5811

SAND77-0735 - Supplement A

Unlimited Release

A Materials Information Data Bank

Keith E. Mead

Sandia Laboratories

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A MATERIALS INFORMATION DATA BANK

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ABSTRACT

This supplement to SAND77-0735 is a working paper describing in detail the procedures for entering and retrieving information from the Materials Information Data Bank.

CONTENTS

		Page
I	INTRODUCTION	7
	Purpose	7
II	OPERATIONAL PROCEDURE	7
	Preparation of Input Information	7
	Procedure for Entry of Information	8
	Materials Numbering System	8
	Procedure for Information Retrieval	9
APPENDIX A - Examples of Information Retrieval Routines		17
APPENDIX B - Materials Information Data Bank System		31

TABLES

Table		Page
I	Guide to Recording a NEW MATERIAL RECORD	11
II	Guide to Recording ADDITIONS TO DATA IN FILE	13
III	Guide to Recording the TEST SUMMARY RECORD	15
IV	Information Retrieval Routines	16
A-1	Query Options	19
A-2	DUMPALL	20
A-3	DUMPIT	21
A-4	DUMPAIR	22
A-5	ALLNAME	23
A-6	Batch Output ALLBAD-1	24
A-7	ALLBAD-2	25
A-8	ALLAPPL	26
A-9	DUMPCAT	27
A-10	DUMPUSE	28
A-11	DUMPAPL	29
B-1	Material Information Data Bank Systems Procedure	34

ILLUSTRATIONS

Figure		Page
1	Sample Entries: NEW MATERIAL RECORD - SA7195-VFC(12-77)	10
2	Sample Entries: ADDITIONS TO DATA IN FILE - SA7195-VFB(2-78)	12
3	Sample Entries: TEST SUMMARY RECORD - SA7195-VFB(2-78)	14
B-1	MCSIS Data Input Flow Chart	33

A MATERIALS INFORMATION DATA BANK

I. INTRODUCTION

Purpose

To assist in materials selection, a computerized materials data bank has been established. In addition to references on personnel and documents, this data bank provides annotated information on materials so that the designer and materials engineer can draw on it for guidance in selecting materials. The primary purpose of the data bank is to provide materials compatibility data. However, the structure of the system permits the data bank to be used for storage and retrieval of general materials information.

II. OPERATIONAL PROCEDURE

Preparation of Input Information

Input information is prepared by entering appropriate data into two Sandia forms. They are:

1. SA7195-VFC (12-77) NEW MATERIAL RECORD (prepared only by the Materials Laboratory)

2. SA7195-VFB (2-78) TEST SUMMARY RECORD and ADDITIONS TO DATA IN FILE (prepared by the test engineer or author)

These forms have entry level numbers in the first column of each representation of an IBM card. These entry level numbers are referred to in subsequent explanations of procedure. For convenience, instructions for preparing the forms are printed on the page opposing the respective sample form shown later is this document.

For each unique materials tested, one-time entries are made into the bank with NEW MATERIAL RECORDS (Figure 1). These records are prepared only by Materials Laboratory personnel. The first column of each IBM card contains the entry number. The second column contains the card number for that entry. The third column contains a control for inputting new information or for correcting existing information. Information placed in the bank by this record includes four entry levels, material name and synonyms, material category, material contents, and, where applicable, material formula.

Each NEW MATERIAL RECORD is coordinated by means of a reference number assigned to that material by the Materials Laboratory, e.g., M05502. All information that has any bearing on that material is controlled and correlated in the bank by this reference number and need not be entered again no matter how many other entries are subsequently made.

Each time a material is subjected to a test, an entry is made, using the form for ADDITIONS TO DATA IN FILE, entry level No. 5 (Figure 2). This entry is correlated with the reference number assigned that material by the Materials Laboratory. Information entered in this form consists of the material application, material use or form, and the test reference number. This number coordinates entry No. 5 with entry No. 6, TEST SUMMARY RECORD, which is an abstract of test information. A sample of TEST SUMMARY RECORD is shown in Figure 3.

Procedure for Entry of Information

When a compatibility test or a single material evaluation is completed, an entry(s) describing the test is made into the bank. This information is provided by the test engineer who prepares the TEST SUMMARY RECORD, entries 6-1 through 6-5 (Figure 3). Detailed instruction for the preparation of input information are given in a table on the page opposite the appropriate sample entry (Tables I, II, and III). The test engineer also prepares ADDITIONS TO DATA IN FILE, entries 5-1 through 5-n (n is the total number of materials involved in the test). If the materials are either all compatible or all incompatible, only a single TEST SUMMARY RECORD is required. However, if some are compatible and others incompatible, then a TEST SUMMARY RECORD is required for each set, one for the compatible and another for the incompatible materials.

Prepared TEST SUMMARY RECORD forms along with a copy of the documented data are submitted to compatibility coordinators of an interested organization. They review the data, assign a unique test reference document number to each TEST SUMMARY RECORD, and enter material numbers. These numbers are used by the bank to coordinate and control all information on that particular test. NEW MATERIAL RECORDS, as required by materials listed on the ADDITIONS TO DATA IN FILE form, are prepared by the Materials Laboratory. The data is then submitted to the Data Operations Division 9626 who prepare IBM cards for batch entry into the bank.

Materials Numbering System

All material numbers are prefixed with M and have five digits (Mxxxx1). NEW MATERIAL RECORD forms can be prepared either at the time of need or ahead of time. The number is assigned to a material on this form. NEW MATERIAL RECORDS are prepared by Materials Laboratory specialists in the various material disciplines. To provide open-ended freedom to

assign numbers, material reference numbers are given to the various disciplines in blocks. This system provides for 200 material categories with 500 names to the category. The blocks are:

1.	Metal	1 to 20, 000 or 40 possible categories
2.	Organic Materials	20, 001 to 40, 000
3.	Ceramics	40, 0001 to 60, 000
4.	Available	60, 001 to 99, 999

Procedure for Information Retrieval

During the early life of the data bank, retrieval will be by request through compatibility coordinators. As data becomes extensive and the probability of retrieving useful information increases along with confidence in the program, direct retrieval by engineers will be permitted.

