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UNITED NUCLEAR CORPORATION
FUELS DIVISION - CHEMICAL PRODUCTS
WOOD RIVER JUNCTION PLANT

PROCEDURE MANUAL
FOR CONTROL OF
SOURCE AND SPECIAL NUCLEAR MATERIALS

REVISED MAY 25, 1967

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A. INTRODUCTION

This Procedure Manual for Control of Source and Special Nuclear Materials describes the organization, operations, receiving and shipping, inventory, storage, measurements, and records and reports used in an effort to maintain control of Source and Special Nuclear Materials at the United Nuclear Corporation Wood River Junction Facility in Wood River Junction, Rhode Island, and is issued under the approval of the Chemical Products Manager.

B. FACILITY ORGANIZATION

The Wood River Junction Plant is operated as part of the Fuels Division, which also includes Plants in New Haven and Montville, Connecticut, and Hematite, Missouri. Because of their similar technologies, the Wood River Junction and Hematite Plants are combined, for administrative purposes, into "Chemical Products" headed by a Manager reporting to the Division Vice-President.

I. ASSIGNMENT OF RESPONSIBILITY

- a. The Vice-President of the Fuels Division has general overall responsibility for the Wood River Junction Plant.
- b. The Chemical Products Manager is responsible to the Vice-President of the Fuels Division for all plant operations and organizational development.
- c. The Director of Licensing is responsible to the Vice-President of the Fuels Division for establishing operational policy and the adequacy of Nuclear Safety and Health Physics Control.
- d. The Plant Superintendent is responsible to the Chemical Products Manager for the planning of production and maintenance schedules, carrying out all administrative duties, and assuring that the Plant operates safely and efficiently in conformance with established policies and procedures.

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1. The Nuclear Materials Control Representative serves also as Analytical Chemist, and exercises chemical control over the process, evaluates, by chemical analysis, the uranium at input, and output of process, submits samples to outside laboratories as required, evaluates product for purity specifications, and supervises activities of NMC clerk who maintains all S.S. Material ledgers and records, and prepares and submits all required reports. The NMC representative also has general supervision to insure compliance by production for adhering to prescribed Materials Control Procedures. The Nuclear Materials Control Representative reports to the Plant Superintendent.

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C. FACILITY OPERATIONS

The Fuels Recovery Plant is licensed by the AEC Division of Materials Licensing, for receiving, processing, storing and shipping of Source and Special Nuclear Materials of all enrichments. It is established as an Accountability Station under the Oak Ridge Operations Office. It is also established as an AEC Supply Agreement facility.

Uranium containing materials, scrap in nature- from residues to alloys, are processed for their Uranium content. All enrichments may be processed through the facility.

The Plant production facilities are located in one building. Outside storage areas for incoming scrap are located to the north and south of the building. In-process material is stored indoors on approved storage shelves in material storage bunkers.

The Process Laboratory is located on a mezzanine area above the clothes change rooms. Storage racks are provided for sample bottles, and records are maintained as to amount of other Uranium bearing materials present in the Laboratory for experimental purposes.

A more complete description of the processing facilities may be found in the "General Information and Procedures Manual", on file with the AEC, under Special Nuclear Material License SNM-777, Section 300.

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D. RECEIVING AND SHIPPING

1. RECEIVING PROCEDURES

Standard Operating Procedure 111-A, dated September 1, 1964, details the receiving per se.

- A. In general, the following procedure, carried out by production personnel, takes place.
1. Inspects containers as they are unloaded from incoming transportation.
 2. Makes a piece count.
 3. Makes a gross weight measurement of each unit, and establishes and assigns a job number.
 4. Container identification, job number, and gross weights are recorded in Receiving Log Book. This data verified against shipper's packing list.
 5. Fills out a Nuclear Materials Tag for each container and affixes it to the container.
 6. Transfers containers to storage area designated by Supervision (approval of Plant Superintendent required).
 7. NMC clerk, or NMC representative, notified of any significant gross weight differences, or differences in piece count.

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8. Notifies shipper of any disagreement, especially weights that are outside the acceptable limits.

B. Nuclear Materials Control (NMC)

1. The NMC Clerk prepares a folder for papers pertaining to the particular job, and inserts the folder into the job file.
2. Prepares detailed sheet of containers shipped in, using shipper's backup sheets and/or Receiver's Log Book. At this point, container numbers are again checked. Both are recorded if a disagreement is present.
3. Enters data from S.S. Material Transfer Form into the NMC records.
4. Issues documents as required by contract, first the Form AEC-284 Transfer Receipt. Other operating forms and reports are handled by the NMC Clerk and are described under In-Plant Control.
5. Notice of difference in gross weight of any container, container identification number, or container count, is dispatched to the shipper before the container is further processed.

II. SHIPPING PROCEDURES

A. Production

1. Packages the material for shipment.

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2. Applies a Nuclear Materials Label, prepared by the NMC Clerk, to each container.
3. Provides the NMC Clerk with Factory Shipping Order (Packing List), Bill-of-lading, and Instructions-to-driver.
4. Requests Health Physics Technician to monitor and apply necessary paper work and seals.
5. Informs NMC Clerk that shipment is ready.
6. NMC Clerk will verify weights supplied by Packing List (Para. (3.) above) with book record of weights of containers packed.

