7.18.18 A YES answer processes the transaction and returns to the submenu.

FMF/FC/ZONE4 CENTRAL COMPUTER 08/28/89 15:11:46 dymac-004(3/88)

ZONE LIST	U-235/Equv.	ITEM COUNT	B/C COUNT
ZONE TOTALS	471.87	2	1

*** ITEMS NOT IN CONTAINERS***

SERIAL	BATCH#	SPM#	PRODUCT	SL/EL	NET AMT	ALLOY	URAN	U-235	Pu	Pu Iso	DU	DU-235
215605	MKIIC-F-IC025	189-020-60009-00000	SLUG	055/CK53	45.53	45.53	40.95	31.97	0.00	0.00	0.00	0.00
218809	MKIII-F-IC091	086-020-60181-00000	SLUG	001/	81.13	81.13	72.79	48.64	0.00	0.00	0.00	0.00
					126.66	126.66	40.95	80.61	0.00	0.00	0.00	0.00

*** CONTAINERS ***

CONT	BATCH#	SPM#	PRODUCT	COUNT	NET AMT	ALLOY	URAN	U-235	Pu	Pu Iso	DU	DU-235
CLBC011	MKIII-F-IC091	086-020-60181-00000	SLUG	8	651.01	651.01	585.41	391.26	0.00	0.00	0.00	0.00

Fig. 44. Print Zone Inventory (5.2)

08/29/89 11:36:53 LIST OF ALL INVENTORY BY SPM# 189-020-60009-00000 dymac-020(3/88)

SERIAL#	BATCH#	DESCRIP.	CONTAINER	RM	SPM#	ALLOY	URAN	U-235	PU	PU ISO.	DU	DU-235
215925	MKIIC-F-IC026	SLUG/FINES	CLBC010	FC	189-020-60009-00000	2,196.30	1,976.44	1,544.30	10.00	5.00	0.00	0.00
216057	MKIIC-F-IC029	SLUG/FINES	CLBC010	FC	189-020-60009-00000	1,906.00	1,714.41	1,338.57	0.00	0.00	0.00	0.00

Fig. 45. Print All Items For A Selected SPM Number (5.3)

08/29/89
09:58:28

dymac-006(3/88)

SERIAL#	BATCH#	PRODUCT	SL#/ELE#	SPM#	NET AMT	ALLOY	URAN	U-235	PU	PU-ISO	DU	DU-235
218537	MKIII-F-IC089	ELEMENT	086 L578	086-020-60181-00000	81.48	81.48	73.12	48.96	0.00	0.00	0.00	0.00
218538	MKIII-F-IC089	ELEMENT	087 L547	086-020-60181-00000	22.00	21.90	19.65	13.16	0.00	0.00	0.00	0.00
218539	MKIII-F-IC089	ELEMENT	088 K966	086-020-60181-00000	22.00	21.80	19.56	13.10	0.00	0.00	0.00	0.00
218540	MKIII-F-IC089	ELEMENT	089 L593	086-020-60181-00000	22.00	21.71	19.48	13.04	0.00	0.00	0.00	0.00
218541	MKIII-F-IC089	ELEMENT	090 L998	086-020-60181-00000	42.00	41.60	37.33	25.00	0.00	0.00	0.00	0.00
218542	MKIII-F-IC089	ELEMENT	091 K999	086-020-60181-00000	82.00	81.49	73.13	48.97	0.00	0.00	0.00	0.00
218543	MKIII-F-IC089	ELEMENT	092 L554	086-020-60181-00000	81.54	81.54	73.17	48.99	0.00	0.00	0.00	0.00
218544	MKIII-F-IC089	ELEMENT	093 K981	086-020-60181-00000	81.58	81.58	73.21	49.02	0.00	0.00	0.00	0.00
701538	MKIII-F-IC089	ELEMENT	087 L547	086-020-60181-00000	40.00	39.81	35.73	23.93	0.00	0.00	0.00	0.00
701539	MKIII-F-IC089	ELEMENT	087 L547	086-020-60181-00000	20.00	19.91	17.87	11.96	0.00	0.00	0.00	0.00
701541	MKIII-F-IC089	ELEMENT	088 K966	086-020-60181-00000	40.00	39.63	35.57	23.81	0.00	0.00	0.00	0.00
701542	MKIII-F-IC089	ELEMENT	088 K966	086-020-60181-00000	20.00	19.82	17.79	11.91	0.00	0.00	0.00	0.00
701544	MKIII-F-IC089	ELEMENT	089 L593	086-020-60181-00000	40.00	39.47	35.42	23.72	0.00	0.00	0.00	0.00
701545	MKIII-F-IC089	ELEMENT	089 L593	086-020-60181-00000	20.00	19.73	17.71	11.86	0.00	0.00	0.00	0.00
701546	MKIII-F-IC089	ELEMENT	090 L998	086-020-60181-00000	40.00	39.62	35.56	23.81	0.00	0.00	0.00	0.00
					654.60	651.09	584.30	391.24	0.00	0.00	0.00	0.00

Fig. 46. Print All Items In a Batch (5.4)

Serial#:218810	dymac-007(3/88)
Batch#: MKIII-F-IC091	DESCR: SLUG
SPM # : 086-020-60181-00000	COMP : 90%U10%ZR
Alloy : 82.02	%Enr : 66.83
Uran : 73.59	NDA : 13549
U-235 : 49.18	Gross:
Pu : 0.00	
PuIso : 0.00	Net :
Du : 0.00	
DU-235: 0.00	Tare :

Fig. 47. Print A Label (5.5)

FC dymac-008(3/88)

CLBC020	BGJ
DATE	08/29/89
ALLOY WT.	325.12
URAN WT.	291.70
U-235 WT.	194.94
PU WT.	0.00
Pu Iso WT.	0.00
DU WT.	0.00
DU-235 WT.	0.00
MODERATOR	POLY
MOD. WT.	115.40
4*U-235 Eqv	194.94
3.3*U-235 Eqv	194.940

SEAL_____ DATE _____ INITIAL _____

SEAL_____ DATE _____ INITIAL _____

SEAL_____ DATE _____ INITIAL _____

ITEMS

SERIAL#	BATCH#	PRODUCT	SL#/ELE#	SPM#	ALLOY	URAN	U-235	PU	PU-ISO	DU	DU-235
218810	MKIII-F-IC091	SLUG	002	086-020-60181-00000	82.02	73.59	49.18	0.00	0.00	0.00	0.00
218811	MKIII-F-IC091	SLUG	003	086-020-60181-00000	81.04	72.71	48.59	0.00	0.00	0.00	0.00
218812	MKIII-F-IC091	SLUG	004	086-020-60181-00000	81.02	72.69	48.58	0.00	0.00	0.00	0.00
218813	MKIII-F-IC091	SLUG	005	086-020-60181-00000	81.04	72.71	48.59	0.00	0.00	0.00	0.00
TOTAL ITEMS = 4					325.12	291.70	194.94	0.00	0.00	0.00	0.00

SPM TOTALS

086-020-60181-00000	325.12	291.70	194.94	0.00	0.00	0.00	0.00
	325.12	291.70	194.94	0.00	0.00	0.00	0.00

Fig. 48. Print A Tag For A Containter (5.6)

08/29/89
13:09:41

dymac-030(3/88)

