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Semi-Annual Report on Strategic Special Nuclear Material Inventory Differences

January 1980

U.S. Department of Energy

Assistant Secretary for Defense Programs

Office of Safeguards and Security

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STATEMENT OF THE
DEPARTMENT OF ENERGY (DOE) DIRECTOR OF SAFEGUARDS AND SECURITY

The Department of Energy has specified accounting requirements as part of its integrated safeguards system for the protection of special nuclear materials. This report provides and explains the generally small differences between the amounts of nuclear materials charged to DOE facilities and the amounts that could be physically inventoried.

These Inventory Differences, previously called Material Unaccounted For (MUF), are being publicly released on a semiannual basis. This report covers data for the period from October 1, 1978, through March 31, 1979, and includes accounting corrections for data from earlier periods. It is the fifth such semiannual report, subsequent to the August 4, 1977, publication (by DOE's predecessor, Energy Research and Development Administration) of all historical Inventory Difference data prior to October 1, 1976. All Inventory Differences reported here have been analyzed, investigated when necessary, and resolved.

These data and explanations, together with the absences of physical indications of any theft attempt, support a finding that during this period no theft or diversion of a significant amount of strategic special nuclear material has occurred.

George Weisz
Director
Office of Safeguards and Security
Department of Energy

UNITED STATES DEPARTMENT OF ENERGY
REPORT ON STRATEGIC SPECIAL NUCLEAR MATERIAL INVENTORY DIFFERENCES
OCTOBER 1, 1978 THROUGH MARCH 31, 1979

This fifth periodic semiannual report of Inventory Differences (ID) covers the first six months of fiscal year 1979 (October 1, 1978, through March 31, 1979), for the Department of Energy (DOE) and DOE contractor facilities possessing significant quantities of strategic special nuclear material (SSNM)*. The initial ID report, issued as ERDA 77-68 in August 1977, contained data for fiscal year 1976 (July 1, 1975, through September 30, 1976), for the Energy Research and Development Administration (ERDA) and ERDA contractor facilities and also contained historical data for ERDA/AEC and ERDA/AEC contractor facilities from 1947 through fiscal year 1975 and for AEC licensees from 1954 through calendar year 1967, including cumulative IDs by facility. The first semiannual ID report was issued as DOE/DP-000-1 in January 1978, and covered the first six months of fiscal year 1977.

Inventory Differences are simply the differences between the amount of material shown in the accounting records and the amount of material reported in the physical inventory. These differences are generally due to errors in estimating material in unmeasurable form at the time of an inventory, unmeasurable holdup in equipment, measurement imprecisions, inaccuracies in initial determinations of SSNM produced or used in nuclear reactors, and inventory or bookkeeping errors. However, since it is possible that even a small ID may be caused by theft of nuclear material, both DOE and contractors operating DOE facilities carefully maintain, analyze, and investigate ID data.

IDs are expected in nuclear material processing and are not, in and of themselves, evidence of lost or stolen material. On the other hand, ID analysis provides valuable information on the effectiveness of the safeguards system's physical protection and material control measures as well as a check on the process controls and material management procedures. IDs outside safeguards control limits or involving a missing SSNM discrete item are investigated. If necessary, an operation may be shut down until an ID is resolved.

* Strategic special nuclear material is plutonium or uranium-233 or uranium-235 in material whose uranium-235 content is 20% or greater (known as highly enriched uranium). A significant quantity is either 2 kilograms of plutonium or uranium-233 or 5 kilograms of uranium-235 in highly enriched uranium or the appropriate weighted combination.

Analysis of accounting statistics alone, however, cannot show with absolute certainty that theft has not occurred. Therefore, DOE relies on a safeguards system that integrates stringent physical security and material control measures with material measurement and accounting to ensure that material is not misappropriated. It is this total integrated safeguards system coupled with analysis and, when necessary, investigations of IDs, that DOE and DOE contractors operating DOE facilities use to arrive at a judgment of whether theft of significant amounts of SSNM has occurred.

Analyses of the data as they were generated, in each case, have resulted in the explanations for the IDs provided in this report. These explanations, together with the absence of physical indications of any theft attempt, support a finding that during this period no theft or diversion of a significant amount of nuclear material has occurred.

