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**Information Gathering for the
Transportation Statistics
Data Bank**

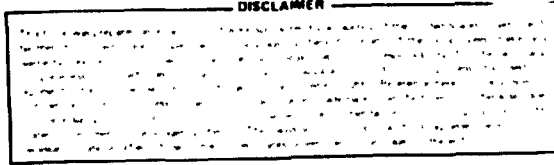
L. B. Shappert
P. J. Mason

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Contract No. W-7405-eng-26
CHEMICAL TECHNOLOGY DIVISION

NUCLEAR WASTE PROGRAM

INFORMATION GATHERING FOR THE TRANSPORTATION
STATISTICS DATA BANK

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(BAN AR 05 25 00 0) (FTPA ONL-WROL)

*Information Systems Department
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Date Published - October 1981

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INFORMATION GATHERING FOR THE TRANSPORTATION
STATISTICS DATA BANK

L. B. Shappert
P. J. Mason

ABSTRACT

The Transportation Statistics Data Bank (TSDB) was developed in 1974 to collect information on the transport of Department of Energy (DOE) materials. This computer program may be used to provide the framework for collecting more detailed information on DOE shipments of radioactive materials. This report describes the type of information that is needed in this area and concludes that the existing system could be readily modified to collect and process it. The additional needed information, available from bills of lading and similar documents, could be gathered from DOE field offices and transferred in a standard format to the TSDB system. Costs of the system are also discussed briefly.

1. INTRODUCTION

The Transportation Statistics Data Bank (TSDB) was developed at Oak Ridge in 1974 to gather, process, and produce information dealing with the transportation of both radioactive and nonradioactive materials for the Department of Energy (DOE). The system is now operating on funds provided by the Oak Ridge Operations (ORO) Office, even though not all DOE sites contribute to or receive reports from it.

A lack of funds in FY 1980 caused an interruption in TSDB data processing, while information continued to flow in from the field offices participating in the program. Near the end of FY 1980, limited funds were made available, processing of backlogged data resumed, and some reports were issued. Lack of funding in early FY 1981 again stopped the data processing for the TSDB, but the data flow has continued. Funds are currently being provided by ORO to process backlogged and recent data.

In FY 1980, the Transportation Technology Center (TTC) in cooperation with DOE Headquarters, the Department of Transportation (DOT), and the Nuclear Regulatory Commission (NRC), saw a need to survey all shippers of radioactive materials in the United States in an update of a Battelle Northwest study¹ carried out in 1975. The TSDB was recognized as a possible source of information, although ~80% of the data in the system concerned shipment of nonradioactive materials and was of no interest to TTC. It became apparent that the data on radioactive materials shipments were not sufficient to cover the needs of the survey; nevertheless, TTC supplied funding near the end of FY 1980 to maintain data processing. Funds were also provided for the TSDB system in FY 1981 in order to (1) determine whether modifications could be made to improve collection of information of interest to TTC (while preserving the elements needed by transportation managers), (2) identify additional sources of readily available transportation information, (3) make recommendations on restructuring the collection system, and (4) evaluate the possible impact (cost and/or manpower) of implementing the recommendations. This report summarizes that investigation.

2. DESIRED INFORMATION

The TTC supplied to Oak Ridge National Laboratory (ORNL) a suggested list of information to be collected in the radioactive materials shipment survey. This list formed the basis of our investigation. Many elements correspond to data already being collected for the TSDB; other data important to TTC appear to be readily available from the bills of lading.

Table 1 lists data elements of interest to TTC as well as those now collected by the TSDB. Sources of the information are also shown in Table 1 and are discussed below.

3. SOURCES OF INFORMATION

All shipments of radioactive materials leaving a DOE installation are sent with a bill of lading, which is a primary source of information for the modified TSDB system. Also, information for a limited list of

Table 1. Materials transportation data elements

Data element	Of interest to TTC	Currently in TSDB ^b	Source	
			Bills of lading	NMSS ^c
Origin	X	X	X	X
Destination	X	X	X	X
Type of shipment ^d		X	X	
Shipment identification		X	X	X
Commodity	X	X	X	X
Date of shipment		X	X	X
Package identification	X	X	X	X
Protection		X		X
Freight cost		X	X ^e	
Gross weight		X	X	X
Element weight	X	X	X	X
Isotope weight	X	X	X	X
Carrier(s)		X	X ^f	X ^g
Transportation mode	X	X	X ^f	X ^g
Transportation mileage	X	X	^h	^h
Physical form	X		X	X
Chemical form	X		X	X
Transport index	X		X	
Ci/package	X		X	X ⁱ
Radionuclide	X		X	X
Packages per shipment	X	X	X	X
Port of entry	X			X
Port of exit	X			X
Sole-use vehicle	X		X ^j	
Material use	X			
Routing information	X			X ^k

^aTTC = Transportation Technology Center.

^bTSDB = Transportation Statistics Data Bank.

^cNMSS = Nuclear Materials Management and Safeguards System.

^dInbound collect or prepaid, outbound collect or prepaid.

^eFrom freight bills for shipments that are outbound prepaid or inbound collect.

^fInitial carrier only.

^gUp to 4 consecutive carriers.

^hIs estimated.

ⁱCi/shipment; if a single package, then Ci/package.

^jIf required by DOE.

^kIdentifies transfer points.

radioactive materials may be gathered from the Nuclear Materials Management and Safeguards System (NMMSS), in operation at the Oak Ridge Gaseous Diffusion Plant (ORGDP) and supported by the Division of Safeguards and Security, DOE. The radioactive materials covered by that system are listed in Table 2.

Table 2. Materials for which information is available in the Nuclear Management and Safeguards System (NMMSS)

Americium-241	Plutonium-238
Americium-243	Plutonium-242
Berkelium	Thorium
Californium	Tritium
Curium	Uranium (depleted)
Deuterium	Uranium (enriched)
Lithium (enriched)	Uranium (normal)
Neptunium	Uranium-233
Plutonium	

As shown in Table 1, the types of information available from these two sources are not the same. However, they both feed the TSDB as indicated in Fig. 1. This same flow of information could be used to feed the modified TSDB and produce periodic reports for TTC, Traffic Managers, DOE Headquarters, and others as requested.

3.1 Bills of Lading

A bill of lading, or manifest, is produced whenever a shipment of material is made, no matter what mode is used to transport the material. This document contains all the information needed by a carrier to complete the shipment. Two examples of bills of lading are shown in Appendix A.

The desired information from the bills of lading is recorded and transferred to the TSDB system (for the Oak Ridge plants only), by the Accounts Payable (AP) Department, Union Carbide Corporation, Nuclear Division (UCC-ND). At present, eighteen DOE sites also supply bills of lading information to the TSDB. Less than 4% of the bills of lading processed for use in the TSDB involve radioactive materials shipments; the major percentage is for nonradioactive shipments.

