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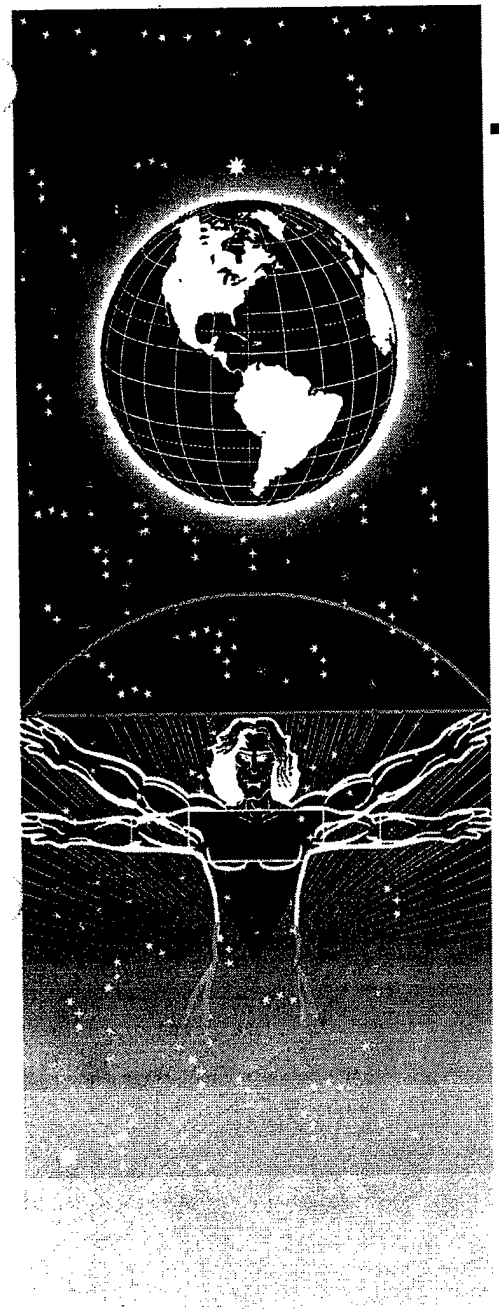

UNITED STATES AIR FORCE
IERA

Update AF-EMIS for Hazardous Material Data Entry, McGuire Air Force Base, New Jersey

Pacific Environmental Services, Incorporated
560 Herndon Parkway, Suite 200
Herndon, Virginia 20170-5240

June 1999

Approved for public release;

distribution is unlimited.

Air Force Institute for Environment, Safety and Occupational Health Risk Analysis
Risk Analysis Directorate
Environmental Analysis Division
2513 Kennedy Circle
Brooks Air Force Base TX 78235-5123

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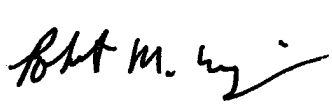

ROBERT M. ENINGER, Capt, USAF, BSC
Consultant Engineer

MICHAEL G. ELLIOTT, Maj, USAF, BSC, Ph.D., P.E.
Chief, Environmental Analysis Division

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Report details the upload of the U.S. Air Force Environmental Management Information System for subject installation. A summary of records and types of data input is provided. Also included is a summary of input procedures to include workplace data, national stock number entry and validation, manufacturer data entry and validation, material safety data sheet information, and authorizations/validation paperwork sources.

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1.0 INTRODUCTION

1.1 BACKGROUND

Pacific Environmental Services, Inc. (PES) was contracted under Air Force Contract F41624-95-D-9017, Order 48, to enter and validate data in the Air Force Environmental Management Information System (AF-EMIS) at Hazardous Material Pharmacies at Charleston, Grand Forks, MacDill, McChord, McConnell, McGuire, and Travis Air Force Bases (AFBs). Air Force Instruction (AFI) 32-7086 Hazardous Materials Management, 01 August 1997, requires that bases collect and maintain hazardous material (HAZMAT) data on standardized automated data processing equipment through a Defense Environmental Security Corporate Information Management (DESCIM) program, or a DESCIM-approved interim program. Presently, AF-EMIS is the DESCIM-approved interim program for the Air Mobility Command (AMC). While AF-EMIS is installed at each of the seven AMC bases addressed by this Order, presently its full capabilities cannot be utilized because key data has not been entered into the system. The objective of Order 48 was to correct this deficiency by contracting PES to enter and validate the needed data.

AF-EMIS was developed to provide HAZMAT data to the functional organizations responsible for execution of the HAZMAT Management Process: i.e., Civil Engineering (CE), Bioenvironmental Engineering (BE), Safety (SE), and the Logistics Group (LG). These organizations shall be referred to hereafter as AF-EMIS stakeholders. The HAZMAT data are needed by the organizations to meet their HAZMAT-related reporting requirements; assess pollution prevention opportunities; measure the success in minimizing HAZMAT use; and protect the environmental, safety, and health conditions of workers and the community. Because some of the data fields have not been populated, AF-EMIS cannot be fully utilized for these purposes at the seven bases addressed by this Order.

Furthermore, not all sources of supply (SOS) currently have connectivity to AF-EMIS or have arrangements with another SOS to make the necessary entries into the tracking system, as required by AMC Supplement I to AFI 32-7086.

PES is to determine the status of the AF-EMIS at the seven bases and to populate the tracking system to allow CE, BE, SE, and LG to satisfy their HAZMAT-related data requirements. In performing this work, PES is to enter data from other SOS, as provided and directed by each base. Data entry for the first of the seven bases (McGuire AFB) was completed 12 February 1999. This report documents the results of the McGuire AFB effort.

PES conducted a base-specific Kick-off Meeting at McGuire AFB on 13 October 1998 and 14 October 1998 to determine the initial status of AF-EMIS data completeness and quality. In addition, the availability of information and resources to complete data input/validation was discussed. Meeting minutes were prepared and distributed on 6 November 1998. The initial AF-EMIS status is summarized in Section 1.3.

Data elements to be entered or verified were established through the use of hardcopies of AF-EMIS data entry screens. Base CE and BE personnel identified, with checkmarks, which data elements PES was to enter and/or validate. SE personnel established that their data needs for AF-EMIS were identical to those of CE and BE. The data needs for LG were established based on discussions at the Kick-off Meeting and PES' knowledge of the logistics of Hazardous Material Pharmacy (HAZMART) operation. Upon receipt of these marked hardcopies, PES developed a master source documentation list, identifying each required data element and the expected data source, such as a material safety data sheet (MSDS). This source documentation list was forwarded to the appropriate Base personnel on 6 November 1998. The data

fields that the various Base organizations wanted populated/updated are identified in Section 1.2.

Data entry/validation was conducted at McGuire AFB by a two-person PES team on the following dates: 16 November 1998 to 24 November 1998; 30 November 1998 to 18 December 1998, 11 January 1999 to 29 January 1999, and 8 February 1999 to 12 February 1999. PES' data entry/validation efforts are presented in Sections 2 through 7 of this report.

1.2 AF-EMIS DATA FIELDS TO BE POPULATED/UPDATED

The hazardous material data resides in the "Materials Module" in the AF-EMIS program. This module consists of the following six types of records: National Stock Number (NSN); Shop; Authorization; Commercial and Government Entity (CAGE), which contains information from the MSDS; Chemical Abstract Service (CAS); and Manufacturer. These records were presented to the AF-EMIS stakeholders as the data entry forms (screens) that the AF-EMIS software generates. The AF-EMIS stakeholders used these screens to identify the data fields to be populated/updated by PES.

This record:	Stores information on:
NSN	**Hazardous material and waste profiles identified by a National Stock Number or other identifying stock number, such as Local Purchase Number (LPN).**
Shop	**Organizations and work areas where hazardous material is used and waste is accumulated.**
Authorization	**Authorizations for shops to use hazardous material.**
CAGE (MSDS)	**MSDS information on the hazardous material and waste profiles.**
CAS	**Information on the chemicals contained in the hazardous material or hazardous waste streams.**
Manufacturer	**Manufacturers and vendors that supply hazardous material.**

Data fields that the Base AFB AF-EMIS stakeholders wanted populated for the six record types are listed in Table 1.1. Those data fields appearing in bold for each record are the mandatory data that must be entered in order for the AF-EMIS program to create that record. For example, AF-EMIS will not create a NSN record if the NSN, Components in NSN, Noun, Supply, or Shelf Life fields are not populated.

1.3 INITIAL AF-EMIS STATUS

A limited assessment of the status of the data already entered into the AF-EMIS system before PES arrived onsite was determined from discussions during the Base-specific Kick-off Meeting and a perusal of the database master reports and the Authorization (Form 3952). Only through entering and validating the data was PES able to develop a full understanding of the database condition.

There were 2,960 valid hardcopy Form 3952s, Chemical/Hazardous Material Request/ Authorizations, on file at the Base HAZMART. Most of these authorizations were entered into AF-EMIS by the LG prior to PES' data entry activities; however, not all of the data fields were populated. Typically, the only AF-EMIS data fields populated for the authorization record by LG personnel were the mandatory ones for adding a record to the database. In addition, PES found approximately 284 expired and/or invalid authorizations that were listed in AF-EMIS as active authorizations during its data entry activities. These authorizations were made inactive.

With respect to NSN records, approximately 950 NSNs and LPNs were already in the AF-EMIS database when PES initiated its data entry activities; however, only AF-EMIS-mandatory (for record creation) data fields were typically populated correctly. Because the AF-EMIS software uses multiple NSNs or LPNs for the same hazardous material to differentiate container type/size, the

Table 1-1: AF-EMIS Data Fields that McGuire AFB Organizations Wanted Populated	
Records	**Data Field**
NSN	**NSN** **Components in NSN** **Noun** Status Break NSN Break Qty Size Unit Pkg. **Supply** Seq. Tracking Type Material Aerosol EPA 17 ODC Empty Container Regulated Outside Container VOC % Min. (automatically calculated) VOC % Max. (automatically calculated) Health Review IEX Code Physical Hazard **Shelf Life**
Shop	**Shop Code** **Shop Type** BES WPID Ins. **Cmd.** **Org.** **Ofc.** **Title** CSA ID **Shop Status** Building Location Address

Table 1-1 (Continued)	
Records	Data Field
Shop (continued)	City State Zip **Contractor** COR Shop Contract Period From and To HM POC with Phone Number Supervisor with Phone Number UEC with Phone Number HW POC Supply Account Code Supply Account Code Status Supply Account Code Effective Date Process Code Process Description Mission Statement
Authorization	**NSN** **Shop Code** **Status** **Process** New Process ODC (system generated) ODC Application EPCRA 311 / 312 Exempt EPCRA 313 Exempt **Draw Amount** **Draw Frequency** **Reset** How Used **Date Next Action** **Next Action** Health Review – PPE

Table 1-1 (Continued)	
Records	**Data Field**
CAGE (MSDS)	**NSN** **CAGE** CAGE Status **CAGE Version** **CAGE Component No.** Part No. or Trade Name MSDS Date Health Review Code Health Hazard Physical Hazard **Ounces** **Type** pH Type, Min., and Max. VOC with Units Specific Gravity Density Vapor Pressure with Units Constituents – CAS Constituents – Chemical Name Constituents – Amount Min. and Max. Constituents – Concentration Units Constituents – Percent Weight or Volume Constituents – Chemical Form Constituents – Chemical State
CAS	**CAS Number** NIOSH Number **Chemical Name** ODC EPA 17 EHS TRI CERCLA 102(a) CAA HAP Organic CAA HAP Inorganic CAA RMP Flammable CAA RMP Toxic RCRA Acutely Hazardous

Table 1-1 (Concluded)

Records	Data Field
CAS (continued)	OSHA Appendix to 1910 Chemical Weapons TLV ppm TLV mg/m^3 STEL ppm STEL mg/m^3 ACGIH Skin Hazard ACGIH Conc. Ceiling Exist Hazard – Inhalation Hazard – Absorption Hazard – Ingestion Hazard – Contact Hazard – Teratogen Hazard – Mutagen Hazard – Suspected Carcinogen Hazard – Confirmed Carcinogen Adopted Value on Notice of Intended Change? BEI Exist for this Substance? Substance Identified By Other Sources as Carcinogen? OSHA or NIOSH has lower PEL for this substance? See Notice of Intended Changes? Vapor Pressure Specific Gravity Molecular Weight
Manufacturer	**CAGE** **Status** Distributor **Company Name** Address City County State Country Zip Phone Fax

950 NSNs and LPNs represent a somewhat smaller number of different HAZMATs. Based on a review of the AF-EMIS Master NSN Report at the outset of PES' data entry activities, there were 650 different authorized hazardous materials in the database.