The Inventory Differences reported during this period represent the summation of numerical gains and losses. The volume of materials measured while in process, transferred and or in inventory has an affect upon the reported inventory differences. The ratio of inventory differences to the amount of material in inventory is a measure of the acceptability of the inventory differences. In addition, analyses are made of each ID, to determine whether the explanations given are reasonable. In this report all the IDs are considered well within expected measurement variations. The explanations for the IDs in the report columns headed "Analysis Findings" indicate that there has not been any new unexplained variations from the reported IDs of previous years. The analysis of the more significant IDs contained in this report are discussed below.

The 5.3 kilograms inventory increase in the plutonium account at the E. I. duPont de Nemours Facility resulted from cumulative differences due to: (1) adjustment for shipper/receiver differences; (2) adjustments for process holdup; and (3) many small measurement inaccuracies.

The 8.7 kilograms inventory decrease in the enriched uranium account at the Los Alamos Scientific Laboratory resulted from cumulative inventory differences due to remeasurement of uranium during fuel processing, and changes to the percent of enrichment due to remeasurements.

The 24.6 kilograms inventory increase in the enriched uranium account at the E. I. duPont de Nemours Facility resulted from cumulative inventory differences due to measurement uncertainties in the fuel fabrication and resulting scrap material and shipper/receiver adjustments.

The IDs of the very low enriched uranium processed through the gaseous diffusion facilities at Portsmouth, Paducah, and Oak Ridge, involve the measurement of materials largely in gas-tight process equipment in a reactive gaseous form under elevated temperature and pressure. The IDs for this period are reasonable and consistent with expected normal operations and the very large amounts of materials handled in these types of facilities. Not included in this report are data for the Rocky Flats and Y-12 nuclear weapons production facilities, in order to protect classified nuclear weapons information. However, the classified ID data from these facilities receive the same scrutiny and analysis as the unclassified data and similar conclusions were reached.

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INVENTORY DIFFERENCE DATA

OCTOBER 1, 1978 TO MARCH 31, 1979

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FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
PLUTONIUM*

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Albuquerque</u>		
Los Alamos Scientific Laboratory Los Alamos, New Mexico	.3	Cumulative Inventory Differences as a result of measurement differences for difficult to measure processing residues.
Mason & Hanger-Silas Mason Co., Inc., Amarillo, Texas	NONE	All material contained in weapons parts and have been accounted for.
Monsanto Research Corporation Mound Facility Miamisburg, Ohio	< 0.1	Cumulative inventory differences due to measurement uncertainties for low-level residues.
Sandia Laboratories Albuquerque, New Mexico	NONE	All material is contained in discrete identifiable forms and have been accounted for.
<u>Chicago</u>		
Argonne National Laboratory Argonne, Illinois	(< 0.1)	Cumulative inventory difference due to rounding.

<0.1 means inventory difference amount is less than 50 grams.

() means an inventory increase.

* This and subsequent Plutonium tables exclude Pu-238 which is reported separately.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
PLUTONIUM*

<u>Field Office and Contractor</u>	<u>Inventory Differences in Kilograms</u>	<u>Analysis Findings</u>
<u>Chicago (continued)</u>		
Argonne National Laboratory Idaho National Engineering Laboratory Idaho Falls, Idaho	<0.1	Cumulative inventory differences due to recording and reporting errors and rounding.
Battelle, Columbus Laboratories Columbus, Ohio	(0.2)	Cumulative inventory differences due to rounding and remeasurement adjustments.
Brookhaven National Laboratory Upton, New York	<0.1	Cumulative inventory differences due to rounding.
<u>Idaho</u>		
Allied Chemical Corporation CPP Idaho National Engineering Laboratory Idaho Falls, Idaho	(2.4)	Cumulative amounts of unreported produced plutonium measured during recovery of irradiated high enriched uranium fuel elements.
EG&G Idaho, Inc. TRA Idaho National Engineering Laboratory Idaho Falls, Idaho	NONE	All material accounted for.

<0.1 means inventory difference amount is less than 50 grams.

() means an inventory increase.

