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Hazardous Materials Information Network (HAZMIN®) Software Conversion Study

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Foreword

This research was funded under 622720960, "Congressional – Watervliet Arsenal Pollution Projects." The project was co-developed under the Value Engineering Program of the U.S. Army Corps of Engineers. The project described in this report was conducted at Watervliet Arsenal (WVA) during Fiscal Year (FY) 2000. The project adds the capability of tracking hazardous materials to the Environmental Management Information System (EMIS). The WVA technical monitor was Gary Wager (SMAWV-RMI).

The work was performed by the Environmental Processes Branch (CN-E), of the Installations Division (CN), Construction Engineering Research Laboratory (CERL), Champaign, IL, and consultants MSE Technology Applications, Inc. (MSE-TA), Butte, MT. The CERL principal investigator was Joyce C. Baird, and Joe Mullaney was project manager for MSE-TA, assisted by Don Schiller. The technical editor was Linda L. Wheatley, Information Technology Laboratory — Champaign. Michelle Hanson is Acting Chief, CN-E, and Dr. John Bandy is Chief, Installations Division (CN). The Technical Director of the Installation Operations business area is Gary W. Schanche, and the Director of CERL is Dr. Alan W. Moore.

CERL is an element of the U.S. Army Engineer Research and Development Center (ERDC), U.S. Army Corps of Engineers. The Commander and Executive Director of ERDC is COL John W. Morris III, EN, and the Director of ERDC is Dr. James R. Houston.

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1 Introduction

Background

The U.S. Army's Watervliet Arsenal (WVA) in New York is faced with increasing environmental regulation and reduced manpower to meet regulatory requirements. An important ongoing program for WVA is to track and control all hazardous materials from "cradle to grave" from either:

- generation in a process or
- arrival in the warehouse

to either:

- removal from the site (shipping manifesto, internal destruction) or
- product or material usage, negating effects.

If a hazardous material is generated or arrives at WVA and it does not legitimately leave the Arsenal, then there may be a compliance issue that must be addressed before it becomes a Notice of Violation (NOV). Commercial-off-the-shelf (COTS) software is available to help manage these hazardous materials at industrial sites.

WVA is currently licensed to use Logical software (Logical Technology, Inc., Peoria, IL) for site hazardous waste material tracking. The software is the Hazardous Materials Information Network (HAZMIN®). The previous version of HAZMIN® at WVA was on an outdated computer equipment, however, and needed to be updated to a more current version running on a World Wide Web (WWW) platform. For this project, the software was updated and installed on the server computer designated as "Vulcan," and uses a Microsoft Structured Query Language (MSSQL®) server as the database. Existing Material Safety Data Sheets (MSDSs) were converted to the new version of HAZMIN®, intranet access for the MSDSs were provided, and training classes were held for key users.

Watervliet Plan for Using HAZMIN®

Watervliet Arsenal developed plans to use HAZMIN® for the following purposes:

- Right-To-Know access for General Users
- Committee review of Requests for use of materials
- Generating compliance reports from the Requests submitted.

Right-To-Know Access

The first purpose of HAZMIN® is to make the MSDSs of products used on the facility available to all personnel. A General User will launch the HAZMIN® program and search for the particular product MSDS they wish to view. The use of one of several search criteria, including Product Name and Manufacturer Name, allows this.

Committee Review

Secondly, all products to be used will have a Request submitted into HAZMIN® for electronic approval by the Committee. Information in the electronic Request includes Location of Use, Specific Use, Usage, Application, Ventilation, Disposal, Process Description, and Planned Quantities of Storage and Use. The approval Committee reviews this information, and compares the MSDS against the Regulated Substance Database in HAZMIN® for possible hazardous components and their impact on the compliance reports. Upon approval, the Committee will generate a Standing Operating Procedure (SOP) for the product. Included in the SOP will be safe use, proper usage directions, and spill control procedures. The SOP is then available to the General User in electronic form when they view the MSDS. Between the MSDS and SOP, the users will have all the information they need to safely use the product. When a product is approved, the Requestor is automatically notified by e-mail. If a product is rejected for use, a reason is given and stored in HAZMIN® for future reference.

Compliance Reports

Compliance reports are available from the database, which is kept up-to-date based upon the material quantities and activities submitted on the Requests. Handling of exempt reporting areas is done by assigning a location type of "Storage – TIER II Exempt" and adding the word "exempt" to the location name. When the location is no longer exempt, a new location name is validated and location type assigned. Requests are now assigned to the new location. This allows the compliance reports to be generated from the time that exemption no longer applies. Periodic review of the

numbers reported on the Request will be done to assure the most accurate information is available for the compliance reports.