While most of the NSN records had at least one associated CAGE (MSDS) record, many had multiple CAGE records. This posed an unmanageable quantity of data entry/validation to be performed (>5,000 CAGE records). To reduce the data entry effort to a more manageable level, mutual agreement was reached between HAZMART personnel and PES to limit the CAGE(s) for population/updating to those associated with HAZMAT(s) that was (were) in the electronic inventory in the AF-EMIS Staging Area Module or, if no HAZMAT with the NSN/LPN were in inventory, to the most recent CAGE based on the MSDS date listed in the Hazardous Material Information System (HMIS) database. This procedure limited the number of CAGE records to be entered/validated to slightly greater than the number of different NSNs and LPNs that must be entered. CAGE records that were already in AF-EMIS before PES began data entry, but no longer active (i.e., the associated HAZMAT was not in inventory or the record did not reflect the latest MSDS) were assigned proper sizes (Ounces and Type) and inactivated. Additional details on this subject are presented in Section 6.

Another issue regarding CAGE records relates to the incorrect population of the "CAGE Version" fields. When a new version of a MSDS is obtained for a HAZMAT used at the Base, a new CAGE record should be created utilizing the same CAGE but changing the "CAGE Version" to the next letter value (i.e., old version "B", new version "C"). The CAGE records in AF-EMIS, when PES first reviewed the data, did not reflect the use of this procedure; the "CAGE Component No." was increased instead. The CAGE Component No. is designed for multi-part kits, such as a two-part epoxy. This incorrect practice resulted in CAGE records with multiple components listed for a single component material.

These invalid CAGE records were assigned an inactive status and near zero sizes (Ounces and Type). Based on discussions with personnel at the AF-EMIS Help Desk, the new AF-EMIS, Version 6.0 due for May 1999 release, will not allow the number of CAGE components to exceed the Components in NSN entered in the NSN records. For additional details, refer to Section 6.

About one half of the final number of Manufacturer records required updating to some degree. Most updates were minor such as changes in Office Location or area codes for phone/fax numbers.

PES did not attempt to update CAS records because they would be updated with the new AF-EMIS Version 6.0 due to be released in May 1999. Version 6.0 will contain updated CAS records, including some new fields. Therefore, any updates that PES made to the current version of AF-EMIS, would be overwritten by the new CAS records associated with AF-EMIS Version 6.0.

Most of the Shop record data fields were populated for 140 of the 147 Base shops before PES began its data entry. PES' efforts to update/validate these records were hampered by a lack of data on the shops. The Shop Profile Worksheet contains all of the information needed to completely populate all Shop record fields that the AF-EMIS stakeholders wanted populated; however, only 35 of 147 shops completed these forms. For those shops that did not complete the Shop Profile Worksheet, the Form 3952 was used to partially populate/validate the Shop record. The Form 3952 contained little of the information needed to completely populate/validate the Shop record.

1.4 OVERVIEW OF DATA ENTRY/VALIDATION PROCEDURES

The population of the six hazardous material records must be performed in the following order: Shop, NSN, Manufacturer, CAS, CAGE, and Authorization.

Procedures used by PES for each record are described in Sections 2 through 7, with each section devoted to a particular type of record. The data fields, including the data sources, difficulties encountered, and conventions for a specific type of record are discussed in each section. A table that lists each data field; identifies sources of information used to populate each field; and enumerates data entries made by PES is included in each section. The AF-EMIS record screen is also presented for each record type.

The hard copies of Form 3952 on file at the HAZMART formed the basis of data entry in three respects. First, PES entered data for a HAZMAT only if there was a hard copy Form 3952 authorizing its use on Base; the Order's Statement of Work did not include the capture of HAZMAT in the AF-EMIS database if this material were not being acquired, stored, etc. in accordance with the HAZMAT management process authorization procedures. Second, the information contained on the hardcopy Form 3952 was used as one of the standard resources for validating the information previously entered into AF-EMIS and the data entered by PES under this Order. Last, the HAZMART file contained all authorized Form 3952's on Base; therefore, this was the most extensive list of hazardous materials and was the logical choice for the basis of data entry.

Shops requiring the use of hazardous materials are required to submit a Form 3952 prior to obtaining such materials. The Form 3952 is deemed approved when it has been reviewed and signed by appropriate BE, CE, and SE representatives and forwarded to the HAZMART for input into AF-EMIS. In fact, the HAZMART will not issue a material to a shop that is not authorized by the Form 3952 process to use that material.

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2.0 SHOP RECORD DATA ENTRY/VALIDATION PROCEDURES

AF-EMIS has two Shop record screens; these are presented as Figures 2.1 and 2.2. The Shop record data fields that the AF-EMIS stakeholders wanted updated; the sources of information PES used to update them, and the number of times data were entered by PES for each data field are presented in Table 2.1. PES used information from the Shop Profile Worksheets (See Appendix A) and Form 3952 for the shops to populate the Shop records following the procedures described below.

The first step in the data entry/validation procedure was to obtain the Form 3952 and the Shop Profile Worksheet for the shops. Data entry/validation at this shop was limited to verifying the existence of the appropriate Shop Code in AF-EMIS as many shops did not submit a Shop Profile Worksheet as requested by BE and LG personnel.

The reason that Shop records must be entered/validated first is because each material authorization is specific to the processes in a particular shop. The Authorization record cannot be created in AF-EMIS if the shop and process codes do not already exist in the database.

The mandatory data fields for creating a shop record were already populated for 140 of the base's 147 shops before PES began populating the AF-EMIS database. Generic process codes (e.g., MI01 for miscellaneous permanent) were assigned for each shop if specific processes were not available at the time the AF-EMIS tracking system was installed at McGuire AFB. Since the PES data entry team did not have any Shop Profile Worksheets at the start of the project, the generic process codes were retained; therefore, authorizations were assigned to some shops which had only generic process codes assigned to them

FIGURE 2.1

AF-EMIS SHOP RECORD SCREEN NUMBER 1 OF 2

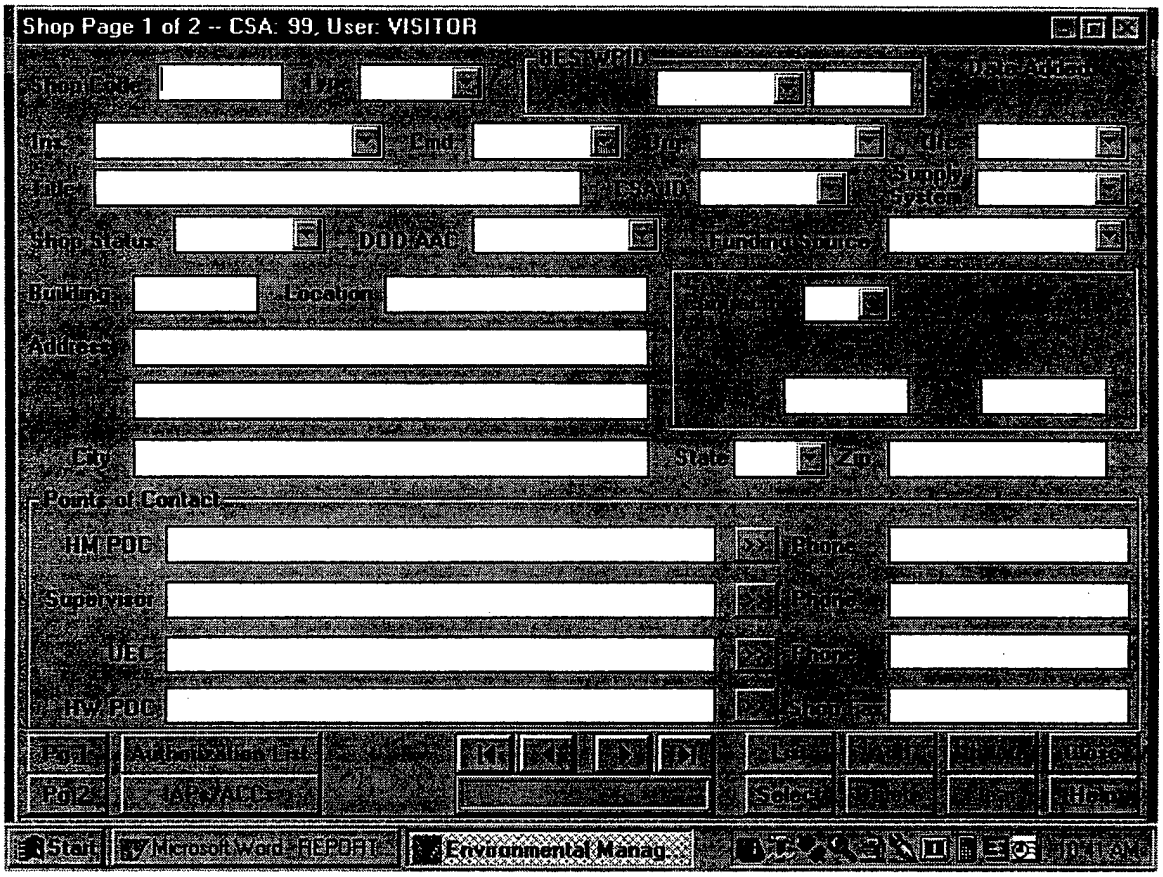

FIGURE 2.2

AF-EMIS SHOP RECORD SCREEN NUMBER 2 OF 2

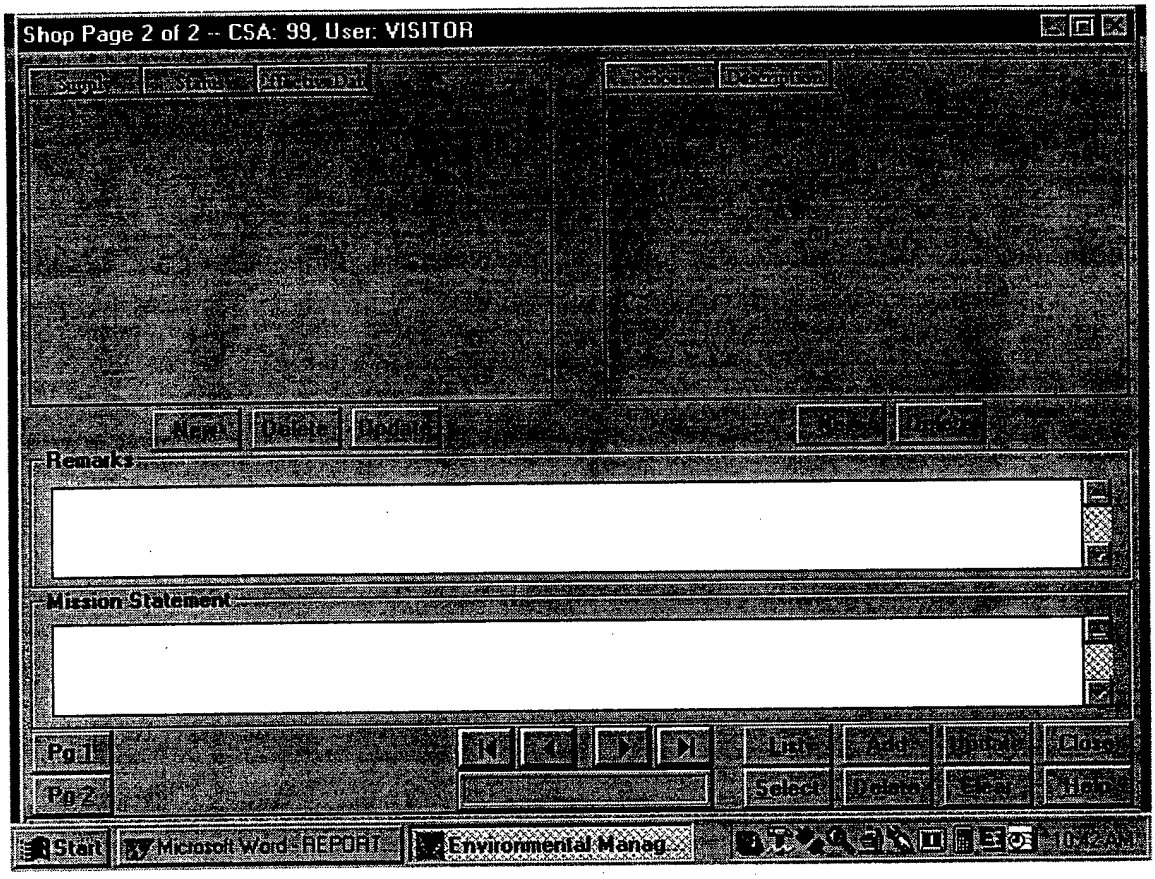

Table 2-1. Shop Record Data Fields with Sources of Information and Number of PES Entries		
Data Field	Source of Information	Number of PES Entries
Shop Code	Shop Profile	7
Shop Type	Shop Profile	7
BES WPID	Shop Profile	5
Ins.	Shop Profile	7
Cmd.	Shop Profile	7
Org.	Shop Profile	33
Ofc.	Shop Profile	29
Title	Shop Profile	15
CSA ID	Shop Profile	0
Shop Status	Shop Profile	7
Building	Shop Profile/Form 3952	25
Location	Shop Profile/Form 3952	37
Address	Shop Profile	26
City	Shop Profile	23
State	Shop Profile	23
Zip	Shop Profile	23
Contractor	Shop Profile	7
COR Shop	Shop Profile	0
Contract Period From and To	Shop Profile	0
HM POC with Phone Number	Shop Profile	35
Supervisor with Phone Number	Shop Profile	34
UEC with Phone Number	Shop Profile	0
HW POC	Shop Profile	0
Supply Account Code	Shop Profile	5
Supply Account Code Status	Shop Profile	5
Supply Account Code Effective Date	Shop Profile	5
Process Code	Shop Profile/Form 3952	48
Process Description	Shop Profile/Form 3952	48
Mission Statement	Shop Profile	23

in the database. The drawback with using the generic process codes arises when valid process codes become available. In order to change the process code in AF-EMIS for an authorization, a new authorization record must be created. The new record is created by changing the process code and saving the record as new by pressing the "Add" button on the bottom of the screen. The "Update" option is not available when the process code is changed. Pressing the "Add" button will create a new authorization record identical to the old one with a new process code; however, any personal protective equipment associated with the old authorization is lost and must be re-entered. In addition, the old authorization record must be opened again and assigned an inactive status.