* This and subsequent Plutonium tables exclude Pu-238 which is reported separately.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
PLUTONIUM*

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Idaho (continued)</u>		
EG&G Idaho, Inc. ARA, LOFT, PBF, TAN Idaho National Engineering Laboratory Idaho Falls, Idaho	NONE	All material accounted for.
<u>Nevada</u>		
Nevada Test Site Mercury, Nevada	NONE	All material contained in test devices has been accounted for.
<u>Oak Ridge</u>		
Oak Ridge National Laboratory Oak Ridge, Tennessee	< 0.1	Cumulative inventory difference due to small measurement inaccuracies.
<u>Pittsburgh Naval Reactors</u>		
Duquesne Light Company Shippingport, Pennsylvania	NONE	Contained in irradiated fuel elements. All elements accounted for.

< 0.1 means inventory difference amount is less than 50 grams.

* This and subsequent Plutonium tables exclude Pu-238 which is reported separately.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
PLUTONIUM*

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Pittsburgh Naval Reactors (continued)</u>		
Westinghouse, Naval Reactors Facility Idaho National Engineering Laboratory Idaho Falls, Idaho	NONE	Contained in irradiated fuel elements. All elements accounted for.
Westinghouse, Bettis Atomic Power Laboratory West Mifflin, Pennsylvania	<0.1	Inventory difference due to rounding.
<u>Richland</u>		
Rockwell Hanford Operations Richland, Washington	2.4	Cumulative small inventory differences. Resulting from the remeasurement of Plutonium inventories associated with the cleanup of a recovery plant.
Hanford Engineering Development Laboratory Richland, Washington	(1.1)	Cumulative small inventory differences resulting from the remeasurement of Plutonium contained in fuel pins.
Battelle Pacific Northwest Laboratories Richland, Washington	(0.4)	Cumulative small inventory differences as results of remeasured values of Plutonium taken at different inventory periods.

< 0.1 means inventory difference amount is less than 50 grams.

() means an inventory increase.

* This and subsequent Plutonium tables exclude Pu-238 which is reported separately.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
PLUTONIUM*

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Richland (continued)</u>		
United Nuclear Industries, Inc. Richland, Washington	(0.1)	Cumulative small inventory differences from periodic inventory evaluations of Plutonium contained in irradiated fuel elements.
<u>San Francisco</u>		
Atomics International Canoga Park, California	(< 0.1)	Cumulative inventory differences resulting from measurement uncertainty and rounding.
Lawrence Livermore Laboratory Livermore, California	(0.8)	Cumulative inventory differences resulting from redetermination of material in process, shipper/receiver adjustments, and rounding.
<u>Savannah River</u>		
E. I. duPont de Nemours Aiken, South Carolina	(5.3)	Cumulative inventory differences resulting from the combination of: (1) adjustment for shipper/receiver differences; (2) adjustments for process holdup quantities; and (3) many small measurement inaccuracies.

() means an inventory increase.

< 0.1 means inventory difference amount is less than 50 grams.

* This and subsequent Plutonium tables exclude Pu-238 which is reported separately.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
U-235 IN 20% AND GREATER ENRICHED URANIUM

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Albuquerque</u>		
Los Alamos Scientific Laboratory Los Alamos, New Mexico	8.7	Cumulative inventory differences due to both remeasurement of uranium during fuel processing, and changes to the percent of enrichment due to remeasurements.
Mason & Hanger-Silas Mason Co., Inc. Amarillo, Texas	NONE	Contained in weapons parts. All parts accounted for.
Monsanto Research Corporation Mound Facility Miamisburg, Ohio	< 0.1	Cumulative inventory differences due to remeasurement and rounding.
Sandia Laboratories Albuquerque, New Mexico	NONE	No processing. All material accounted for.
<u>Chicago</u>		
Argonne National Laboratory Argonne, Illinois	0.1	Cumulative inventory differences due to remeasurement of material, reporting and recording errors and rounding.

< 0.1 means inventory difference amount is less than 50 grams.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
U-235 IN 20% AND GREATER ENRICHED URANIUM

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Chicago (continued)</u>		
Argonne National Laboratory Idaho National Engineering Laboratory Idaho Falls, Idaho	(0.3)	Cumulative inventory differences due to recording and reporting errors and rounding.
Battelle, Columbus Laboratories Columbus, Ohio	(0.2)	Cumulative inventory differences due to shipper receiver adjustments and rounding.
Brookhaven National Laboratory Upton, New York	(< 0.1)	Difference due to rounding.
<u>Idaho</u>		
Allied Chemical Corporation CPP Idaho National Engineering Laboratory Idaho Falls, Idaho	(2.3)	Cumulative inventory differences resulting from cleanup of irradiated fuel storage basin, and minor measurement adjustments.
EG&G Idaho, Inc. TRA Idaho National Engineering Laboratory Idaho Falls, Idaho	< 0.1	Cumulative differences due to rounding.