Retrieval will be either interactive for small amounts of information or batch for more lengthy output. Information retrieved from the data bank should be interpreted cautiously. A reference indicating that materials are either compatible or incompatible represents the conclusion of the test engineer and then only under the conditions and environment of his test. Interpreting information with respect to particular needs may require consulting with Materials Laboratory personnel.

Table IV is a listing of information retrieval routines. The programs are listed in the order of priority which has been established for developing the data bank. The list provides a versatile set of routines for directing retrieval toward either broad or specific interests. All routines listed in this table are currently functional. Examples of retrieved information are included in Appendix A. Appendix B contains a flow chart for input of data. Also included is a detailed list of the sequence of input events showing who has the responsibility to complete each necessary step.

date:

to: Materials Compatibility Coordinating Group (MCCG) - 5810

from:

re: New Material Record (one-time entry)

Test Report Title
and Date: 4/20/77

Please note that shaded areas are for MCCG use.
Complete instructions for entries are printed on reverse side.

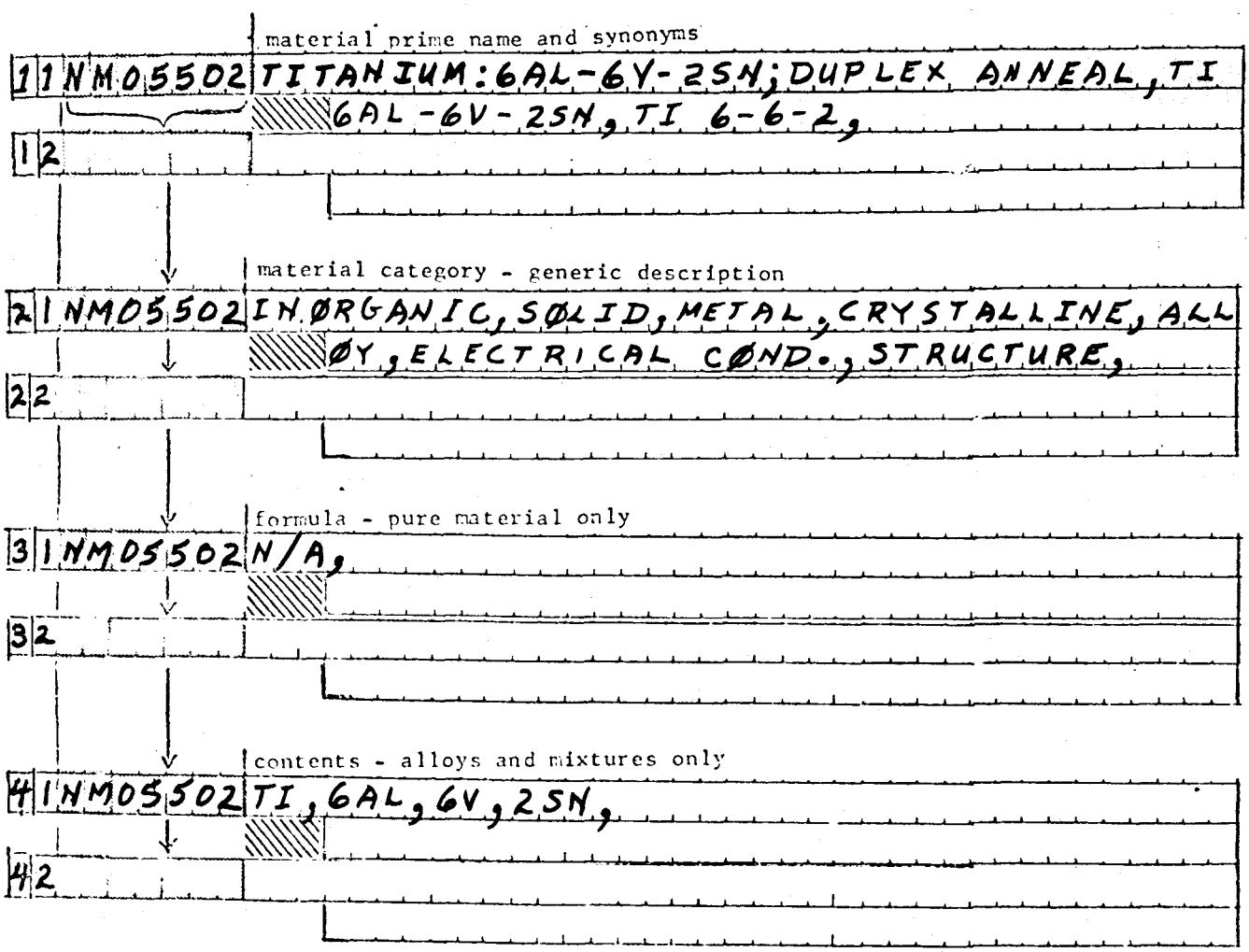

Figure 1. Sample Entries: NEW MATERIAL RECORD

SA7195-VFC(12-77)

TABLE I

Guide to Recording a NEW MATERIAL RECORD

A. General Instructions

1. Start the data in the left most column of the field.
2. A name may consist of one or more words with a single space between words but the total number of characters in a name may not exceed 40.
3. When entering a series of names or terms in a field, separate them with a comma but do not leave a space after the comma.
4. Enter a comma after the last character in each field.

B. Specific Instructions - 1st ENTRY - Material prime name and synonyms

1. The name is to be definitive; the name and following synonyms must end with a comma. All commonly used synonyms should be entered as space permits.
2. The name may be divided into a maximum of three parts by a colon and a semicolon so that multiple level searching is practical (see TEST SUMMARY RECORD).

Examples:	Name	Synonyms
(1)	ALUMINUM:7075;T7351,	AL7075, 7075AL,
(2)	SILICØNE:GE RTV 610,	GE 610, RTV 610,
(3)	EPØXY:EPØN 828 Z;3M GMB,	EPØN 828 Z/GMB,

2nd ENTRY - Generic name, material category - generic description. This entry permits searching by generic characteristics.

This entry is to include as many of the names from the following lists as necessary to completely describe the material. Additional descriptors are sought.