The PES team eventually received Shop Profile Worksheets for 35 of the 147 shops located on Base; process codes were included on only some of the 35 forms. For those shops that the Shop Profile Worksheet included process codes, the Form 3952 also included these codes; therefore, the addition of new Shop records was not necessary for any of these 35 shops. Since the Shop Profile Worksheets were designed to mirror AF-EMIS, the required data could be entered/validated easily. PES' data entry procedures/activities for each data field of the Shop record is described in the following paragraphs.

Shop Code. Most shop codes were already in AF-EMIS when PES began the data entry. The codes are alphanumeric symbols consisting of the letter "M" and four numbers. The numbers were developed by the Base LG staff by sequentially numbering the shop supply account codes that appear on a list maintained at the HAZMART. Thus, the shop corresponding to the first supply account code on the list was assigned a shop code of M0001, the second one M0002, and so on. When a new Shop Code needed to be created, the next available sequential shop code was used regardless of the sequential order of

supply account codes. Only seven new shop codes were created by PES to provide a unique identifier for all the Base's 147 shops.

Type. There are three shop types to choose from a pick list provided in AF-EMIS: shop, Chemical Staging Area (CSA), or other. For all shops, the shop type entered was shop.

BES WPID. The Bioenvironmental Engineering Services Workplace Identification number (BES WPID) is a three part number based on the installation identification number, Air Force Occupational, Safety and Health (AFOSH) Shop Code, and the Bioenvironmental Engineering Flight (BEF) case file number, respectively. For the majority of shops, AF-EMIS already contained the correct BES WPID; only shops added to the database required this information.

Ins., Cmd., Org., and Ofc. These abbreviations stand for installation, command, organization, and office, respectively. The installation field is the name of the installation (McGuire AFB) and required input only for the shops added to the database. Also, the command (major command or agency) required input only for the shops that PES added to the database.

The organization and office data fields represent the shop's organization and office symbols, respectively. These fields required updates for nearly all the 35 shops that completed Shop Profile Worksheets.

Each of these data fields was populated using Base-maintained pick-lists. If the necessary information was not in any of these pick-lists, the data was added to the appropriate pick-list table using the system administration module of AF-EMIS.

Title. The title is the Organization Title on the Shop Profile Worksheets and represents the name of the shop, such as Corrosion Control Shop. Updates were required for 15 of the 35 shops that submitted Shop Profile Worksheets.

CSA ID. This data field represents the shop's assigned Chemical Staging Area Identification (CSA ID), such as the HAZMART. PES found this data field to be correct for all the 35 shops that submitted Shop Profile Worksheets.

Status. This data field defines the shop status as active or inactive. PES verified that the status for all shops was listed active by the AF-EMIS database. PES had to enter a status designation for seven new shops.

Building, Location, Address, City, State, and Zip. These data fields relate to the physical location of the shop. The building is the number assigned to the shop building. The location is a general description of the shop location on Base, such as north of the airfield. The address, city, state and zip refer to the shop's mailing address. Each of these data fields were updated as needed for the 35 shops that submitted a Shop Profile Worksheet; approximately 65 percent of these required updating.

Contractor, COR Shop, Contract Period From, and Contract Period To. These data fields indicate if a contractor is performing services in the shop. None of the Shop records already in the database when PES initiated its work nor any of the Shop Profile Worksheets indicated contractor operations in the shop. PES did not populate this field because no data were available.

HM POC and Phone Number. These data fields represent the shop hazardous material point of contact (HM POC) and phone number. Revisions to these AF-EMIS data fields were required for nearly all of the shops that submitted Shop Profile Worksheets. The data field is actually a pick-list. If the name of the POC

is not in the list, it must be added. There are two methods for adding employees to this list, depending on whether or not the AF-EMIS employee module is being used. If the employee module is being used, the POC must be added to the employee module to be available in the HM POC pick-list. If it is not being used, as was the case at McGuire AFB, the name of the POC was entered in the data field without using the pick-list.

Supervisor with Phone Number, UEC with Phone Number, and HW POC. These data fields represent the names and phone numbers of the shop supervisor, Unit Environmental Coordinator (UEC), and the hazardous waste point of contact (HW POC). The method for entering this data is identical to that used to enter the HM POC. As with the HM POC, revisions to these AF-EMIS data fields were required for nearly all of the shops that submitted Shop Profile Worksheets. The UEC or HW POC information was never populated on the Shop Profile Worksheets; therefore, no revisions were made to the existing data in these two data fields.

Supply Account Code, Supply Status, and Effective Date. The supply account code is the code used to bill for hazardous material purchases and wastes. These codes were the basis for establishing AF-EMIS Shop Codes and are included on every Form 3952; in fact, the hardcopy of these 3952 forms are filed at the HAZMART by the supply account code. The only new account codes that PES created were for the shops where no information was in the database. The effective date entered by PES was based on the date the supply account code was added to AF-EMIS. As was the case with the shop status, the majority of shops had active authorizations; therefore, the supply status of all shops was active.

Process Code and Description. The process code is a four character code (two-letters followed by two numbers) that indicates the process operations that occur

in the shop, such as industrial soldering. These fields were populated/validated for each shop to the extent information was available from the Shop Profile Worksheet and the Form 3952 for that shop. As discussed above, generic process codes that were entered by the Logistics Group were not changed by PES.

Mission Statement. The mission statement is a description of the shop's primary mission (i.e., corrosion control of ground support equipment). This information had to be revised by PES for approximately 65 percent of the 35 shops for which Shop Profile Worksheets were completed.

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3.0 NSN RECORD DATA ENTY/VALIDATION PROCEDURES

The sources of information needed to enter/validate the data fields that Base AF-EMIS stakeholders wanted populated were as follows: Form 3952, Fedlog database, Hazardous Material Information System (HMIS) or MSDS if HMIS information was not available, list of EPA 17 chemicals, and a list of ozone depleting chemicals (ODCs). The NSN record data fields; the sources of information used to populate these fields; and the number of times PES entered data for each data field are listed in Table 3.1. The AF-EMIS NSN record screen is included as Figure 3.1.

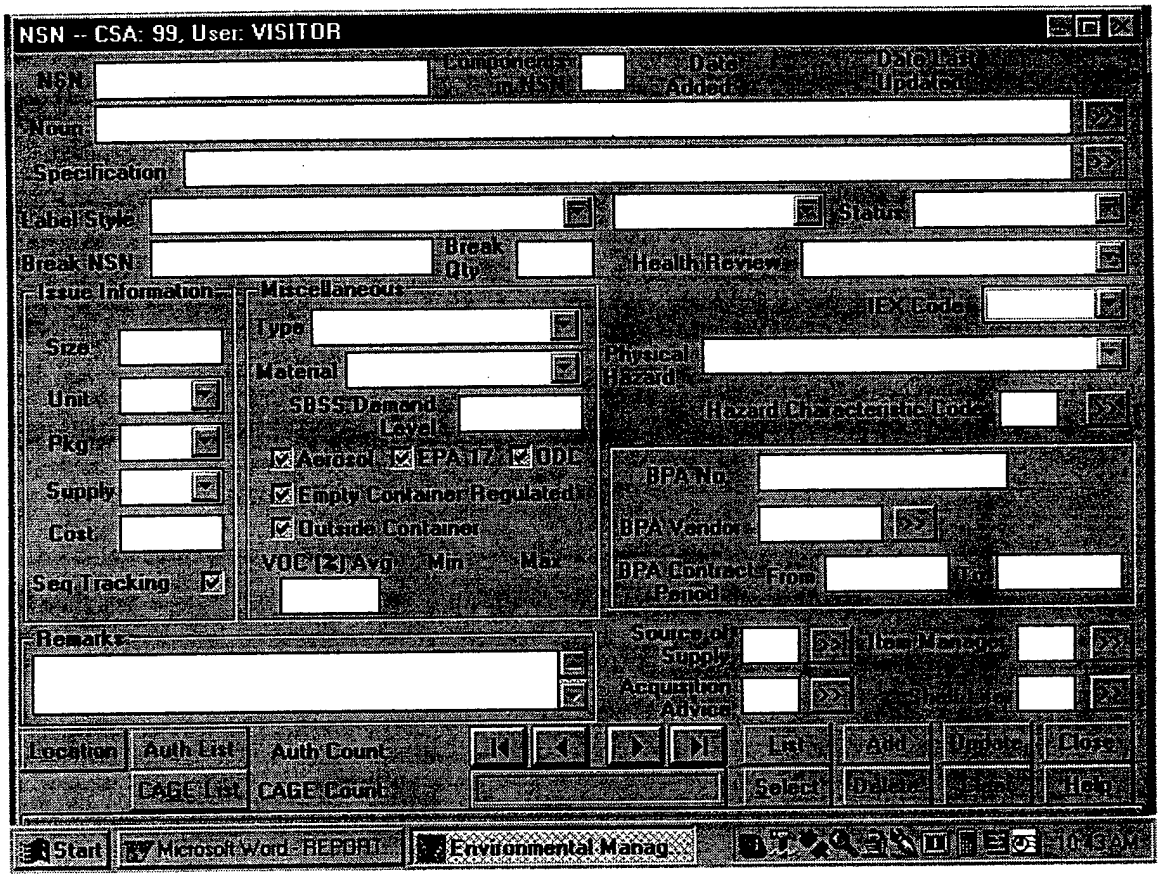
The first step for entering NSN record information was to select valid CAGE(s) (MSDS) to serve as the information basis for the data fields. The CAGE(s) were initially selected based on the presence of the associated HAZMAT in the AF-EMIS inventory module, and hence being stored in the HAZMART at the time of the record update. If the material from one or more suppliers was in the inventory, the corresponding CAGE(s) was used. If none of this material were in inventory the CAGE with the most recent MSDS preparation and evaluation dates located in the General Information section of HMIS was selected. Typically, the most recent MSDS preparation date was used; however, an older MSDS was used if it was evaluated far more recently.

Another consideration in the CAGE selection was whether manufacturer information existed. If HMIS did not have sufficient manufacturer information for a CAGE, Fedlog was checked. If the CAGE did not exist in Fedlog (likely for CAGEs consisting of five letters), another CAGE was chosen with similar dates; however, this was extremely rare. If a CAGE was not in HMIS, a hard copy of the MSDS was needed. A MSDS could not be obtained by the Base for 124 stock items (including local purchases) in time for the PES team to enter MSDS

Table 3.1 NSN Record Data Fields with Sources of Information and Number of PES Entries		
Data Field	Source of Information	Number of PES Entries
NSN	Form 3952	407
Components in NSN	Fedlog / HMIS	447
Noun	Fedlog / HMIS / 3952	415
Status	Fedlog / HMIS / 3952	407
Break NSN	Fedlog / HMIS / 3952	49
Break Qty	Fedlog / HMIS / 3952	49
Size	Fedlog / HMIS / 3952	1,181
Unit	Fedlog / HMIS / 3952	1,176
Pkg.	Fedlog / HMIS / 3952	1,174
Supply	Fedlog / HMIS / 3952	430
Seq. Tracking	Fedlog	49
Type	Fedlog / HMIS / 3952	1,176
Material	Fedlog / HMIS / 3952	1,156
Aerosol	Fedlog / HMIS / 3952	289
EPA 17	HMIS / EPA 17 List	See Discussion
ODC	HMIS / ODC List	See Discussion
Empty Container Regulated	HMIS / Reg. Cont. List	See Discussion
Outside Container	Fedlog / HMIS / 3952	141
VOC %Min (automatically calculated)	Not Applicable	N/A
VOC %Max (automatically calculated)	Not Applicable	N/A
Health Review	HMIS	779
IEX Code	HMIS	1,236
Physical Hazard	HMIS	1,236
Shelf Life	Fedlog	465

FIGURE 3.1

AF-EMIS NSN RECORD SCREEN



information. Of the 124 MSDSs needed, only 23 were for HAZMAT with NSNs; the remainder was for local purchases. It was suspected that many of the NSNs for these materials were incorrectly entered on the Form 3952, as some success was attained in searching Fedlog and/or HMIS for a different NSN created by transposing a few characters of the NSN listed on the Form 3952 to make it correspond to the product description listed there.