< 0.1 means inventory difference amount is less than 50 grams.
() means an inventory increase.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
U-235 IN 20% AND GREATER ENRICHED URANIUM

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Idaho (continued)</u>		
EG&G Idaho, Inc. ARA, LOFT, PBF, TAN Idaho National Engineering Laboratory Idaho Falls, Idaho	NONE	All material accounted for.
<u>Nevada</u>		
Nevada Test Site Mercury, Nevada	NONE	Inventory consists principally of test devices and nuclear rocket fuel. All material accounted for.
<u>Oak Ridge</u>		
Goodyear Atomic Corporation Piketon, Ohio (except cascades)	(1.9)	Cumulative inventory differences due to remeasurement, sampling, and measurement uncertainties.
Oak Ridge National Laboratory Oak Ridge, Tennessee	<0.1	Cumulative inventory differences due to sampling and measurement uncertainties.

< 0.1 means inventory difference amount is less than 50 grams.
() means an inventory increase.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
U-235 IN 20% AND GREATER ENRICHED URANIUM

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Pittsburgh Naval Reactors (continued)</u>		
Pittsburgh Naval Reactors Office West Mifflin, Pennsylvania	NONE	Contained in unirradiated fuel elements. All elements accounted for.
Westinghouse, Bettis Atomic Power Laboratory West Mifflin, Pennsylvania	2.1	Cumulative inventory differences due to difference between estimated scrap value and measured material recovered, round- ing, and recording errors.
Westinghouse, Naval Reactors Facility Idaho National Engineering Laboratory Idaho Falls, Idaho	(< 0.1)	Cumulative inventory difference due to measurement adjustments.
<u>Richland</u>		
Rockwell Hanford Operations Richland, Washington	NONE	Contained in scrap in static storage under seal. All material accounted for.
Hanford Engineering Development Laboratory Richland, Washington	0.1	Cumulative small inventory differences between measured values of enriched uranium taken at different inventory periods.

< 0.1 means inventory difference amount is less than 50 grams.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
U-235 IN 20% AND GREATER ENRICHED URANIUM

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Richland (continued)</u>		
Battelle, Pacific Northwest Laboratories Richland, Washington	1.4	Cumulative small inventory differences between measured values of enriched uranium taken at different inventory periods.
<u>San Francisco</u>		
Atomics International Canoga Park, California	NONE	All material accounted for.
Lawrence Livermore Laboratory Livermore, California	(0.1)	Cumulative inventory differences resulting from redetermination of material in process, rounding, and shipper/receiver adjustments.
Lawrence Livermore Laboratory Mercury, Nevada	NONE	Contained in reactor fuel. All items accounted for.
<u>Savannah River</u>		
E. I. duPont de Nemours Aiken, South Carolina	(24.6)	Cumulative inventory differences resulting from measurement uncertainties in the processing and inventorying of scrap material from fuel fabrication, measurement uncertainties in the recovery process, and shipper/receiver adjustments.

() means an inventory increase.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
U-235 IN 20% AND GREATER ENRICHED URANIUM

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Schenectady Naval Reactors</u>		
General Electric Company Kesselring Site West Milton, New York	NONE	Inventory consists of prototype reactor fuel. All material accounted for.
General Electric Company Knolls Atomic Power Laboratory Schenectady, New York	<0.1	Cumulative inventory difference due to many small measurement differences and rounding.
General Electric Company Windsor Site Windsor, Connecticut	NONE	Inventory consists of prototype reactor fuel. All material accounted for.