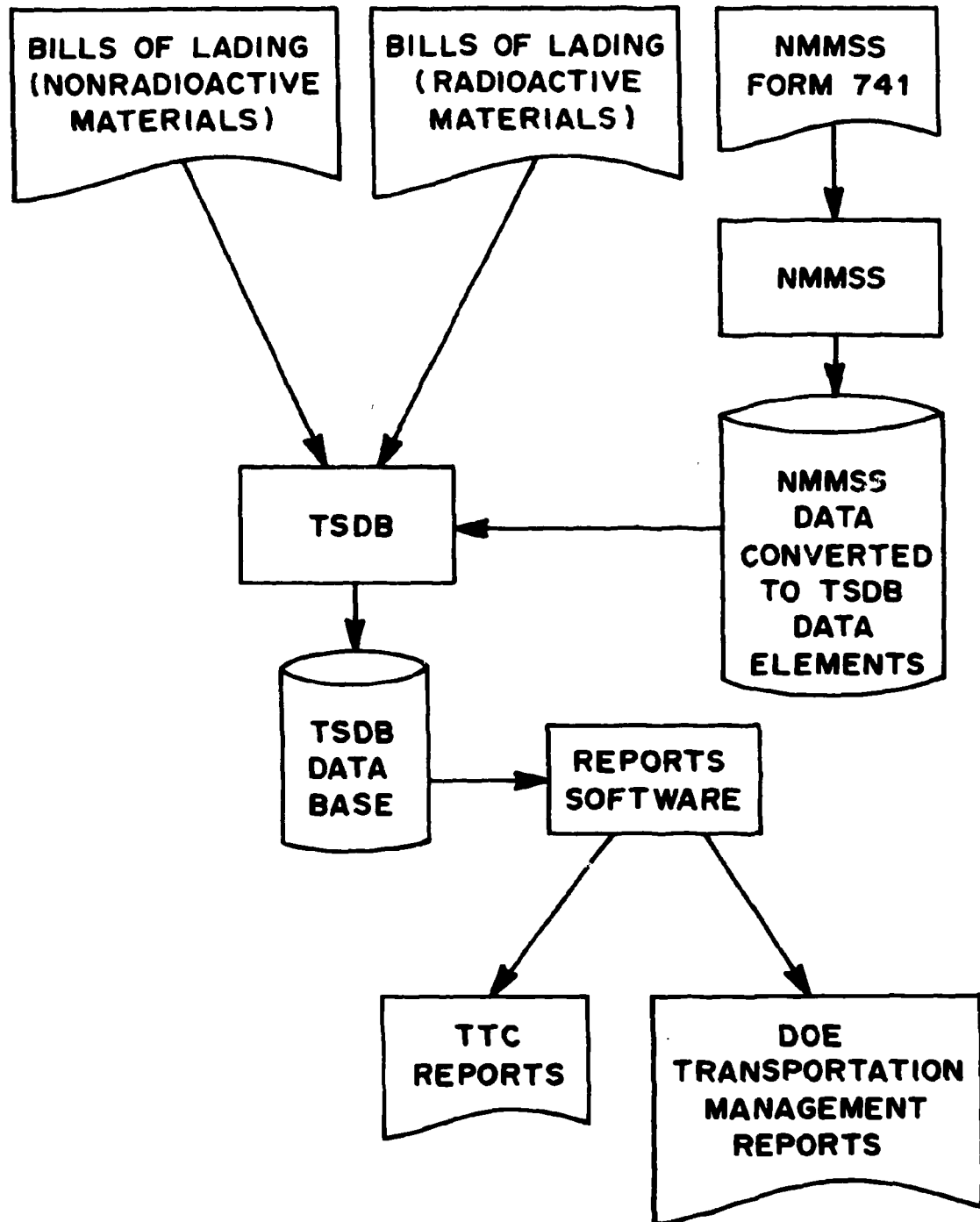


Fig. 1. Proposed flow of data from the Nuclear Materials and Management System (NMMSS) and bills of lading with a modified Transportation Statistics Data Bank (TSDB).

More information is given on the bills of lading than is presently extracted and placed into the TSDB. Much of this information is of interest to the TTC and could be included as part of the information transfer by all participants. With regard to the Oak Ridge plants, the AP Department has indicated that it would not be a significant additional burden to extract and supply this additional information to the TSDB.

A list of the specific topics of interest to TTC, along with a description of the topic as it appears on the bill of lading, is given in Appendix B.

3.2 The Nuclear Materials Management and Safeguards System

The Nuclear Materials Management and Safeguards System (NMMSS) is the official national data base and information support system for nuclear materials controlled by the United States Government. The system is classified and contains information on shipments of certain radioactive materials used in U.S. government nuclear research, development, and production programs, the private U.S. nuclear programs subject to federal regulations, and the foreign nuclear programs under international agreements for cooperation. Over 130 DOE facilities supply the information to the system, as do approximately 1100 facilities licensed by the NRC.

Information is processed by the NMMSS on the nuclear materials that are identified in Table 2 and that are: (1) owned and used by the U.S. government, (2) owned by private companies within the United States, (3) leased by the U.S. government to private companies for domestic use, (4) produced in the United States and leased or sold to foreign governments, and (5) produced in foreign countries under conditions that bring the materials under U.S. safeguards interest.

The information placed into the NMMSS is taken from a DOE/NRC Form 741 that is filled out on all shipments covered by the system. This form is frequently completed before a bill of lading is made and contains basically similar information, with a few important differences. For example, the transportation index (TI) is given on bills of lading, but not on the Form 741.

Examples of Form 741 are shown in Appendix C. The information on the form is often abbreviated by a code and is, therefore, difficult to interpret without the proper background. Not all of the information shown on the 741 form is placed into the NMMSS. The TSDB program has been developed to extract only specific pieces of information from the NMMSS, but reprogramming would allow extraction and processing of additional unclassified information of interest to TTC.

A description of information on topics of interest to TTC, as it appears on the 741 form, is given in Appendix D.

4. INVESTIGATION RESULTS

After several months of evaluating the TSDB program and its information-gathering system, it was determined that the system could be readily modified and almost all of the information of interest to TTC could be extracted from documents that are already being processed. If those personnel now providing input information to the TSDB, as well as those DOE contractors who are not now participating (see Sect. 7), were to extract all the desired information from appropriate shipping documents and transmit it to the TSDB, the computer program could produce detailed transportation reports on radioactive materials shipments.

The structure of the modified system and the reports generated from it would initially be based on those elements of interest to TTC that are listed in Table 1. Additional modification could follow a period of evaluation after the new data are processed through the system.

The cost of the modified system would likely exceed present TSDB funding; however, the extent of the increase will depend upon the extent of DOE support for the revised and updated system. A discussion of projected implementation costs is given in the following section of this report.

5. IMPLEMENTATION COSTS

Costs of implementing the recommendations of this report will be incurred in (1) the TSDB system modifications, (2) manpower to gather additional information from bills of lading, (3) manpower to bring those

DOE operators into the system who are not now contributing to it, and (4) manpower to maintain and operate the new TSDB system.