This project was funded through the Department of Defense (DOD) U.S. Army Engineer Research and Development Center/Construction Engineering Research Laboratory (ERDC/CERL) under MSE Technology Applications, Inc. (MSE) Waste Minimization and Pollution Prevention Program. MSE, headquartered in Butte, MT, was the primary contractor for ERDC/CERL.

Objectives

The main task of this project was to update an existing software-based hazardous material tracking software application. The objective of this task was to increase the capabilities of the existing Environmental Management Information System (EMIS) to allow hazardous material control, tracking, and reporting. Another main objective is to improve users' right-to-know about potential hazardous material hazards. EMIS is used to centralize, automate, and manage the acquisition, flow, storage, and reporting of environmental information throughout the arsenal. This project is to provide data from the hazardous material tracking system on the EMIS database server to be accessed through the Watervliet Intranet System (WINX).

Approach

It should be noted that Logical's HAZMIN® software has numerous features available to allow management of hazardous materials. However, the funding available for this project was not expected to support full implementation. Since it was desired for this project to obtain maximum benefits with the available funding, discussions were held early in the project to formulate a plan for achieving those benefits. A consensus obtained on what could be accomplished within budget resulted in the following preliminary list of baseline tasks:

- Converting the old Virtual Address eXtension (VAX)-based HAZMIN® system to the new Microsoft Windows®-based system.
- Making available all relevant MSDSs over the Intranet using web browser technology.
- Providing an approval system for issuing hazardous materials.
- Providing training on use of the system.

The actual tasks completed within budget exceeded expectations, and included the following:

- The entire HAZMIN® software suite (newest version) was installed onto the Vulcan Server and linked to the MSSQL® server database.
- Over 3,000 MSDSs, requests, and any notices that were currently installed and valid on the current system were converted to the new configuration and installed on the database.
- An e-mail-based system was installed for approving products to be used, which included approval, tracking, and control of material usage.
- Reporting tools were provided for Superfund Amendments and Reauthorization Act (SARA) Tier II and Form R thresholds for state-required reporting specific to WVA.
- A notification feature was included (not completely set up during this project) that provides an automatic notification of potential problems or exceeding thresholds that may lead to an NOV. This feature is easily set up by coordinators and was included in the training.
- Formal classroom training was conducted for the coordinators, users, and approvers for issuing and approving materials, system maintenance, and report generation. A total of 120 personnel were trained.

In addition to the above, a task management maintenance and support contract was set up with Logical Technology, funded by WVA, to provide support (such as software updates) and data entry for new materials MSDSs.

Mode of Technology Transfer

It is anticipated that the HAZMIN® Software Conversion Study will be available on both the CERL and the WVA web pages. The web site addresses are:

http://www.cecer.army.mil/

http://www.wva.army.mil/

Units of Weight and Measure

U.S. standard units of measure are used throughout this report. A table of conversion factors for Standard International (SI) units is provided below.

SI conversion factors		
1 in.	=	2.54 cm
1 lb	=	0.453 kg
°F	=	(°C x 1.8) + 32

2 Preliminary Planning

Initial Meeting at Watervliet Arsenal

An initial meeting was conducted at WVA on 29 August 2001 to assess the existing system and finalize the project scope and software services subcontractor specification.

Enough flexibility existed within the present work plan to include WVA's requests and any other significant changes that came from the meeting. WVA requested that the system documentation include the following items:

- User Manuals
- System Operating Procedures
- System Backup Procedures/Crash Recovery Procedures
- System Initialization Procedures
- System Disks
- Software Licenses
- Software Location and Paths.

Software Services Subcontract

MSE developed a software services procurement package, assisted in the selection of a subcontractor, and performed subcontract technical monitoring.

Sole Source Contract Award

A sole source is defined as the one and only source, regardless of the market place, that possesses a unique capability for the purpose of contract award. The sole source contract was written and submitted by MSE.

Logical Technology, Inc. Contract

Logical Technology, Inc. (LOGICAL) was contracted through sole source to convert the Watervliet HAZMIN® VAX database to the HAZMIN® MSSQL® database because (1) the database designs are proprietary to LOGICAL and (2) the company

had already developed the tools and procedures to provide the conversion, which minimized the cost to WVA.