B. Nuclear Materials Control

1. Enters shipment data into NMC records.
2. Prepare applicable S.S. Material Transfer Document, and distributes according to AEC instructions.

III. SAMPLES, OUTGOING

A. Nuclear Materials Control

1. All samples originate, and are prepared by NMC representative.
2. Pertinent data, such as weights, quantity of S.S. Material, and destination, is submitted to NMC Clerk, who prepares all required shipping documents and S.S Material Transfer Forms as required.

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3. All outgoing packages are checked by Health Physics to insure compliance with Shipping Regulations.

E. INVENTORY

A complete Plant Physical Inventory is taken at least once each year. At that time, all production activities are stopped. A Standard Operating Procedure is issued by the Nuclear Materials Control Representative to the plant personnel, (Exhibit I-24) giving inventory assignments and specific inventory instructions for that inventory. All containers of S.S. material are inventoried. An Inventory Tag (Exhibit I-2) on which is recorded the material identity, enrichment, Uranium assay, and gross, tare and net weights, is attached to each container. The information for the Inventory Tag is derived from the sample tag on the container.

When all containers have been tagged, the tear-off portion of the tag (containing a matching serial number) is collected for the inventory and the remainder stays on the container to aid in later verification, should such be required.

Uranium assays are determined by type of material.

All items are summarized, from the tear-off portion of the tags, and extended for final tabulation of the inventory.

All material, at time of inventory, will have weights, when applicable. A statistical plan for check weighing provides verification.

The Physical Inventory is compared with the ledger accounts to determine the differences between the Physical Inventory and the Book Inventory.

The ledger accounts will then be adjusted, either upward or downward, to correlate the book balance with the Physical Inventory.

F. STORAGE

A. Incoming

1. Incoming material will be stored outdoors until ready for introduction into the process stream.
2. Material from storage will be moved into process only by the authorization of the Plant Superintendent.
3. This material would then be processed and accountability established on the basis of the job number assigned to that material.

B. Outgoing Product

1. End product (UO_2) is stored in a locked, In-process storage area. A separate record, obtained from the Daily Production Reports, (Exhibit I-21), is maintained by the NMC Clerk, of all containers and weights of product in this storage area. Each container is tagged (Exhibit I-25) to show related data.
2. UO_2 , removed from the In-process storage area, (for shipment or rework), is re-weighed, and this data is submitted to the NMC Clerk, who makes a comparison with the In-process storage area records. The Materials Control Representative and Plant Superintendent are immediately notified of any significant differences.

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G. MEASUREMENTS

Weighings are performed on all material received and at all points in the process at which it is essential to establish quantitative data for control and identification of materials. (These points are shown in the Operating Reports).

The initial measurement to establish Uranium input into the Plant (This is where "Accountability" is established), is in the Assay Tanks into which all dissolved solids are collected for sampling and analysis for Uranium and Isotope.

Solutions received from outside sources (and some generated later in the process) are weighed into storage containers, sampled directly from the storage containers, and information based on analysis of this sample used to provide input into the Plant ("Accountability").

The sampling techniques and procedure utilized will be as outlined in Standard Operating Procedures and/or by Process Parameters.

All analytical data will be obtained by the use of acceptable analytical techniques. Routine known control standards are used to indicate accuracy. Periodic cross checks are made with other laboratories.

Responsibility for the performance of these measurements and for the maintenance of the program is the responsibility of the Analytical Chemist at FRP.

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Scales and balances used for weighing are routinely calibrated by use of standard check weights at stated intervals. A contract for outside services is issued for quarterly calibration, cleaning, etc. by the manufacturer or other authorized service group.

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H. RECORDS AND REPORTS

The Nuclear Materials Control Clerk reports to the Nuclear Materials Control Representative.

1. Daily Journal (Exhibit 1-3)

Each receipt, shipment, or -In-plant transfer to another responsibility is recorded in chronological order showing both Uranium and Isotope. This journal is reconciled monthly with the Contract Ledger Balance.

II. Contract Ledger (Exhibit 1-4)

Records are maintained showing uranium and isotope on a contract basis. Receipts, shipments and In-plant transfers are entered chronologically. Monthly balances are obtained for each contract, and a total of the balances is reconciled with the journal.

III. Job Book (Exhibit 1-4-A)

Records are maintained showing Uranium, isotope, and dollar value for any assigned processing job. These records will include receipts, processing losses, samples removed, and shipments.

(Posting documents for the above records are Form AEC-101 (Exhibit 1-5), Form AEC-388 (Exhibit 1-6), and production discard records (Exhibit 1-7 and 1-7-A)

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IV. AEC Reports

a. Station

1. An AEC-577 (Exhibit 1-8) report is submitted monthly to the Oak Ridge Operations Office.

b. License

1. Form AEC-578 (Exhibit 1-9) is submitted semi-annually to the AEC Leasing Office covering all enriched license material for which United Nuclear is responsible.

c. Enriched Uranium Supply Account

Semi-annual reports are submitted to the AEC as specified in the Supply Agreement.