SERIAL#	BATCH#	PRODUCT	SPM#	SLUG#	ELE#	ALLOY	URAN	U-235	PU	PU ISO.	DU	DU-235
218810	MKIII-F-IC091	SLUG	086-020-60181-00000	002		82.02	73.59	49.18	0.00	0.00	0.00	0.00
218811	MKIII-F-IC091	SLUG	086-020-60181-00000	003		81.04	72.71	48.59	0.00	0.00	0.00	0.00
218812	MKIII-F-IC091	SLUG	086-020-60181-00000	004		81.02	72.69	48.58	0.00	0.00	0.00	0.00
218813	MKIII-F-IC091	SLUG	086-020-60181-00000	005		81.04	72.71	48.59	0.00	0.00	0.00	0.00
						325.12	291.70	194.94	0.00	0.00	0.00	0.00

Fig. 49. Print Selected Items (5.7)

TRANSFERS FOR SPM BATCH#
093-060-60027-60041
05/23/89 TO 05/25/89

dymac-031(3/88)

FROM TRANSACTION															
DATE	SERIAL#	ROOM	ZONE	CONTAINER	ALLOY	URAN	U-235	PU	PU-ISO	DU	DU-ISO	SPM#	DESCR.	BATCH#	ELE#
05/23/89	0				22.21	0.00	0.00	0.00	0.00	0.00	0.00	093-060-60027-60041			
REMARKS:				NAME:		G.JACKSON									
TO TRANSACTION															
05/23/89	701540	FASB	RMS LAB		22.21	0.00	0.00	0.00	0.00	0.00	0.00	093-060-60027-60041	SAMPLE	IFCF-F-IC029	
REMARKS:	6 DU SAMPLES FROM HFEF/N														
FROM TRANSACTION															
DATE	SERIAL#	ROOM	ZONE	CONTAINER	ALLOY	URAN	U-235	PU	PU-ISO	DU	DU-ISO	SPM#	DESCR.	BATCH#	ELE#
05/23/89	701540	FASB	RMS LAB		22.21	0.00	0.00	0.00	0.00	0.00	0.00	093-060-60027-60041	SAMPLE	IFCF-F-IC029	
REMARKS:	6 DU SAMPLES FROM HFEF/N			NAME:		G.JACKSON									
TO TRANSACTION															
05/23/89	701540	FASB	RMS LAB		22.21	0.00	0.00	0.00	0.00	0.00	0.00	093-060-60027-60041	SAMPLE	IFCF-F-IC029	
REMARKS:	6 DU SAMPLES FROM HFEF/N														
FROM TRANSACTION															
DATE	SERIAL#	ROOM	ZONE	CONTAINER	ALLOY	URAN	U-235	PU	PU-ISO	DU	DU-ISO	SPM#	DESCR.	BATCH#	ELE#
05/23/89	701540	FASB	RMS LAB		22.22	0.00	0.00	0.00	0.00	0.00	0.00	093-060-60027-60041	SAMPLE	IFCF-F-IC029	
REMARKS:	6 DU SAMPLES FROM HFEF/N			NAME:		G.JACKSON									
TO TRANSACTION															
05/23/89	701540	FASB	RMS LAB	LOCKBOX	22.22	0.00	0.00	0.00	0.00	0.00	0.00	093-060-60027-60041	SAMPLE	IFCF-F-IC029	
REMARKS:	6 DU SAMPLES FROM HFEF/N														
FROM TRANSACTION															
DATE	SERIAL#	ROOM	ZONE	CONTAINER	ALLOY	URAN	U-235	PU	PU-ISO	DU	DU-ISO	SPM#	DESCR.	BATCH#	ELE#
05/25/89	0				19.50	0.00	0.00	0.00	0.00	0.00	0.00	093-060-60027-60041			
REMARKS:				NAME:		G.JACKSON									
TO TRANSACTION															
05/25/89	701541	FASB	RMS LAB		19.50	0.00	0.00	0.00	0.00	0.00	0.00	093-060-60027-60041	SAMPLE	IFCF-F-IC018	
REMARKS:	1 SAMPLE FROM FMF														

Fig. 50. Print All Transfers By SPM Number And Date (5.8)

CONTAINER	ROOM	ZONE	SSTOT	COUNT	dymac-012(3/88)
CLBC010	FC	ZONE2	3,156.21	10	
CLBC011	FC	ZONE4	196.32	4	
CLBC013	FC	ZONE9	191.26	7	
CLBC014	FC	ZONE9	531.29	8	
CLBC020	FC	ZONE4	194.94	4	
CLBC025	FC	ZONE9	207.18	10	
SPMCONT	FC	SA	308.65	11	

Fig. 51. Print All Containers In A Room (5.9)

08/30/89 ELEMENT LISTING FOR MKIII-F-IC070 15:10:37

SERIAL#	SLUG#	ELE#	ALLOY	URAN	U-235	Pu	Pu Iso.	Du	Du-235	SPM#
212636	053	J458	82.26	73.97	49.54	0.00	0.00	0.00	0.00	086-020-60020-00000
212637	054	J409	82.66	74.33	49.78	0.00	0.00	0.00	0.00	086-020-60020-00000
212638	055	J455	82.01	73.75	49.39	0.00	0.00	0.00	0.00	086-020-60020-00000
212639	056	J000	82.18	73.90	49.49	0.00	0.00	0.00	0.00	086-020-60020-00000
212640	057	J454	82.86	74.51	49.90	0.00	0.00	0.00	0.00	086-020-60020-00000
212641	058	J007	82.45	74.14	49.65	0.00	0.00	0.00	0.00	086-020-60020-00000
212642	059	J012	82.15	73.88	49.47	0.00	0.00	0.00	0.00	086-020-60020-00000
212643	060	J417	81.89	73.64	49.32	0.00	0.00	0.00	0.00	086-020-60020-00000
212644	061	J402	82.58	74.26	49.73	0.00	0.00	0.00	0.00	086-020-60020-00000
212645	062	J441	82.64	74.32	49.77	0.00	0.00	0.00	0.00	086-020-60020-00000
212646	063	J481	81.89	73.64	49.32	0.00	0.00	0.00	0.00	086-020-60020-00000
212647	064	J085	82.58	74.26	49.73	0.00	0.00	0.00	0.00	086-020-60020-00000
212648	065	J019	82.44	74.14	49.65	0.00	0.00	0.00	0.00	086-020-60020-00000
212649	066	J432	82.03	73.77	49.40	0.00	0.00	0.00	0.00	086-020-60020-00000
212650	067	J415	81.47	73.26	49.06	0.00	0.00	0.00	0.00	086-020-60020-00000
212651	068	J071	82.02	73.76	49.40	0.00	0.00	0.00	0.00	086-020-60020-00000
212652	069	J456	82.47	74.16	49.67	0.00	0.00	0.00	0.00	086-020-60020-00000
212653	070	J079	82.33	74.04	49.58	0.00	0.00	0.00	0.00	086-020-60020-00000
212654	071	J446	82.16	73.88	49.48	0.00	0.00	0.00	0.00	086-020-60020-00000
212655	072	J418	81.88	73.63	49.31	0.00	0.00	0.00	0.00	086-020-60020-00000
212656	073	J498	82.72	74.39	49.82	0.00	0.00	0.00	0.00	086-020-60020-00000
212657	074	J005	82.29	74.00	49.56	0.00	0.00	0.00	0.00	086-020-60020-00000
212658	075	J062	82.27	73.98	49.55	0.00	0.00	0.00	0.00	086-020-60020-00000
212659	076	J406	81.84	73.60	49.29	0.00	0.00	0.00	0.00	086-020-60020-00000
212660	077	J089	82.14	73.87	49.47	0.00	0.00	0.00	0.00	086-020-60020-00000
212661	078	J037	82.54	74.23	49.71	0.00	0.00	0.00	0.00	086-020-60020-00000
212662	079	J471	82.23	73.95	49.52	0.00	0.00	0.00	0.00	086-020-60020-00000
212663	080	J041	82.39	74.09	49.62	0.00	0.00	0.00	0.00	086-020-60020-00000
212664	081	J479	82.94	74.58	49.95	0.00	0.00	0.00	0.00	086-020-60020-00000
212665	082	J400	81.96	73.70	49.36	0.00	0.00	0.00	0.00	086-020-60020-00000
212666	083	J044	81.93	73.68	49.34	0.00	0.00	0.00	0.00	086-020-60020-00000
			2,550.20	2,293.31	1,535.83	0.00	0.00	0.00	0.00	