(.) means an inventory increase.
<0.1 means inventory difference amount is less than 50 grams.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
FOR THE URANIUM GASEOUS DIFFUSION PLANTS ENRICHED
URANIUM OF LESS THAN 5% U-235

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Oak Ridge</u>		
Goodyear Atomic Corporation Piketon, Ohio (Average Enrichment = 1.4%)	(12.1)	The inventory differences at all facilities are due to equipment holdup, the combined uncertainties of sampling and measurement of receipts, removals, gas phase inventory, and rounding of inventories to the nearest kilogram in the various material accountancy areas.
Union Carbide, Nuclear Division Oak Ridge, Tennessee (Average Enrichment = 1.00%)	(24.3)	
Union Carbide, Nuclear Division Paducah, Kentucky (Average Enrichment = 0.69%)	(56.4)	

() means an inventory increase.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
URANIUM-233

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Albuquerque</u>		
Los Alamos Scientific Laboratory Los Alamos, New Mexico	< 0.1	Cumulative inventory differences due to rounding.
Monsanto Research Corporation Mound Facility Miamisburg, Ohio	< 0.1	Cumulative inventory differences due to rounding.
<u>Chicago</u>		
Argonne National Laboratory Argonne, Illinois	NONE	All material accounted for.
<u>Idaho</u>		
Allied Chemical Corporation CPP Idaho National Engineering Laboratory Idaho Falls, Idaho	NONE	Inventory consists principally of irradiated fuel elements. All elements accounted for.
<u>Oak Ridge</u>		
Oak Ridge National Laboratory Oak Ridge, Tennessee	(< 0.1)	Cumulative inventory differences due to measurement uncertainties.

< 0.1 means inventory difference amount is less than 50 grams.
() means an inventory increase.

FIRST HALF FO FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
URANIUM-233

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Pittsburgh Naval Reactors</u>		
Duquesne Light Company Shippingport, Pennsylvania	NONE	Contained in irradiated fuel elements within an operating reactor. All elements accounted for.
Westinghouse, Bettis Atomic Power Laboratory West Mifflin, Pennsylvania	(0.4)	Cumulative inventory differences due to redetermination of material holdup in equipment, rounding, and recording errors.
Westinghouse Electric Corporation Naval Reactors Facility Idaho Falls, Idaho	NONE	Contained in unirradiated and irradiated fuel elements. All elements accounted for.

20

() means an inventory increase.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
URANIUM-233

Field Office
and Contractor

Inventory Difference
in Kilograms

Analysis Findings

San Francisco

Lawrence Livermore Laboratory
Livermore, California

NONE

All material accounted for.

Savannah River

E. I. duPont de Nemours
Aiken, South Carolina

NONE

Inventory consists principally of
irradiated fuel in storage basin.
All material accounted for.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
PLUTONIUM-238

<u>Field Office and Contractor</u>	<u>Inventory Difference in Kilograms</u>	<u>Analysis Findings</u>
<u>Albuquerque</u>		
Los Alamos Scientific Laboratory Los Alamos, New Mexico	< 0.1	Cumulative inventory differences from shutdown and cleanout of the facility.
Monsanto Research Corporation Mound Facility Miamisburg, Ohio	(0.3)	Cumulative inventory differences from cleanup of equipment and "gloveboxes" in process area.
Sandia Laboratories Albuquerque, New Mexico	NONE	Material contained in heat sources. All sources accounted for.
<u>Oak Ridge</u>		
Oak Ridge National Laboratory Oak Ridge, Tennessee	NONE	All material accounted for.
<u>Idaho</u>		
Allied Chemical Corporation CPP Idaho National Engineering Laboratory Idaho Falls, Idaho	(< 0.1)	Inventory difference due to cleanup of plant equipment.

< 0.1 means inventory difference amount is less than 50 grams.
(.) means an inventory increase.

FIRST HALF OF FISCAL YEAR 1979 INVENTORY DIFFERENCES
DOE AND DOE CONTRACTOR SPECIAL NUCLEAR MATERIALS
PLUTONIUM-238

Field Office
and Contractor

Inventory Difference
in Kilograms

Analysis Findings

Richland

Rockwell Hanford Operations
Richland, Washington

NONE

Contained in scrap in static storage
under seal. All material accounted
for.

Savannah River

E. I. duPont de Nemours
Aiken, South Carolina

3.5

Cumulative inventory differences due to
remeasurements, shipper/receiver adjust-
ments and many small measurement
inaccuracies.

ABBREVIATIONS

CPP Chemical Processing Plant

TRA Test Reactor Area

ARA Auxiliary Reactor Area

LOFT Loss of Fluid Test

PBF Power Burst Facility

TAN Test Area North