LOGICAL will also provide training in the application and use of the HAZMIN® software since it developed the HAZMIN® software and routinely provides such training for customers. There is no third party company that has ever offered HAZMIN® training. The training is necessary due to the significant enhancements and increased functionality in HAZMIN® Version 6x over Watervliet's existing VAX HAZMIN®. Lastly, LOGICAL offered the training at the same daily rate that it offers training to any other customer.

Time Line

LOGICAL agreed that it would be able to meet WVA's time line of implementation of HAZMIN® by mid-December as long as it was given several alternate dates to schedule Planning, Installation, and Training. To keep travel costs under control, LOGICAL requested that it be able to acquire 14-day advance plane tickets.

Once LOGICAL receives authorization to convert the MSDSs, it will log into the WVA VAX via modem and export all of the current MSDSs. (Any changes made to the MSDSs by WVA after that date will be lost.) Within 14 days LOGICAL will import the MSDSs into a new MSSQL® database for WVA and have an MSSQL® database ready for installation at WVA.

LOGICAL stated its availability to meet with key WVA personnel for planning at WVA's earliest convenience. Planning includes discussions of what data and how data will be entered into HAZMIN® by the various HAZMIN® users. Based upon the discussions, LOGICAL would produce a HAZMIN® users guide for WVA and develop requirements for an e-mail enhancement to HAZMIN®. Planning could occur in Peoria or at WVA.

After the data have been imported into the HAZMIN® MSSQL® database, LOGICAL would be available to travel to WVA to install the software and MSSQL® database and conduct training.

Assumptions

The LOGICAL subcontract was based on the following assumptions:

1. WVA has an intranet with a personal computer (PC) capable of running Internet Explorer (IE) or Netscape browsers,

2. WVA has a Microsoft NT4 or Windows 2000 server running IIS 4.0 or 5.0, which is available to host the HAZMIN® web pages, and the server is visible on the intranet,
3. WVA has MSSQL® 7.0 running on a server and the server has adequate space and capacity to handle the addition of the HAZMIN® database (this may be the same machine as the one in Item 2),
4. WVA will continue to provide modem access to LOGICAL so that LOGICAL can export all of the MSDS information out of Watervliet's VAX,
5. WVA wants the HAZMIN® client loaded on two desktops which will be used to add or modify MSDS information or import MSDS information from LOGICAL,
6. WVA will request only a reasonable e-mail enhancement to HAZMIN® 6x, and
7. WVA will require only that up to 12 personnel be trained by LOGICAL and those personnel will be responsible for training all other HAZMIN® users at Watervliet.

Quote From LOGICAL

Item 1. Convert MSDSs from VAX HAZMIN® format and import into MSSQL® database: 1,322 MSDSs at $1.50 per MSDS. Total of Item 1 is $1,983.

Item 2. Provide onsite:
a) installation of the HAZMIN® database on an MSSQL® server,
b) installation of the HAZMIN® web site on an IIS server,
c) installation of the HAZMIN® client software on two desktops,
d) installation of the integrated e-mail functionality of HAZMIN® and
e) HAZMIN® training for up to 12 people.

(**Notes**: When the database is installed, it will contain the imported MSDSs from Watervliet's VAX HAZMIN®. The HAZMIN® web site will enable anyone on Watervliet's intranet who has access to the IIS server to run HAZMIN® through an IE or Netscape browser. The HAZMIN® client is needed for the individual(s) who will be importing new MSDSs and MSDS updates from LOGICAL's data entry service. In addition, the HAZMIN® client is required for any individual who needs to add or edit MSDS information in HAZMIN®. All other HAZMIN® entry and reports can be accomplished with HAZMIN® through the browser. The integrated e-mail functionality is still to be defined.)

The scope of Item 2 should not exceed 9 days and 3 separate trips from Peoria to WVA. Total of Item 2 is $10,590. Table 1 includes details of the quote from LOGICAL.

Table 1. Details of the quote from LOGICAL.