Fig. 52. Print An Element Listing (5.10)

08/30/89 08:34:08 ELEMENTS IN FMF INVENTORY dymac-016(3/88)

BATCH#	COUNT	ALLOY	URAN	U-235	Pu	Pu Iso.	Du	Du-235	XENON TAG
MKIIC-F-IC004	8	369.61	332.65	260.00	0.00	0.00	0.00	0.00	TAGGED
MKIII-F-IC088	15	1,228.68	1,112.32	743.60	0.00	0.00	0.00	0.00	
MKIII-F-IC089	15	651.09	584.30	391.24	0.00	0.00	0.00	0.00	
XBPBE-F-IC003	2	620.62	608.40	51.31	0.00	0.00	0.00	0.00	

STANDARD ELEMENT 32 EXPERIMENTAL ELEMENT TOTAL 8

Fig. 53. Print Accept Element Report (5.11)

08/30/89 09:48:19 SLUGS IN FMF INVENTORY dymac-016(3/88)

BATCH#	COUNT	ALLOY	URAN	U-235	Pu	Pu Iso.	Du	Du-235	SPM#
MFF3-F-IC001	9	842.60	757.96	245.64	0.00	0.00	0.00	0.00	159-020-60050-00000
MKIIC-F-IC004	3	69.16	62.25	48.65	0.00	0.00	0.00	0.00	189-020-60009-00000
MKIIC-F-IC025	8	363.98	327.34	255.60	0.00	0.00	0.00	0.00	189-020-60009-00000
MKIII-F-IC091	7	568.36	509.93	340.78	0.00	0.00	0.00	0.00	086-020-60181-00000
MKIV[illegible]-F-IC004	105	5,444.51	4,895.12	3,407.54	0.00	0.00	0.00	0.00	086-020-60124-00000

STANDARD SLUGS		EXPERIMENTAL SLUGS	
13.500" SLUGS	51	13.500" SLUGS	9
< 13.500" SLUGS	72	< 13.500" SLUGS	0

Fig. 54. Print Accept Slug Report (5.12)

ELEMENT LISTING FOR MKIIC-F-IC004

SERIAL#	BATCH#	PRODUCT	SPM#	SLUG#	ELE#	ALLOY	URAN	U-235	PU	PU ISO.	DU	DU-235
301114	MKIIC-F-IC004	C/ELEMENT	189-020-60009-00000	68&69	P009	45.97	41.37	32.33	0.00	0.00	0.00	0.00
301115	MKIIC-F-IC004	C/ELEMENT	189-020-60009-00000	69&70	N968	46.20	41.58	32.50	0.00	0.00	0.00	0.00
301116	MKIIC-F-IC004	C/ELEMENT	189-020-60009-00000	71&72	R338	46.30	41.67	32.57	0.00	0.00	0.00	0.00
301117	MKIIC-F-IC004	C/ELEMENT	189-020-60009-00000	73&74	N961	46.28	41.65	32.56	0.00	0.00	0.00	0.00
301123	MKIIC-F-IC004	CS/ELEMENT	189-020-60009-00000	86&87	A468	46.38	41.74	32.63	0.00	0.00	0.00	0.00
						231.13	208.01	162.59	0.00	0.00	0.00	0.00

Fig. 55. Print Element Report (Multiple Slug Elements) (5.13)

08/30/89 10:29:57 ZONE 12 EXCEPTION REPORT dymac-014(3/88)

SERIAL#	SPM#	BATCH#	DESCRIP.	ROOM	ZONE	CONTAINER	ALLOY	URAN	U-235	Pu	Pu-Iso	Du	Du-235
302240	086-020-60020-00000	MKIII-F-IC057	ELEMENT	FC	ZONE2		82.53	74.22	49.71	10.00	5.00	0.00	0.00
215925	189-020-60009-00000	MKIIC-F-IC026	SLUG/FINES	FC	ZONE2		2,196.30	1,976.44	1,544.30	10.00	5.00	0.00	0.00
216057	189-020-60009-00000	MKIIC-F-IC029	SLUG/FINES	FC	ZONE2		1,906.00	1,714.41	1,338.57	0.00	0.00	0.00	0.00
207421	159-020-60050-00000	MFF3-F-IC001	SLUG	FC	ZONE2	CLBC013	94.24	84.77	27.47	0.00	0.00	0.00	0.00
207422	159-020-60050-00000	MFF3-F-IC001	SLUG	FC	ZONE2	CLBC013	93.72	84.30	27.32	0.00	0.00	0.00	0.00
207423	159-020-60050-00000	MFF3-F-IC001	SLUG	FC	ZONE2	CLBC013	93.57	84.17	27.28	0.00	0.00	0.00	0.00

TOTALS BY ROOM

				FC			4,466.36	4,018.31	3,014.65	20.00	10.00	0.00	0.00

TOTAL U-235 3080.65

Fig. 56. Print Zone 12 Exception Report (5.14)

SPM TOTALS FOR
08/30/89

dymac-005(3/88)

SPM NUMBER	ALLOY	URAN	U_235	Pu	Pu Iso	Du	Du-235
086-020-60020-00000	82.53	74.22	49.71	10.00	5.00	0.00	0.00
086-020-60181-00000	651.01	585.41	391.26	0.00	0.00	0.00	0.00
159-020-60050-00000	281.53	253.24	82.07	0.00	0.00	0.00	0.00
189-020-60009-00000	4,102.30	3,690.85	2,882.87	10.00	5.00	0.00	0.00
TOTALS	5,117.37	4,603.72	3,405.91	20.00	10.00	0.00	0.00

Fig. 57. Print SPM Report (5.15)

11/08/89 10:51:40 WEEKLY AUDIT FOR FC/ZONE2 dymac-022(3/88)