The procedure for selecting a CAGE for local purchases differed from that used for selecting a CAGE for NSNs because locally purchased items were not kept in the AF-EMIS inventory module and the CAGE data for these items were rarely in Fedlog. The only sources of information were HMIS, Form 3952, and an MSDS, if it were attached to the Form 3952. The first step was to attempt to find the LPN in HMIS using the LPN provided on the Form 3952. LPNs with a letter as the seventh digit can typically be found in HMIS. If this method did not work, searches were attempted on manufacturers, part numbers, product names, or any other information relating to the product. Using these methods, PES was able to identify CAGEs and thus populate the NSN records for 370 of 471 local purchases in the AF-EMIS database. The remaining 101 locally purchased items require hard copy MSDSs or more material information to populate a NSN record for each as they could not be found in HMIS. The lack of product information supplied on the Form 3952 prevented PES from finding the MSDS in HMIS for any of these.

Once a CAGE was chosen for the NSN/LPN, all data fields were populated or validated as described in the following paragraphs.

NSN. The NSN for a stock or local purchase item was obtained from its Form 3952; however, several scenarios required that the NSN in AF-EMIS from the value listed on the Form 3952 be changed. The supply unit of issue in the management and characteristics sections of Fedlog may indicate that the item is

received by the HAZMART in bulk. If this is known to be the case, the "Break Open" feature in AF-EMIS must be used. This allows for the issue and tracking of material that is ordered in bulk, but can be either delivered as bulk (e.g., a box of 12 cans of spray paint) or as individual issues (e.g., one can of spray paint). The base NSN is for the bulk item. Another NSN, commonly referred to as "dash one NSN" because it is formed by adding a "-1" to the end of the base NSN, is created as the AF-EMIS identification number for sequential tracking of the individual units from a bulk package. The "dash one NSN is also referred to as a "Break NSN".

The "Break Open" feature also must be used for bulk compressed gases, such as acetylene. The base NSN is for the empty cylinder (with the supply units of issue equal to CF or LB). The "dash-one NSN" is for the cylinder with gas (supply units equal to CY for cylinder). Many of the compressed gas NSN records already in the database were created in this fashion; therefore, few revisions were needed.

PES entered data for 49 "Break" NSN records created in the database. The majority of these records involved boxes of paint, cleaner, oil, or insect repellant.

Another scenario that required a change to the NSN entered into AF-EMIS from the Form 3952 occurred when Fedlog showed that the authorized NSN had been replaced. For this scenario, the status of the pre-existing (i.e., before PES' data entry activities) NSN record status was changed to "replaced" and a remark was added discussing the replacement of this NSN record. A new NSN record was created (or if the new NSN existed in AF-EMIS, that record was updated), based on the new Fedlog data and appropriate CAGES.

For locally purchased HAZMAT with no LPN listed on its Form 3952, but with MSDS information in an attached MSDS or in HMIS, the LPN was assigned

using the NSN listed in HMIS for that HAZMAT, except that the fifth and sixth digits were changed to "LP" to indicate a local purchase. Since the NSN would now be different from that listed in HMIS for the HAZMAT, a note was included in the remarks data field indicating the NSN was found in HMIS.

In addition, many of the local purchases had a LPN assigned on the Form 3952 and entered into AF-EMIS by the LG personnel; however, these LPNs were based on the four-digit prefix stock classification plus an alphanumeric description of the material, such as 8010-REDPAINT2. These NSNs were changed by PES to the NSNs found in HMIS (and modified with "LP" as described above), if possible. If a NSN could not be found in HMIS, the base assigned LPN was retained. The key factor in determining PES' success in finding a HMIS NSN was the level of detail in the information presented on the Form 3952, such as part numbers or trade names.

Components in NSN. This data field represents the number of components, or parts, in a single NSN and was obtained by PES from either the characteristics section of Fedlog or in HMIS (typically in the Part Number/Trade Name). For most materials, such as oil, the value is one; however, some materials are multi-part kits, such as an epoxy adhesive.

Noun. The Noun is the nomenclature associated with a NSN. In AF-EMIS, it must be chosen from a pull-down list pre-loaded in the software by the Air Force. Typically, the correct Noun was available from the pull-down list for the NSN, but it was validated and occasionally changed based on information from Fedlog or HMIS/MSDS/Form 3952 for local purchases. If the required Noun did not exist in the pull-down list, it was added to the list using the AF-EMIS systems administration module.

Status. The Status of a NSN record was always entered as "active" unless the material was not authorized for use by any shop on Base. For instance, if a material was replaced (see discussion under NSN above), the Status was assigned "Replaced". As the last step of updating the NSN records, PES changed the status of NSN records for unauthorized material use to "Inactive".

Break NSN. This data field was used for bulk materials and compressed gases when using the Break Open feature of AF-EMIS. See discussion under NSN above on when to use this feature. The Break NSN was entered in the base NSN record; this data field is left blank in the Break NSN (dash one) record. Also note, the Break NSN record must be created before this data field can be populated in the base NSN record.

Break Qty. This data field represents the number of individual items indicated within the base NSN (from which the "dash one NSN" was created), such as 12 cans of paint in a box. As was the case for the Break NSN data field, it was used when the Break Open feature was required and could not be populated until the Break NSN record was created.

Size. The field gives the quantity of HAZMAT shipped in the container provided by the supplier. The management and characteristics sections of Fedlog or general information section of HMIS indicated the appropriate Size for a given NSN. When PES began the data entry, the size data field for all NSN records were either empty or were incorrectly populated with packaging information (e.g., box or bottle) rather than HAZMAT size units of measurements. PES updated these fields to mass (e.g., pounds) or volumetric (e.g., gallons) units using data from Fedlog.

Size information for local purchases was typically based on the Form 3952 for each material as Fedlog was not available for local purchases and HMIS records

rarely listed such data for these items. If the Form 3952 did not include sufficient data, the Size was based on typical quantities for similar materials. For example, the typical size for spray paint was one pint.

Unit. The Unit represents the stock item's mass or volumetric unit of measurement within the package specified by the NSN; it was chosen from a pull-down menu. The management and characteristics sections of Fedlog or general information section of HMIS indicated the Unit for each NSN. Most of the Unit data entered into the AF-EMIS database before PES started its data entry was found to be incorrect and was changed to the right values of pounds or gallons.

Pkg. This data field is the packaging specific to the NSN. The management and characteristics sections of Fedlog or general information section of HMIS give the packaging for each NSN. In AF-EMIS, it was chosen from a pull-down menu, which provided the same choices as Unit; however, this field was not the same as Unit. Instead of mass or volumetric units of measurement, the packaging is the physical container of the material, such as a bottle, can, box, roll, cylinder, drum, etc. This data field had to be updated for most NSN records.

Supply. This data field is used for identifying the unit of issue that the supply system uses when ordering a material and is obtained from the management section of Fedlog. This field rarely required updating as the pre-existing Supply data was typically correct.

Seq. Tracking. This data field enables the sequential tracking feature in AF-EMIS and is locally established through the use of a three way check box. The box is checked "yes" (indicated by an "X" in the box) for bulk materials and compressed gases when using the Break Open feature of AF-EMIS. See discussion under NSN on when to use this feature. Otherwise, the box is

checked "no" (indicated by an empty, non-shaded box). The third option, which was never used, was "unknown", indicated by an empty, shaded box.

Type. The Type data field represents the type of container the material is packaged in, such as can, box, bottle, etc. It was chosen from a pull-down menu and matched the Pkg. data field. If none of the choices in the pull-down menu match the Pkg. field, "other" was selected (typical for unusual packages such as rolls of solder). Also, for a NSN record that had a Break NSN, the Type data field for the base NSN reflected the individual units' container, not the package containing the individual units (i.e., the bulk package). This data field was populated for all NSN records.

Material. The container material of construction (i.e., glass, metal, plastic, or cardboard) is entered in the Material data field. As is the case with the Type data field, it was limited to the options in a pull-down menu and did not represent the outside container of the original NSN when the Break Open feature was utilized. This field was also populated for all NSN records.

Aerosol. The Aerosol data field is a three-way check box with yes, no and unknown options. If the characteristics section of Fedlog or the constituents in HMIS indicates that the material is an aerosol, the box was toggled to contain an "X"; otherwise the box was left empty and non-shaded. In the pre-existing database (prior to PES' efforts), this data field was rarely checked with an "X" regardless of whether it was an aerosol or not.

EPA 17. This three-way check box indicates the possible presence of an EPA-17 regulated chemical within the material. Because there may be multiple CAGEs with different constituents for a given NSN, this data field does not indicate that the HAZMAT corresponding to the NSN does in fact contain an EPA 17 chemical. It only indicates that at least one supplier of the HAZMAT includes

an ingredient that is an EPA 17 chemical. Because it has no bearing on EPA-17 related calculations, this data field was not populated. This decision was made jointly by PES and representatives from BE and CE.

ODC. Similar to the EPA 17 data field, ODC indicates, through the use of a three-way check box, the possible presence of an ozone depleting chemical. This data field was populated even though the same information exists elsewhere (in the CAS record) of the database because there were not many ODCs present in the authorized materials.

Empty Container Regulated. This data field indicates whether or not disposal of the empty container of the material is regulated. This data field was not populated because the post-use treatment of the empty container may vary the regulated status of an empty container.

Outside Container. This data field indicates that the material is contained within an outside container through the use of a three way check box. The box was checked "yes" if an outside container were used, such as for bulk materials when the Break Open feature of AF-EMIS (i.e., box of metal cans containing paint) was used. Otherwise, the box was checked "no". The third option, which was never used, is "unknown", indicated by an empty, shaded box. PES changed the "unknown" for many of the NSN records to "no" or "yes" as appropriate.

VOC (%) Avg., Min., and Max. These data fields represent the average, minimum, and maximum percent by weight concentration of volatile organic compounds. This information is AF-EMIS-generated based on information entered in the associated CAGE record(s).

Health Review and IEX Code. The Health Review data field is based on the Issue Exception (IEX) Code. If the Health Review and IEX Code data fields were

already populated, they were left unchanged. If one field was populated, the other field was assigned the matching value (both fields showed the IEX Code). Otherwise, per the direction of LG, CE, and BE, they were assigned "IEX9 - Acute Hazard" and "9", respectively.

Physical Hazard. The Physical Hazard data field represents the physical hazards associated with the material. A pull-down menu provides a set number of choices. This data field was populated/verified in conjunction with the Hazard Characteristic Code data field. In the general information section of HMIS, the hazard characteristic code, if available, is given by a code consisting of one letter followed by one number, such as F1. This code is the same code as the Hazard Characteristic Code in AF-EMIS; the associated pick-list shows each code along with a description of that code. This description corresponds to the options in the Physical Hazard data field.

There were three situations for which the exact code and description given in HMIS was not used to populate this data field in AF-EMIS. The first situation was when HMIS showed a hazard characteristic code of "N1", the corresponding description in the AF-EMIS Hazard Characteristic Code was "Nonhazardous Material". Because this option does not exist under Physical Hazard, "No Specific Hazard" was used instead.

Another situation was when HMIS did not list a hazard characteristic code. When this occurred, the transportation data section of HMIS, which occasionally describes the physical hazards associated with the material, was checked. For this situation, the Hazard Characteristic Code was left blank and the option under Physical Hazard that best fit the description given in HMIS was selected.

The last situation was when HMIS did not list a hazard characteristic code or informative transportation data for the HAZMAT. When this occurred, the

Hazard Characteristic Code was left blank and "No Specific Data" was chosen from the pull-down menu under Physical Hazard. The Physical Hazard data field was populated or updated for virtually all NSN records.