5.1 System Modifications

It is anticipated that the work required to modify the existing computer programs for extraction of additional information from the NMSS can be accomplished with the existing FY 1981 funds supplied by TTC at Sandia.

5.2 Bills of Lading Information

Bills of lading that are processed by the AP group of UCC-ND for the Oak Ridge complex of plants could be handled without a significant increase in costs for extracting the additional information on radioactive materials shipments.

At other DOE sites, the information concerning radioisotope shipments must come from bills of lading rather than the NMSS. Since more radioisotope shipments (excluding shipments of special nuclear materials) probably originate at ORNL than at any other DOE site, it was felt that the number of bills of lading for radioactive materials shipments from other sites would not exceed those processed locally and would, therefore, add only marginally to their workload.

5.3 Nonparticipating DOE Sites

Two of the DOE operations offices, along with their contractors, are not now supplying information from bills of lading to the TSDB. Should they be requested by DOE to supply information on both radioactive and nonradioactive materials shipments, it could substantially increase their workload, depending upon the number of documents processed. Table 3 summarizes information on the TSDB transactions for June 1980 with participating contractors. Approximately 30% of the 266 bills of lading were processed at ORGDP.

Table 3. Transportation Statistics Data Bank
transactions for June 1980^a

Type of transaction	Documents processed	Percentage of total
Total number of shipments reported	9981	100.0
Radioactive shipments, information from NMMSS ^b	1716	17.2
Radioactive shipments, information from bills of lading	266	2.7
Nonradioactive shipments, information from bills of lading	7999	80.1

^aInformation from all (except two) DOE field offices.

^bNMMSS = Nuclear Materials Management and Safeguards System.

Apparently the nonparticipating field offices have not initiated information flow to the TSDB because of their concern for the effort required to extract the desired information from available documents. The need and the proper incentives for their participation must be established by DOE Headquarters and transmitted to those offices to ensure their full cooperation. The cost of this participation cannot be evaluated until the number of documents to be processed by these organizations and their contractors is known.

The desirability of more timely and detailed monitoring of radioactive materials shipments may provide the justification for bringing nonparticipants into the system. Such potentially hazardous shipments are receiving considerable attention from the media, and completion of a monitoring system should be valuable to both DOE Headquarters and the TTC.

All DOE facilities already provide data for the NMMSS on the DOE/NRC Form 741; therefore, a large body of information on certain radioactive materials shipments from these sites is available for collection. However, guidance, approval, and support from DOE Headquarters will be required to ensure that the TSDB collects all the needed information and produces the reports needed for the various DOE programs.

5.4 Operation of the TSDB

To process the bills of lading data that are presently channeled into the TSDB (see Fig. i), approximately one full-time equivalent (FTE) plus one quarter FTE in a supervisory role, are required at the Oak Ridge facility. The needed information is automatically extracted from the NMSS by computer.

Processing the additional input from the bills of lading will probably not require more than an additional one-quarter FTE for the present participants to simply add the additional data recommended. Extracting additional data from the NMSS data base after the program modifications are made will not significantly affect manpower requirements, since the data will be automatically extracted. It is worth noting that 13% (266/1982) of the transactions for radioactive materials shipments listed in Table 3 were from bills of lading and 87% (1716/1982) were from information already in the NMSS.

However, if nonparticipating DOE sites are requested by DOE Headquarters to provide information on both radioactive and nonradioactive materials shipments to the TSDB, the increase in workload would be significant. Extrapolation of the data in Table 3 provides some basis for estimating these costs. If the additional number of shipments should be ~10,000 shipments per month (double the current processing rate), the TSDB manpower requirements would probably increase from about 1.25 FTEs to approximately 2 FTEs.

5.5 Summary of Cost Information

Table 4 presents a summary of the cost information discussed above. The figures should be considered only estimates because of the lack of definitive information concerning some of the elements.

6. CLASSIFICATION OF THE TSDB

Data collected from bills of lading on radioactive materials shipments are generally unclassified. However, since the NMSS contains classified information, and since information is now supplied to the TSDB from that system, the TSDB processed reports must be checked for classification.

Table 4. Summary of costs

Source	Costs, thousands of dollars	
	Initial	Annual
System modification	60 ^a	0
Information transfer from bills of lading	0	0 ^b
Addition of nonparticipating DOE sites to system	0	c
Operation of TSDB ^d	0	125
Operation of TSDB ^e	0	175

^aCurrent funding in FY 1981 from TTC.

^bNegligible increase in costs for obtaining additional TTC data elements.

^cDependent upon DOE Headquarters decision to collect all shipping information or only radioactive materials information.

^dCurrent FY 1981 projection.

^eAssumes receiving both radioactive and nonradioactive material shipment information from all DOE and contractor sites.

7. CONCLUSIONS AND RECOMMENDATIONS

The TSDB currently collects, processes, and reports on both radioactive and nonradioactive materials shipments carried out by all except two DOE field offices and their contractors. The information comes to the TSDB from bills of lading and from the NMSS as shown in Fig. 1. The TSDB system can be readily adapted to provide more detailed information on radioactive materials shipments and to produce reports for both the TTC and the DOE transportation managers.

The support and cooperation of all DOE operations offices and their contractors is needed for the TSDB. The two field offices that are currently not participating in the system make numerous shipments of radioactive materials. Many of these shipments are clearly identified in the NMSS, and information on them could be extracted by modification

of the interface program between the NMSS and the TSDB systems, although some additional radioactive materials shipments, recorded only in bills of lading, undoubtedly occur.

For those organizations that are now supplying information to the TSDB from bills of lading, a relatively insignificant effort would be required to collect the additional information of interest to TTC on radioactive materials shipments.

Approval from DOE Headquarters will be needed for extraction of additional information from the NMSS.

It is important that certain actions be taken as quickly as possible to permit the program to move forward. Specifically, it is recommended that:

1. A letter be initiated to DOE Headquarters requesting permission to extract additional information from the NMSS as outlined;
2. DOE Headquarters, in consultation with the TTC, field offices, and contractors (as appropriate), consider the desirability of the TSDB program and the degree to which it should be supported;
3. Modification of the TSDB be initiated to permit it to extract, accept, and process the proposed additional information on radioactive materials shipments;
4. Modification to the TSDB be completed in summer of 1981;
5. UCC-ND contractors submit all requested information into the modified system, thus permitting it to be evaluated by the end of FY 1981;
6. Following the evaluation period, a report be generated to summarize the status and results of the system and to recommend whatever changes appear necessary; and
7. DOE Headquarters advise field offices, as appropriate, to submit input information to the TSDB program.

8. REFERENCES

1. J. L. Simmons et al., *Survey of Radioactive Material Shipments in the U.S.*, BNWL-1972, Battelle Northwest Laboratories, Richland, Washington (April 1976).

STRAIGHT BILL OF LADING Original Not Negotiable **SHORT FORM**

SHIPPER'S NAME: **A. J. Mettler** DATE: **August 24, 1980** CARRIER'S NO. SHIPPER'S NO. **SS80-8-6,7,8**

RECEIVED, subject to the classification and tariffs in effect on the date of the receipt by the carrier of the property described in the Bill of Lading.