SERIAL#	BATCH#	DESCRIP.	CONTAINER	SLUG/ELE	ALLOY	URAN	U-235	PU	PU ISO.	OU	DU-235	SPH#
208748	CC #88-09	FINE/FINES			0.00	0.00	0.00	0.00	0.00	0.00	0.00	159-020-60205-00000
222028	MKIIC-F-IC036	SLUG			0.00	0.00	0.00	0.00	0.00	0.00	0.00	189-020-60176-00000
201004	CR-100	CRUCIBLE			0.00	0.00	0.00	0.00	0.00	0.00	0.00	000-000-00000-00000
222814	MKIII-F-IC111	GLASS/DUST			0.00	0.00	0.00	0.00	0.00	0.00	0.00	086-020-60020-00000
222815	MKIII-F-IC111	GLASS/DUST			0.00	0.00	0.00	0.00	0.00	0.00	0.00	086-020-60020-00000
222821	289-9	EU FEEDSTOCK			0.50	0.50	0.33	0.00	0.00	0.00	0.00	086-020-60186-00000
TOTAL FOR ITEMS NOT IN A CONTAINER					0.50	0.50	0.33	0.00	0.00	0.00	0.00	
TOTAL FOR ZONE ZONE2					0.50	0.50	0.33	0.00	0.00	0.00	0.00	

Fig. 58. Print Audit Report (5.16)

11/08/89 10:51:49 WEEKLY AUDIT FOR FC/ZONE4 dymac-022(3/88)

SERIAL#	BATCH#	DESCRIP.	CONTAINER	SLUG/ELE	ALLOY	URAN	U-235	PU	PU ISO.	DU	DU-235	SPM#
219471	STIRRER 37	STIRRER			0.00	0.00	0.00	0.00	0.00	0.00	0.00	086-020-60020-00000
217229	STIRRER 36	STIRRER			183.10	164.60	110.29	0.00	0.00	0.00	0.00	086-020-60020-00000
207063	STIRRER 17	STIRRER			434.40	0.00	0.00	0.00	0.00	372.70	0.75	093-060-60030-00000
TOTAL FOR ITEMS NOT IN A CONTAINER					617.50	164.60	110.29	0.00	0.00	372.70	0.75	
TOTAL FOR ZONE ZONE4					617.50	164.60	110.29	0.00	0.00	372.70	0.75	
TOTAL FOR ROOM FC					408,805.79	250,339.87	132,843.17	0.00	0.00	147,524.90	294.98	

Fig. 58 (Cont'd)

11/08/89 11:10:47 WEEKLY AUDIT FOR VLT/ZONE11 dynac-022(3/88)

SERIAL#	BATCH#	DESCRIP.	CONTAINER	SLUG/E	E	ALLOY	URAN	U-235	PU	PU ISO.	DU	DU-235	SPH#
601895	SGS STD, 2QT CN	NDA STANDARD				12.20	10.33	10.02	0.00	0.00	0.00	0.00	002-020-04687-034 3
601900	NDA ELM S,F-143	NDA STANDARD				82.22	73.94	49.49	0.00	0.00	0.00	0.00	086-020-60228-000 0
601901	NDA ELM S,F-127	NDA STANDARD				82.34	74.05	49.56	0.00	0.00	0.00	0.00	086-020-60228-000 0
601902	NDA ELM S,F-083	NDA STANDARD		F083		82.70	74.37	49.78	0.00	0.00	0.00	0.00	086-020-60228-00000
601897	NDA STD (U5FS)	NDA STANDARD				109.17	103.71	69.19	0.00	0.00	0.00	0.00	086-020-07849-04217
601898	NDA STD (U10ZR)	NDA STANDARD				201.53	181.22	121.23	0.00	0.00	0.00	0.00	086-020-08811-04205
601899	NDA STD, EU PLT	NDA STANDARD				333.00	142.36	132.78	0.00	0.00	0.00	0.00	038-020-08454-60084
602000	NDA STD PL-20-2	NDA STANDARD				111.34	111.34	22.11	0.00	0.00	0.00	0.00	146-020-07796-03929
TOTAL FOR ITEMS NOT IN A CONTAINER						1,014.50	771.32	504.16	0.00	0.00	0.00	0.00	
TOTAL FOR ZONE ZONE11						1,014.50	771.32	504.16	0.00	0.00	0.00	0.00	
TOTAL FOR ROOM VLT						249,897.38	216,788.30	80,806.56	5,742.48	4,990.88	1,118.34	2.23	

TOTAL ALLOY = 719,083.51
TOTAL URANIUM = 520,620.12
TOTAL U-235 = 240,976.11
TOTAL PU = 6,975.37
TOTAL PU ISO = 6,080.36
TOTAL DU = 149,006.88
TOTAL DU-235 = 297.94

Fig. 58 (Cont'd)

SLUG TOTAL BY CAST BATCH NUMBER

BATCH#	COUNT	SPM#	ALLOY	URAN	U-235	PU	PU ISO.	DU	DU-235
ANLE-E-IC002	1	154-080-07244-00000	109.84	0.00	0.00	32.95	27.15	49.43	0.10
ANLE-E-IC002A	1	153-080-07243-02903	280.33	0.00	0.00	84.10	69.31	126.15	0.25
BLANK-F-IC001	1	093-060-60026-00000	10,076.95	0.00	0.00	0.00	0.00	10,076.95	20.16
BSC-E-IC001	1	181-080-60166-60156	137.58	0.00	0.00	11.01	9.75	112.81	0.23
BSC-E-IC002	1	181-080-60170-60157	139.72	0.00	0.00	26.55	23.50	99.20	0.20
ELW-E-IC001	5	154-080-60009-60001	518.26	0.00	0.00	134.74	110.70	331.70	0.65
FFTF SPD-1	1	159-020-10050-00000	2,743.80	2,404.32	608.86	0.00	0.00	0.00	0.00
FFTF-EFL-IC010	2	160-080-07149-00000	188.29	154.41	27.17	15.07	14.19	0.00	0.00
FFTF-EFL-IC011	1	160-080-07158-00000	93.82	66.60	2.99	17.83	16.79	0.00	0.00
FFTF-EFL-IC018	1	160-080-07158-00000	92.69	65.81	2.96	17.61	16.57	0.00	0.00
FFTF-EFL-IC019	8	160-080-07191-00000	754.57	618.69	108.35	60.38	56.87	0.00	0.00
FFTF-EFL-IC021	3	160-080-07158-00000	284.89	202.27	9.11	54.13	50.86	0.00	0.00
FFTF-R20-IC015B	1	159-020-07993-00000	728.16	640.78	162.37	0.00	0.00	0.00	0.00
FFTF-R20-IC019	1	159-020-07994-00000	540.50	475.63	120.09	0.00	0.00	0.00	0.00
FFTF-R20-IC020A	1	159-020-07991-00000	179.13	157.63	39.83	0.00	0.00	0.00	0.00
FFTF-R20-IC028	1	159-020-07991-00000	3,473.32	3,056.52	772.38	0.00	0.00	0.00	0.00
FFTF-R20-IC034	1	159-020-10002-00000	1,416.48	1,274.82	321.12	0.00	0.00	0.00	0.00
FSE-001	6	154-080-07075-00000	808.96	727.67	269.13	0.00	0.00	0.00	0.00
FSE-001C	1	154-080-07075-00000	134.29	120.79	44.68	0.00	0.00	0.00	0.00
FSE001A	1	154-080-07075-00000	134.16	120.68	44.63	0.00	0.00	0.00	0.00
FSE001B	2	154-080-07075-00000	270.15	243.00	89.87	0.00	0.00	0.00	0.00
FSE001F	3	154-080-07075-00000	389.18	350.07	129.47	0.00	0.00	0.00	0.00
FVT-E-IC003	2	154-080-07257-02935	155.90	110.65	66.71	29.62	24.32	0.00	0.00
FVT-E-IC008	5	154-080-07257-02935	393.70	279.18	168.07	75.04	61.50	0.00	0.00
IFCF-F-IC017	1	093-060-60030-00000	259.20	0.00	0.00	0.00	0.00	222.72	0.45
IFCF-F-IC025	10	093-060-60035-00000	404.04	0.00	0.00	0.00	0.00	363.64	0.73
IFCF-F-IC026	11	093-060-60035-00000	444.98	0.00	0.00	0.00	0.00	397.81	0.77
IFCF-F-IC027	11	093-060-60035-00000	449.04	0.00	0.00	0.00	0.00	404.14	0.77
IFCF-F-IC029	10	093-060-60035-00000	808.73	0.00	0.00	0.00	0.00	727.85	1.45
IFCF-F-IC032	1	093-060-60027-00000	2,153.00	0.00	0.00	0.00	0.00	1,928.96	3.86
IFR001	6	160-080-07129-00000	565.07	508.35	128.02	0.00	0.00	0.00	0.00
IFR002	2	160-080-07129-00000	189.44	170.45	42.92	0.00	0.00	0.00	0.00
IFR003	3	160-080-07129-00000	367.62	330.79	83.30	0.00	0.00	0.00	0.00
MFF1-F-IC001	2	159-020-08806-00000	184.19	165.79	31.57	0.00	0.00	0.00	0.00
MFF1-F-IC002	2	159-020-08806-00000	183.24	164.86	31.35	0.00	0.00	0.00	0.00
MFF1-F-IC004	5	159-020-08806-00000	459.94	413.88	78.56	0.00	0.00	0.00	0.00
MFF2-F-IC002	15	159-020-60050-00000	2,087.45	1,877.77	608.53	0.00	0.00	0.00	0.00
MFF3-F-IC001	67	159-020-60050-00000	6,682.10	6,010.83	1,947.99	0.00	0.00	0.00	0.00
MFF3-F-IC002	35	159-020-60050-00000	3,921.28	3,527.28	1,143.54	0.00	0.00	0.00	0.00
MFF3-F-IC003	37	159-020-60050-00000	4,660.57	4,192.57	1,364.31	0.00	0.00	0.00	0.00
MFF3-F-IC014	16	159-020-60050-00000	2,256.03	2,029.70	656.97	0.00	0.00	0.00	0.00