Generic Names

Organic	Polymer	Elastomer
Inorganic	Compound	Thermoset
Organometallic	Metal	Thermoplastic
	Ceramic	
	Glass-ceramic	
	Glass	

Generic Form or Physical Characteristic

Gas	Crystalline	Pure
Liquid	Foam	Mixture
Solid	Film	Alloy
	Composite	
	Glass	

Generic Function

Catalyst	Molding	Coating
Adhesive	Thermal Ins.	Electroplate
Laminate	Thermal Cond.	Electrolessplate
Structure	Electrical Ins.	Evaporative
Lubricant	Electrical Cond.	Dip
Coolant	Sealant	Spray
	Potting	Casting

The following examples relate to the names above: (Note that each entry must end with a comma.)

(1) INØRGANIC, METAL, SØLID, ALLØY, STRUCTURE, ELECTRICAL CØND,
(2) ØRGANIC, PØLYMER, ELASTØMER, SØLID, MIXTURE, ELECTRICAL INS., PØTTING, CASTING,
(3) ØRGANIC, PØLYMER, THERMØSET, SØLID, MIXTURE, PØTTING, ELECTRICAL INS., ADHESIVE, SEALANT,

3rd ENTRY - Formula

1. Enter the chemistry of pure materials

Example: Sucrose $C_{12}H_{22}O_{11}$ must be entered C12-H22-Ø11

Note: When not applicable, as for the name examples above, enter N/A.

4th ENTRY - Material Contents

1. Enter the chemistry or ingredients of mixtures and alloys.
The following examples relate to the prime name and categories above; each entry must end with a comma.

(1) AL, 1.6CU, 2.5MG, 0.2MN, 5.6ZN, 0.3CR,
(2) PØLYDIMETHYL SILØXANE VINYL TERMINATED, METHYL HYDRØGEN, SILØXANE, CHLØRØPLATINIC ACID, FILLER,
(3) DIGLYCIDAL ETHER BISPHENØL A, M-PHENYLENE DIAMINE, METHYLENE DIANILINE, SILICA, SIØ2,

date:

to: Materials Compatibility Coordinating Group (MCCG) - 5810

from:

re: Test Reference Additions to Data in File. Sheet 1 of 1

Test report title and date: B77 Structural Design & Materials Review Meeting, Sept. 8-10, 1976

Please note that shaded areas are for MCCG use.
Complete instructions for entries are printed on reverse side.

1. Material name: TITANIUM:6AL-6V-2SN;DUPLEX ANNEAL,

material number	test reference number: yr	mo	da	+	MCCG USE ONLY	material application (final assy, subassy)
51NM05502R	770329	C	C	MN	W77,	

form or functional use of the material as tested: MID CASE,

2. Material name: NICKEL

51NM04501 | Keypunch: repeat from entry for material no. 1.

form or functional use of the material as tested: WIRE

3. Material name: STAINLESS STEEL:304;0.5H,

51NM01001 | keypunch: repeat from entry for material no. 1.

form or functional use of the material as tested: RØD,

4. Material name: GØLD,

51NM07001 | keypunch: repeat from entry for material no. 1.

form or functional use of the material as tested:

5. Material name: COPPER,

51NM07003 | keypunch: repeat from entry for material no. 1.

form or functional use of the material as tested:

6. Material name: IRØN:9NI-4CØ-0.2C,

51NM00002 | keypunch: repeat from entry for material no. 1.

form or functional use of the material as tested: SHEET,

Figure 2. Sample Entries: ADDITIONS TO DATA IN FILE

SA7195-VFB(2-78)

TABLE II

Guide to Recording ADDITIONS TO DATA IN FILE

A. General Instructions

1. Prepare this form after the TEST SUMMARY RECORD is prepared.

2. Start the data in the left most column of each field.

3. A name may consist of one or more words with a single space between words but the total number of characters in a name may not exceed 40 (see NEW MATERIAL RECORD).

4. Enter a comma after the last character in each field.

B. Specific Instructions

1. On the numbered lines (1, 2, etc.) print all material names used in the test, one name per numbered line (as listed in the TEST SUMMARY RECORD). This entry is not computerized; it is used to assign the material record number.

2. The "test reference number" entries refer to the same entries on the TEST SUMMARY RECORD.

3. For "application" field, enter the weapon system or equipment title as the "final ass'y," end it with a comma, then enter the major component (MC) or other device name as "subass'y." (Note that this entry and the "test reference number" need be entered only once for the first material record entry, as it is the same for all materials in the test. It is entered for the records of the other tested materials during keypunching.)

4. The "form or functional use" field is a separate entry for each material tested and is intended to reflect the use or form of the material in this test. This description enables selective retrieval from the material record(s) of a list of materials by use or by form. Within the limit of the field length this entry may include one or more uses or forms but will be searchable for only one name at a time; each entry must end with a comma.

   Examples: (1) MØLDED STRUCTURE,
   (2) WIRE, SPRING,
   (3) PØWDER CØMPACT, BEARING,
   (4) RØLLED RING FØRGING,

date:

to: Materials Compatibility Coordinating Group (MCCG) - 5810

from:

re: Test Summary Record

Test Report Title and Date: B77 Structural Design & Materials Review Meeting, Sept. 8-10, 1976

Please note that shaded areas are for MCCG use.

Complete instructions for entries are printed on reverse side.

test reference number

	yr	mo	da	+	result	c/n/blank	type test	erda lab	org.	engineer (last name, first, initial)
61	N	R	7	70329	C	C	CMN	SLA	5831	PØHLMAN, S.L.,

Comment on test status.

45 PRELIM DESIGN

List each of the materials or conditions included in this test. Use the remaining space for comment(s) on test result.

62 TITANIUM:6AL-6V-2SN;DUPLEX ANNEAL

63 ,NICKEL,STAINLESS STEEL:304;0.5H

,GØLD:ELECTRØPLATE,CØPPER,IRØN:9N

I-4CØ-0.2C,

64 SALT SPRAY TEST IN 5 PCT NACL AT

32 DEG C,

65

Figure 3. Sample Entries: TEST SUMMARY RECORD

SA7195-VFB(2-78)

TABLE III

Guide to Recording the TEST SUMMARY RECORD
(Prepare this form first)

A. General Instructions. This data record is in IBM card format.

1. Start the data in the left most column of the field.
2. A name may consist of one or more words with a single space between words but the total number of characters in a name may not exceed 40.
3. When entering a series of names or terms in a field, separate them with a comma but do not leave a space after the comma.
4. Enter a comma after the last character in each field.

B. Specific Instructions

1. Test Reference Number. No entry is required in the shaded area.
   a. Enter the test results C, N, or leave it blank. Use a separate form for each of these entries.
      C - This record is for materials found to be compatible
      N - This record is for materials found to be incompatible
      Blank - Indicates a physical or mechanical property test of a single material (Test Type entry must be PRP)
   b. The last three columns define the type of test performed. Enter CMN, GRP, or PRP.
      CMN - A test involving a single material paired with one or more other materials. The material common to all MUST be the first listed in entry 6-2.
      GRP - A test of several materials together to determine their joint compatibility.
      PRP - A test of one material under one or more physical or mechanical conditions, e.g., temperature, stress, etc., to determine its limits of satisfactory service (Test result entry MUST be blank)
2. DOE Laboratory or Contractor - Enter the abbreviation for the appropriate laboratory. Left justify.
   Examples: SLL, SLA, LLL, LASL, GEND, BX, MD, Y-12, ØRNL
3. Organization - Enter organization number. Left justify.
4. Engineer - Enter last name followed by a comma and then initials. Left justify.
5. Comment on test status - This brief narrative entry (14 characters maximum) indicates the status of use of the material; each entry must end with a comma.
   Examples: (1) PRELIM DESIGN,
   (2) MATRL DEVELØP,
   (3) CYCLE 6 EVAL,
6. List of materials included in the test and comments on test results.
   a. Cards 6-2 through 6-5 - Enter the names of all materials in the test. For every test labeled CMN (see B.1.b above) the first material in entry 6-2 must be the common material.

      Each name is to be definitive. A name may be divided into a maximum of three parts by using a colon between the first and second part and a semicolon between the second and third part so that multiple level searching is practical; each name must end with a comma.
      Examples: (1) ALUMINUM:7075;T7351,
      (2) SILICØNE:GE TRV 610,
      (3) EPØXY:EPØN 828 Z;3M GMB,
   b. Upon completing 6.a. above, go to the next card and the remaining space (i.e., cards 6-3 through 6-5) may be used for an abstract of test results or warning regarding restrictions on material use.

TABLE IV

Information Retrieval Routines

Program Name	Priority	Program Function	Preg Mode*	Processing Frequency
FILEIT	1	Edit changes; update MCSIS data base; create backup magnetic tape.	B	Weekly
RESTORE	2	Recover MCSIS data base from backup magnetic.	B	As required
ALLDUMP	3	Dump entire MCSIS data base on printer.	I/B	As required
MENU	4	Provide menu of query programs with callup capabilities.	I	Daily
DUMPIT	5	For a specific material name, list one or more levels of information (including test summaries).	I	As required
DUMPAIR	6	For specific pairs of materials, retrieve common test summaries.	I	As required
DUMPNON	7	For specific material, list all associated noncompatible material and properties.	I	As required
ALLNAME	8	Generate a listing of all material prime names (alphabetic order) with associated material control number.	I/B	As required
ALLBAD-1	9	List by material prime name (alphabetic order) all nonconforming tests.	I/B	As required
ALLBAD-2	10	List all noncompatible tests (test reference number order) with associated material prime names.	I/B	As required
ALLAPPL	11	List all material prime names associated with each application.	I/B	As required
ALLTEST	12	List all test summaries in MCSIS data base (test reference number order).	/B	As required
DUMPCAT	13	For specific material category, list associated material names (alphabetic order).	I	As required
DUMPUSE	14	Given a specific material form or use, list all associated material names (alphabetic order).	I	As required
DUMPCON	15	Given a specific Content, list all materials (alphabetic order) containing that Contents.	I	As required
DUMPAPL	16	Given a specific application, list all associated material names (alphabetic order) and test reference numbers.	I	As required
DUMPTR	17	Given Lab/organization/engineer, list all associated test reference numbers.	I	As required

*B - Batch
I - Interactive
I/B - Initiate batch from I term

APPENDIX A

Examples of Information Retrieval Routines

TABLE A-1

Query Options

```
ENTER HELP FOR LISTING OF QUERY OPTIONS
ENTER QUERY OPTION NUMBER OR
LOGOFF TO TERMINATE
>HELP
 1= DUMPALL   (BATCH)
 2= DUMPIT   (INTERACTIVE)
 3= DUMPAIR   (INTERACTIVE)
 4= DUMPNON   (INTERACTIVE)
 5= ALLNAME   (BATCH)
 6= ALLBAD1    (BATCH)
 7= ALLBAD2    (BATCH)
 8= ALLAPPL    (BATCH)
 9= ALLTEST    (BATCH)
10= DUMPCAT    (INTERACTIVE)
11= DUMPUSE    (INTERACTIVE)
12= DUMPCON    (INTERACTIVE)
13= DUMPAPL    (INTERACTIVE)
14= DUMPTR     (INTERACTIVE)
ENTER QUERY OPTION NUMBER OR
LOGOFF TO TERMINATE
```

TABLE A-2

DUMPALL

A portion of the routine DUMPALL is reproduced here. It provides a listing of all six levels of information for each material and all references.

```
MC2501   1                    1     ALUMINUM:7075;T7351,7075AL,
         2                    1     INORGANIC,METAL,SOLID,CRYSTALLINE,ALLOY,STRUCTURE,ELECTRICAL COND.,
         3                    1     N/A
         4                    1     AL,1.6CU,2.5MG,0.2MN,5.6ZN,0.3CR,
         5  R770328ACCMN      1     WXX,                    AFT COVER SEAL,
         6  R770328ACCMN      1     SLA 5831 POHLMAN;S.L.,        DEVELOPMENT,  T,
                               2     ALUMINUM:7075;T7351,CADMIUM,
                               3     SALT SPRAY TEST IN 20 PCT NACL AT 32 DEG C,
         5  R770328ANCMN      1     WXX,                    AFT COVER SEAL,
         6  R770328ANCMN      1     SLA 5831 POHLMAN;S.L.,        DEVELOPMENT,  T,
                               2     ALUMINUM:7075;T7351,STAINLESS STEEL:304;0.5H,COPPER:2 PCT BE,GOLD
                               3     ,NICKEL,
                               4     SALT SPRAY TEST IN 20 PCT NACL AT 32 DEG C,
         5  R770329CNCMN      1     WYY,                    SHEET,
         6  R770329CNCMN      1     SLA 5831 POHLMAN;S.L.,        PRELIM DESIGN,IGN,
                               2     TITANIUM:6AL-6V-2SN;DUPLEX ANNEAL,ALUMINUM:7075;T7351,CADMIUM,
                               3     SALT SPRAY TEST IN 5 PCT NACL AT 32 DEG C,
MC2502   1                    1     ALUMINUM:6061;T6,
         2                    1     SOLID,METAL,INORGANIC,CRYSTALLINE,ALLOY,STRUCTURE,ELECTRICAL COND.,
         3                    1     N/A
         4                    1     AL,1.0MG,0.6SI,0.25CU,0.25CR,
         5  R770328BNCMN      1     WZZ,                    FIN ASSEMBLY,
         6  R770328BNCMN      1     SLA 5831 POHLMAN;S.L.,        PRELIM DESIGN,IGN,
                               2     ALUMINUM:6061;T6,STAINLESS STEEL:304;0.5H,
                               3     SALT SPRAY TEST 3.5 PCT NACL AT ROOM TEMPERATURE,
```

TABLE A-3

DUMPIT

The DUMPIT (dump item) routine provides up to six levels of information for the material of interest.

```
 DUMPIT ROUTINE STARTS HERE
ENTER 1 IF SELECTION IS TO BE ON MATERIAL NUMBER
ENTER 2 IF SELECTION IS TO BE ON MATERIAL NAME
>2
ENTER MATERIAL NAME
>NITROUS OXIDE
ENTER YES IF QUERY ENTRY IS OK
>YES
ENTER LEVELS OF INFORMATION REQUIRED
>136
ENTER YES IF QUERY ENTRY IS OK
>YES
IF TEKTRONIX TERMINAL HIT PAGE-ERASE AND RETURN KEY
IF TEXAS INST., HIT RETURN KEY
>
SELECTED MATERIAL NAME  =  NITROUS OXIDE

SELECTED MATERIAL NUMBER = M19506

  NAMES
NITROUS OXIDE
 FORMULA
N2-O,

TEST REFERENCE NO. = R770518ACGRP

ERDA LAB= PX    ORG= 2354   ENGINEER= LYLES,DON,
TEST STATUS= PRELIM DESIGN
CARBON DIOXIDE,ARGON,OXYGEN,NITROGEN,METHANE,HYDROGEN,
WXX COMPATIBILITY TEST,DATA ON MODELS CLOSED AND OPEN TO ATMOSP
HERE. ONE MONTH AT 32,50,60 DEG C. HIGHER TEMP SHOWS SOME NO2,

TEST REFERENCE NO. = R770518BCGRP

ERDA LAB= PX    ORG= 2354   ENGINEER= LYLES,DON,
TEST STATUS= PRELIM DESIGN
CARBON DIOXIDE,NITROUS OXIDE,ARGON,OXYGEN,NITROGEN,METHANE,CARB
◆◆
>
ON MONOXIDE,HYDROGEN,
ZERO TIME GAS ANALYSIS OF WXX COMPATIBILITY MODELS. OPEN AND CL
OSED TO ATMOSPHERE. START TEST AT AMBIENT PRESSURE,32,50,60 C,


ENTER YES IF MORE DUMPIT QUERIES
```

TABLE A-4

DUMPAIR

The DUMPAIR (dump pair) routine will list all references common to the two materials of interest.

```
ENTER YES IF MORE DUMPAIR QUERIES
>YES
ENTER 1 IF SELECTION IS TO BE ON MATERIAL NUMBER
ENTER 2 IF SELECTION IS TO BE ON MATERIAL NAME
>2
ENTER 1ST MATERIAL NAME
>10 VOL PCT NO2:AIR
ENTER 2ND MATERIAL NAME
>POLYARYLSULFONE
ENTER YES IF QUERY IS OK
>YES
IF TEKTRONIX TERMINAL HIT PAGE-ERASE AND RETURN KEY
IF TEXAS INST., HIT RETURN KEY
>

1ST SELECTED MATERIAL NUMBER = M19508
    10 VOL PCT NO2:AIR
2ND SELECTED MATERIAL NUMBER = M31504
    POLYARYLSULFONE:3M ASTREL 360

MATCHED TEST REFERENCE NO. = R770528BNCMN


ERDA LAB= SLA   ORG= 5811   ENGINEER= ARNOLD,C.JR.
TEST STATUS= PRELIM INVEST.
10 VOL PCT NO2:AIR,SILICONE:DC 3140,POLYAMIDE:NYLON 66,POLYFORM
ALDEHYDE:DELRIN,POLYIMIDE:KAPTON:DUPONT,
SILICONE DEGRADED IN 6 DAYS,NYLONDEGRADED IN 2 WKS,DELRIN DISSA
PPEARED IN 24 HRS AT RT,KAPTON EMBRITTLED AFTER 2WKS,

1ST SELECTED MATERIAL NUMBER = M19508
    10 VOL PCT NO2:AIR
2ND SELECTED MATERIAL NUMBER = M31504
    POLYARYLSULFONE:3M ASTREL 360

MATCHED TEST REFERENCE NO. = R770528DNCMN
++
>


ERDA LAB= SLA   ORG= 5811   ENGINEER= ARNOLD,C,JR.,
TEST STATUS= PRELIM INVEST,
10 VOL PCT NO2:AIR,POLYARYLSULFONE:ASTREL 360,
INCREASED MODULUS DECREASED STRENGTH AT 215C FOR 500 HOURS ALSO S
.URFACE DARKENING,


ENTER YES IF MORE DUMPAIR QUERIES
```

TABLE A-5

ALLNAME

ALLNAME routine provides an alphabetic listing of materials represented by the data bank. This routine automatically reproduces a numerical list of materials. The computer program recognizes only an exact spelling of a name.

ALPHABETIC LISTING OF MATERIAL PRIME NAME AND ASSOCIATED MATERIAL NUMBER

MATL NO.	PRIME NAMES
M28501	ADIPRENE:L100;MOCA
M19509	AGED WEAPON ATMOSPHERE:1
M02505	ALUMINUM:BORON;COMPOSITE
M02504	ALUMINUM:2024;0
M02502	ALUMINUM:6061;T6
M02503	ALUMINUM:7075;T7
M02501	ALUMINUM:7075;T7351
M19505	ARGON
M01501	CADMIUM:ELECTROPLATE
M19507	CARBON DIOXIDE
M19502	CARBON MONOXIDE
M03002	COPPER
M03001	COPPER:2 PCT BE
M07001	GOLD:ELECTROPLATE
M19501	HYDROGEN
M00001	IRON:A455 TYPE 1
M00003	IRON:H-11;MDD
M00002	IRON:9NI-4CO-0.2C
M20001	METHANE
M04501	NICKEL
M19503	NITROGEN
M19506	NITROUS OXIDE
M19504	OXYGEN
M31503	POLYAMIDE:NYLON;66
M31502	POLYAMIDE;NYLON;AMIDEL
M31504	POLYARYLSULFONE:3M ASTREL 360
M31501	POLYFORMALDEHYDE:DELRIN
M34501	POLYIMIDE:KAPTON;DUPONT
M29001	POLYSULFIDE:PR1221;THIOKOL
M32501	POLYVINYL CHLORIDE:PLASTICIZED
M28506	SILICONE:DC 12561
M28505	SILICONE:DC 3140
M01001	STAINLESS STEEL:304;0.5H
M05501	TITANIUM:6AL-4V
M05502	TITANIUM:6AL-6V-2SN;DUPLEX ANNEAL
M19508	10 VOL PCT NO2:AIR
M19510	10 VOL PCT NO2:HELIUM

TABLE A-6

Batch Output ALLBAD-1

The batch output shown here, ALLBAD 1, lists all references indicating an incompatibility for each material represented in the data bank.

REPORT OF NONCONFORMING TESTS BY PRIME MATERIAL NAME PAGE 1

MATL NO.	PRIME NAME	TEST REF. NO.
M19509	AGED WEAPON ATMOSPHERE:1	R770528BNGRP
M02504	ALUMINUM:2024;0	R770329ANCMN
M02502	ALUMINUM:6061;T6	R770328BNCMN
M02503	ALUMINUM:7075;T7	R770329ANCMN
M02501	ALUMINUM:7075;T7351	R770328ANCMN
		R770329CNCMN
M01501	CADMIUM:ELECTROPLATE	R770329ANCMN
		R770329CNCMN
M03001	COPPER:2 PCT BE	R770328ANCMN
M07001	GOLD:ELECTROPLATE	R770328ANCMN
M04501	NICKEL	R770328ANCMN
M31503	POLYAMIDE:NYLON;66	R770528BNCMN
M31504	POLYARYLSULFONE:3M ASTREL 360	R770528BNCMN
		R770528DNCMN
M31501	POLYFORMALDEHYDE:DELRIN	R770528BNCMN
		R770528BNGRP
M34501	POLYIMIDE:KAPTON;DUPONT	R770528BNCMN
M28505	SILICONE:DC 3140	R770528BNCMN
M01001	STAINLESS STEEL:304;0.5H	R770328ANCMN
		R770328BNCMN
M05501	TITANIUM:6AL-4V	R770329ANCMN
M05502	TITANIUM:6AL-6V-2SN;DUPLEX ANNEAL	R770329CNCMN
M19508	10 VOL PCT NO2:AIR	R770528BNCMN
		R770528CNCMN
		R770528DNCMN

TABLE A-7

ALLBAD-2

ALLBAD 2 routine lists all references indicating an incompatibility with a listing of all materials involved in the reference.

REPORT OF NONCONFORMING TESTS WITH ASSOCIATED PRIME MATERIAL NAMES

TEST REF. NO.	MATL NO.	PRIME NAME
R770328ANCMN	M02501	ALUMINUM:7075;T7351
	M03001	COPPER:2 PCT BE
	M07001	GOLD:ELECTROPLATE
	M04501	NICKEL
	M01001	STAINLESS STEEL:304;0.5H
R770328BNCMN	M02502	ALUMINUM:6061;T6
	M01001	STAINLESS STEEL:304;0.5H
R770329ANCMN	M02504	ALUMINUM:2024;0
	M02503	ALUMINUM:7075;T7
	M01501	CADMIUM:ELECTROPLATE
	M05501	TITANIUM:6AL-4V
R770329CNCMN	M02501	ALUMINUM:7075;T7351
	M01501	CADMIUM:ELECTROPLATE
	M05502	TITANIUM:6AL-6V-2SN;DUPLEX ANNEAL
R770528BNCMN	M31503	POLYAMIDE:NYLON;66
	M31504	POLYARYLSULFONE:3M ASTREL 360
	M31501	POLYFORMALDEHYDE:DELRIN
	M34501	POLYIMIDE:KAPTON;DUPONT
	M28505	SILICONE:DC 3140
	M19508	10 VOL PCT NO2:AIR
R770528BNGRP	M19509	AGED WEAPON ATMOSPHERE:1
	M31501	POLYFORMALDEHYDE:DELRIN
R770528CNCMN	M19508	10 VOL PCT NO2:AIR
R770528DNCMN	M31504	POLYARYLSULFONE:3M ASTREL 360
	M19508	10 VOL PCT NO2:AIR

TABLE A-8

ALLAPPL

ALLAPPL (all applications) routine lists each application represented by the data bank and a list of materials for which some information pertinent to that application has been entered in the data bank.

LISTING OF MATERIALS USED ON EACH APPLICATION

APPLICATION	MATL NO.	PRIME NAME
SOLAR TOTAL ENERGY SYSTEM	M01001	STAINLESS STEEL:304;0.5H
SST TRANSPORT TRAILOR	M07501	IRON:A455 TYPE 1
WXX	M02502	ALUMINUM:6061;T6
	M01001	STAINLESS STEEL:304;0.5H
WYY	M02501	ALUMINUM:7075;T7351
	M07002	CADMIUM
	M03001	COPPER:2 PCT BE
	M07001	GOLD
	M04501	NICKEL
	M01001	STAINLESS STEEL:304;0.5H
WZZ	M02505	ALUMINUM:BORON;COMPOSITE
	M02504	ALUMINUM:2024;0
	M02503	ALUMINUM:7075;T7
	M02501	ALUMINUM:7075;T7351
	M07002	CADMIUM
	M07003	COPPER
	M07001	GOLD
	M07502	IRON:9NI-4CO-0.2C
	M04501	NICKEL
	M01001	STAINLESS STEEL:304;0.5H
	M05501	TITANIUM:6AL-4V
	M05502	TITANIUM:6AL-6V-2SN;DUPLEX ANNEAL

TABLE A-9

DUMPCAT

The DUMPCAT (dump category) routine permits a query using up to three generic descriptors of a material. The descriptors used can be any combination generic names, forms, or functions.

```
ENTER YES IF MORE DUMPCAT QUERIES
>YES
ENTER GENERIC NAME
>SOLID
ENTER GENERIC FORM
>METAL
ENTER GENRIC FUNCTION
>ALLOY
ENTER YES IF QUERY IS OK
>YES
IF TEKTRONIX TERMINAL HIT PAGE-ERASE AND RETURN KEY
IF TEXAS INST.  HIT RETURN KEY
P>

GENERIC NAME SELECTED = SOLID
GENERIC FORM SELECTED = METAL
GENERIC FUNCTION SELECTED = ALLOY


ALUMINUM:2024:0                                M02504
ALUMINUM:6061:T6                               M02502
ALUMINUM:7075:T7                               M02503
ALUMINUM:7075:T7351                            M02501
TITANIUM:6AL-4V                                M05501
TITANIUM:6AL-6V-2SN:DUPLEX ANNEAL              M05502


ENTER YES IF MORE DUMPCAT QUERIES
```

TABLE A-10

DUMPUSE

The DUMPUSE routine will list all materials having a common form or functional use in entry level five.

```
ENTER YES IF MORE DUMPUSE QUERIES
>YES
ENTER FORM/USE NAME
>ENCXAPSULANT
ENTER YES IF QUERY IS OK
>
ENTER FORM/USE NAME
>ENCAPSULANT
ENTER YES IF QUERY IS OK
>YES
IF TEKTRONIX TERMINAL HIT PAGE-ERASE AND RETURN KEY
IF TEXAS INST.  HIT RETURN KEY
>


FORM/USE SELECTED = ENCAPSULANT


SILICONE:DC 12561                          M28506


ENTER YES IF MORE DUMPUSE QUERIES
```

TABLE A-11

DUMPAPL

DUMPAPL (dump applications) is an interactive routine for obtaining a materials list represented by a single application.

```
ENTER APPLICATION
>BXX
ENTER YES IF QUERY IS OK
>YES
IF TEKTRONIX TERMINAL HIT PAGE-ERASE AND RETURN KEY
IF TEXAS INST.  HIT RETURN KEY
>


APPLICATION SELECTED = BXX


ALUMINUM:BORON:COMPOSITE                    M02505
     R770329A PRP
ALUMINUM:2024:O                             M02504
     R770329ANCMN
ALUMINUM:7075:T7                            M02503
     R770329ANCMN
ALUMINUM:7075:T7351                         M02501
     R770329CNCMN
CADMIUM:ELECTROPLATE                        M01501
     R770329ANCMN
     R770329CNCMN
COPPER                                      M03002
     R770329ACCMN
     R770329CCCMN
GOLD:ELECTROPLATE                           M07001
     R770329ACCMN
     R770329CCCMN
◆◆
>
IRON:9NI-4CO-0.2C                           M00002
     R770329ACCMN
     R770329CCCMN
NICKEL                                      M04501
     R770329ACCMN
     R770329CCCMN
STAINLE$S STEEL:304:0.5H                    M01001
     R770329ACCMN
     R770329CCCMN
TITANIUM:6AL-4V                             M05501
     R770329ACCMN
     R770329ANCMN
TITANIUM:6AL-6V-2SN:DUPLEX ANNEAL           M05502
     R770329CCCMN
     R770329CNCMN
```

APPENDIX B

Materials Information Data Bank System
(Includes a Data Input Flow Chart and Systems Procedure)