Shelf Life. This data field represents the amount of time, selected via a pick-list, a material can remain unused in storage before it must be tested, disposed, or reconditioned. Typically, Shelf Life did not need to be updated for NSNs; however, the shelf life for local purchases was entered as "unknown" because the information was not available (no Fedlog for local purchases).

4.0 MANUFACTURER RECORD DATA ENTRY/VALIDATION PROCEDURES

Manufacturer records were updated/validated using both HMIS/MSDS and Fedlog. HMIS/MSDS was used to provide search information in retrieving data in Fedlog, which was typically more up-to-date. Many of the most recent MSDSs for products were several years old; however, Fedlog is updated monthly with more recent information.

Once the NSN record was updated, the Manufacturer record was populated next. It is necessary to populate the Manufacturer record before the CAGE record because the latter cannot be created unless the CAGE data field in the Manufacturer records has been entered into the AF-EMIS database.

While the Manufacturer records are not directly connected to NSN records, they are indirectly linked via the CAGE record. Once a Manufacturer record for a given CAGE has been updated, it did not need to be updated again if the same CAGE were used for a different NSN record. For instance, if one manufacturer (CAGE) makes ten different colors of spray paint (each color would have a different NSN record), the Manufacturer record only needed to be updated one time. For this data entry/validation task, PES determined if a Manufacturer record needed updating by inspecting the system-generated Date Last Updated data field. If this date was before the PES data entry team arrived onsite, the record needed to be updated.

Also, when a CAGE record is imported from HMIS, manufacturer information is imported as well. If the manufacturer data were updated using Fedlog before the CAGE record were imported from HMIS, the Fedlog-based data (which reflects the most recent information) is overwritten with the older data from HMIS. There are two approaches for avoiding this problem. One approach is not to use the

electronic HMIS import feature; data needed from HMIS is manually transferred to AF-EMIS. The other approach is to verify that the manufacturer CAGE has been entered in the NSN record, import the CAGE record electronically from HMIS, and then enter/validate the Manufacturer record.

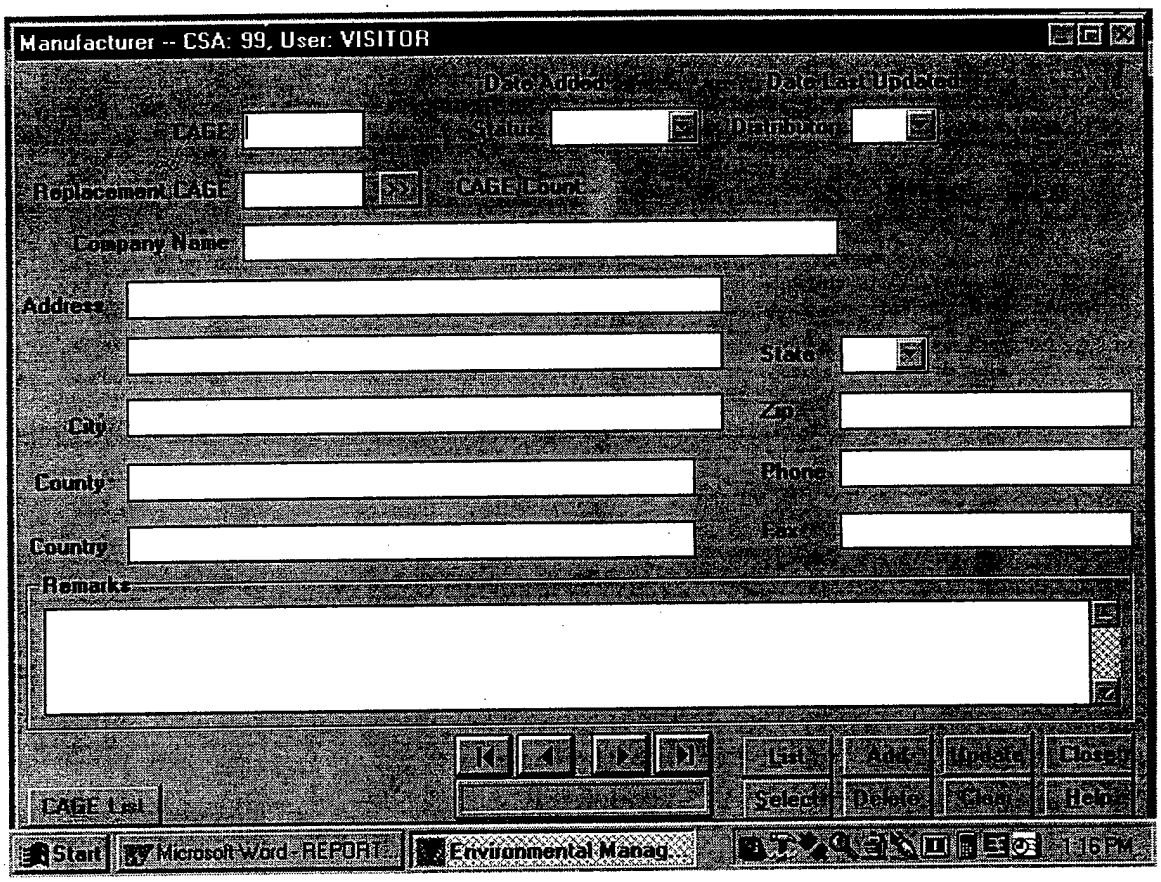
Table 4.1 lists the Manufacturer data fields that the Base AF-EMIS stakeholders wanted populated; the associated sources of information PES used to populate them; and the number of times data were entered for each data field. The AF-EMIS Manufacturer record screen is presented as Figure 4.1. Much of the Manufacturer record data had already been pre-loaded by the AF-EMIS software developer before PES arrived onsite and the entered data were typically correct. Data entry/validation by PES was fairly straight forward.

Table 4.1. Manufacturer Record Data Fields With Sources of Information and Number of PES Entries

Data Field	Source of Information	Number of PES Entries
CAGE	AF-EMIS Inventory Module / HMIS	124
Status	See Discussion	125
Distributor	See Discussion	157
Company Name	Fedlog / HMIS / MSDS	155
Address	Fedlog / HMIS / MSDS	225
City	Fedlog / HMIS / MSDS	274
County	Fedlog / HMIS / MSDS	3
State	Fedlog / HMIS / MSDS	141
Country	Fedlog / HMIS / MSDS	143
Zip	Fedlog / HMIS / MSDS	274
Phone	Fedlog / HMIS / MSDS	267
Fax	Fedlog / HMIS / MSDS	90

FIGURE 4.1

AF-EMIS MANUFACTURER RECORD SCREEN



CAGE. This data field is the HAZMAT vendor's Commercial and Government Entity (CAGE). The majority of the CAGE data fields had already been entered into the AF-EMIS database by the Logistics Group before PES began its data entry. Only 124 CAGEs needed to be entered, which brought the total number to 567.

Status. For all Manufacturer records associated with a CAGE chosen for use in the NSN record, the Status was "Active". The other Manufacturer records were left unchanged.

Distributor. This data field identifies if the manufacturer is a distributor, as indicated by "Yes or "No. There was no specific source for this information; therefore, the data team made two assumptions regarding the distributor field. First, if the data field was populated, it was assumed correct. Otherwise, the field was set to "No" unless the manufacturer name indicated that it was a distributor.

Company Name, Address, City, County, State, Country and Zip Code. These data fields relate to the location of the HAZMAT vendor/manufacturer. All data entry/validation for these fields was performed with no difficulties, except for the County field, which was rarely listed in Fedlog or HMIS. Because there were no available data, the County data field was left blank.

Phone and Fax Numbers. These data fields were also entered/validated with little difficulty. Fax numbers were sometimes left blank because they were not listed in HMIS or Fedlog.

5.0 CAS RECORD DATA ENTRY/VALIDATION PROCEDURES

As mentioned in Section 1.3, CAS records were not updated because AF-EMIS Version 6.0, which is scheduled for release in May 1999, will contain updated CAS records, including some new fields. If PES would have made any updates to the current version of AF-EMIS, they would be overwritten by the new CAS records associated with AF-EMIS Version 6.0.

6.0 CAGE (MSDS) RECORD DATA ENTRY/VALIDATION PROCEDURES

The sources of information needed to enter/validate information for the CAGE record data fields that the Base AF-EMIS stakeholders wanted updated were as follows: Fedlog database and HMIS (or MSDS if HMIS information was not available). Table 6.1 lists these CAGE (MSDS) record data fields; the sources of information that PES used to update them; and the number of times data were entered for each data field. The AF-EMIS CAGE (MSDS) record screens are included as Figures 6.1 and 6.2.

A significant amount of time was spent "cleaning-up" the CAGE (MSDS) records because of two factors. First, some NSNs had multiple (up to 45) CAGE (MSDS) records associated with them. The only CAGE records that were needed for a NSN were those for which their CAGE(s) were in the AF-EMIS inventory module (indicating that HAZMAT from the vendor corresponding to the CAGE was actually in the HAZMART) or those with the most recent MSDS (see NSN discussion). To allow for easy identification of the CAGEs (MSDS) selected by PES and the HAZMART staff to be kept active in the database, all other CAGE (MSDS) records were assigned appropriate Ounces and Types and the Status was set at "Inactive" (See Section 3 for more details on this issue).

The second factor regarding CAGE (MSDS) records was the "CAGE Component No." and "CAGE Version" fields. When a new version of a MSDS is obtained, a new CAGE (MSDS) record should be created utilizing the same CAGE but changing the "CAGE Version" to the next letter value (i.e., old version "B", new version "C"). The CAGE (MSDS) records already in the AF-EMIS before PES initiated its data entry did not reflect the use of this procedure; the "CAGE Component No." was increased instead. The Component Number should be used for multi-part kits, such as a two-part epoxy. This incorrect

Table 6.1. CAGE (MSDS) Record Data Fields with Sources of Information and Number of PES Entries		
Data Field	Source of Information	Number of PES Entries
NSN	Form 3952 / HMIS	1,342
CAGE	AF-EMIS Inventory Module/ HMIS	1,342
CAGE Status	Inventory / MSDS Date	4,295
CAGE Version	HMIS / MSDS	1,330
CAGE Component No.	HMIS / MSDS	1,329
Part No. or Trade Name	HMIS / MSDS	1,159
MSDS Date	HMIS / MSDS	1,224
Health Review Code	HMIS / MSDS	1,482
Health Hazard	HMIS / MSDS	1,512
Physical Hazard	HMIS / MSDS	1,501
Ounces	Fedlog / HMIS / Form 3952	4,102
Type	Fedlog / HMIS / Form 3952	3,874
pH Type	HMIS / MSDS	943
pH Min. and Max.	HMIS / MSDS	167
VOC with Units	HMIS / MSDS	708
Specific Gravity	HMIS / MSDS	1,282
Density	HMIS / MSDS	1,282
Vapor Pressure with Units	HMIS / MSDS	688
Constituents – CAS	HMIS / MSDS	5,467
Constituents – Chemical Name	HMIS / MSDS	5,467
Constituents – Amount Min. and Max.	HMIS / MSDS	5,041
Constituents – Concentration Units	HMIS / MSDS	5,042
Constituents – % Weight or Volume	HMIS / MSDS	5,040
Constituents – Chemical Form	HMIS / MSDS	6,000
Constituents – Chemical State	HMIS / MSDS	6,010