Fig. 58. (Cont'd)

ELEMENT TOTAL BY CAST BATCH NUMBER

BATCH#	COUNT	SPM#	ALLOY	URAN	U-235	PU	PU ISO.	DU	DU-235
DP1-E-1C011	3	154-080-60054-60059	242.11	171.87	118.59	46.01	40.73	0.00	0.00
DP1-E-1C012	4	154-080-60054-60059	260.43	184.90	127.49	49.48	43.80	0.00	0.00
FFTF E# 181006	1	159-090-02429-00000	388.72	255.32	64.24	0.00	0.00	0.09	0.00
FFTF E# 181163	1	159-090-02429-00000	381.82	250.44	63.14	0.00	0.00	0.09	0.00
FFTF E# 181179	1	159-090-02429-00000	379.27	251.91	63.40	0.00	0.00	0.09	0.00
FFTF E# 181192	1	159-090-02429-00000	377.51	251.59	63.32	0.00	0.00	0.09	0.00
FVT-E-1C001	2	154-080-07257-02935	158.58	112.55	67.91	30.14	24.76	0.00	0.00
FVT-E-1C004	1	154-080-07281-02959	79.40	65.06	42.55	6.36	5.21	0.00	0.00
FVT-E-1C005	1	154-080-07281-02959	79.42	65.07	42.56	6.36	5.21	0.00	0.00
FVT-E-1C007	2	154-080-07281-02959	152.92	125.30	81.94	12.24	10.02	0.00	0.00
FVT-E-1C008	1	154-080-07257-02935	79.06	56.11	33.86	15.03	12.34	0.00	0.00
FVT-R-1C001A	5	150-020-10072-00000	397.37	357.63	247.02	0.00	0.00	0.00	0.00
IFR-E-1C148	1	154-080-07032-02911	76.34	68.76	47.26	0.02	0.02	0.00	0.00
MFT-1-CAL PINS	2	160-020-60132-00000	557.90	502.05	95.54	0.00	0.00	0.00	0.00
MKIIC-F-1C015	1	189-020-60009-00000	45.41	40.83	31.92	0.00	0.00	0.00	0.00
MKIIC-F-1C021	1	189-020-60009-00000	45.25	40.69	31.78	0.00	0.00	0.00	0.00
MKIII-F-1C057	1	086-020-60020-00000	82.53	74.22	49.71	0.00	0.00	0.00	0.00
MKIII-F-1C059	3	086-020-60167-00000	245.88	221.11	147.98	0.00	0.00	0.00	0.00
MKIII-F-1C059	3	086-020-60198-00000	245.96	221.18	148.03	0.00	0.00	0.00	0.00
MKIII-F-1C059	1	086-020-60198-00000	81.72	73.49	49.18	0.00	0.00	0.00	0.00
MKIII-F-1C059	3	086-020-60198-00000	245.65	220.90	147.85	0.00	0.00	0.00	0.00
MKIII-F-1C060	1	086-020-60020-00000	81.57	73.35	49.16	0.00	0.00	0.00	0.00
MKIII-F-1C061	2	086-020-60020-00000	163.55	147.07	98.50	0.00	0.00	0.00	0.00
MKIII-F-1C089	1	086-020-60181-00000	81.59	73.22	49.03	0.00	0.00	0.00	0.00
MKIII-F-1C105	102	086-020-60181-00000	8,279.04	7,527.34	5,048.61	0.00	0.00	0.00	0.00
MKIVA-F-1C004	3	086-020-60201-00000	232.28	208.84	145.37	0.00	0.00	0.00	0.00
X425-E-1C001	1	154-080-07205-00000	78.00	64.22	40.89	5.67	5.35	0.00	0.00
X425-E-1C008	1	154-080-07213-02836	77.38	55.00	33.07	14.57	12.02	0.00	0.00
X425-E-1C008	1	154-080-07213-02836	77.18	54.86	32.99	14.54	12.00	0.00	0.00
X425-E-1C009	1	154-080-07213-02912	79.11	56.14	33.83	15.03	12.35	0.00	0.00
X425-E-1C009	7	154-080-07213-02939	553.19	392.36	236.56	105.60	86.79	0.00	0.00
X425-E-1C010	1	154-080-07235-02938	78.26	64.91	42.47	6.03	4.96	0.00	0.00
X425-R-1C004	3	150-020-10003-00000	235.32	212.03	146.55	0.00	0.00	0.00	0.00
X430-E-1C005	4	154-080-03302-60172	551.81	374.99	78.63	121.40	99.80	0.00	0.00
X430-E-1C007	1	154-080-03310-03021	138.63	88.71	13.72	36.04	29.63	0.00	0.00
X430-E-1C007	2	154-080-03310-60173	276.83	177.15	27.40	71.98	59.17	0.00	0.00
X430-E-1C011	1	154-080-03302-03009	136.34	92.70	19.43	30.00	24.64	0.00	0.00
X430-E-1C013	1	154-080-03289-02980	138.26	124.39	52.86	0.00	0.00	0.00	0.00
X430-E-1C014C	6	154-080-03289-02980	839.34	755.03	320.77	0.00	0.00	0.00	0.00
X481-E-1C007	1	154-080-60182-60179	81.24	57.91	30.71	15.50	13.72	0.00	0.00
X481-E-1C008	8	154-080-60151-60143	643.22	456.59	241.99	122.19	104.40	0.00	0.00