MATERIALS INFORMATION DATA BANK GRID CHART

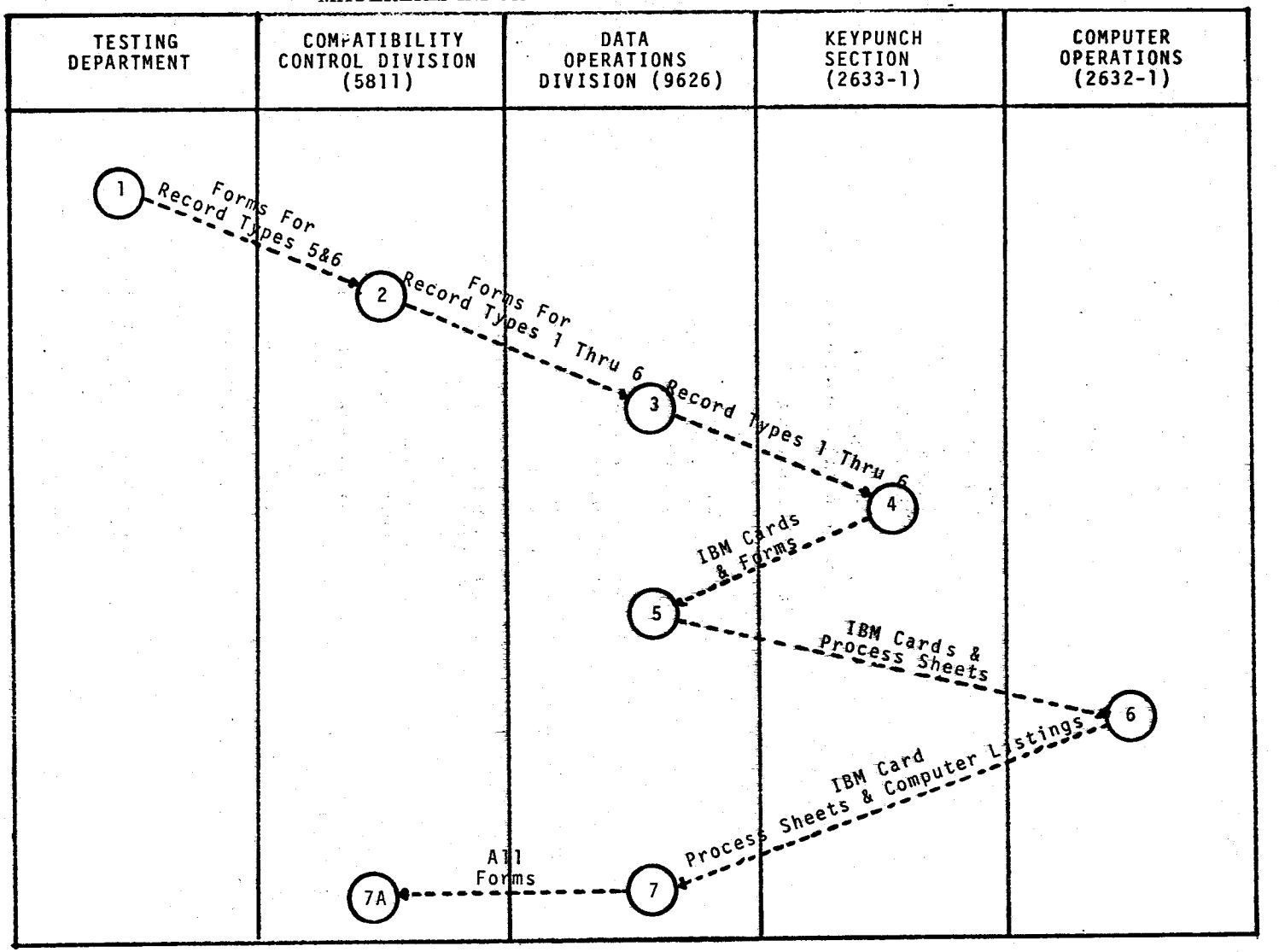

Figure B-1. MCSIS Data Input Flow Chart

TABLE B-1

Material Information Data Bank Systems Procedure **20 June 77**

Responsibility	Action
TEST ENGINEER	1. On completion of test, completes a copy of TEST SUMMARY RECORD form for all compatible materials and another copy for all incompatible materials. a. Fills in only the following data blocks: Test Result Test Type ERDA Lab Organization Engineer Name Test Status Material Names and/or Comments
	2. Completes ADDITIONS TO EXISTING MATERIAL RECORDS form for each material involved in the test. a. Fills in only the following data blocks: Test Result Test Type Material Application(s) Material Form or Use
	3. Attaches forms to a copy of the test report and forwards to compatibility clerk.
COMPATIBILITY CLERK	4. Verifies the TEST SUMMARY and ADDITIONS TO EXISTING MATERIALS RECORDS forms for completness and accuracy.
	5. Fills in material number on ADDITIONS TO EXISTING RECORDS form for each material name. a. If material name has not been assigned a material number, sends forms to compatibility coordinator.
COMPATIBILITY COORDINATOR	(1) Fills in NEW MATERIALS RECORD form for each new material name (record types 1 thru 4). (2) Returns forms to compatibility clerk.
COMPATIBILITY CLERK	6. Assigns new material numbers to new material names.
	7. Records new material number in log book.
	8. Assigns test reference document number to each TEST SUMMARY RECORD form (Record Type 6).
	9. Records same test reference document number on each associated ADDITIONS TO EXISTING RECORDS form (Record Type 5).

TABLE B-1 (cont)

Responsibility	Action
COMPATIBILITY CLERK (cont)	10. Records test reference document number(s) on test report document.
	11. Fills copy of test report by test reference document number.
	12. Sends forms to data operations clerk.
DATA OPERATIONS CLERK	13. Reviews forms for completness.
	a. If not OK, returns to compatibility clerk.
	14. Prepares keypunch request.
	a. Counts number of forms and marks on keypunch request.
	15. Attaches forms to keypunch request and submits forms to keypunch.
KEYPUNCH	16. Keypunches forms on IBM cards.
	17. Returns forms and associated IBM cards to the data operations clerk.
DATA OPERATIONS CLERK	18. Counts forms and verifies count on keypunch request. If count does not agree contacts keypunch for missing forms.
	19. Stores IBM cards in weekly work-in-process card file.
	20. Stores forms in weekly work-in-process forms files.
	21. At end of week, takes cards in work-in-process file and marks with next batch number.
	a. Submits cards to preliminary edit from the 9300 remote terminal.
	b. Corrects errors and repeats step 21a until all errors have been eliminated.
	22. Prepares operations form 1108.
	a. Fills in reel number of the next backup file.
	23. Submits IBM cards and operations forms 1108 to computer operations clerk.
COMPUTER OPERATIONS CLERK	24. (See separate procedure for computer operations clerk.)
	25. Returns IBM cards, operations forms 1108, and computer listing to data operations clerk.

TABLE B-1 (cont)

Responsibility	Action
DATA OPERATIONS CLERK	26. Checks to see if computer program ran to completions. If not, notifies computer programmer.
	27. If run is OK, logs in new backup reel number.
	28. Examines computer update counts. If in error, notifies programmer.
	29. Examines computer listing for edit rejects.
	If edit rejected records
	a. Pulls error cards from card deck (all record types). Also pulls associated forms from weekly work-in-process forms file.
	b. Researches errors. Coordinates with compatibility clerk.
	c. Corrects IBM cards.
	d. Files corrected cards in weekly work-in-process card file.
	e. Files forms in weekly work-in-process forms file.
	30. Attaches operations form 1108 to computer listing and files in date order.
	31. Files IBM cards in completed card file. Orders decks by batch number. Keeps the last five batches.
	32. Returns those forms accepted by the edit to the compatibility clerk.
COMPATIBILITY CLERK	33. Files NEW MATERIALS RECORD forms (record types 1 through 4) by material number.
	34. Attaches TEST SUMMARY RECORDS and ADDITIONS TO EXISTING RECORDS forms to the associated test report and files in test reference number order.

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