FIGURE 6.1

AF-EMIS CAGE (MSDS) RECORD SCREEN NUMBER 1 OF 2

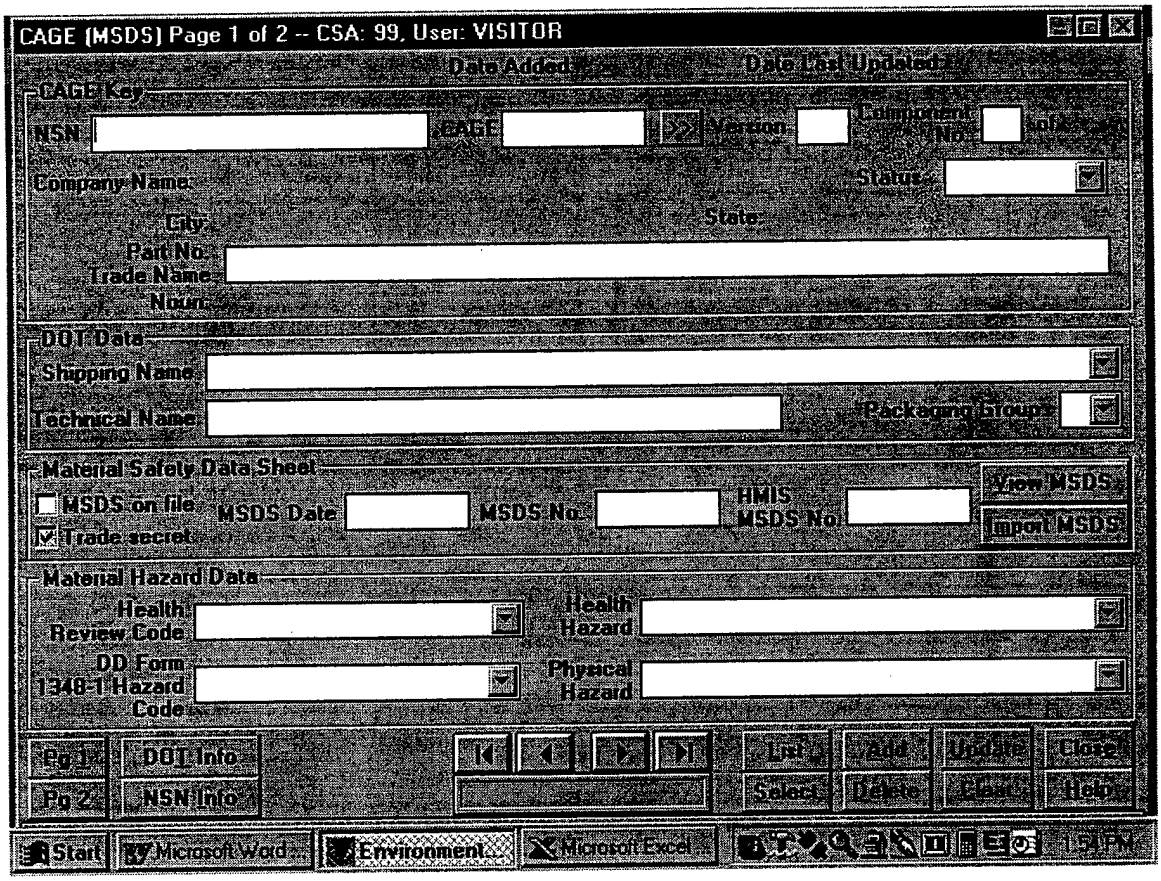
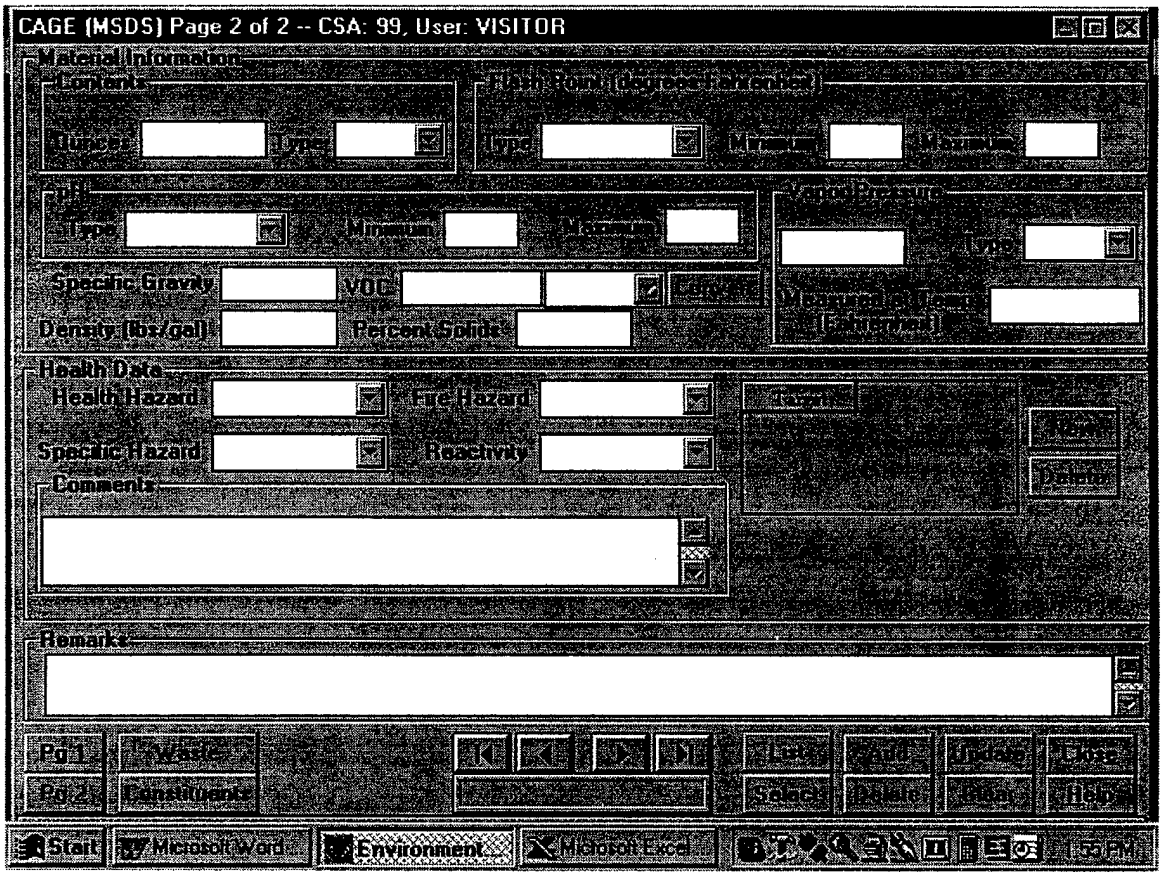


FIGURE 6.2

AF-EMIS CAGE (MSDS) RECORD SCREEN NUMBER 2 OF 2



procedure resulted in CAGE (MSDS) records with multiple components for a single component material. To resolve this error, PES assigned the additional components near zero size in Ounces and Types (zero cannot be entered) and inactivated the record. Next, the correct CAGE version and component(s) were created. A total of 2,779 CAGE (MSDS) records were inactivated for this reason.

While HMIS was used for the majority of CAGE (MSDS) records, hard copy MSDSs were required for 124 CAGE records (including those needed for local purchases). A list of these MSDSs was provided to the LG and BE for future input as time constraints would not allow the PES team to wait until the MSDSs were obtained to populate these 124 CAGE records. Of the 124 MSDSs needed, only 23 of them were for HAZMATs that were not local purchase items. It is suspected that the NSNs for these 23 materials were incorrectly entered by the shops on the Form 3952, because PES was able to find a MSDS from HMIS for some HAZMAT for which the NSNs were not correctly listed on the Form 3952 and thus not listed in Fedlog or HMIS. PES was able to do this by transposing some of the NSN characters to obtain a NSN that was listed in Fedlog with a description that matched that given on the Form 3952.

Once the correct CAGE(s) had been identified as part of NSN record population and all others made inactive, all the CAGE record data fields were entered or verified using two methods.

One method utilized the "Import MSDS from HMIS" feature in AF-EMIS. Use of this feature automatically populated the following CAGE (MSDS) record data fields:

- NSN;
- CAGE;
- CAGE Version;
- CAGE Component Number;

- CAGE Status;
- Part Number or Trade Name;
- MSDS Date;
- HMIS MSDS Number;
- Ounces with Type;
- pH Type/Minimum/Maximum;
- Vapor Pressure with Type;
- Specific Gravity;
- Constituent CAS;
- Constituent Name;
- Constituent Concentration with Units; and,
- Constituent Weight or Volume Percent.

Although this information was imported directly from HMIS, PES checked it to assure that the import procedure worked correctly. In some instances, corrections were required to imported information, such as Vapor Pressures with Type. For these data fields, AF-EMIS would import the Vapor Pressure and Temperature into the same vapor pressure data field. For example, a vapor pressure of "50@70 (mm Hg@°F)" sometimes was imported in the Vapor Pressure field as 5070 mm Hg. Also, some constituents were not always imported because the HMIS CAS data field was either blank or incorrect.

The other method did not utilize the AF-EMIS Import MSDS feature. Instead, the HMIS information was manually entered into the database. This method worked well when two computers were used; one machine had AF-EMIS on-screen while the other had HMIS on-screen. Since some information had to be entered/validated manually even when the electronic import feature was used, it was more efficient to manually enter all information rather than to execute the electronic import, check imported information, then enter the remaining data.

NSN. The NSN was obtained from the Form 3952. The number of NSNs entered into AF-EMIS CAGE records by PES is the sum of NSNs associated with added NSN records and the NSNs associated with the CAGE (MSDS)

records created to correct the CAGE version and component(s), as described above.

CAGE. The CAGE numbers to be entered were chosen as described in the NSN record discussion in Section 3.

CAGE Status. This data field establishes the status of the CAGE (MSDS) record as "active" or "inactive". Each NSN record must have at least one "active" CAGE (MSDS) record. As discussed above, a CAGE (MSDS) was chosen based on two criteria. The first criteria was that the AF-EMIS inventory module showed that some of the HAZMAT from the supplier identified by the CAGE was in the HAZMART; if the HAZMAT corresponding to this NSN/CAGE combination was in the inventory, this CAGE (MSDS) was "active". Otherwise, the "active" CAGE (MSDS) was the most recent MSDS (CAGE) as determined by PES from a review of MSDS preparation and evaluation dates located in the General Information section of HMIS. Typically, the most recent MSDS preparation date was used; however, an older MSDS was used if it was evaluated far more recently. Additional information on this topic is provided in Section 3.

As discussed above, a large number of CAGE records were updated to inactivate CAGE records for suppliers that are currently not being used on Base and those that were incorrectly assigned improper versions and CAGE component numbers. PES either updated/validated the status of 4,295 CAGE (MSDS), many of which were for new CAGE records.

CAGE Version. The CAGE Version data field represents the version of the MSDS. This field is indicated in the HMIS data field "Part No. Indicator" under the top section (untitled). It was also imported using the Import MSDS feature in AF-EMIS.

As noted previously, when the database contained multiple versions of a MSDS, there should be a CAGE (MSDS) for each version. Each record should have the same CAGE code but a different CAGE Version with the next letter value (i.e., old version "B", new version "C"). The CAGE (MSDS) records in AF-EMIS when PES began its data entry did not reflect the use of this procedure; the "CAGE Component No." was increased instead.

To correct this problem, the correct version/component was created and the CAGE (MSDS) records with incorrect "CAGE Component No." were assigned near zero sizes (Ounces and Type) and inactivated.

For multi-component HAZMAT, HMIS lists a different CAGE version for each component. For example, Part One of the multi-component HAZMAT may be listed in HMIS as Version A, and Part Two listed as Version B. PES entered all parts of a multi-component HAZMAT with the same version in the AF-EMIS database. If the components in HMIS were not listed in alphabetical order, remarks were added to each CAGE record clarifying which HMIS MSDS version letter corresponds to each component constituent number.

CAGE Component Number. For multiple component HAZMATs, a separate CAGE record must be created in AF-EMIS for each component. The CAGE Component Number data field identifies the component for which the information is presented in the CAGE record. While most materials were single part or component products, this data field was designed to accommodate multi-part kits, such as a two-part epoxy. It was imported from HMIS into AF-EMIS or manually entered. In HMIS, the CAGE Component Number was typically found in the Part Number or Trade Name field. In addition, Fedlog and the Transportation Data section of HMIS would show occasionally component information.

As with the CAGE version, PES found the CAGE component to be incorrect for many of the CAGE records. The CAGE (MSDS) record data was entered incorrectly with respect to CAGE Version and CAGE Component. These errors were corrected by establishing proper CAGE (MSDS) records, and assigning near zero sizes (Ounces and Type) and inactivating the incorrect CAGE (MSDS) records as discussed previously.

Part Number or Trade Name. This data field contains the manufacturer's (or vendor's) part number or trade name for the material. It can be imported or found in the HMIS data field "Part Number/Trade Name", located in the top section of the HMIS screen. Typically, the Part Number or Trade Name pre-loaded in the CAGE records by the AF-EMIS software developer required only minor revisions by PES.

MSDS Date. The MSDS Date represents the date the MSDS was prepared or revised. Along with the data field HMIS MSDS Number, these data fields are the basis for the Import MSDS feature. It can be found in HMIS as "Date MSDS Prepared" in the General Information section.

For materials that were not in the HAZMART inventory, this data field, in conjunction with the HMIS data field MSDS Safety Review Date, was used to select the CAGE (MSDS) record to be associated with the NSN record. As described above, the CAGE with the most recent MSDS date was used.

Health Review Code. This data field is identical to the IEX Code data field in the associated NSN record. To quickly access the associated NSN record, there is a "NSN" button located in the bottom left corner of the first page of the CAGE (MSDS) screen. "Clicking" the mouse pointer on this button will reveal a summary of all NSN record data fields for that NSN. Upon closing this NSN

summary, the same IEX Code was entered in this Health Review Code data field.