Fig. 58. (Cont'd)

ACCEPT SLUG LISTING FOR MKIII-F-IC091 dymac-029(3/88)

08/31/89 13:03:34

SERIAL#	BATCH#	SPM#	PRODUCT	SLUG#	ALLOY	URAN	U-235	PU	PU-ISO	DU	DU-235
218810	MKIII-F-IC091	086-020-60181-00000	SLUG	002	82.02	73.59	49.18	0.00	0.00	0.00	0.00
218811	MKIII-F-IC091	086-020-60181-00000	SLUG	003	81.04	72.71	48.59	0.00	0.00	0.00	0.00
218812	MKIII-F-IC091	086-020-60181-00000	SLUG	004	81.02	72.69	48.58	0.00	0.00	0.00	0.00
218813	MKIII-F-IC091	086-020-60181-00000	SLUG	005	81.04	72.71	48.59	0.00	0.00	0.00	0.00
218814	MKIII-F-IC091	086-020-60181-00000	SLUG	006	81.29	72.93	48.74	0.00	0.00	0.00	0.00
218815	MKIII-F-IC091	086-020-60181-00000	SLUG	007	80.82	72.51	48.46	0.00	0.00	0.00	0.00
		TOTALS 6			487.23	437.14	292.14	0.00	0.00	0.00	0.00

Fig. 59. Print All Slugs In A Cast Batch (5.17)

08/30/89 S/A LISTING FOR EXAMPLE 15:08:33

SERIAL#	BATCH#	PRODUCT	SLUG#	ELE#	GRID#	ALLOY	URAN	U-234	U-235	U-236	U-238	Pu	Pu Iso.	Pu-239	Pu-240	Pu-241	Pu-242	Du	Du-235	Zr	TAG#
218199	MKIII-F-IC088	ELEMENT	060	L947	0	81.90	74.14	0.54	49.56	0.21	23.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.33	
						81.90	74.14	0.54	49.56	0.21	23.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.33	

U-235 EQUIVALENT = 49.56

INDIVIDUAL SPM BATCH TOTALS

SPM#	ALLOY	URAN	U-234	U-235	U-236	U-238	Pu	Pu Iso.	Pu-239	Pu-240	Pu-241	Pu-242	Du	Du-235	Zr
086-020-60181-00000	81.90	74.14	0.54	49.56	0.21	23.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.33
	81.90	74.14	0.54	49.56	0.21	23.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.33

INDIVIDUAL CAST BATCH TOTALS

BATCH#	ALLOY	URAN	U-234	U-235	U-236	U-238	Pu	Pu Iso.	Pu-239	Pu-240	Pu-241	Pu-242	Du	Du-235	Zr
MKIII-F-IC088	81.90	74.14	0.54	49.56	0.21	23.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.33
	81.90	74.14	0.54	49.56	0.21	23.64	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	8.33

INDIVIDUAL CAST BATCH COMPOSITION AND % ENRICHMENTS

BATCH#	URAN	U-234	U-235	U-236	U-238	Pu	Pu Iso.	Pu-239	Pu-240	Pu-241	Pu-242	Du	Du-235	Zr
MKIII-F-IC088	90.53	.728	66.85	.283	31.89	0.00	0.00	0.00	0.00	0.00	.000	0.00	.000	10.17

Fig. 60. Print Subassembly Report (All Types) (5.18)

VIII. PC-DYMAC GLOSSARY

A	Accept. See accept elements and accept slugs.
Accept Elements	Fuel elements produced by the casting operation which meet the specification criteria for fabrication in subassemblies.
Accept Slugs	Fuel slugs produced by the casting operation which meet the specification criteria for inclusion in elements.
Accountability Control Area (ACA)	A physical area designated by the AWS Nuclear Materials Representative: (1) which encompasses a building or group of buildings and (2) within which all SPM-W functions are under the control of a Special Materials Representative.
Alloy	Uranium or plutonium feedstock melted with zirconium in the casting operation to produce fuel slugs.
Average Sodium Load	See sodium load
Bandolier	The soft inner container used to hold the batch of accepted fuel slugs from the casting operation for transfer to other areas. This container provides segregation and identification of each fuel slug in the casting batch.
Batch	See cast batch.
Batch Number	See cast batch number.
Birdcage	Type of container used for in-process storage of material item in Vault 65. Two types are used fixed birdcage and coldline birdcage.
Blanket Element	Element designed for use in a reactor blanket subassembly rather than a reactor core subassembly.
Bonding	An operation performed by fuel element manufacturing to ensure a bond of sodium exists between the fuel material and the element cladding material.
Can	A type of container used to store heels, slug/fines, fine/fines, cast scrap, and waste from the casting batch.

Cast Batch*	Products and byproducts produced from heating of a single crucible, consisting of, but not limited to, enriched and/or depleted feedstock; alloy; remelt material such as heels and slug/fines; glass/molds; and crucible.
Casting Batch	See cast batch.
Cast Scrap*	Byproducts from a cast batch, (e.g., heel, slug/fines) which may be remelted and reused.
Casting Scrap	See cast scrap.
Central Computer (CC)	Primary functions; of the Central Computer unit are updating of transaction data, maintenance of a complete inventory of all fuel material in the FMF MBA, the location database, and production and distribution of slug and element inventory report.
Charge	The material items which are placed in the crucible as the components of the fuel casting alloy or cast batch.
Chemical Analysis	Measurements performed in the Analytical Chemistry Laboratory to determine composition, enrichment, and impurities of each cast batch. Chemical examination of the sample slug by batch provides weight percentage of each material in the top, center, and bottom portions of the fuel slug with a breakdown of U and Pu isotopic content.
Chemistry Values	Values determined by the Analytical Chemistry Laboratory's analysis of the cast batch sample supplied by fuel casting.
Coldline Birdcage	Movable container used to transfer and store in-process material.
Container	A birdcage, box, can, drum, glovebox, or other location in which nuclear material is stored.
Crucible*	A graphite container used to hold molten metal alloy during melting and casting operations. The crucible is coated to prevent interaction between the molten metal and graphite.

* Acceptable product descriptions.

C/Element*	A U-10 Zr fuel slug encapsulated in a .174" O.D. by 25" 316 stainless steel jacket. (MK-IIC).
CS/Element*	A U-10 Zr fuel slug encapsulated in a .174" O.D. by 21" 316 stainless steel jacket. (MK-IICS).
Database	A collection of interrelated data stored and used by different programs without concern for the data structure or organization. A common approach is used to add new data and to modify and retrieve existing data. The PC-DYMAC system contains several databases.
Demolding	A hood operation following casting in which the contents of the molds are removed and separated into slugs, slug/fines, sample, glass/dust, fine/fines, and scrap.
Depleted Feedstock	Depleted uranium material with a U-235 content less then .07 percent supplied to fuel casting by Special Materials for inclusion in the casting batch charge.
Dross*	Oxidized material from a casting batch which usually forms at the top of the molten metal in the furnace.
Drum	A type of container, generally used for shipping nuclear material off-site.
DU	Depleted uranium.
DU Feedstock*	See depleted feedstock.
DU-235	U-235 in depleted uranium.
PC-DYMAC System	A computer-based system designed to provide a near real-time inventory of all nuclear material in the FMF MBA. The Materials Control and Accountability database maintained by PC-DYMAC is updated each time fuel material is received at the facility, moved within the facility, or is released by the facility.
PC-DYMAC Work Request	A form used to specify corrections, changes, and enhancements to be considered for the PC-DYMAC system.