IV. MATERIAL CONTROL

A. GENERAL

Material received into the Plant is assigned a four-digit job number. The first job was numbered 0001, and later jobs were given consecutive numbers.

In general, a job number represents (but is not necessarily limited to) one receipt of nuclear material as identified by one AEC Transfer Form. An exception is material received as the result of the award of an AEC Recovery Contract. This material is assigned one job number to each lot. Also, several small shipments of similar material, from the same source, may be combined into one job if permission to do this is given by the shipper.

B. IN-PLANT TRANSFERS

1. The Fuels Recovery Plant is a Material Balance area in itself.
2. Transfers and Documentation

When a shipper's container is removed from the storage yard, it is routed to the Receiving Scale for a recheck of the gross weight before unloading.

The following presents the sequence of events:

- a. An S.S. Material Receiving Log is prepared (Exhibit 1-1).
- b. Inner containers are identified, weighed, and assigned a container tag.

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- c. Weights are compared, and any difference outside the combined limits-of-error of the shipper and receiver are investigated. If agreement is not obtained, the container is stored and the shipper notified.
- d. Any container entering the process is listed on the Supervisor's Daily Report (Exhibit 1-10), containers of Pickle Liquor are an exception, and are listed on a separate document (Exhibit 1-11).

C. PROCESS CHARGING

Special Nuclear Material "Received and ready for processing" is logged into the process on Operating Reports designed particularly for the equipment which is to be used in the processing.

All details essential to Nuclear Materials Control is specified by the Operating Report form. Any change or omission must be reviewed in advance by NMC.

The Operating Reports are as follows:

1. Ball Milling (Exhibit 1-12)
2. Head-End Calcining (Exhibit 1-13)
3. Dissolver, Stainless Steel and Teflon (Exhibit 1-14).
4. Dissolver, Tray (Exhibit 1-15)

Pickle Liquor is not a part of this sequence since accountability is determined on each drum, as received, and is documented on the Operating Report instead of on the S. S. Material Receiving Log.

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5. Chloride Sparge Column (Exhibit 1-16)
6. Carbon Burning Tower (Exhibit 1-17)
7. Destructive Distillation Unit (Exhibit 1-18)

At the Assay Tank, accountability is established and material blended for further processing (Exhibit 1-19).

Intermediate Product, such as ADU, is weighed, tagged, and placed in storage. Records of this material is on Supervisor's Plant Daily Report, and in addition, an ADU Production Operating Report is submitted to the NMC Clerk (Exhibit 1-20).

Final Product. ADU from the storage area is processed to final product UO_2 . ADU containers charged to the reactor, and product generated, are recorded on the Pyrohydrolysis Operating Report (Exhibit 1-21). This form is submitted to the NMC Clerk, from which a shelf inventory of product is maintained. A Product Packaging Operating Report is shown as (Exhibit 1-22).

D. KNOWN LOSSES

Process Waste Streams (such as filtrates, raffinates, floor washings, solid residues, etc.) are sampled and assayed for Uranium content. If the concentration is within the decision to dump, the material is discarded. Quantities so discarded are listed on Disposal Report (Exhibit 1-7) which is forwarded to the NMC Clerk for monthly postings to the applicable jobs and/or contracts.

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Solid residues are blended and sampled for measurement of S.S. Material. These residues, which are considered uneconomical for recovery, are packaged for disposal by burial. A record of all S.S. Material in this category is submitted to the NMC Clerk, who incorporates the data into the records (See Exhibit 1-7-a).

During the process of recovering the S.S. Materials, residues and solutions result from filter press cleanings, spills, mop water, etc., and strict control of such rework material must be maintained.

All material that is removed from the process stream into portable containers must be accounted for on a Rework Material Notice (Exhibit 1-23), or a Process Material Notice (Exhibit 1-23-a).

To further move and process the materials listed on a Rework Material Notice, a Rework Route Card must accompany the movement and is further backed up at some point in time by one of the Operating Reports described earlier.

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1. EXHIBITS

- 1 S.S. Material Receiving Log
- 2 S.S. Material Inventory Ticket
- 3 Daily Journal
- 4 Contract Ledger
- 4-a Job Book
- 5 Form AEC-101
- 6 Form AEC-388
- 7 Liquid Waste (Discard Sheet)
- 7-a Solid Residue Discards
- 8 Form AEC-577
- 9 Form AEC-578
- 10 FRP Daily Equipment Hour Report
(Supervisor's Report)
- 11 Pickle Liquor
- 12 Ball Milling (Operating Report)
- 13 Head-End Calciner (Operating Report)
- 14 Dissolver, S.S. and Teflon (Operating Report)
- 15 Dissolver, Tray (Operating Report)
- 16 Chloride Sparge Column (Operating Report)
- 17 Carbon Burning Tower (Shift Operating Report)
- 18 Destructive Distillation Unit (Operating Report)
- 19 Assay Tanks (Operating Report)
- 20 ADU Production (Operating Report)
- 21 Pyrohydrolysis (Operating Report)
- 22 Product Packaging (Operating Report)
- 23 Rework Material Notice
- 23-a Process Material Notice
- 24 Inventory S.O.P.
- 25 Container Tag