UNION CARBIDE CORPORATION
NUCLEAR DIVISION

AT **Oak Ridge, Tennessee** FROM: **Installation ABC Company**

The property described herein is shipped under weight as noted (weights and conditions of packages unknown), marked, packaged and checked as indicated herein, which said carrier (the yard carrier being understood throughout this receipt as meaning any person or corporation in possession of the property under the contract agreed to carry to its usual place of said destination, and as to each party at any time succeeded to all or any of said property) and every vessel to be performed hereunder shall be subject to all the terms and conditions of the Uniform Domestic Through Bill of Lading set forth (1) in Official Southern, Western, and Atlantic Freight Classification in effect on the date hereof, if there is a rail ocean shipment or (2) in the applicable motor carrier classification or tariff, if there is a motor carrier shipment or (3) in the Uniform Railway Express Receipts if this is a railway or air express shipment or (4) in the Uniform Airbill if this is an air freight shipment.

Shipper hereby certifies that he is familiar with all the terms and conditions of the said Bill of Lading including those on the back thereof set forth in the classification or tariff which governs the transportation of this shipment, and the said terms and conditions are hereby agreed to by the shipper and accepted for himself and his consignee.

CONSIGNEE TO: **XYZ Company** (Mail or street address of consignee - for purposes of notification only.)

DESTINATION: **Dunbarton, South Carolina** STATE: _____ COUNTY: _____

ROUTE: **"EXCLUSIVE USE"**

DELIVERING CARRIER: **Attention: J. T. Jones** TRAILER NO: **06914** SEALS NO. **742, 743**

NO. OF VEHICLES INITIALS: _____ NO. _____

Mettler **ICC TENDER 794: \$755.00 plus FSC Item No. 164900A Sub I**

NO. PACKAGES	DESCRIPTION OF ARTICLES, SPECIAL MARKS, AND EXCEPTIONS	WEIGHT (Below is Correct)	CLASS OR RATE	CHECK COLUMN	Subject to Section 7 of Conditions of applicable Bill of Lading, if this shipment is to be delivered to the consignee without recourse to the consignor, the consignor shall sign the following statement: The carrier shall not make delivery of this shipment without payment of freight and all other lawful charges. _____ Signature of Consignor If charges are to be prepaid, write or stamp here, "TO BE PREPAID". "TO BE PREPAID" ACCT. OR S.O. NO. 332570-0121 <small>*It is understood and agreed that this shipment is made by the consignor for and on behalf of the U.S. Government and that the consignor is authorized to and will make any payment due as consignor or shipper from government funds advanced to it by the U.S. Department of Energy and not from its own assets, and that nothing herein shall preclude liability of the Government for any payment properly due hereunder if for any reason such payment is not made by the consignor from such government funds. This shipment is subject to the terms and conditions set forth in the standard form of the U.S. Government bill of lading and to any available special rates or charges.</small>
(1)	Radioactive Material, Fissile, n.o.s. 1.2 megacuries Mixed Fission Products Transport Group: II; Transport Index: 4.0; Label: <u>Yellow III</u> USA/5507/BLF Container 95-23-176	23,000 lb			
(1)	Radioactive Material, n.o.s. <u>19,141 Curies Tritium-3</u> as uncompressed gas; Transport Group: VII; Transport Index: <u>NONE</u> ; Label: <u>White I</u> USA/6678/BL SRP-581/SN-35	260 lb			
(2)	Empty Containers, previously contained radioactive material containers 29 and 47	600 lb			
		23,860 lb			

Gross _____ Tare _____ Net _____

*Shipper's interest in lieu of stamp, not a part of Bill of Lading approved by the Interstate Commerce Commission.

This is to certify that the above named articles are properly classified, described, packaged, marked and labeled, and are in proper condition for transportation according to the applicable regulations of the Department of Transportation.

*Subject to Rail Freight Agreement with Atomic Energy Commission, et. al., dated July 12, 1951, where applicable.

UNION CARBIDE CORPORATION - Nuclear Division, Shipper
Operating Under Contract No. W-7409-Eng. 26
with the U.S. Department of Energy

*The additions on the face hereof and to the terms and conditions are noted.

1
PER _____ Traffic Department
PERMANENT POST-OFFICE ADDRESS OF SHIPPER _____

Agent
Per _____

UC-1156
1979-10-77

Fig. A.1. Sample of straight bill of lading.

OAK RIDGE NATIONAL LABORATORY
OPERATED BY
UNION CARBIDE CORPORATION
NUCLEAR DIVISION

RADIOACTIVE MATERIAL SHIPPING ORDER

LICENSE NUMBER	SCHEDULED SHIPPING DATE 11-04-82	CUSTOMER ORDER NUMBER R-32701	ISOTOPE ORDER NUMBER 34-0110
----------------	-------------------------------------	----------------------------------	---------------------------------

ORDER Strontium 89 as liquid	
SHIP TO: Radiation Safety Officer State University of New York WXYZ Research Laboratory Buffalo, NY 14214	MODE AND ROUTING Federal Express - Collect
FOR EXPORT: VALUE \$	ATOMIC NUMBER
ORDER RELEASED TO <input type="checkbox"/> SHIPPING <input type="checkbox"/> MMD DATE	

PACKAGING AND SHIPPING INFORMATION				
NO. OF PKGS.	SHIPPING NAME(S) FOR HAZARDOUS MATERIAL OR DESCRIPTION OF MATERIAL	HAZARDOUS MATERIAL CLASS	IATA ART. NO.	HAZARDOUS MATERIAL LABEL
1	Radioactive material, n.o.s., Cargo - only aircraft Hydrochloric acid	Radioactive material Corrosive material		Radioactive II Corrosive

WARNING: THIS SHIPMENT MUST NOT BE OPENED UNTIL ADEQUATE HEALTH AND SAFETY MEASURES ARE TAKEN (SUCH AS PLACED IN HOOD, GLOVE BOX, CELL) SO AS TO PROTECT THE HANDLER FROM EXCESSIVE EXPOSURE TO THE BODY AS A RESULT OF RADIATION AND/OR CONTAMINATION

RADIOACTIVE MATERIAL (RAM) CONTENT				NON-RAM HAZARDOUS MATERIAL CONTENT	
RADIOISOTOPE	AMOUNT SHIPPED	ASSAYED AT 8:00 A.M.	TRANSPORT GROUP		
Strontium 89	4 mCi		III	0.25 ml of 1.62 HCL	
CHEMICAL AND PHYSICAL FORM Strontium chloride				SOLUTION VOLUME OR PRODUCT WT.	VOLUME AND PRESSURE (GASES)
RAM CONCENTRATION		RAM PURITY		TYPE CONTAINER	CONTAINER CERTIFICATION NO. 7A
SPECIFIC ACTIVITY 4 mCi		ORNL BATCH NUMBER		CONTAINER NO.	CONTAINER WEIGHT 22 lb

RADIATION SURVEY - OUTSIDE OF PACKAGE - SEE ATTACHMENT IF MORE THAN ONE PACKAGE

RADIATION AT SURFACE	RADIATION AT 3 FEET	TRANSPORT INDEX	TYPE RAM LABEL	HEALTH PHYSICS APPROVAL
<0.5		None	WHITE I	

REMARKS:

ATTACHMENTS:

SHIPPERS CERTIFICATION

APPROVED FOR SHIPMENT

DATE

UCR-2775
(3-8-81)

1-PACKING LIST

Fig. A.2. Sample of radioactive material shipping order.