Health Hazard. This data field represents the specific hazard to human health. It is on page one of the CAGE (MSDS) record screens; another non-required Health Hazard data field that the Base AF-EMIS stakeholders did not request PES to update is on page two of the CAGE (MSDS) screens.

A pick-list containing various health hazards, such as irritant or carcinogen, is provided. This information was found in the Health Hazard Data section of HMIS. The information in this section did not identify a specific health hazard; interpretation of the information was required. Typically, materials were described as an irritant. Some materials had other specific hazards listed, such as carcinogenicity.

Physical Hazard. This data field is identical to the Physical Hazard data field in the associated NSN record. As described for Health Review Code above, this information was copied from the NSN record using the "NSN" button.

Ounces. This AF-EMIS-mandatory data field specifies the number of ounces per unit of issue as indicated in the NSN record for that material. The ounces are either in terms of weight or volume; the next data field, "Type", provides this selection. The information used by PES to populate this field was obtained by converting the units of measurement of the Size and Unit data fields in the NSN record to weight- or volume-based ounces.

With respect to units of measurement, the ounces data field represented typical conventions. For instance, a quart of oil would be entered as 32 fluid ounces or a pound of grease as 16 net ounces. As long as the specific gravity and density

are entered correctly (especially for compressed gases), it does not matter whether the ounces are measured by weight or volume.

The Ounces and Type data fields are used to generate storage and usage reports used for regulatory reporting, such as the Chemical On-Site Summary and Issues Containing EPA 17 chemicals. Thus, it is crucial that these fields be entered correctly. PES found that many of the Ounces and Type fields were incorrect or blank. One typical error found by PES was that pounds were entered in the Ounces field.

As noted previously, when the AF-EMIS database contained multiple versions of a MSDS, multiple CAGE (MSDS) records were created utilizing the same CAGE, but a different CAGE Version formed by entering the letter that follows the one used in the record being replaced (i.e., old version "B", new version "C"). PES found that the CAGE (MSDS) records did not reflect the use of this procedure; the "CAGE Component No." was increased instead. To correct this problem, a new CAGE record with the correct version/component was created and the Ounces data field of the incorrect CAGE (MSDS) records was changed to a near zero size and the record was inactivated.

Type. This data field indicates the measurement unit for the value entered in the Ounces data field. A pick-list provides two choices; fluid for volumetric units or net for mass units. As discussed above, this data field must be entered correctly as numerous reports are generated using this data.

pH Type, Minimum, and Maximum. The pH Type data field is populated from a pick-list to indicate whether pH is not applicable to the HAZMAT material ("N/A") or if the value is entered as a range ("Range"). If the Type is not applicable, the Minimum and Maximum data fields were left blank. If a pH was available, the pH type was "Range" and the minimum and maximum values were entered. If a

single pH value was given in HMIS or a MSDS, the value was entered in both the Minimum and Maximum data fields. The pH value was given in HMIS for only 167 of the HAZMATs handled at the Base; PES entered these values in the AF-EMIS database.

VOC with Units. The VOC data field represents the amount of volatile organic compounds in the HAZMAT. The Units data field is a pick-list with the following choices: weight percent (%), pounds per gallon (lbs/gal), grams per liter (g/l), and not applicable (N/A). If no VOCs were present in the HAZMAT, the VOC data field was left blank and "N/A" was chosen from the Units pick-list. If VOCs were present in the HAZMAT, the value was entered and the appropriate units were selected. If the units were pounds per gallon or grams per liter, it was necessary to use the AF-EMIS unit conversion feature. There is a button labeled "Convert" near the Units data field; clicking the mouse pointer on this button converts these units to a percentage.

VOC information was found either on a MSDS or in HMIS, typically under the Physical Characteristics section. Occasionally, the VOC concentration was included in the ingredients information or transportation data section.

Care must be taken to note whether the VOC concentration is reported in terms of weight or volume. MSDSs and the HMIS ingredients information typically noted weight or volume units. In the HMIS Physical Characteristics section, the VOC concentration was reported in terms of volume. When VOC units were presented in terms of volume only, data was entered with respect to volume as this provided a reasonable estimate of the VOC weight concentration. Verification of volume-based VOC concentrations were based on a review of the actual ingredients; adjustments were made for some VOC concentrations after this review.

Specific Gravity and Density. The specific gravity and density of the HAZMAT were available from a MSDS or HMIS for nearly all of the authorized materials. When the MSDS or HMIS did not have a specific gravity or density, the HAZMAT was typically a solid; the specific gravity and density were given for some solid materials. The specific gravity was located in the Physical Characteristics section of HMIS. The density, reported in pounds per gallon, was calculated by multiplying the specific gravity by the density of water, 8.34 pounds per gallon.

Vapor Pressure, Type, and Measure Temperature. These data fields represent the vapor pressure, with units (pounds per square inch or mm Hg) and reference temperature of the HAZMAT. Approximately one half of the materials had a vapor pressure sufficiently high enough to report (above 0.01 mm Hg). The remaining materials were solids or liquids with low vapor pressures, such as oil.

As previously mentioned, corrections were required for electronically imported vapor pressures. For these data fields, AF-EMIS would import the vapor pressure and temperature into the same vapor pressure data field. For example, a vapor pressure of "50@70 (mm Hg@°F)" sometimes was imported in the vapor pressure field as 5070 mm Hg.

Constituent CAS and Name. The constituent data fields were populated by using the "Constituents" button located on the bottom left portion of the second screen. The Constituent CAS data field is a pick-list of the CAS numbers from the CAS records. Upon entering the CAS number from HMIS or a MSDS in the data field, the corresponding chemical typically appeared. Sometimes no chemical name would appear or the chemical name that appeared was incorrect. This situation resulted because either the CAS was not in the AF-EMIS CAS records or the HMIS CAS number was incorrect. If the AF-EMIS Import MSDS feature were used, such constituents would not be imported. In such cases, a search for the chemical name using the CAS pick-list search was utilized which

allowed PES to locate the needed constituents. Material constituents listed in HMIS with generic names, such as additives, were not entered into AF-EMIS.

PES entered/validated nearly 6,000 constituents into the McGuire AFB AF-EMIS database. Some of this effort was required to replace constituent data lost when a new CAGE record was created to correct for the improperly entered CAGE Versions.

Constituent Concentration Minimum, Maximum, Concentration Units, and Percent By Weight or Volume. These data fields all relate to the amount of constituent in an authorized HAZMAT. The Minimum and Maximum data fields represent the numeric minimum and maximum concentrations of the constituent in the authorized HAZMAT. If a single value was shown in HMIS, this value was entered for both fields. The Concentration Units data field provided three options for the minimum and maximum concentrations: parts per million (ppm), parts per billion (ppb), or percent (%). In all cases, PES entered the concentration in percent. When percent is selected from the units data field, another data field appears; percent by weight or volume. Because all HMIS records and MSDSs reported concentrations in percent by weight, this unit was selected for the AF-EMIS database.

EPCRA Chemical Form. This data field represents the constituent form as defined by EPCRA Form R reporting. There are two options provided in the pick-list; pure or mixture. The majority of constituents were reported as a mixture. A pure form was selected for materials that consisted entirely of one constituent, such as pure gases.

EPCRA Chemical State. This data field represents the constituent state as defined by EPCRA Form R reporting. The following states are available in the pick-list: solid, liquid, gas, fine powder or dust, fibrous, molten, dissolved in

solution, and fume. The majority of constituents were either a solid, liquid or gas. The remaining options apply to only a few chemicals (i.e., fibrous aluminum oxide).

It should be noted that AF-EMIS does not account for the generation of EPCRA-regulated materials from reaction of air emissions. Care must be taken to account for such scenarios as they are required for EPCRA reporting.

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7.0 AUTHORIZATION RECORD DATA ENTRY/VALIDATION PROCEDURES

The sources of information needed to enter/validate the Authorization record data fields that the Base AF-EMIS stakeholders wanted updated were as follows: Form 3952 and HMIS (or MSDS if HMIS information was not available). The AF-EMIS Authorization record screens are included as Figures 7.1 and 7.2. Table 7.1 lists the authorization data fields to be updated; the source of information PES used to update each; and the number of times data were entered for each data field.

There were 2,960 valid Form 3952s on file at the McGuire AFB HAZMART. Information on most of these authorizations were already entered in AF-EMIS by the Logistics Group; however, not all of the data that the Base AF-EMIS stakeholders wanted updated were populated. Typically only data fields that are mandatory for creating the Authorization record were populated. In addition, approximately 284 expired and/or invalid authorizations remained in AF-EMIS as active authorizations. PES made these authorizations inactive.

Populating the Authorization record is the last step in entering/validating authorized materials in AF-EMIS. Because the authorized NSN and shop numbers have been established to create the NSN and shop records, respectively, these numbers were available for entry into the Authorization records.

NSN. The NSN data field was entered or validated from data on the Form 3952. As described above, most of the authorizations were already entered into AF-EMIS by the Logistics Group. PES entered an additional 758 authorizations from Form 3952 that were submitted while the team was onsite and from the reassignment of LPNs as discussed previously.