S.S. MATERIAL RECEIVING LOG

Description:

Shipping Containers Number	Nº 01403
Job Number	AEC or Customer Lot No.
Date of Introduction of Mat'l into Plant	

	Shipper	UNC — RI	Weighed by	Checked by	Cont. Tag No.	Comments
Identification						
Gross wt.						
Tare wt.						
Net wt.						
Identification						
Gross wt.						
Tare wt.						
Net wt.						
Identification						
Gross wt.						
Tare wt.						
Net wt.						
Identification						
Gross wt.						
Tare wt.						
Net wt.						
Identification						
Gross wt.						
Tare wt.						
Net wt.						
Identification						
Gross wt.						
Tare wt.						
Net wt.						

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FUELS RECOVERY PLANT

S S MATERIAL
Physical Inventory Ticket

Container No.
Material
Job No. Enrich. %
Net Weight or Volume
..... gm. or lb. l. or gal.
Verif. of contents
Date
Location
Uranium Conc.
Laboratory No.
Total Uranium
Inventoried By

Tag N^o 0800

PLEASE CALL 45-442
2070 BUFF 45782

DATE REC'D	DESCRIPTION AND 101#	JOB	CONTRACT	NUMBER	RECEIPTS MONTHLY	
					SS NET	U-235
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
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RECEIPTS		REMOVALS		REMOVALS		BALANCE		
F. Y. T. D.		MONTHLY		F. Y. T. D.				
SS NET	U-235	SS NET	U-235	SS NET	U-235	SS NET	U-235	
								1
								2
								3
								4
								5
								6
								7
								8
								9
								10
								11
								12
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								36
								37
								38
								39
								40

Exhibit 1-3

RECEIPTS AND REMOVALS

PG OF

DATE	DESCRIPTION	JOB	①		②		③		④	
			101#				RECEIPTS MONTHLY			
							U		X	
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
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PLEASE RELEASE 45-602 20720 BUFILE 45-762

Exhibit I-4

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RECEIPTS		REMOVALS		REMOVALS		BALANCE		
F. Y. T. D.		MONTHLY		F. Y. T. D.				
U	X	U	X	U	X	U	X	
								1
								2
								3
								4
								5
								6
								7
								8
								9
								10
								11
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								39
								40

Exhibit I-4

NUCLEAR MATERIAL TRANSFER DOCUMENT

1. TRANSFER NO.

2. SHIPPER'S FACILITY CODE _____
Name _____
Address _____

3. RECEIVER'S FACILITY CODE _____
Name _____
Address _____
Attention: _____

4. No.	DISTRIBUTION of COPIES
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	

5. SHIPPED FOR ACCOUNT OF (Facility Code) _____
Name _____
Address _____

6. SHIPPED TO ACCOUNT OF (Facility Code) _____
Name _____
Address _____

7. MATERIAL TRANSFERRED IS: (Check if applicable)

a. Under Supply Agreement with AEC	Shipper	Receiver
	()	()

8. THIS TRANSFER:

a. Initiates or Alters Financial Liability to the AEC	()
b. Does Not Initiate or Alter Financial Liability to the AEC	()

10. TRANSFER AUTHORITY: _____

9. DOCUMENTATION (If document is classified)

a. Page _____ of _____ Pages

b. Copy _____ of _____ Copies

c. Series _____

11. MATERIAL TYPE AND DESCRIPTION

13. a. _____
(Signature of Receiver's Authorized Representative)

12. TRANSFER DATA

a. The Quantities Listed Below Were Shipped On _____ 19____

(Signature of Shipper's Authorized Representative)

*FOR OTHER THAN AEC COST-TYPE CONTRACTORS, COMPLETION OF BLOCK 13. a. CONSTITUTES ACCEPTANCE OF THE DATA IN BLOCK 12; IF THE RECEIVER INTENDS TO CONTEST THE DATA, BLOCK 13. a. SHOULD NOT BE COMPLETED AND THE SHIPPER SO NOTIFIED.