APPENDIX B: TOPICS OF INTEREST TO THE TTC ON BILLS OF LADING

The following is a summary of the topics of interest to the TTC (listed in Table 1) and for which information is needed. The description indicates the information on the topic that is available from the bills of lading.

B.1 Origin and Destination

Both the shipper and receiver (or consignee) are given on the bill of lading.

B.2 Commodity

Currently, only the general description is extracted from the bill of lading [e.g., radioactive material, not otherwise specified (n.o.s.)] however, more detailed information can be extracted. For the documents shown in Appendix A, the descriptions are: mixed fission products, tritium-3, and strontium-89.

B.3 Package Identification

All packages are identified by number. In the examples given in Appendix A, the mixed fission products are carried in a cask whose certificate number is 5507 and whose identification number is USA/5507/BLF. The tritium-3 is carried in a package identified as USA/6678/BL. The strontium-89 was carried in a DOT 7A package.

B.4 Element/Isotope Weight

This information is not explicitly given on the bill of lading. However, if the number of curies and the specific isotope are identified, the weight of the isotope can be estimated.

B.5 Transportation Mode

On outbound shipments, the mode of transportation and the carrier used when it leaves the place of origin is given. However, for inbound shipments, more information is generally available.

B.6 Transportation Mileage

This is not given but is estimated from knowledge of the origin and destination.

B.7 Physical Form

The material is described in general terms and its form is either given or can easily be determined. In Appendix A, the first shipment of mixed fission products is a spent-fuel assembly, which is a solid. The tritium is an uncompressed gas and is so noted. The strontium is in an acid solution, also noted.

B.9 Chemical Form

The chemical form is normally given. In Appendix A, the spent fuel is not described in such terms. The tritium is a gas and the strontium is shipped as strontium chloride in an acid solution.

B.10 Transport Index

The transport index is given.

B.11 Curies per Package

The curies per package is given.

B.12 Radionuclide

Generally, the radionuclide is given per DOT regulations. Currently, however, the TSDB uses it as a generic commodity listing.

B.13 Packages per Shipment

This information is given on the bill of lading.

B.14 Port of Entry/Exit

This information is not given on the bill of lading, since many overseas shipments are sent through freight forwarders.

B.15 Sole Use Vehicles

If a sole use vehicle is required, it will be identified on the bill of lading. If a vehicle is used to ship a cask and, because of its weight, is not used for any other commodity, the bill of lading will not identify it as a sole use shipment.

B.16 Material Use

The end use of the material is not identified on the bill of lading.

B. 17 Routing Information

On outbound shipments, only the carrier that picks up the shipment is identified. Other carriers are not identified. On inbound shipments, all carriers of the shipment are identified.

APPENDIX C: SAMPLES OF DOE/NRC FORM 741

DOE/NRC FORM 741
 (7-88) Previous editions are obsolete.
 MANDATORY DATA COLLECTION
 AUTHORIZED BY 18 CFR 26.40, 80, 70,
 75, 188, Public Laws 93-703, 93-438, 98-51

U.S. DEPARTMENT OF ENERGY AND U.S. NUCLEAR REGULATORY COMMISSION
NUCLEAR MATERIAL TRANSACTION REPORT

Controlled by ORES
 826-74678
 Approved by GAO
 9-188276 (FEB88)
 Expires 8-30-87

1. SHIPPER'S USE (1-4)		2. RECEIVER'S USE (5-8)		3. TRANSACTION NO. (9-12)		4. CONTRACT NO. (13-16)		5. PROCESSING CODE (17-20)		6. RECEIVED (21-24)		7. ACTION CODE (25-28)		8. DATA CODE (29-32)		9. DOCUMENTATION (Only if document is classified SECRET)													
FOA		DOB		1505		SHIPPER A		RECEIVER		SHIPPER A		RECEIVER		PAGE 1		OF 6 COPIES SERIALIZED													
9. A. NAME AND ADDRESS OF SHIPPER Bear Creek Laboratory P.O. Box 2 Wheat, IN 37800 C. ATTENTION J. T. Jones D. TELEPHONE FTS 555-1212				B. LICENSE NO.				10. A. NAME AND ADDRESS OF RECEIVER I. P. Semmelweis & Co. Allendale, SC 29800 C. ATTENTION W. B. Smith D. TELEPHONE FTS 666-6666				11. NO. OF DATA LINES (170-21) 02				12. A. SHIPPED FOR ACCOUNT OF (A. NO. (120-21))				13. A. SHIPPED TO (A. NO. (127-28))				14. DISTRIBUTION OF COPIES 1. DOO FOO 2. DOO 3. DOO DAA 4. DAA 5. FOO 6. PROJ ACCTG					
16. TRANSFER AUTHORITY - CONTRACT, DRAFT, OR ORDER NUMBER (150-20) NPH-0000										18. EXPORT OR IMPORT TRANSFER (A. LICENSE NO. (222-21)) B. U.S. PORT (217-219) (232-234)																			
17. MATERIAL TYPE AND DESCRIPTION Enriched Uranium - Irradiated MSRE Elements										19. IC-2850																			
21. A. MISCELLANEOUS BCL Trailer No.: 000000 W/seals Nos.: 000 and 001										B. Consign Note Attached Yes <input type="checkbox"/> No <input type="checkbox"/> C. Consign Note Attached Yes <input type="checkbox"/> No <input type="checkbox"/>																			
20. TRANSPORTATION PROFILE										22. TOTAL GROSS WEIGHT (457-58) 23,000										23. TOTAL VOLUME (Volume Transported) (467-51)									

LINE NO. (20-21)	TYPE (22-23)	IDENTIFICATION (24-26)	NO. OF ITEMS (27-28)	PROJECT (29-31)	DATE (32-33)	COMP. FACILITY CODE (34-35)	FORM (36-37)	COUNTRY CONTROL NUMBER (38-40)	REV. NO. AS POINT (41-42)	IRAS (43-44)	GROSS WEIGHT (45-46)	NET WEIGHT (47-48)	ELEMENT WEIGHT (49-50)	ELEMENT NO. OF ORDER (51-52)	WEIGHT % (53-54)	LENGTH AS F. (55-56)	HEIGHT AS F. (57-58)
01		182-1	1	FKC010202H	20	385	G	USUS0000					2008.00	±23	83.86	1684.00	±27
02		182-0	1	FKC010202H	20	385	G	USUS0000					5820.00	±45	87.06	5067.00	±52
24. SHIPPER'S DATA Container No.: 9S-23-176																	

24. SHIPPER'S DATA SIGNATURE OF AUTHORIZED OFFICIAL AND DATE SIGNED (See instructions for processing reporting requirements)										25. RECEIVER'S DATA SIGNATURE OF AUTHORIZED OFFICIAL AND DATE SIGNED (See instructions for processing reporting requirements)									
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18 U.S.C. SECTION 1001, ACT OF JUNE 25, 1949 (52 STAT. 38) MAKES IT A CRIMINAL OFFENSE TO MAKE A KNOWINGLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

Fig. C.1. Sample of nuclear material transaction report - irradiated reactor fuel elements.