FIGURE 7.1

AF-EMIS AUTHORIZATION RECORD SCREEN NUMBER 1 OF 2

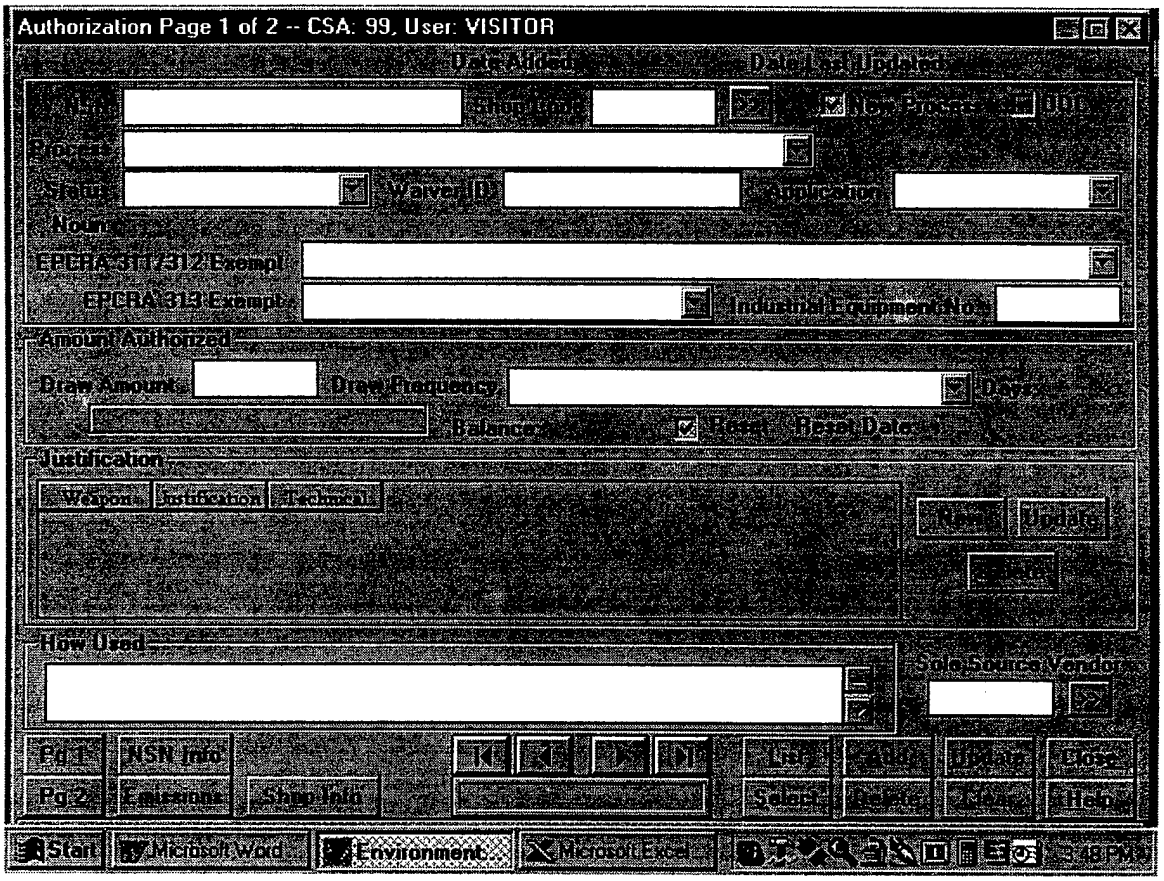

FIGURE 7.2

AF-EMIS AUTHORIZATION RECORD SCREEN NUMBER 2 OF 2

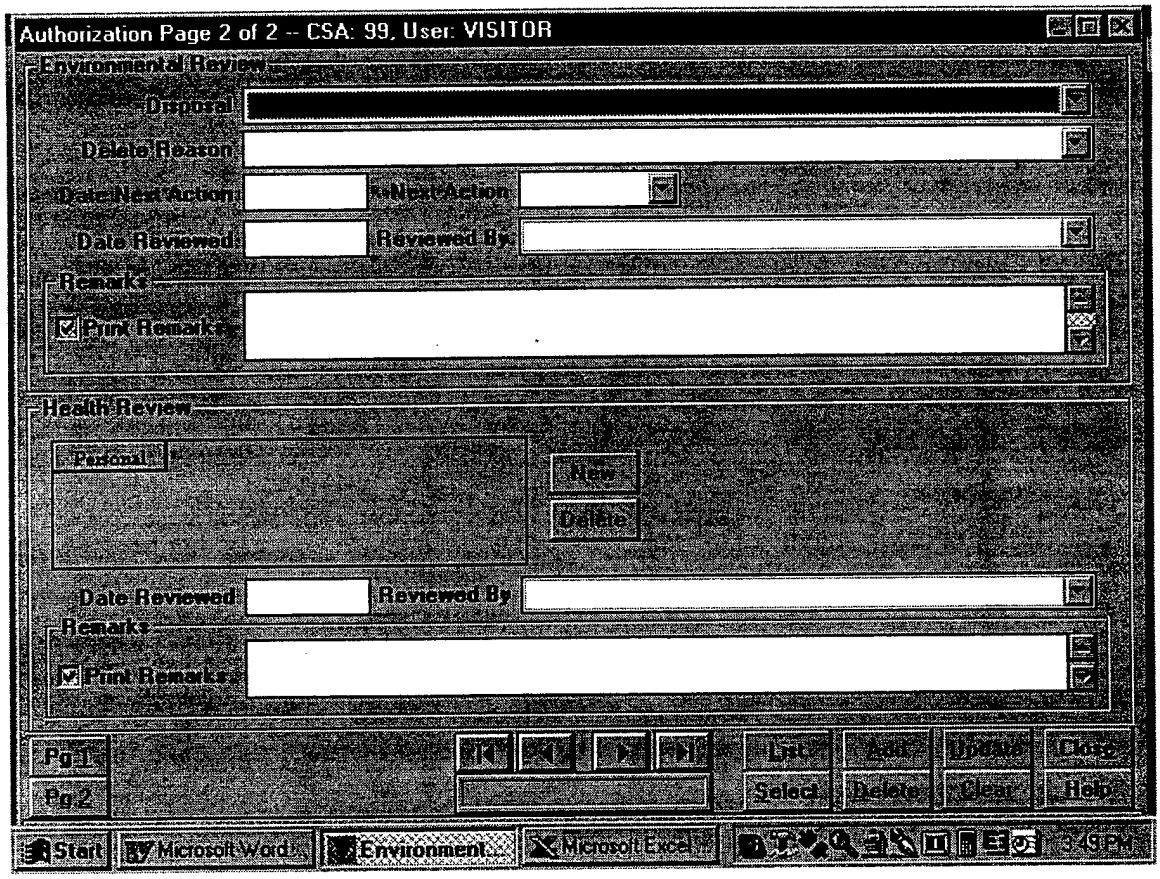

Table 7.1. Authorization Record Data Fields with Sources of Information and Number of PES Entries		
Data Field	Source of Information	Number of PES Entries
NSN	Form 3952 / HMIS	758
Shop Code	Form 3952	758
Status	Form 3952	779
Process	Form 3952	752
New Process	Form 3952	703
ODC (system generated)	System Generated	System Generated
ODC Application	Form 3952	0
EPCRA 311 / 312 Exempt	See Discussion	See Discussion
EPCRA 313 Exempt	See Discussion	See Discussion
Draw Amount	Form 3952	822
Draw Frequency	Form 3952	793
Reset	HAZMART Personnel	794
How Used	Form 3952	2,691
Date Next Action	Form 3952	1,161
Next Action	Form 3952	769
Health Review – PPE	HMIS / MSDS	4,896

Shop Code. This data field identifies the shop that is authorized to use the specific material. The shop code was obtained by comparing the supply account code from Form 3952 to a Base-created list of supply account codes with shop codes.

Status. The status of the authorization was obtained using a pick-list. If the Form 3952 was signed by a representative from CE, SE, and LG and was not expired, the status was "Active". If any signatures were missing, PES set the status at "Deleted" and stated the reason for the deleted status was the lack of approval signatures. There were 24 Form 3952s that required additional approval signatures.

After all records were entered/validated, the authorizations for each shop were checked against a spreadsheet developed by the data team. This check revealed that some materials automatically expired (status became "Expired") because the Date Next Action data field had passed. At the time these authorizations were validated by PES, their status was active; however, their status at the time of this final validation check before the PES data team completed work onsite had changed. There were 129 authorizations that expired in the database when PES completed the data entry.

Process. The process code is a four character code (two-letters followed by two numbers) that indicates the process operations that occur in the shop, such as industrial soldering. This field was populated using a pick-list established in the Shop records. As discussed in Section 2, most of the codes in the database were generic; PES retained these codes because more specific codes were not provided.

New Process. This data field is a three-way check box (yes, no, or unknown) used to indicate whether a process was newly created. This information was not

listed on the Form 3952. The check box was left blank by PES for all authorization records indicating that the process was not new.

ODC. This check-box indicates that an ODC may be present in the authorized material. This data field is automatically populated by AF-EMIS through a direct link to the ODC check-box in the NSN records.

Application (if ODC). This pick-list data field indicates how the HAZMAT is used if it is an ODC. The pick-list provides the following four options: solvent, fire suppressant, refrigerant or other. Since the ODC check-box is CAGE-specific and authorizations are not CAGE-specific, this data field was not populated because the material may or may not contain an ODC depending on supplier (CAGE). Even though this field was not populated, the method of use was always populated in the How Used data field described below.

EPCRA 311/312 Exempt and EPCRA 313 Exempt. These data fields indicate if the authorized material and process for which it is used is exempt from EPCRA 311/312 and 313 reporting requirements. These exemptions are based on the material's method of use, purpose, packaging, potential for exposure, and intended consumer.

These data fields were not populated for two reasons. First, since meaningful process codes were rarely given on the Shop Profile Worksheets or Form 3952s, it was rarely possible to exempt materials based on the usage methods or purposes. Second, the applicability of the consumer exemption to the base is unclear. A recommended practice for applying exemptions is to focus on materials that exceed reporting thresholds. This method minimizes the unnecessary process of applying exemptions to materials that will never exceed any reporting thresholds.

Draw Amount and Draw Frequency. These data fields represent the quantity of material a shop is authorized to be issued over a given period of time, e.g., two cans per week. These data fields were typically populated correctly; the only PES revisions/inputs required were associated with new authorizations or renewals of existing authorizations.

The Draw Frequency data field is a pick-list consisting of the following time periods: daily, weekly, monthly, quarterly, semi-annually, annually, greater than annually, and one-time only. If the frequency shown on Form 3952 did not match any of the pick-list frequencies, PES entered a Draw amount and frequency that was equivalent to the value on the Form 3952 (e.g., four cans per week would be entered for eight cans bi-weekly).

Reset. This data field (check-box) indicates if the draw balance should be reset after each draw. At the request of HAZMART personnel, the check-box was set to "Yes" for all authorizations except one-time only draw frequencies.

How Used. This data field is a large text box to be used to describe the material's purpose and how the material is used. PES found this data field not to be populated for all records. PES entered text for all authorizations for which it was included on the Form 3952. The majority of Form 3952s included some description of how the material was used.

Date Next Action. The Date Next Action data field indicates the date of the next required action, typically authorization renewal. The date is one year after the latest signature date on the Form 3952. This data field was updated for many of the authorization records.

Next Action. This data field indicates the next action that should occur on the date listed in the Date Next Action data field. Renewal was chosen for all

authorizations except one-time only issues. Since one-time only authorizations are good for one issue of a quantity of material, the next action was set to "Deletion". PES typically found this data field to be correct; only new authorizations required Next Action data updating.

A Remarks data field is included under this Environmental Review section. It was used to describe reasons material authorizations were deleted that were not included under the non-required Delete Reason data field. For instance, if additional signatures were required on the Form 3952, it was noted here. In addition, if a NSN had been replaced, the authorization for the old NSN included comments in this remarks field identifying the new NSN.

Health Review – Personal Protective Equipment. Personal Protective Equipment (PPE) was entered into this data field based on information taken from the control measures section of HMIS. This data field is available for entry/validation by clicking the "New" button located to the right of the PPE data field box. A pick-list includes most PPE that may be required; however, chemical splash goggles were not included. Since it was not possible to add to this list (and any change would be lost upon upgrade to AF-EMIS Version 6.0), dust goggles were chosen instead. Since very few materials required the use of dust goggles and they are similar to chemical goggles, this was deemed an acceptable approach. Identification of which goggles are required can be easily accomplished by noting the authorized material. For instance, dust goggles are not necessary for work with liquids; therefore, chemical goggles are required.

Since the PPE was based on HMIS/MSDS information, it was far more efficient to populate all PPE data fields for a single NSN at once. Because most authorizations had already been entered in AF-EMIS by the Logistics Group, it was possible to scroll through all authorizations for a single NSN and populate the PPE. The fastest method was to add one PPE to the first authorization of

the NSN, scroll to the next authorization, click the "New" button, click the "OK" button, then scroll to the next record. When one PPE is entered for all authorizations for a given NSN at a time, AF-EMIS "remembers" the last PPE selected; therefore, the selected PPE already appears in the pick-list. Thus, simply clicking "OK" populated the field.

A Remarks data field is included under the PPE data field. It was used to note that no PPE was necessary or other circumstances that related to PPE.

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8.0 FINAL AF-EMIS STATUS

This section summarizes the final overall status of AF-EMIS at McGuire AFB after completion of data entry. In addition, remaining data gaps and issues are discussed, including proposed resolutions.

At completion of the data entry on 12 February 1999, there were 1,340 different authorized HAZMATs identified in the Base AF-EMIS database with either a NSN or LPN; 868 were items with a NSN and 472 were locally purchased items that were identified with a LPN. The NSN and CAGE records were complete for all but 124 of these materials. PES could not populate the NSN and CAGE records for these 124 materials (23 NSNs and 101 LPNs) because a MSDS could not be obtained. As discussed Section 3, some of these materials may have been assigned an incorrect NSN; a better description of the material is needed from shop personnel to resolve this issue. In addition, shop personnel input may allow the identification in HMIS of local purchase materials that currently cannot be found in HMIS due to insufficient material description.

As discussed in Section 2, Shop Profile Worksheets were obtained for 35 of the 147 shops authorized for hazardous material use. The Shop records for the remaining 112 shops could not be validated because the Shop Profile Worksheets were not completed by the shop staff.

There were 2,960 authorizations in the Base's AF-EMIS database when PES completed the data entry activities. This number included authorizations that were missing required signatures and those that had expired during the PES data entry activities.

At the project outbriefing, PES submitted a one megabyte Excel spreadsheet that lists each shop and their authorized HAZMATs. Notes were included for each HAZMAT on the spreadsheet. These notes indicated the status of the AF-EMIS record types with respect to each shop's authorized HAZMAT. Additional notes were included describing all deficiencies in AF-EMIS record types for each shop-specific authorized HAZMAT, such as the Form 3952 needs signatures or a MSDS is needed. In addition, authorizations that have automatically expired were identified. Included in this spreadsheet was a master list of materials requiring a MSDS and/or shop input.

PES developed the spreadsheet to monitor and document its data entry progress. It was submitted to the Base to aid CE, BE, and LG personnel in filling the few data gaps that require information not available to PES during its onsite work. It also will be helpful in maintaining the database.

Appendix A

Shop Profile Worksheet

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Shop Profile Worksheet

AF-EMIS Code:_____ BES WIPD _____

Contractor _____ Contractor Shop Code: _____ Contract Period: _____

Command: _____ Organization: _____ Office: _____

Organization Title: _____

Address 1: _____ City: _____

Address 2: _____ State: _____

Bldg: _____ Location: _____

Supply System: _____ Fund Source: _____ CSA-ID: _____

Supply Acct Code(s) _____
_____
_____
_____

Shop Processes: 1. _____ 5. _____
2. _____ 6. _____
3. _____ 7. _____
4. _____ 8. _____

DOD ACC: _____

HM POC Name: _____ Phone: _____

Supv Name: _____ Phone: _____

UEC: _____ Phone: _____

HW POC: _____ Phone: _____

Shop Fax: _____

Shop Mission Statement:

Remarks: