MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A
TRACKING HAZARDOUS MATERIALS THROUGH ARMY INSTALLATIONS: A FEASIBILITY STUDY

by
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The handling, storage, and disposal of hazardous materials has recently become the focus of stringent regulation under the Resource Conservation and Recovery Act. One requirement of this Act is that all generators of legally defined hazardous wastes report to the U.S. Environmental Protection Agency on the volumes and types of wastes produced. One way to produce such a report is to track hazardous materials from procurement to disposal.
This research investigated the feasibility of tracking hazardous materials through procurement, distribution, use, collection, and disposal of U.S. Army fixed facilities. It was found that a complete tracking system would require major changes to materials distribution and accountability procedures. Implementing complete tracking procedures would be very costly at military installations because of the great diversity of hazardous materials procured and the large numbers of activities which use them. In addition, some of the information required for a complete tracking system is not available.

Another tracking system investigated was the monitoring of procurement data. This type of system has been used successfully at two installations and it is recommended that it be tried at others on an experimental basis.
FOREWORD

This study was funded by the Assistant Chief of Engineers, under FAD No. MP-81-6, dated 12 August 1981. The work was performed by the Environmental Division (EN) of the U.S. Army Construction Engineering Research Laboratory (CERL). The Project Monitoring Office was DAEN-ZCF. Dr. R. K. Jain is Chief of EN.

COL Louis J. Circeo is Commander and Director of CERL, and Dr. L. R. Shaffer is Technical Director.
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TRACKING HAZARDOUS MATERIALS THROUGH ARMY INSTALLATIONS: A FEASIBILITY STUDY

INTRODUCTION

Background

The hazardous waste regulations set forth by the Resource Conservation and Recovery Act (RCRA) in May 1980 regulate the treatment, storage, and disposal of toxic, ignitable, reactive, and corrosive substances. One requirement of the regulation is that all generators of hazardous wastes report to the U.S. Environmental Protection Agency (USEPA) the volume and types of hazardous wastes produced. Military installations, rather than their individual tenants, are considered hazardous waste generators subject to all RCRA requirements.

To fulfill these legal requirements for the many diverse activities the installations support, information is needed concerning which tenant organizations are procuring hazardous materials, the volume of the materials, and their ultimate disposition. Such information is also helpful to the installation Environmental Officer in assessing the magnitude of a hazardous waste problem.

Objective

The objective of this study was to review two different types of hazardous materials tracking systems: one involved complete tracking from procurement through disposal, using existing documents and information systems, and the other monitoring procurement data only.

Approach

The "paper trail" that describes procured materials was defined by analyzing Army procurement, warehousing, and disposal functions used for hazardous materials at five Army installations. The hazardous material tracking systems in use at Oak Ridge National Laboratory and Fort Devens were studied also.
2 REQUIRED AND AVAILABLE INFORMATION

Required Information

To track hazardous materials from entry through departure, a complete paper trail of each item is needed, including:

1. What was bought. This information is most useful if available by both National Stock Number (NSN) and chemical name.
2. Who bought it.
3. Where it will be used and stored.
4. Carton size and type and number of cartons bought.
5. When it was ordered and received. It is also helpful to know how fast each item is expected to be used.
6. Shelf life of item.
7. How much of each item will be consumed in use, and how much can be expected to be turned in to the Property Disposal Office (PDO).
8. What and how much is actually being turned in to PDO, and by whom.
9. An accurate, comprehensive list of hazardous materials, by name and NSN.

Available Information

Procurement, warehousing, and disposal procedures for hazardous materials were analyzed at five installations; Fort Knox, KY; Fort Campbell, KY; Fort Hood, TX; Fort Lewis, WA; and Fort Devens, MA.

Supply and Services Division (SSD)

The SSD on most installations keeps extensive, automated records on materials ordered. The Standard Army Intermediate Level Supply (SAILS) system is the vehicle used to order most chemical items for an installation. One of the reports available from the SAILS system is the Consolidated Transaction Register (Figure 1). This information includes the NSN of the items on order, a Department of the Defense Activity Code (DODAC) which specifies the buyer's unit, the carton size, the quantity ordered, and a hazard code which specifies whether the item is radioactive, poisonous, flammable, or an oxidizer. Inquiry programs are available to retrieve this information by either NSN or DODAC number. SAILS keeps records that are both detailed enough and accessible enough to supply much of the required information listed in requirements 1, 2, 4, and 5 above. The hazard code is not available with enough frequency or detail to provide information requirement number 9. The SSD inputs the required data into SAILS, but the system is actually operated by the
Figure 1. Example SAILS output.
installation computer services at Management Information Systems Office (MISO).

Items procured locally are handled through the SAILS system at most installations by assigning a Local Stock Number (LSN) to them. LSNs are not correlated among installations, but rather assigned sequentially as needed. Therefore, it is impossible to prepare a list of hazardous materials by LSNs. Estimates of the percentage of chemical items procured locally range from insignificant to about 25 percent, depending on the installation.