DOE/NRC FORM 741

(7-88) Previous editions are obsolete.
 MANDATORY DATA COLLECTION
 AUTHORIZED BY 10 CFR 26, 40, 50, 70,
 75, 100, Public Laws 93-703, 93-438, 98-51

U.S. DEPARTMENT OF ENERGY AND U.S. NUCLEAR REGULATORY COMMISSION
 NUCLEAR MATERIAL TRANSACTION REPORT

Approved by OMB
 038-R0478
 Approved by GAO
 8-180226 (R0040)
 Expires 8-30-83

1 SHIPPER'S R#	2 RECEIVER'S R#	3 TRANSACTION R#	4 CORRECTION R#	5 PROCESSING CODE	6 OBSERVED	7 ACTION CODE	8 DATA CODE	DOCUMENTATION (Only if document is classified SECRET)				
XOB	XOA	1001		SHIPPER A RECEIVER	SHIPPER A RECEIVER			PAGE 1 OF 1 PAGES COPY OF 8 COPIES SERIES				
9 A. NAME AND ADDRESS OF SHIPPER ABC Company 1000 Stokie Boulevard Willmette, IL 60091 C ATTENTION I. M. Hipp D TELEPHONE (312) 700-1000		9 B. LICENSE NO. SNM-0000		10 A. NAME AND ADDRESS OF RECEIVER XYZ Company Foggy Bottom Road Yallambie Victoria 3085 C ATTENTION AUSTRALIA D TELEPHONE		10 B. LICENSE NO.		11 NO. OF DATA LINES 1120 251 01	12 NATURE OF TRANSACTION 1121 E	13 A. SHIPPED FOR ACCOUNT OF B R# 1123 301	14 A. SHIPPED TO ACCOUNT OF B R# 1127 301	15 DISTRIBUTION OF COPIES 1 KOA-X00 2 KOA 3 KOA-FAA 4 FAA 5 KOA-RAA 6 RAA 7 X00 8 PROD ACCTG
16. TRANSFER AUTHORITY - CONTRACT, BIL DRAFT, OR ORDER NUMBER 1124-00 S-AU-102				16. EXPORT OR IMPORT TRANSFER A LICENSE NO. 3122 311 SED-FA-000 B U.S. PORT ENTRY 312 301 5401								
17. MATERIAL TYPE AND DESCRIPTION Depleted Uranium - U ₃ O ₈				17. UC-0000				18 TRANSPORTATION PROFILE		19 PACKAGE IDENTIFICATION		20 ACTION DATE
								A CARRIER IDENTIFICATION		B NUMBER		MONTH DAY YEAR 1186 111 1126 75
								1 3136 301 FDE 3140-461 37701 4122 751 7A 4126 201 1		A SHIPMENT		01
								2 3143-481 FDE 3149 521 38130 4123 251		B SHIPPER'S CORRECTION		
								3 3154 571 FDE 3160-621 20001 4126 201		C RECEIPT		
								4 3163-061 QUANT 3167 711		D RECEIVER'S MEASUREMENT		
								5 3172 751		E RECEIVER'S CORRECTION		
				22 TOTAL GROSS WEIGHT 657 00 2				23 TOTAL VOLUME (where Transfer Only) 6167 751				
21. A. MISCELLANEOUS Reference: 00000												

LINE NO. 216 (1-2)	LINE OF NO. 218 (3-4)	IDENTIFICATION (BATCH NAME) 219 301 C	NO. OF TRAYS 218-221 D	PROJECT NUMBER 218-221 E	DATE THIS TYPE 218-221 F	CONTR. FACILITY CODE 218-221 G	PROCESS NUMBER 218-221 H	COUNTRY CONTROL NUMBER 218-221 I	KEY 218-221 J	REAS IDENT 218-221 K	GROSS WEIGHT 218-221 L	NET WEIGHT 218-221 M	ELEMENT WEIGHT 218-221 N	ELEMENT WEIGHT OF ERROR 218-221 O	WEIGHT % 218-221 P	ISOTOPE AS TRAY 218-221 Q	ISOTOPE 218-221 R	24 SHIPPER'S DATA	
																			25 SHIPPER'S DATA
01		U38169 CR	1	FKC0100003	10	455	G	USUS0000								0.006		*	
		U-238: 99.993																	
																			Non-returnable container

18 U.S.C. SECTION 1861, ACT OF JUNE 25, 1948 (52 STAT. 349) MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLIULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

U.S. Government Printing Office: 1981-261-075/1011

Fig. C.2. Sample of nuclear material transaction report - depleted uranium.

DOE/ERC FORM 761
 (7-88) Previous editions are obsolete.
 MANDATORY DATA COLLECTION
 AUTHORIZED BY 10 CFR 30, 40, 60, 70,
 78, 100, Public Laws 93-703, 93-428, 98-91