* Acceptable product descriptions.

Element*	Encapsulated fuel slug or slugs. Slugs are enclosed in a stainless steel jacket which contains sodium for thermal bonding. The ends of the jacket are welded shut.
Element Inventory	A report listing all accept fuel elements in the FMF MBA. The report contains serial number, cast batch number, slug number, SPM number, and all weights for each fuel element.
EU Feedstock*	Enriched uranium material supplied to fuel casting by Special Materials for inclusion in the casting batch charge. Enriched uranium is uranium with a U-235 content greater than .07 percent.
Experimental Element	A fuel element prepared for experimental rather than production reactor use. These elements usually have a xenon tag gas in the plenum for breach identification in reactor.
Experimental Fuels Laboratory (EFL)	The Argonne-West facility dedicated to research, development, and the manufacturing of experimental fuel containing plutonium.
Fuel and Subassembly Building (FASB)	The Fuel and Subassembly Building is used for the manufacturing of Thermal Expansion Difference (TED) capsules, blanket elements, and experimental elements as well as providing many other laboratory functions.
Fine/Fines*	Fine particles of metal from the casting process recovered from the demolding operation and cleanup. The particles contain too much oxide to be remelted and used in future castings.
Fixed Birdcage	Containers used for storage of nuclear material. These containers are permanently fixed and are located in Vault 65.
Flexible Disk	A flexible magnetic disk enclosed in a protective container used as a storage medium on the IBM PC-AT. Synonymous with floppy disk.
FM	Designation of the PC-DYMAC Fuel Manufacturing computer unit.

* Acceptable product descriptions.

FMF	See Fuel Manufacturing Facility.
Form 23	SPM form used to reconcile a PHD.
Fuel Casting (FC)	Primary functions of the fuel casting; are preparing and completing the injection cast; demolding; shearing; separating and weighing slug/fines, fine/fines, glass/dust, heel, crucible, and waste for release or remelt; cutting fuel slug sample and preparing analytical sample sheets; transferring the products and byproducts to the appropriate locations along with the necessary documents. FC is the designation of the computer unit. The FC unit has an auxiliary Okidata printer used for printing container labels.
Fuel Manufacturing (FM)	Primary functions; cutting and loading sodium into jackets; fabricating the elements from accept slugs; inserting them (single or multiple) into jackets; assigning jacket numbers; welding, bonding, final inspection; stripping and weighing reject elements.
Fuel Manufacturing Facility (FMF)	ANL-West Building 704. A facility where metal uranium fuel is cast, jacketed, and built into subassemblies.
Glass/Dust*	Broken pieces of vycor or quartz molds, crucible coating, and small pieces of metal alloy left after demolding and crucible cleanup.
Glass/Molds*	Precision bore vycor or quartz glass molds in which the metal alloy is cast to form the fuel slugs. These molds are used only once, then destroyed during the demolding operation creating the glass in the glass/dust.
Glovebox	Secure enclosure in which operations can be performed on radioactive materials. The operator's hands and arms are encased in gloves.
Grid Identification Number	Designated location of a particular fuel element in a completed subassembly. This number is assigned in the subassembly fabrication process.
Hard Waste*	Non-compactible low-level waste, such as crucibles, TC wells, etc.

* Acceptable product descriptions.

Heel*	Material remaining in the bottom of the crucible after casting. The heel is broken into pieces and canned for storage. If chemistry results meet specifications, the heel is remelted, if not it is shipped out of FMF for reprocessing.
Hood	Metal enclosure with viewing window and glove ports that is used to process fuel and waste products.
I	See Inspection/Disposition Report (I/DR).
Inspection/Disposition Report (I/DR)	The means of documenting a nonconformance. A nonconformance of an item is defined as a deficiency in characteristic, documentation, or procedure that renders the quality of that item inacceptable or indeterminate. The I/DR provides for establishing the responsibilities and requirements for the identification, segregation and disposition of nonconforming material, including operational equipment.
Inventory	A detailed accounting of all nuclear material within the FMF MBA. A complete inventory can be generated at the Central Computer, at any time. Routinely such inventory reports are distributed to the appropriate personnel by Operational Safety and Conformance personnel.
Isotopic Breakdown	A listing, derived from chemical analysis, of the weight percentage of U and Pu isotopes in the top, center, and bottom sections of the fuel slug sample.
Item Count	The number of containers and individual nuclear material items outside containers. An item is any discrete object containing accountable nuclear material, such as the components and products of the fuel casting, fuel manufacturing, and subassembly fabrication processes (i.e., slug, element, crucible, waste, container, heel, feedstock, etc).
Jacket	A stainless steel capsule in which the acceptable fuel slugs are enclosed to make up the fuel element.
Jacket Identification Number	Each jacket is stamped with a unique number for identification purposes. The number, along with the serial number, and slug number becomes part of the record database associated with each fuel element.

* Acceptable product descriptions.

Laser Profilometer	Equipment used to measure the diameter of the fuel slugs produced in the fuel casting process.
Label	Printed information affixed to a container to furnish identification of the contents. Labels are generated at Fuel Casting and Vault65 computers.
Location	A physical position or site in the FMF MBA uniquely identified by room and zone number.
Material Balance Area (MBA)	A physical area which has a single custodian and which typically: (1) encompasses all the Nuclear Material activities of a single organizational group; (2) excludes all such activities of other groups; and (3) lies wholly within the ACA.
Material Control & Accountability (MC&A)	Control and accountability of nuclear material within the FMF MBA. PC-DYMAC was designed to accomplish this task in an automated fashion.
MBA Custodian	Persons authorized by their Division Director to receive and be responsible for nuclear material in their Material Balance Area (MBA), whether for their own use or for reissue to others (users) within that MBA. Custodians are approved by the AWS Nuclear Materials Representative upon appointment by their Division Director.
Menu	A displayed list of options in the PC-DYMAC system from which a user selects actions to be performed.
Na Load	The amount of Sodium placed in the fuel element jacket.
Non-Destructive Analysis (NDA)	Measurement techniques which can provide quantitative or confirmatory measurements of nuclear material without altering their chemical or physical form. NDA is also a physical location within the FMF facility. In all PC-DYMAC computer units it is designated as zone 11.
Nuclear Material (NM)	Collective term which includes source material, special nuclear materials, and other materials designated by DOE to which the provisions of the DOE Orders apply.
Pallet	A portable platform used for suspending the glass/molds in the fuel casting process.
Password	A six-character string that enables a PC-DYMAC user to have full or limited access to one or more system computer units.