Warehouse

Frequently, the DODAC code listed in the SAILS Transaction Register will be that of the Directorate of Industrial Operations (DIO) warehousing function. DIO attempts to stockpile items which are used in quantity and those which are critical to the installation's operations. Therefore, the DODAC code listed in SAILS often does not represent the chemical's ultimate user.

Warehouse records differ among installations, but none are automated. A local requisition form is needed to procure items from the warehouse. The information required on these forms varies, but almost always includes the DODAC code or a verbal description of the unit procuring the item. Generally, warehouse records contain enough information to satisfy requirement 3 on page 6. However, this information is not readily accessible, nor is it in a consistent form among installations.

When an item leaves the warehouse, its paper trail stops. There is no accountability for materials. The unit which has the item can use it, store it for a long or short time, trade it for something else with another unit, or return it to the warehouse. The feasibility of tracking chemicals all the way through an installation is lost at this point.

Property Disposal Office

Once a chemical has been used, its byproducts must be turned in to the PDO. Used solvents, contaminated fuels, and used motor oil are the chemicals most frequently turned in to PDO for reuse within DOD, or for resale to industry, which cleans and resells them.

The PDO requires that a standardized document accompany all items that are turned in (DD Form 1348). These records are almost never automated. An item may be stored for up to 6 months while avenues for its reuse/resale are explored. The PDO is a DOD, rather than an Army, function. Every major Army installation has a PDO, but it serves a much larger community than the installation's SSD. Reserve units, Corps of Engineers recreation areas, camps, and other outposts must turn used chemicals in to the nearest PDO. This practice also limits the feasibility of tracking installation chemical use.

In addition, the PDO publishes a hazardous property notification list each month. Figure 2 is an example list. Sometimes the PDO does not have enough space to store hazardous materials; in this case, the physical custody of the material remains with the generating unit, while PDO accepts accountability for it.
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</table>
Information Which Is Not Available

A complete paper trail on chemical items used at Army installations is not available. Thus, information requirements 6, 7, and 9 (p 6) remain unmet. This greatly limits the feasibility of using existing records to completely track hazardous materials throughout the installation. However, a list of NSNs correlated with chemical name, trade name, and military and Federal specifications is being developed by the U.S. Army Construction Engineering Research Laboratory. It will be part of the Hazardous Materials Management System (HMMS) and is scheduled for completion in September 1984.
Oak Ridge National Laboratory in Oak Ridge, TN -- a research laboratory operated by Union Carbide Corporation for the Department of Energy -- has begun using an automated system to keep complete track of entering hazardous materials.

A central storeroom procures all materials. All requests for materials must contain the Chemical Abstracts Registry (CAS) number; these numbers are screened against a database of 1500 CAS numbers which have been procured in the past. If a number is not found, a Material Safety Data Sheet (MSDS) is requested from the manufacturer. Based on the information in that document, the material is classified as hazardous or nonhazardous. If it is hazardous, labels are printed with the chemical name, CAS registry number, health and safety information, and a bar code similar to those used in supermarkets to identify an item. This label is placed on all containers of that material in the storeroom as soon as they are received. At the same time, the label information and the amount of the material received is input by storeroom personnel into a computer database.

All personnel must wear badges with computer-readable bar codes which identify them and their division. When a chemical is checked out of the storeroom, portable bar code readers run over the bar codes on the chemical container and the personnel badge and inform the computer the quantity of the chemical being checked out and who has it. Semi-annual inventories are performed. Each lab manager must then account for chemicals checked out to his/her employees by estimating the amount consumed in use, counting the quantity in stock, and turning in used chemicals for disposal. Chemicals to be disposed of are tracked to the trench number at the landfill where they are buried on-site, or to the off-site disposer.

The computer database can be searched by chemical name, CAS number, employee name, or division. When a chemical is ordered, this database is checked first to see if there is an excess anywhere in the laboratory. Statistical studies determine which items should be stocked on a regular basis, who the heavy users of hazardous chemicals are, and if consistent amounts are being reported as consumed. The system runs on a PDP 10 computer, written in the 1022 language. All hardware and software was installed for less than $10,000. Operational costs are minimal. Further information about this system is available in "Hazardous Material Management and Control," a January 1982 internal publication, and in "Hazardous Materials Management and Control Program at Oak Ridge National Laboratory," Journal of the American Industrial Hygienists Association, Vol 42, No. 12, p 880.

The Oak Ridge system is an excellent, cost-effective approach to use in a laboratory setting. However, the volume of materials procured by Army installations and the diverse activities that use them probably preclude using such an approach at installations. At Fort Knox, the SAILS system records 20,000 to 30,000 transactions every day. Screening this number of transactions for hazardous chemicals alone would involve a major effort, as would an installation-wide inventory. In addition, a major revamping of present procurement procedures would be necessary.
4 TRACKING BY ANALYSIS OF PROCUREMENT DATA

Environmental Officers at two FORSCOM installations -- Fort Devens and Fort Lewis -- are developing computer systems to search the SAILS transaction register against a list of NSNs known to represent hazardous chemicals. This provides them with information on what is being brought on post and by whom. The system at Fort Devens (described below) is operational.

The Safety Hazardous Information Tracking System was designed during 1981 at the Fort Devens Environmental Office and programmed at the installation MISO. This system merges the Defense Logistics Agency's Hazardous Materials Information System (HMIS) database and the Army Environmental Hygiene Agency's (AEHA) database of NSNs correlated with EPA hazardous waste number; then the stock numbers are run against a tape of the installation's SAILS ABX document history file (X50 ALB) for the past 90 days. For every NSN in the SAILS file that is found in the merged database of hazardous materials, a listing is created that contains the following information:

SAILS: NSN, quantity ordered/received, data, and DODAC code

AEHA: EPA hazardous waste number, chemical name

HMIS: Chemical name, military spec, formulation, selected physical/chemical properties, handling and storage instructions, and waste disposal options.

Figure 3 provides a sample listing from this system, which is still under development; plans for the future include translating the DODACs into a name and address; adding the HMIS trade name; correlating the HMIS storage compatibility code with EPA hazardous waste numbers; translating the SAILS codes for ordered/received/on-hand into words; producing an alphabetic listing by chemical name; and identifying items found for the first time. Figure 4 shows these changes. The program runs on the SAILS computer, an IBM 350/60, written in COBOL. The appendix provides a listing.

A similar system was designed and operated at Fort Lewis in 1981; however, due to a change in how SAILS is used there, the system is not currently working.
<table>
<thead>
<tr>
<th>Component</th>
<th>Amount</th>
<th>Date Ordered or Received</th>
<th>Flash Point</th>
<th>Lower Explosive Limit</th>
<th>Unusual Fire Hazards</th>
<th>Flammable Dec. Combustion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methanol</td>
<td></td>
<td></td>
<td>22°F</td>
<td>L.O. (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Methyl Ethyl Ketone</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Other Precautions:**
- Avoid contact with poison, organic peroxides, and radioactive materials.
- DOT Class: Flammable Liquid
- DOT Label: Flammable Liquid

**Handling & Storage:**
- Keep away from heat, sparks, and open flame.
- Avoid prolonged breathing of vapors.
- Avoid skin contact.
- Avoid contact with explosives, oxidizing materials.

**Figure 3.** Sample output from Fort Devens program.
Figure 4. Changes to Fort Devens program.
5 CONCLUSIONS AND RECOMMENDATIONS

Two types of tracking systems were studied and assessed for application to Army procedures:

1. Institution of a complete tracking system to follow hazardous materials from the time they enter the installation until they leave it would require major revamping of material distribution and accountability procedures. While it is possible to have complete tracking procedures on a small scale, such as at Oak Ridge National Laboratory, such procedures would be extremely costly at a military installation.

2. Systems to provide information on hazardous materials procurement have been operated successfully at two Army installations. These systems have shown great merit, and standardizing and transporting them to other installations should be attempted on an R&D basis.

There is no list of NSNs which meet a variety of hazardous criteria. Such a list, which is necessary to the success of systems interfacing with procurement data, is being developed by CERL. It should be interfaced with the existing systems at Fort Devens and Lewis when available.
IDENTIFICATION DIVISION.
PROGRAM-ID. DGQO1P.
ENVIRONMENT DIVISION.
CONFIGURATION SECTION.
SOURCE-COMPUTER.
IBM-360-F50.
OBJECT-COMPUTER.
IBM-360-F50.
INPUT-OUTPUT SECTION.
FILE-CONTROL.
SELECT HAZMAS ASSIGN SYS012-UT-2400-S.
SELECT DOC-HIST ASSIGN TO SYS013-UT-2400-S.
SELECT PRT-OUT ASSIGN TO SYS011-UT-2400-S.
DATA DIVISION.
FILE SECTION.
FD DOC-HIST
RECORDING MODE IS V
LABEL RECORDS ARE STANDARD
RECORD CONTAINS 208 TO 6280 CHARACTERS
DATA RECORD IS DOC-FILE.
01 DOC-FILE.
  02 DO-DAC  PIC X(14).
  02 NSN  PIC X(13).
  02 FILLER  PIC X(93).
  02 SEG-1  PIC X(88).
  02 SEG-2  PIC X(88).
  02 SEG-3  PIC X(88).
  02 SEG-4  PIC X(88).
  02 SEG-5  PIC X(88).
  02 SEG-6  PIC X(88).
  02 SEG-7  PIC X(88).
  02 SEG-8  PIC X(88).
  02 SEG-9  PIC X(88).
  02 SEG-10  PIC X(88).
  02 SEG-11  PIC X(88).
  02 SEG-12  PIC X(88).
  02 SEG-13  PIC X(88).
  02 SEG-14  PIC X(88).
  02 SEG-15  PIC X(88).
  02 SEG-16  PIC X(88).
  02 SEG-17  PIC X(88).
  02 SEG-18  PIC X(88).
  02 SEG-19  PIC X(88).
  02 SEG-20  PIC X(88).
  02 SEG-21  PIC X(88).
  02 SEG-22  PIC X(88).
  02 SEG-23  PIC X(88).
  02 SEG-24  PIC X(88).
  02 SEG-25  PIC X(88).
  02 SEG-26  PIC X(88).
FD HAZMAS
RECORDING MODE IS F
BLOCK CONTAINS 4 RECORDS
RECORD CONTAINS 1780 CHARACTERS
LABEL RECORDS ARE STANDARD
DATA RECORD IS HAZ-OUT.