U.S. DEPARTMENT OF ENERGY AND U.S. NUCLEAR REGULATORY COMMISSION
 NUCLEAR MATERIAL TRANSACTION REPORT

Approved by OMB
 038-P0478
 Approved by GAO
 B-180725 (R0040)
 Expires 8-30-83

1 SHIPPER'S RITE (1-4)	2 RECEIVER'S RITE (1-4)	3 TRANSACTION NO (1-14)	4 CORRECTION NO (1-14)	5 PROCESSING CODE (1-14)	6 RESERVED (1-17)	7 ACTION CODE (1-18)	8 DATA CODE (1-19)	DOCUMENTATION (2-1) (2-2) (2-3) (2-4) (2-5) (2-6) (2-7) (2-8) (2-9) (2-10) (2-11) (2-12) (2-13) (2-14) (2-15) (2-16) (2-17) (2-18) (2-19) (2-20) (2-21) (2-22) (2-23) (2-24) (2-25) (2-26) (2-27) (2-28) (2-29) (2-30) (2-31) (2-32) (2-33) (2-34) (2-35) (2-36) (2-37) (2-38) (2-39) (2-40) (2-41) (2-42) (2-43) (2-44) (2-45) (2-46) (2-47) (2-48) (2-49) (2-50) (2-51) (2-52) (2-53) (2-54) (2-55) (2-56) (2-57) (2-58) (2-59) (2-60) (2-61) (2-62) (2-63) (2-64) (2-65) (2-66) (2-67) (2-68) (2-69) (2-70) (2-71) (2-72) (2-73) (2-74) (2-75) (2-76) (2-77) (2-78) (2-79) (2-80) (2-81) (2-82) (2-83) (2-84) (2-85) (2-86) (2-87) (2-88) (2-89) (2-90) (2-91) (2-92) (2-93) (2-94) (2-95) (2-96) (2-97) (2-98) (2-99) (2-100)	PAGE 1 of 1 PAGES	COPY of 6 COPIES	SERIES													
9 A NAME AND ADDRESS OF SHIPPER Bear Creek Laboratory P.O. Box Z Wheat, TN 37800 C ATTENTION J. T. Jones D TELEPHONE FTS 555-1212		10 A NAME AND ADDRESS OF RECEIVER Quality Research Corporation 1234 Romanoff Road Dayton, OH 45400 C ATTENTION J. J. Doe D TELEPHONE		11 NO OF DATA LINES (1-20) 03		12 NATURE OF TRANSACTION (1-22)		13 A SHIPPED FOR ACCOUNT OF (1-23) (1-24) (1-25) (1-26) (1-27) (1-28) (1-29) (1-30) (1-31) (1-32) (1-33) (1-34) (1-35) (1-36) (1-37) (1-38) (1-39) (1-40) (1-41) (1-42) (1-43) (1-44) (1-45) (1-46) (1-47) (1-48) (1-49) (1-50) (1-51) (1-52) (1-53) (1-54) (1-55) (1-56) (1-57) (1-58) (1-59) (1-60) (1-61) (1-62) (1-63) (1-64) (1-65) (1-66) (1-67) (1-68) (1-69) (1-70) (1-71) (1-72) (1-73) (1-74) (1-75) (1-76) (1-77) (1-78) (1-79) (1-80) (1-81) (1-82) (1-83) (1-84) (1-85) (1-86) (1-87) (1-88) (1-89) (1-90) (1-91) (1-92) (1-93) (1-94) (1-95) (1-96) (1-97) (1-98) (1-99) (1-100)					14 A SHIPPED TO ACCOUNT OF (1-23) (1-24) (1-25) (1-26) (1-27) (1-28) (1-29) (1-30) (1-31) (1-32) (1-33) (1-34) (1-35) (1-36) (1-37) (1-38) (1-39) (1-40) (1-41) (1-42) (1-43) (1-44) (1-45) (1-46) (1-47) (1-48) (1-49) (1-50) (1-51) (1-52) (1-53) (1-54) (1-55) (1-56) (1-57) (1-58) (1-59) (1-60) (1-61) (1-62) (1-63) (1-64) (1-65) (1-66) (1-67) (1-68) (1-69) (1-70) (1-71) (1-72) (1-73) (1-74) (1-75) (1-76) (1-77) (1-78) (1-79) (1-80) (1-81) (1-82) (1-83) (1-84) (1-85) (1-86) (1-87) (1-88) (1-89) (1-90) (1-91) (1-92) (1-93) (1-94) (1-95) (1-96) (1-97) (1-98) (1-99) (1-100)		15 TRANSFER AUTHORITY - CONTRACT, NO DRAFT, OR ORDER NUMBER (1-20) D111011		16 EXPORT OR IMPORT TRANSFER A LICENSE NO (1-22) 311		17 MATERIAL TYPE AND DESCRIPTION Americium-241 - Oxide IC-3402		18 EXPORT OR IMPORT TRANSFER B U.S. PORT OF ENTRY (1-22) 311		19 DISTRIBUTION OF COPIES	
21 A MISCELLANEOUS Cont. No. Seal No. Cont. No. Seal No. 6M-156 00001 6M-102 00004 6M-159 00002 6M-122 00005		22 TOTAL GROSS WEIGHT (1-27) 385		23 TOTAL VOLUME (1-28) 15		24 CARRIER IDENTIFICATION (1-29) (1-30) (1-31) (1-32) (1-33) (1-34) (1-35) (1-36) (1-37) (1-38) (1-39) (1-40) (1-41) (1-42) (1-43) (1-44) (1-45) (1-46) (1-47) (1-48) (1-49) (1-50) (1-51) (1-52) (1-53) (1-54) (1-55) (1-56) (1-57) (1-58) (1-59) (1-60) (1-61) (1-62) (1-63) (1-64) (1-65) (1-66) (1-67) (1-68) (1-69) (1-70) (1-71) (1-72) (1-73) (1-74) (1-75) (1-76) (1-77) (1-78) (1-79) (1-80) (1-81) (1-82) (1-83) (1-84) (1-85) (1-86) (1-87) (1-88) (1-89) (1-90) (1-91) (1-92) (1-93) (1-94) (1-95) (1-96) (1-97) (1-98) (1-99) (1-100)		25 ACTION DATE (1-29) (1-30) (1-31) (1-32) (1-33) (1-34) (1-35) (1-36) (1-37) (1-38) (1-39) (1-40) (1-41) (1-42) (1-43) (1-44) (1-45) (1-46) (1-47) (1-48) (1-49) (1-50) (1-51) (1-52) (1-53) (1-54) (1-55) (1-56) (1-57) (1-58) (1-59) (1-60) (1-61) (1-62) (1-63) (1-64) (1-65) (1-66) (1-67) (1-68) (1-69) (1-70) (1-71) (1-72) (1-73) (1-74) (1-75) (1-76) (1-77) (1-78) (1-79) (1-80) (1-81) (1-82) (1-83) (1-84) (1-85) (1-86) (1-87) (1-88) (1-89) (1-90) (1-91) (1-92) (1-93) (1-94) (1-95) (1-96) (1-97) (1-98) (1-99) (1-100)		26 SHIPPER'S CORRECTION (1-29) (1-30) (1-31) (1-32) (1-33) (1-34) (1-35) (1-36) (1-37) (1-38) (1-39) (1-40) (1-41) (1-42) (1-43) (1-44) (1-45) (1-46) (1-47) (1-48) (1-49) (1-50) (1-51) (1-52) (1-53) (1-54) (1-55) (1-56) (1-57) (1-58) (1-59) (1-60) (1-61) (1-62) (1-63) (1-64) (1-65) (1-66) (1-67) (1-68) (1-69) (1-70) (1-71) (1-72) (1-73) (1-74) (1-75) (1-76) (1-77) (1-78) (1-79) (1-80) (1-81) (1-82) (1-83) (1-84) (1-85) (1-86) (1-87) (1-88) (1-89) (1-90) (1-91) (1-92) (1-93) (1-94) (1-95) (1-96) (1-97) (1-98) (1-99) (1-100)		27 RECEIVER'S CORRECTION (1-29) (1-30) (1-31) (1-32) (1-33) (1-34) (1-35) (1-36) (1-37) (1-38) (1-39) (1-40) (1-41) (1-42) (1-43) (1-44) (1-45) (1-46) (1-47) (1-48) (1-49) (1-50) (1-51) (1-52) (1-53) (1-54) (1-55) (1-56) (1-57) (1-58) (1-59) (1-60) (1-61) (1-62) (1-63) (1-64) (1-65) (1-66) (1-67) (1-68) (1-69) (1-70) (1-71) (1-72) (1-73) (1-74) (1-75) (1-76) (1-77) (1-78) (1-79) (1-80) (1-81) (1-82) (1-83) (1-84) (1-85) (1-86) (1-87) (1-88) (1-89) (1-90) (1-91) (1-92) (1-93) (1-94) (1-95) (1-96) (1-97) (1-98) (1-99) (1-100)		28 RECEIVER'S MEASUREMENT (1-29) (1-30) (1-31) (1-32) (1-33) (1-34) (1-35) (1-36) (1-37) (1-38) (1-39) (1-40) (1-41) (1-42) (1-43) (1-44) (1-45) (1-46) (1-47) (1-48) (1-49) (1-50) (1-51) (1-52) (1-53) (1-54) (1-55) (1-56) (1-57) (1-58) (1-59) (1-60) (1-61) (1-62) (1-63) (1-64) (1-65) (1-66) (1-67) (1-68) (1-69) (1-70) (1-71) (1-72) (1-73) (1-74) (1-75) (1-76) (1-77) (1-78) (1-79) (1-80) (1-81) (1-82) (1-83) (1-84) (1-85) (1-86) (1-87) (1-88) (1-89) (1-90) (1-91) (1-92) (1-93) (1-94) (1-95) (1-96) (1-97) (1-98) (1-99) (1-100)		29 RECEIVER'S CORRECTION (1-29) (1-30) (1-31) (1-32) (1-33) (1-34) (1-35) (1-36) (1-37) (1-38) (1-39) (1-40) (1-41) (1-42) (1-43) (1-44) (1-45) (1-46) (1-47) (1-48) (1-49) (1-50) (1-51) (1-52) (1-53) (1-54) (1-55) (1-56) (1-57) (1-58) (1-59) (1-60) (1-61) (1-62) (1-63) (1-64) (1-65) (1-66) (1-67) (1-68) (1-69) (1-70) (1-71) (1-72) (1-73) (1-74) (1-75) (1-76) (1-77) (1-78) (1-79) (1-80) (1-81) (1-82) (1-83) (1-84) (1-85) (1-86) (1-87) (1-88) (1-89) (1-90) (1-91) (1-92) (1-93) (1-94) (1-95) (1-96) (1-97) (1-98) (1-99) (1-100)								