AEC COST-TYPE CONTRACTORS MUST SHOW THEIR RECEIVER'S DATA IN BLOCK 13.

b. Weight Units	c. From-AEC Project No.	b. To-AEC Project No.	c. Date Material Received
-----------------	-------------------------	-----------------------	---------------------------

d. lot & container no.	e. Gross weight	f. Net weight	g. Element weight	h. Weight % Isotope	i. Isotope weight	d. Gross weight	e. Net weight	f. Element weight	g. Weight % Isotope	h. Isotope weight
Exhibit I-5										

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LIQUID WASTE

FROM

TO

(INCLUSIVE DATES)

Filtrate and Raffinate Waste			Sample Number:		
Date	Oper.	Amount of Waste		Tank Number	Number Inches
		Grams	Gallons		
Job No.	Batch No.				
Chem. Lab.			Health Physics		
Lab. No.	PPM	Total U in waste	DPM/ML	Total U in waste	
		grams		grams	
Transfer to waste treatment tank 1-D-14 (Circle one) A B -----				Supervisor check one and initial	
Return to process -----					

Waste Treatment:

				Transfer to Lagoon @ AM PM	
Date	Volume of Waste	Lbs of Lime used	Volume of Water added	Transferred by:	
	Gals.		Gals.	Approved by:	
				PH	Lines rinsed @
				AM	PM

Exhibit I-7

UNITED STATES ATOMIC ENERGY COMMISSION
MATERIAL STATUS REPORT

FOR SPECIAL NUCLEAR MATERIALS HELD UNDER LICENSE
PREPARE A SEPARATE REPORT FOR EACH LICENSE

1. REPORTING LICENSEE:			
a. Name _____		c. License No. _____	
b. Address _____ (INCLUDE ZIP CODE)		d. Period Ending _____	
2. MATERIAL: (Prepare separate report for each material)	3. WEIGHT UNIT	4. TOTAL QUANTITY AND ISOTOPE DATA	
		a. ELEMENT	b. ISOTOPE
5. BEGINNING INVENTORY:			
6. RECEIPTS:			
From _____	Shipper's License No. _____		
_____	_____		
_____	_____		
7. TOTAL RECEIPTS			
8. PRODUCTION			
9. MATERIAL TO BE ACCOUNTED FOR (Total of lines 5, 7, and 8).			
10. SHIPMENTS:			
To _____	Consignee's License No. _____		
_____	_____		
_____	_____		
11. TOTAL SHIPMENTS			
12. PROCESSING LOSSES, DISCARDS, ETC.:			
a. MATERIAL FOR WHICH THE REPORTING LICENSEE IS FINANCIALLY RESPONSIBLE			
b. MATERIAL FOR WHICH THE REPORTING LICENSEE IS NOT FINANCIALLY RESPONSIBLE			
13. BURN-UP.			
14. ENDING INVENTORY			
15. MATERIAL ACCOUNTED FOR (Total of lines 11, 12a, 12b, 13 and 14).			
16. DETAIL OF ENDING INVENTORY:			
a. MATERIAL ON HAND FOR WHICH REPORTING LICENSEE IS FINANCIALLY RESPONSIBLE TO THE AEC UNDER ABOVE LICENSE.			
b. MATERIAL ON HAND FOR WHICH SOMEONE OTHER THAN REPORTING LICENSEE IS FINANCIALLY RESPONSIBLE TO THE AEC (Detail below)			
Name _____	License No. _____		
_____	_____		
_____	_____		
_____	_____		
c. Total of a. and b.			
17. MATERIAL IN POSSESSION OF OTHERS FOR WHICH REPORTING LICENSEE IS FINANCIALLY RESPONSIBLE TO THE AEC UNDER ABOVE LICENSE (Detail below)			
Name _____	Possessor's License No. _____		
_____	_____		
_____	_____		
_____	_____		
TOTAL			

PICKLE LIQUOR

Job No. _____ Receiving and Operating Report
Lot No. _____ Drum Identification _____
% Enrichment _____ Tag No. _____

I. SAMPLING DATA:

A. Date _____
Air Sparge Time from _____ to _____
by _____ Operator's Initials.
_____ ml Sample taken by _____
B. U Conc. _____ mg U/l Lab No. _____
Est. drum U content _____ (Max.)
Lab. results certified by _____

II. PROCESS DATA:

Process Parameter _____ Date _____
A. Authorization to dump by _____
B.

<u>Operation</u>	<u>Supervisor</u> <u>Op. Initials</u>	<u>Time</u>
_____ lbs. Al() ₃ Added	_____	_____
Drum dumped to 1-D-12	_____	_____
Acid Adjusted to _____ N	_____	_____
Free Fluoride check <input type="checkbox"/> Pos <input type="checkbox"/> Neg.	_____	_____
_____ lbs. Al Nitrate added	_____	_____
Free fluoride recheck	_____	_____
Solution pumped to 1-D-41	_____	_____

<u>Shippers</u>	<u>UNC RI</u>	<u>By</u>	<u>Verified</u>
Gross Wt. _____	_____	_____	_____
Tare Wt. _____	_____	_____	_____
Net Wt. _____	_____	_____	_____

III. COMMENTS:

BALL MILLING
Operating Report

Job Symbol _____

Date _____

Enrichment _____

R. M. N. No. _____ or Process Parameter Sheet No. _____

I. Weight Check

Scrap Container No.	Material Description	Supplier's Net Wt. ()	Our Weights ()			Initials	
			Gross	Tare	Net	Oper.	Verif.

II. Ball Milling

Ball Mill Number _____ Oper.

Scrap Charged (kgs) _____

Time Milling Started _____

Time Milling Finished _____

Density Check

Slurry Weight

Cyl. Gross (g) _____

Cyl. Tare (g) _____

Cyl. Net (g) _____

Slurry Volume

after _____ min. _____

after _____ min. _____

after _____ min. _____

Material Density (g/cc)

Supervisor's Disposition _____

III. Comments

HEAD END CALCINER
Operating Report

Job Symbol _____ Enrichment _____

1. Material Source ACCOUNTED UNACCOUNTED Date _____

RMN No. _____ or Process Parameter Sheet No. _____

II Weight Check (THIS SECTION TO BE FILLED IN FOR UNACCOUNTED MATERIALS)

Scrap Container No.	Material Description	Supplier's Net Wt. ()	Our Weights ()			Initials	
			Gross	Tare	Net	Operator	Verifier

III Tray Loading and Unloading (NOTE: TRAY WEIGHTS ARE NOT REQUIRED FOR ACCOUNTED MATERIALS)
With Cover On

Job No. _____ Lot No. _____ Job No. _____ Lot No. _____

	Tray No. 1		Cont.No.	Tray No. 2		Cont.No.
	before calc.	after calc.		before calc.	after calc.	
Gross Weight, Grams						
Tare " "						
Net " "						
Weights By (Op. Init.)						

IV Calcination

<u>OPERATION</u>	<u>TIME</u>	<u>OPERATOR</u>
Trays Charged to Unit 1H _____ and Power On.	_____	_____
Exhaust Fan On	_____	_____
Scrubber Checked	_____	_____
Temp. at _____ °F	_____	_____
_____ CFM Gas To Unit	_____	_____
Power Off Unit	_____	_____
Unit Unloaded	_____	_____
Calcined Residue Unloaded from Trays	_____	_____
Residues Milled and Blended	_____	_____
Comments:	_____	_____

TRAY DISSOLVER
Operating Report

Job Symbol _____
 Lot No. _____
 Enrichment _____

Date _____
 Batch No. _____
 Process Parameter _____

I. DISSOLVER CHARGE: 1-J-_____

Material Source Drum No.	Cont. No.	Net Weights	Operators Initials	Comments

II. DISSOLUTION DATA:

		TIME	OPERATOR
A.	Addition of _____ L acid mix completed		
B.	Volume of acid in tray readjusted to _____ " from top of tray.		
C.	Aluminum Nitrate added.		
D.	Filtration Completed (Solution in 1-D-36).		
E.	Solution transferred to _____ for assay.		

III. COMMENTS:

(1) Fresh batch of _____ made up in 1-D-_____
 Vol _____ By _____

OPERATING REPORT
Chloride Sparge Column

Process Parameter Sheet _____
Job Symbol _____

RMN _____
Lot _____

Date _____
Batch No. _____

I. WEIGHTS

WEIGHTS	Cont. No.		Cont. No.		Cont. No.		Cont. No.	
	shipper	UNC	shipper	UNC	shipper	UNC	shipper	UNC
GROSS								
TARE								
NET								
OPER. INIT.								
SUPRV. INIT.								

II. OPERATIONS

	TIME	OP. INIT.
_____ L Nitric acid to column, prior to scrap	_____	_____
_____ L Water to column, prior to scrap	_____	_____
_____ Kg scrap to dissolver tank	_____	_____
_____ L Nitric acid to dissolver tank	_____	_____
_____ L Water to dissolver tank	_____	_____
Scrap dissolved and charged to column	_____	_____
_____ L N ₂ O ₄ added to column	_____	_____
N ₂ O ₄ cylinder valves closed	_____	_____
Air sparge started to column	_____	_____
Air sparge complete	_____	_____
Solution sampled for chloride	_____	_____
Chloride concentration, Laboratory result	_____	_____
Rework: Yes - No Supervisor's Init.	_____	_____
Additional _____ L N ₂ O ₄ added	_____	_____

III. ADJUSTMENT

_____ L H ₂ O to column	_____	_____
_____ Kg Al(NO ₃) ₃ to column	_____	_____
_____ L HNO ₃ to column	_____	_____
Solution adjusted to _____ M HNO ₃	_____	_____

IV. TRANSFER AND ASSAY

Pumping to Assay tank _____ started
at _____; completed at _____ by _____

V. COMMENTS

A. Feed	Can and Tag No.	Gross	Tare	Net	Time On	Oper. Init.	Time Off	Oper. Init.
Total Charged								

B. Product	Can and Tag No.	Gross	Tare	Net	Time On	Oper. Init.	Time Off	Oper. Init.
Total Product								

IV. PRODUCT (Storage)

<u>Container and Tag No.</u>	<u>Net Weight</u>
_____	_____
_____	_____

V. SHUTDOWN

	<u>Time</u>	<u>Oper. Initials</u>
Feed Screw and Stirrer Off	_____	_____
O ₂ Flow Off	_____	_____
Heaters Off	_____	_____
N ₂ Purge Off	_____	_____
Air Jet Eductor Off	_____	_____
Exhaust Fan Off	_____	_____

VI. COMMENTS

**OPERATING REPORT
Destructive Distillation Unit**

Job- _____
Lot _____
Batch No. _____

RMN _____

Date _____
FPS _____

Accounted

Unaccounted

I. Weights and Description

		GROSS	TARE	NET
Shippers	Container No.			
U N C				
<u>Description</u>				
<u>Scan (Gamma)</u>				

II. Operations:

	Time	Opr. Init
1. Fan On		
2. Scrubber Checked		
3. Retort Loaded		
4. Heat On		

Oxygen Supply		Nitrogen Supply	
Left	Right	Left	Right
%	%	%	%
Checked By: _____			
Time: _____			

5. Record readings below every hour:

TIME									
Internal Temp. (Rt.)									
Ext. Temp. (Left)									
GAS									
Gas Flow									
CFM									

	Time	Opr. Init.
6. Power Off		
7. Internal Temp. Reaches _____ ° C		
8. Unit Unloaded		

1. O=Oxygen
N=Nitrogen
A=Air

III. Product

Ash transferred to Cont. No. _____

Gross _____ Tare _____ Net _____

IV. Comments:

ASSAY TANKS
Operating Report

Job Symbol _____
Enrichment _____
Process Param. Sheet _____

Date _____
Dissolver Used _____
Dissolver Batch(es) _____

I. Assay Tank Batch No. _____

Initials
Oper. _____
Supr. _____

Mixing Started at _____ and Finished at _____

	<u>AT Batch Weight</u>	<u>Accountability Sample Weights</u>				
Gross	_____	_____	_____	_____	_____	_____
Tare	_____	_____	_____	_____	_____	_____
Net	_____	_____	_____	_____	_____	_____
		Spl. to _____				

Transfer to Feed Tank Started at _____ and Finished at _____

Volume Added to Feed Tank = _____ gallons. Tank No. _____
Tank No. _____

II. Assay Tank Batch No. _____

Initials
Oper. _____
Supr. _____

Mixing Started at _____ and Finished at _____

	<u>AT Batch Weight</u>	<u>Accountability Sample Weights</u>				
Gross	_____	_____	_____	_____	_____	_____
Tare	_____	_____	_____	_____	_____	_____
Net	_____	_____	_____	_____	_____	_____
		Spl. to _____				

Transfer to Feed Tank Started at _____ and Finished at _____

Volume Added to Feed Tank = _____ gallons. Tank No. _____
Tank No. _____

III. Assay Tank Batch No. _____

Initials
Oper. _____
Supr. _____

Mixing Started at _____ and Finished at _____

	<u>AT Batch Weight</u>	<u>Accountability Sample Weights</u>				
Gross	_____	_____	_____	_____	_____	_____
Tare	_____	_____	_____	_____	_____	_____
Net	_____	_____	_____	_____	_____	_____
		Spl. to _____				

Transfer to Feed Tank Started at _____ and Finished at _____

Volume Added to Feed Tank = _____ gallons. Tank No. _____
Tank No. _____

IV. Comments

STANDARD OPERATING PROCEDURE

UNITED NUCLEAR CORPORATION

NUMBER	REV.	I
PAGE 1	OF 3	
EFFECTIVE	3-13-67	
SUPERCEDES	6-6-66	
PREPARED BY	RAH/pt	

SUBJECT OUTLINE FOR FISCAL INVENTORY

A Physical inventory will be taken during the week of March 27, 1967. This inventory will include all containers and/or equipment which contain uranium bearing materials. As with previous inventories, responsibilities for various activities will be assigned. All personnel will be charged with the responsibility to see that their assignments are carried out.

Representatives of the Nuclear Materials Control Branch of the Atomic Energy Commission will be present during the inventory as a function of their annual survey.

I. GENERAL PLAN

- A. Cut off date & time will be established. From this point in time, the following sequence of events will begin to happen.
 1. Cut off dissolution from the various dissolvers.
 2. Flush dissolvers, open, inspect, clean and dismantle if necessary leaving key inspection points uncovered for observation by AEC/UNC.
 3. Flush assay tanks and store uncovered for inspection.
 4. Work feed solution out of storage tanks, flush where feasible and open for inspection by AEC/UNC.
 5. Flush feed pumps and recycle contents of pulse columns to obtain a representative sample or drain columns completely. Measure and sample organic in the 1-D-5 tank.
 6. Evaporate and precipitate all OK liquor. Flush and open storage tanks for inspection. Drain evaporator.
 7. Clean precipitators and dry the ADU cakes hard to convert to U_3O_8 .
 8. Scan or remove filters for U determination.
 9. Sample, weigh and analyze contents of all residues in containers.
 10. Inventory material in drums in storage on an "as received" basis.
 11. Apply tags and fill in log.

Exhibit I-24

APPROVALS:

PRODUCTION	ENGINEERING	NUCLEAR SAFETY	HEALTH PHYSICS
DATE	DATE	DATE	DATE

STANDARD OPERATING PROCEDURE

S. O. P. No.	Date Effective	Supersedes	Page 2 of 3
-----	3-13-67	6-6-66	

II. SUPERVISORS RESPONSIBILITIES

A. Inspection to verify contents of container.

1. Examine tags on containers, verify description of material and weigh.

All containers in the bunker will be reweighed and the tag weights corrected, if necessary.

2. Identify container contents where tags have disappeared or markings faded.
3. Containers with more than one (1.) inner container, (e.g. drums of residues less than 0.1% U) apply inventory tag to cover entire contents. No credit for material in the holding contract.
4. Once an inventory tag is applied, the contents are to be "frozen" until the physical inventory is taken.
5. Should a container be released for any reason after the tag is applied, the entire contents must be blended, sampled and retagged. Original inventory tag must be voided.
6. Tags are to be filled out in their entirety; including the type of material code for IBM, isotopic enrichment.

B. U Assay

1. All contents of containers must have been sampled and sample submitted to the Process Laboratory for analysis. Sample tag must be applied. The isotopic enrichment will be applied when known or Gamma counted for an estimate.

C. Inventory Tags

1. Tags are pre-numbered and will be provided by the Accountability Clerk, Analytical Chemist or Plant Superintendent.
2. Log in ticket No., Container No., etc. on Inventory Control Roster.

D. Weights

1. All containers weighed & tagged as in II, A,1.

Exceptions:

- a. 11 Liter bottles will have either a volume or weight measurement.
- b. 55 Gallon drums of containers will have a summation of individual weights.
- c. Equipment volumes will be estimated.

STANDARD OPERATING PROCEDURE

S. O. P. No. -----	Date Effective 3-13-67	Supersedes 6-6-66	Page 3 of 3
-----------------------	---------------------------	----------------------	-------------

- d. Laboratory samples will be totalled by estimate.
- e. Containers as received by 101, shipper's values.

E. Check Weights

- 1. Scales were calibrated February 20, 1967
- 2. AEC to apply statistical sampling plan to determine accuracy of the inventory weights.

F. There will be an Inventory Control Sheet

G. Securing Accountability Agreement

- 1. Concurrence must be obtained that the physical portion of the inventory is complete.

H. Compiling Data

I. Critique

At close of inventory, a discussion will be necessary with AEC control group.

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UNITED NUCLEAR C O R P O R A T I O N

Fuels Recovery Plant

APPENDIX B

NUMBER _____ REV. 1

PAGE 1 OF 1

EFFECTIVE 3-23-67

SUPERCEDES Original

SUBJECT S.O.P. OUTLINE FOR FISCAL INVENTORY

PREPARED BY RAH

- | | |
|---|---|
| <ol style="list-style-type: none">1. UO₂ Powder2. UO₂ Pellets3. UO₂ Substrate4. UO₂ThO₂ Powder5. UO₂ThO₂ Pellets6. UO₂ZrO₂ Powder or Green Substrate7. UO₂ZrO₂ Fired Substrate8. UO₂ZrO₂ Master Blend9. UO₂ZrO₂ Pellets10. UO₂ZrO₂ Finished11. U₃O₈ Powder12. UO₂Nb13. UF₄14. UF₆15. U Metal16. ThO₂ Powder17. ThO₂ Pellets18. UO₂F₂
25. Pure ADU26. Impure ADU27. Scrap Recovery Feed Solutions28. Low Level Organic Liquids29. Low Level Aqueous Liquids30. Low Level Combustibles (Rags, Paper)31. Acid Insolubles32. MSA Filters, Reusable33. MSA Filters, Scrap34. Pre-Filters35. Glass Wood36. Mop Water37. Filters From Item Plant Wash Stations38. Analytical Lab Residues, Solid39. Analytical Lab Residues, Liquid40. Leco Crucibles41. Metallographic Mounts42. Bomb Slag43. Oil44. Low Level Non-Combustibles45. Incomong Storage46. Other47. Declad Filter Cake48. Pot Clean-Up | <ol style="list-style-type: none">A. Virgin OK ProductB. Virgin Reject ProductC. Product From RecoveryD. Lot Retainer SamplesE. SamplesF. Declad SubstrateG. Pellet Grinder Sludge CakeH. Pellet Grinder Sludge SlurryJ. Hood Sweepings, CleanK. Hood Sweepings, DirtyL. Green Pellets and/or Agglomerated Press FeedN. Dewaxed Pellets and Powder |
|---|---|
- Each Number 1 - 18 must have a corresponding Letter A - N

FORM 11

CONTAINER TAG

Tag No. 20072

Container No.

Material Description and Source

Job No. _____ Lot No. _____

RMN No. _____ Accounted Yes

ENRICHMENT _____ % No

Date			
Gross			
Tare			
Net			
Sample Tag No.			

Initial			
Vol.			

Disposition: _____

By _____ Date _____

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XERO COPY

XERO COPY

XERO COPY

DOCKET NO. 70-820

Regulatory Suppl File Cy.

PROCEDURE MANUAL
FOR CONTROL OF
SOURCE AND SPECIAL NUCLEAR MATERIALS

Received w/Ltr Dated 7-5-67