003070  02  SEG-27  PIC X(88).
003080  02  SEG-28  PIC X(88).
003090  02  SEG-29  PIC X(88).
003100  02  SEG-30  PIC X(88).
003110  02  SEG-31  PIC X(88).
003120  02  SEG-32  PIC X(88).
003130  02  SEG-33  PIC X(88).
003140  02  SEG-34  PIC X(88).
003150  02  SEG-35  PIC X(88).
003160  02  SEG-36  PIC X(88).
003160  02  SEG-37  PIC X(88).
003160  02  SEG-38  PIC X(88).
003160  02  SEG-39  PIC X(88).
003160  02  SEG-40  PIC X(88).
003160  02  SEG-41  PIC X(88).
003160  02  SEG-42  PIC X(88).
003160  02  SEG-43  PIC X(88).
003160  02  SEG-44  PIC X(88).
003160  02  SEG-45  PIC X(88).
003160  02  SEG-46  PIC X(88).
003160  02  SEG-47  PIC X(88).
003160  02  SEG-48  PIC X(88).
003160  02  SEG-49  PIC X(88).
003160  02  SEG-50  PIC X(88).
003160  02  SEG-51  PIC X(88).
003160  02  SEG-52  PIC X(88).
003160  02  SEG-53  PIC X(88).
003160  02  SEG-54  PIC X(88).
003160  02  SEG-55  PIC X(88).
003160  02  SEG-56  PIC X(88).
003160  02  SEG-57  PIC X(88).
003160  02  SEG-58  PIC X(88).
003160  02  SEG-59  PIC X(88).
003160  02  SEG-60  PIC X(88).
003160  02  SEG-61  PIC X(88).
003160  02  SEG-62  PIC X(88).
003160  02  SEG-63  PIC X(88).
003160  02  SEG-64  PIC X(88).
003160  02  SEG-65  PIC X(88).
003160  02  SEG-66  PIC X(88).
003160  02  SEG-67  PIC X(88).
003160  02  SEG-68  PIC X(88).
003160  02  SEG-69  PIC X(88).
003160  02  SEG-70  PIC X(88).
01 HAZ-OUT.
  02 S-NSN.
    03 ALL-DIG PIC X(13).
  02 NSN-BRK REDEFINES S-NSN.
    03 S-FST-1 PIC XXXX.
    03 S-FST-2 PIC XX.
    03 S-FST-3 PIC XXX.
    03 S-FST-4 PIC XXXX.
  02 FILLER PIC X.
  02 S-ITEM-NAME PIC X(48).
  02 FILLER PIC X.
  02 S-SPEC PIC X(20).
  02 FILLER PIC X.
  02 S-STOR-COMP PIC X(5).
  02 FILLER PIC X.
  02 S-CHEM-NAME PIC X(25).
  02 FILLER PIC X.
  02 S-CHEM-FAM PIC X(25).
  02 FILLER PIC X.
  02 S-FORMULA PIC X(20).
  02 FILLER PIC X.
  02 S-NIOSH.
    03 ALL-NIOSH PIC X(605).
  02 NIOSH-BRK REDEFINES S-NIOSH.
    03 S-NI-1 PIC X(30).
    03 S-NI-2 PIC X(42).
    03 S-NI-3 PIC X(42).
    03 S-NI-4 PIC X(42).
    03 S-NI-5 PIC X(42).
    03 S-NI-6 PIC X(42).
    03 S-NI-7 PIC X(42).
    03 S-NI-8 PIC X(42).
    03 S-NI-9 PIC X(42).
    03 S-NI-10 PIC X(42).
    03 S-NI-11 PIC X(42).
    03 S-NI-12 PIC X(42).
    03 S-NI-13 PIC X(42).
    03 S-NI-14 PIC X(42).
    03 S-NI-15 PIC X(29).
  02 FILLER PIC X.
  02 S-FLASH-PT PIC X(16).
  02 FILLER PIC X.
  02 S-LOW-EXP PIC XXXX.
  02 FILLER PIC X.
  02 S-UN-FIRE.
    03 ALL-FIRE PIC X(100).
  02 UN-FIRE-BRK REDEFINES S-UN-FIRE.
    03 S-UFH-1 PIC X(21).
    03 S-UFH-2 PIC X(42).
    03 S-UFH-3 PIC X(37).
02 FILLER PIC X.
02 S-THRES PIC X(15).
02 FILLER PIC X.
02 S-STABIL PIC XXX.
02 FILLER PIC X.
02 S-HAZ-DECOM.
  03 ALL-H-DECOM PIC X(60).
02 HAZ-BRK REDEFINES S-HAZ-DECOM.
  03 S-HD-15 PIC X(19).
  03 S-HD-16 PIC X(41).
02 FILLER PIC X.
02 S-WASTE-ELIM.
  03 ALL-WASTE PIC X(250).
02 WASTE-BRK REDEFINES S-WASTE-ELIM.
  03 S-WA-1 PIC X(24).
  03 S-WA-2 PIC X(42).
  03 S-WA-3 PIC X(42).
  03 S-WA-4 PIC X(42).
  03 S-WA-5 PIC X(42).
  03 S-WA-6 PIC X(42).
  03 S-WA-7 PIC X(16).
02 FILLER PIC X.
02 S-HAND.
  03 ALL-HAND PIC X(150).
02 HAN-BRK REDEFINES S-HAND.
  03 S-HAN-1 PIC X(23).
  03 S-HAN-2 PIC X(42).
  03 S-HAN-3 PIC X(42).
  03 S-HAN-4 PIC X(43).
02 FILLER PIC X.
02 S-OTHER.
  03 ALL-OTHER PIC X(192).
02 OTHER-BRK REDEFINES S-OTHER.
  03 S-PC-9 PIC X(25).
  03 S-PC-10 PIC X(43).
  03 S-PC-11 PIC X(43).
  03 S-PC-12 PIC X(43).
  03 S-PC-13 PIC X(38).
02 FILLER PIC X.
02 M-DOT-NAM.
  03 ALL-DOT-NAM PIC X(100).
02 DOT-NAME-BRK REDEFINES M-DOT-NAM.
  03 S-DN-14 PIC X(29).
  03 S-DN-15 PIC X(43).
  03 S-DN-16 PIC X(28).
02 FILLER PIC X.
02 M-DOT-CLASS PIC X(23).
02 FILLER PIC X.
02 M-DOT-LABEL PIC X(25).
02 FILLER PIC X.
FD PRT-OUT
  LABEL RECORDS ARE STANDARD
  BLOCK CONTAINS 10 RECORDS
  DATA RECORDS ARE PRINT
  RECORD CONTAINS 133 CHARACTERS.

003201 01 PRINT PIC X(133).
004010 WORKING-STORAGE SECTION.
  77 INDATE1 PIC X(7).
  77 OUTDATE1 PIC X(9).
  77 RETCODE PIC X.
  77 OPCODE PIC XX.
  77 INDATE2 PIC X(5).
  01 HDR-1.
    02 FILLER PIC X(17) VALUE 'DATE OF REPORT'.
    02 DATE-P PIC X(9).
    02 FILLER PIC X(38) VALUE 'SAFETY HAZARDOUS INFO TRACKIN
    - 'G SYSTEM'.
    02 FILLER PIC X(20) VALUE 'PCN: DGQ-001'.
    02 FILLER PIC X(47) VALUE '(PROONENT: DFE ENVIRONMENTAL
    - 'OFFICE BLDG 1419').
  01 HDR-2.
    02 FILLER PIC X(22) VALUE 'NAT STK NO NSN: '.
    02 NSN-P PIC X(16).
  01 HDR-3.
    02 FILLER PIC X(22) VALUE 'NOMENCLATURE SAILS: '.
    02 NOM-S PIC X(55) VALUE SPACES.
  01 HDR-4.
    02 FILLER PIC X(22) VALUE 'NOMENCLATURE HMIS: '.
    02 NOM-H PIC X(48).
  01 HDR-5.
    02 FILLER PIC X(22) VALUE 'NOMENCLATURE AEHA: '.
    02 NOM-A PIC X(55).
  01 HDR-6.
    02 FILLER PIC X(22) VALUE 'HAZ WASTE NO. AEHA: '.
    02 WASTE-N PIC XXXX.
  01 HDR-7.
    02 FILLER PIC X(22) VALUE 'QTY ORD/RECD - DATE: '.
    02 P-qty PIC ZZZZZ9.
    02 FILLER PIC X VALUE SPACE.
    02 P-UI PIC XX.
    02 FILLER PIC XXX VALUE '/ '.
    02 P-RECD PIC ZZZ9.
  01 HDR-8.
    02 FILLER PIC X(22) VALUE 'NAME/LOCATION REQ: '.
    02 P-DODAC PIC X(14).
  01 HDR-8A.
    02 FILLER PIC X(11) VALUE 'DIC CODE: '.