LINE NO	DATE	IDENTIFICATION (BRANCH NAME)	NO OF ITEMS	PROJECT NUMBER	SHIPPER'S CODE	COMPL CODE	COUNTRY CONTROL NUMBER	REV	BLAS IDENT	GROSS WEIGHT	NET WEIGHT	ELEMENT WEIGHT	ELEMENT NO. OF GROUP	WEIGHT	SIGNATURE	DATE	SIGNATURE	DATE	
																			SHIPPER'S DATA
01		79AMB-2	6	FKC028100A	44	454	G					150.00	±8						
02		AMP-58	5	FKC028100A	44	454	G					110.00	±6						
03		79AMB-3	4	FKC028100A	44	454	G					100.00	±5						

18 U.S.C. SECTION 1001, ACT OF JUNE 25, 1908, AS AMENDED, MAKES IT A CRIMINAL OFFENSE TO MAKE A WILLFULLY FALSE STATEMENT OR REPRESENTATION TO ANY DEPARTMENT OR AGENCY OF THE UNITED STATES AS TO ANY MATTER WITHIN ITS JURISDICTION.

U.S. Government Printing Office: 1981-341-073/1031

Fig. C.3. Sample of nuclear material transaction report - americium oxide.

**APPENDIX D: TOPICS FOR WHICH INFORMATION IS
AVAILABLE ON THE NMSS**

APPENDIX D: TOPICS FOR WHICH INFORMATION IS
AVAILABLE ON THE NMMSS

The following is a summary of the topics given in Table 1 about which information is needed. The description indicates the information on the topic that is available on the NMMSS.

D.1 Origin and destination

These are identified by an RIS code in blocks 1 and 2 of each Form 741. This RIS code is cross-referenced to a specific facility and location given by latitude and longitude. The approximate number of road or rail miles between the two sites can be easily determined.

D.2 Commodity

While the material type and description are given in block 17 of Form 741, this information is not transferred to the NMMSS and is, therefore, not available for recall. The material type and composition code given in columns D and E of block 24 are available, however. For the examples given in Appendix C, the codes refer to: enriched uranium fuel and target material to be entered into an aluminum recovery process, depleted uranium and other oxides product (other than dioxide), and americium-241 dioxide product.

D.3 Package Identification

The NMMSS identifies, in block 19, the type and number of packages used in the shipment. When DOE- or NRC-approved casks are used to ship spent fuel or other type-B quantities, their certificate numbers are given. When specification packages are used (see Figs. C.1 and C.2), they are identified as such.

D.4 Element/Isotope Weight

This information is given in columns L and N of block 24 on Form 741.

D.5 Transport Mode

This information is reported in considerable detail in block 18, Form 741. Figure C.1 indicates that this overseas shipment was picked up by federal express (FDE) and delivered to the Knoxville airport (Zip 37701); flown to Memphis (Zip 38130) by FDE; transferred at the airport and flown to Washington, DC (Zip 20001); then transferred to Qantas Air Lines for the flight to Australia. Five transfer points can be identified.

D.6 Transport Mileage

This information is not given, but it can be estimated from the origin and destination codes given in blocks 1 and 2 of Form 741. A more accurate mileage figure could be determined if the intermediate transfer points were accounted for in the calculation; for example, the shipment described in Fig. C.1 moved from Knoxville to Memphis and back to Washington, DC before being sent overseas.

D.7 Physical and Chemical Form

Neither the physical nor chemical form is given explicitly on Form 741. They can be inferred, however, from the material type and composition codes discussed in Sect. C.2.

D.8 Transport Index

This information is not reported on Form 741.

D.9 Curies per Package

This number is not given explicitly on Form 741. However, for shipments of radioisotopes, the curies per shipment can frequently be calculated if the weight of the isotope is given (as it is for all except trace quantities). If the specific activity of the isotope is known, the number of curies can be determined automatically.

D.10 Radionuclide

This is identified in the same manner as the commodity (see Sect. D.2.

D.11 Packages per Shipment

This information can be obtained by looking at the transportation profile, block 18, and the package identification data, block 19 on Form 741.

D.12 Port of Entry/Exit

This information is reported on Form 741 in block 16 B.

D.13 Sole-Use Vehicles

If a sole-use vehicle is required, it will be shown on Form 741, but the information is not presently transferred into the TSDB.

D.14 Material Use

Ultimate use is not given explicitly on the form, and for some of the shipments identified in the NMSS, the end use would be classified information.

D.15 Routing Information

As many as five different transfer points are defined in the transportation profile, block 18 on Form 741.