Process Holdup Difference (PHD)*	The difference between the weight of component nuclear material items at the beginning and at the completion of the fuel casting process. This difference is the net gain or loss after accountability values have been assigned to all components.
Platter	Iomega Bernoulli Box data storage medium.
Pu	Plutonium.
Pu Feedstock*	Plutonium material supplied to the Experimental Fuel Laboratory (EFL) by Special Materials for inclusion in the casting batch charge.
R	See reject elements or reject slugs.
Radiography	The process of examining fuel slugs or elements with gamma or x-rays. An image of the slugs or elements is produced on film which permits detection of internal defects. Radiography is also a physical location within the FMF facility. In all PC-DYMAC computer units it is designated as zone 13.
Reject Elements	Fuel elements which have failed to meet specification acceptance criteria of the element manufacturing final inspection. The fuel slugs are removed from the jackets, weighed by element manufacturing, then released to fuel casting for remelt.
Reject Slugs	Fuel slugs which have failed to meet the acceptance criteria of the fuel casting final inspection. Reject slugs are chopped and combined with existing slug/fines.
Room	A physical location used in the PC-DYMAC system to designate a partitioned area inside the FMF facility.
SA	Designation of the Subassembly computer unit in the PC-DYMAC system. Its function may be performed on any of the four physical PC-DYMAC computer units by loading the appropriate data and programs. The Central Computer is generally utilized as the SA computer.

* Acceptable product descriptions.

Sample*	Portion of a fuel slug selected from a casting batch for chemical analysis. The selected fuel slug is sampled at three locations - top, center, and bottom. Various analyses are carried out to determine the composition, enrichment, and impurities of these sections.
Serial Number	A 6-digit number assigned each material item. The first digit identifies the PC-DYMAC computer unit at which the item was created. The first digit of the CC computer is 1, FC is 2, FM is 3, SA is 5, and Vault65 is 6.
Settling Furnace	Equipment used in the element fabrication process. The fuel elements are settled at 410° F for 15 minutes. This melts the preloaded sodium and allows the fuel slug to settle to the bottom of the jacket.
Shearing	The fuel casting operation in which demolded fuel slugs are cut to the prescribed length.
Slug*	The product of the fuel casting process. Consists of a cylinderical metallic fuel rod, approximately 13.5" in length and varying diameters (1/8" to 1/4"). Composition can vary from a U-Zr binary alloy to a multiple U-Pu-Zr ternary alloy.
Slug/Fines*	Small pieces of slugs, larger than 1/8", recovered from the casting process during the demolding and cleanup operations.
Slug Inventory	A report listing all accept slugs in the FMF MBA. The report contains serial number, casting batch number, slug number, SPM number, and all weights associated with each slug.
Slug Number	A number assigned a slug after shearing. The number is the same as the bandolier position.
Soft Waste*	Compactable low-level waste, such as paper towels, rubber gloves, plastic, etc.
Special Materials (SPM)	An organizational unit independent of the FMF MBA which supplies and accepts nuclear material items for products and byproducts of FMF activities.

* Acceptable product descriptions.

SPM Number	A 16-digit number assigned by Special Materials to material items supplied by them and carried along in the PC-DYMAC system. Weekly, monthly, and bimonthly audits are conducted in the FMF MBA. Material balances are reconciled with Special Materials by using totals of SPM batch numbers. The SPM number is written in the format of 999-999-99999-99999.
Stirrer*	Tantalum metal device used to mix the molten alloy in the crucible during the casting operation. Any nuclear material that adheres to the stirrer or any nuclear material that is removed from the stirrer must be accounted for. Stirrers are used more than once, but only for one composition/enrichment type.
Stripping	Removal of slugs and sodium from reject elements.
Subassembly*	A collection of fuel elements contained within a hexagonal stainless steel can with attached upper and lower preassemblies. The subassembly contains both fueled and nonfueled elements ready for placement in the reactor.
Subassembly Fabrication	One of the computer units covered by the PC-DYMAC system. Subassembly fabrication functions include placing the acceptable elements in the subassembly, assigning the grid position, and transferring the completed subassembly to the reactor.
S/A Listing	A report of the elements contained in a subassembly with the associated grid position, serial number, cast batch number, and all weights for each element. The report also includes the isotopic breakdown calculated from chemistry values supplied by the Analytical Chemistry Laboratory.
Tag	A PC-DYMAC-generated listing affixed to a container to furnish identification of the contents.
Thermocouple Well (TC Well)	Graphite thimble that is inserted into the charge crucible to monitor charge temperature during casting operations.

* Acceptable product descriptions.

Transaction	Any activity inside the PC-DYMAC system creates a transaction. Moving, creating, deleting, splitting, and modifying are activities that will create a transaction. These transactions are archived from the Central Computer for historical and auditing purposes.
Transfer	The movement of one or more material items into the FMF MBA, between zones in the FMF MBA, or out of the FMF MBA. Each transfer includes date, time, and password of the individual responsible for movement of the item.
U	Uranium.
U-235	Uranium isotope 235.
Vault 65	Primary functions of the Vault 65 computer unit are; receiving feedstock from Special Materials; waste and slugs from the Experimental Fuel Laboratory (EFL); temporary in-process or overnight storage (zone 12); manufacturing. It is also the designation of the Vault 65 computer unit in the PC-DYMAC system. This unit is responsible for receipt and release of feedstock, waste, slugs, elements, and subassemblies, and generation of associated reports.
Waste*	Any low-level non-useable products or process material that is produced or used during fuel manufacturing operations. This includes both hard and soft waste material.
Zirconium*	Metal alloyed with U or Pu feedstock to produce fuel slugs.
Zone	An assigned area in which nuclear material may be located. Zones 2 through 5 are fuel casting areas; zones 6 through 10 are fuel manufacturing areas; zone 11 is the radiography area; zone 12 is Vault 65; and zone 13 is the NDA area.

* Acceptable product descriptions.

ACKNOWLEDGMENTS

A special thanks for the help and support of the following people in writing this document: Margaret Butler, Catherine E. Eyberger, Robert L. Parks, Kelley R. Tucker, Leon C. Walters, Carey F. Walton, Kaylyne Weatherston, Charles W. Wilkes.

In addition, thanks are given to the following people at Los Alamos National Laboratory for development of PC-DYMAC and for their time, effort, and cooperation in the implementation of this system: R. C. Bearse, J. W. Barnes, K. E. Thomas, R. M. Tisinger.

REFERENCES

1. R. C. Bearse et al., "A Materials Accounting System for an IBM PC," INMM 27th Annual Meeting Proceedings, Vol. XV, New Orleans, LA, June 23, 1986.

2. N. J. Roberts, B. H. Erkkila, and H. F. Kelso, "Materials Accountability and Safeguards Systems at Los Alamos," Journal of Nuclear Materials Management, Vol. XIV, No. 3, March 1985.

Distribution for ANL-89/44 Rev. 1

Internal:

C. L. Beck
M. K. Butler (2)
R. D. Haga
W. P. Keeney
S. P. Henslee (2)
B. G. Jackson (10)
K. J. Longua
J. R. Mason
L. R. Monson
D. M. Pace
R. L. Parks
B. R. Seidel
D. B. Tracy (5)
W. R. Vroman
L. C. Walters
C. W. Wilkes
T. P. Zahn
ANL Patent Dept.
ANL Contract Copy
TIS Files (3)

External:

DOE-OSTI (12)
ANL Libraries
Manager, Chicago Operations Office, DOE
R. C. Bearse, Lawrence, KS
C. M. Condit, Westinghouse Naval Reactors Facility (3)
K. E. Thomas, Los Alamos National Laboratory (5)
I. G. Waddoups, Sandia National Laboratories, Albuquerque (2)