20
02 P-DIC PIC XXX.
01 HDR-9.
 02 FILLER PIC X(16) VALUE 'OSPECIFICATION: '.
 02 P-SPEC PIC X(20).
 02 FILLER PIC X(9) VALUE SPACES.
 02 FILLER PIC X(13) VALUE 'FLASH POINT: '.
 02 P-FLASH PIC X(16).
 02 FILLER PIC X(15) VALUE SPACES.
 02 FILLER PIC X(19) VALUE 'OTHER PRECAUTIONS: '.
 02 P-PC-9 PIC X(25).

01 HDR-10.
 02 FILLER PIC X(29) VALUE 'STORAGE COMPATABILITY CODE: '
 02 P-SCC PIC X(5).
 02 FILLER PIC X(11) VALUE SPACES.
 02 FILLER PIC X(23) VALUE 'LOWER EXPLOSIVE LIMIT: '
 02 P-LEX PIC X(4).
 02 FILLER PIC X(18) VALUE SPACES.
 02 P-PC-10 PIC X(43).

01 HDR-11.
 02 FILLER PIC X(12) VALUE 'CHEM NAME: '
 02 P-C-N PIC X(25).
 02 FILLER PIC X(8) VALUE SPACES.
 02 FILLER PIC X(22) VALUE 'UNUSUAL FIRE HAZARDS: '
 02 P-UFH-1 PIC X(21).
 02 FILLER PIC XX VALUE SPACES.
 02 P-PC-11 PIC X(43).

01 HDR-12.
 02 FILLER PIC X(12) VALUE 'CHEM FAML: '
 02 P-C-F PIC X(25).
 02 FILLER PIC X(9) VALUE SPACES.
 02 P-UFH-2 PIC X(42).
 02 FILLER PIC XX VALUE SPACES.
 02 P-PC-12 PIC X(43).

01 HDR-13.
 02 FILLER PIC X(10) VALUE 'FORMULA: '
 02 P-FORM PIC X(20).
 02 FILLER PIC X(16) VALUE SPACES.
 02 P-UFH-3 PIC X(37).
 02 FILLER PIC X(7) VALUE SPACES.
 02 P-PC-13 PIC X(38).
 02 FILLER PIC X(5) VALUE SPACES.

01 HDR-14.
 02 FILLER PIC X(14) VALUE 'NIOSH CODES: '
 02 P-NI-1 PIC X(30).
 02 FILLER PIC X(6) VALUE 'TLV: '
 02 P-THRES PIC X(15).
 02 FILLER PIC X(14) VALUE 'STABILITY: '
 02 P-STAB PIC XXX.
 02 FILLER PIC X(22) VALUE 'DOT SHIP NAME: '
 02 P-DN-14 PIC X(29).
01 HDR-15.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-2 PIC X(42).
  02 FILLER PIC X(25) VALUE 'HAZARDOUS DECOMBUSTION\:
  02 P-HD-15 PIC X(19).
  02 FILLER PIC XX VALUE SPACES.
  02 P-DN-15 PIC X(43).
01 HDR-16.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-3 PIC X(42).
  02 FILLER PIC XX VALUE SPACES.
  02 P-HD-16 PIC X(41).
  02 FILLER PIC XXX VALUE SPACES.
  02 P-DN-16 PIC X(28).
  02 FILLER PIC X(15) VALUE SPACES.
01 HDR-17.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-4 PIC X(42).
  02 FILLER PIC X(20) VALUE 'WASTE ELIMINATION:\n  02 P-WA-1 PIC X(24).
  02 FILLER PIC X(12) VALUE 'DOT CLASS:\n  02 P-D-C PIC X(23).
  02 FILLER PIC X(10) VALUE SPACES.
01 HDR-18.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-5 PIC X(42).
  02 FILLER PIC XX VALUE SPACES.
  02 P-WA-2 PIC X(42).
  02 FILLER PIC X(12) VALUE 'DOT LABEL:\n  02 P-D-L PIC X(25).
  02 FILLER PIC X(8) VALUE SPACES.
01 HDR-19.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-6 PIC X(42).
  02 FILLER PIC XX VALUE SPACES.
  02 P-WA-3 PIC X(42).
  02 FILLER PIC X(45) VALUE SPACES.
01 HDR-20.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-7 PIC X(42).
  02 FILLER PIC XX VALUE SPACES.
  02 P-WA-4 PIC X(42).
  02 FILLER PIC X(45) VALUE SPACES.
01 HDR-21.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-8 PIC X(42).
  02 FILLER PIC XX VALUE SPACES.
  02 P-WA-5 PIC X(42).
  02 FILLER PIC X(45) VALUE SPACES.
01 HDR-22.
02 FILLER PIC XX VALUE SPACES.
02 P-NI-9 PIC X(42).
02 FILLER PIC XX VALUE SPACES.
02 P-WA-6 PIC X(42).
02 FILLER PIC X(45) VALUE SPACES.
01 HDR-23.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-10 PIC X(42).
  02 FILLER PIC XX VALUE SPACES.
  02 P-WA-7 PIC X(16).
  02 FILLER PIC X(71) VALUE SPACES.
01 HDR-24.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-11 PIC X(42).
  02 FILLER PIC X(21) VALUE 'HANDLING & STORAGE: '.
  02 P-HAN-1 PIC X(23).
  02 FILLER PIC X(45) VALUE SPACES.
01 HDR-25.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-12 PIC X(42).
  02 FILLER PIC XX VALUE SPACES.
  02 P-HAN-2 PIC X(42).
  02 FILLER PIC X(45) VALUE SPACES.
01 HDR-26.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-13 PIC X(42).
  02 FILLER PIC XX VALUE SPACES.
  02 P-HAN-3 PIC X(42).
  02 FILLER PIC X(45) VALUE SPACES.
01 HDR-27.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-14 PIC X(42).
  02 FILLER PIC XX VALUE SPACES.
  02 P-HAN-4 PIC X(43).
  02 FILLER PIC X(44) VALUE SPACES.
01 HDR-28.
  02 FILLER PIC XX VALUE SPACES.
  02 P-NI-15 PIC X(29).
  02 FILLER PIC X(103) VALUE SPACES.
004170 01 WRK-1.
004180 02 FILLER PIC X(6).
004190 02 R-UI PIC XX.
004200 02 FILLER PIC XXX.
004201 02 R-QTY PIC S9(7) COMP-3 VALUE +0.
  02 A-QTY REDEFINES R-QTY.
    03 E-1 PIC X(4).
    02 FILLER PIC X(10).
    02 R-RECD PIC S9(5) COMP-3 VALUE +0.
    02 A-RECD REDEFINES R-RECD.
    03 R-1 PIC XXX.
PROCEDURE DIVISION.
OPEN INPUT HAZMAS DOC-HIST OUTPUT PRT-OUT.
MOVE SPACES TO PRINT.
MOVE 'KK' TO OPCODE.
CALL 'S23ATP' USING INDATE1 OUTDATE1 RETCODE OPCODE
      INDATE2.
      MOVE OUTDATE1 TO DATE-P.
RAG-1.
      READ HAZMAS AT END GO TO END-JOB.
      MOVE S-NSN TO NSN-NO.
RAG-2.
      READ DOC-HIST AT END GO TO END-JOB.
COM-PAR.
      IF NSN = MAJ GO TO HIT-1.
      IF NSN > MAJ GO TO RAG-HAZ.
      IF NSN < MAJ GO TO RAG-2.
RAG-HAZ.
      READ HAZMAS AT END GO TO END-JOB.
      MOVE S-NSN TO NSN-NO.
      GO TO COM-PAR.
HIT-1.
  005170 MOVE SEG-1 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
  005170 MOVE SEG-2 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
  005170 MOVE SEG-3 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
  005170 MOVE SEG-4 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
  005170 MOVE SEG-5 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
  005170 MOVE SEG-6 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
  005170 MOVE SEG-7 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
  005170 MOVE SEG-8 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
  005170 MOVE SEG-9 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
  005170 MOVE SEG-10 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-11 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-12 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-13 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-14 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-15 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-16 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-17 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-18 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-19 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-20 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-21 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-22 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-23 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-24 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-25 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-26 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-27 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-28 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-29 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-30 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-31 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-32 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-33 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-34 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-35 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-36 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-37 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-38 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-39 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-40 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-41 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-42 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-43 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-44 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-45 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-46 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-47 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-48 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-49 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-50 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-51 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-52 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-53 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-54 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-55 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-56 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-57 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-58 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-59 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170  MOVE SEG-60 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170 MOVE SEG-61 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170 MOVE SEG-62 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170 MOVE SEG-63 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170 MOVE SEG-64 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170 MOVE SEG-65 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170 MOVE SEG-66 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170 MOVE SEG-67 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170 MOVE SEG-68 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170 MOVE SEG-69 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.
005170 MOVE SEG-70 TO WRK-1 PERFORM LOAD THRU EDIT-EXIT.

LOAD.
IF CDE-1 OR CDE-2 OR CDE-3 OR CDE-4 NEXT SENTENCE ELSE
GO TO EDIT-EXIT.
IF D-1 = 'XX' GO TO EDIT-EXIT.
IF R-QTY NUMERIC MOVE R-QTY TO P-QTY, ELSE GO TO EDIT-EXIT.
IF R-RECD NUMERIC MOVE R-RECD TO P-RECD ELSE MOVE ZEROS TO
P-RECD.
MOVE R-DIC TO P-DIC.
MOVE R-UI TO P-UI.
MOVE S-FST-1 TO FST-1.
MOVE S-FST-2 TO FST-2.
MOVE S-FST-3 TO FST-3.
MOVE S-FST-4 TO FST-4.
MOVE NSN-CODE TO NSN-P.
MOVE DO-DAC TO P-DODAC.
MOVE S-ITEM-NAME TO NOM-H.
MOVE R-NOMEN TO NOM-A.
MOVE R-CODE TO WASTE-N.
MOVE S-SPEC TO P-SPEC.
MOVE S-FLASH-PT TO P-FLASH.
MOVE S-PC-9 TO P-PC-9.
MOVE S-STOR-COMP TO P-SCC.
MOVE S-LOW-EXP TO P-LEX.
MOVE S-PC-10 TO P-PC-10.
MOVE S-CHEM-NAME TO P-C-N.
MOVE S-UFH-1 TO P-UFH-1.
MOVE S-PC-11 TO P-PC-11.
MOVE S-CHEM-FAM TO P-C-F.
MOVE S-UFH-2 TO P-UFH-2.
MOVE S-PC-12 TO P-PC-12.
MOVE S-FORMULA TO P-FORM.
MOVE S-UFH-3 TO P-UFH-3.
MOVE S-NI-1 TO P-NI-1.
MOVE S-THRES TO P-THRES.
MOVE S-STABIL TO P-STAB.
MOVE S-DN-14 TO P-DN-14.
MOVE S-NI-2 TO P-NI-2.
MOVE S-NI-3 TO P-NI-3.
MOVE S-HD-16 TO P-HD-16.
MOVE S-DN-16 TO P-DN-16.
MOVE S-NI-4 TO P-NI-4.
MOVE S-WA-1 TO P-WA-1.
MOVE M-DOT-CLASS TO P-D-C.
MOVE S-NI-5 TO P-NI-5.
MOVE S-WA-2 TO P-WA-2.
MOVE M-DOT-LABEL TO P-D-L.
MOVE S-NI-6 TO P-NI-6.
MOVE S-WA-3 TO P-WA-3.
MOVE S-NI-7 TO P-NI-7.
MOVE S-WA-4 TO P-WA-4.
MOVE S-NI-8 TO P-NI-8.
MOVE S-WA-5 TO P-WA-5.
MOVE S-NI-9 TO P-NI-9.
MOVE S-WA-6 TO P-WA-6.
MOVE S-NI-10 TO P-NI-10.
MOVE S-WA-7 TO P-WA-7.
MOVE S-NI-11 TO P-NI-11.
MOVE S-HAN-1 TO P-HAN-1.
MOVE S-NI-12 TO P-NI-12.
MOVE S-HAN-2 TO P-HAN-2.
MOVE S-HAN-3 TO P-HAN-3.
MOVE S-NI-14 TO P-NI-14.
MOVE S-HAN-4 TO P-HAN-4.
MOVE S-NI-15 TO P-NI-15.
WRITE PRINT FROM HDR-1.
WRITE PRINT FROM HDR-2.
WRITE PRINT FROM HDR-3.
WRITE PRINT FROM HDR-4.
WRITE PRINT FROM HDR-5.
WRITE PRINT FROM HDR-6.
WRITE PRINT FROM HDR-7.
WRITE PRINT FROM HDR-8.
WRITE PRINT FROM HDR-9A.
WRITE PRINT FROM HDR-9.
WRITE PRINT FROM HDR-10.
WRITE PRINT FROM HDR-11.
WRITE PRINT FROM HDR-12.
WRITE PRINT FROM HDR-13.
WRITE PRINT FROM HDR-14.
WRITE PRINT FROM HDR-15.
WRITE PRINT FROM HDR-16.
WRITE PRINT FROM HDR-17.
WRITE PRINT FROM HDR-18.
WRITE PRINT FROM HDR-19.
WRITE PRINT FROM HDR-20.
WRITE PRINT FROM HDR-21.
WRITE PRINT FROM HDR-22.
WRITE PRINT FROM HDR-23.
WRITE PRINT FROM HDR-24.
WRITE PRINT FROM HDR-25.
WRITE PRINT FROM HDR-26.
WRITE PRINT FROM HDR-27.
WRITE PRINT FROM HDR-28.
EDIT-EXIT.
EXIT.
END-JOB.
CLOSE DOC-HIST HAZMAS PRT-OUT.
STOP RUN.