Item	Details of Item	Details of Cost	Total Cost
1	Convert MSDSs from VAX HAZMIN® to Updated HAZMIN® and Import into MSSQL® database	1,322 MSDSs @ $1.50 per MSDS	$1,983
2	• Installation of HAZMIN® database on an MSSQL® server • Installation of HAZMIN® web site on an IIS server • Installation of HAZMIN® client software on two desktops • Installation of the integrated e-mail functionality of HAZMIN® • HAZMIN® training for up to 12 people	Consulting: $850/day * 9 days = $7,650 Expense: $190/day * 9 days = $1,140 (All but air fare) Air fare: $600/trip * 3 trips = $1,800	$10,590
		Total Cost of Items 1 and 2	$12,573

Additional Information

1. LOGICAL knows of at least one customer that has been running HAZMIN® on MSSQL® 2000. They have reported no problems.
2. With regard to the database space requirements, LOGICAL would not envision the database space requirements exceeding 600 megabytes for several years.
3. Once LOGICAL receives the go ahead for the project to convert the MSDSs, it will take LOGICAL several days to download the MSDSs from Watervliet. Once that is done, the modem connection may be closed.
4. With regard to e-mail notification, the request for an e-mail to be sent to the "Requestor" when a "Request" is approved in HAZMIN® seems straightforward enough. To make the e-mail work, LOGICAL will need to install a third party component on the Web server to create the Electronic Membrane Information Library (EMILY). The use of Jmail, an Internet e-mail client working under all computer systems with JAVA1.2 support from www.dimac.net, is preferred. The e-mail object will need to pass the e-mail to the Simple Mail Transfer Protocol (SMTP) server on Watervliet's intranet. The security on Watervliet's SMTP server will have to accept the incoming mail. The site license cost for JMail is $50. JMail is preferred instead of Microsoft's Collaboration Data Objects for NT Server (CDONTS) component (which is free), because JMail offers more functionality.
5. LOGICAL has no objections to a planning meeting at WVA.
6. The HAZMIN® web site itself will not exceed 2 megabytes on the web server. If WVA decides not to enter the entire collection of MSDSs into a database, an MSDS image folder for MSDS Portable Document Format (PDF) files would be required. We would prefer storing the MSDS images in a folder under the

HAZMIN® web site. We would not envision the image space requirements exceeding 500 megabytes for several years. With regard to the HAZMIN® web site sharing a web server with other intranet web sites, we have had no complaints from customer sites where they have implemented HAZMIN® on a shared web server.

Concerns From WVA Addressed to LOGICAL

WVA: Can the converted MSDSs be uploaded back to the VAX server or to another location?

LOGICAL: Once the MSDSs are pulled off the VAX, it is LOGICAL's understanding that the converted MSDSs would never be loaded back onto a VAX. LOGICAL would provide the converted MSDSs inside an MSSQL® "backup" database that would be loaded on the WVA SQL server. That database would probably be provided on a Compact Disk (CD). It is also LOGICAL's understanding that its personnel would be present to install the database at Watervliet.

WVA: What number will LOGICAL use to access the VAX? It is WVA's understanding that there were no longer connections via modems to the Arsenal.

WVA will check with the Administrator to see how LOGICAL is accessing the VAX.

LOGICAL: The following information is in regard to accessing the WVA VAX:

Phone Number (518) 266-6003

Instructions include typing "Telnet Kramer," etc.

3 HAZMIN® Software Conversion Study

This chapter describes the tasks involved with updating and converting a nearly obsolete hazardous materials software suite. The project extends the capabilities of the EMIS already in place at WVA. The EMIS is used to centralize, automate, and manage the acquisition, flow, storage, and reporting of environmental information throughout the Arsenal.

For more information on EMIS, see *Remote Monitoring of Fluid Storage Tanks at Watervliet Arsenal New York* (Northrup et al. 1998) and *Environmental Management Information System (EMIS) at Watervliet Arsenal*, NY (Northrup et al. 2000). These technical reports can be accessed from the following website:

http://www.cecer.army.mil/td/tips/browse/products.cfm.
Select "Publications," "Technical Reports"; then type in the name of the report.

The subcontractor LOGICAL conducted the following tasks.

Install Version 6x HAZMIN® Software

LOGICAL worked with WVA Information Management (IM) to install the newest Windows-based HAZMIN® software on the Vulcan server and link it to the MSSQL® database server.

Convert Documents Currently Installed

LOGICAL converted more than 3,000 MSDSs, requests, and notices that are installed and valid on the current system to the new configuration.

Develop Software

LOGICAL developed software to enable MSDS callup on the WINX intranet.

Training

LOGICAL provided training for coordinators, users, and approvers. This was in the form of formal classes and included hands-on exercises using computer workstations.

4 Material Safety Data Sheets Loading Information

This chapter covers rules and instructions for loading MSDSs in HAZMIN® V5x for Windows®. The greatest purpose of MSDSs is to inform the worker on the job-site of possible dangers and hazards. LOGICAL's goal was to provide this information to them accurately, effectively, and efficiently. The rules and instructions are divided into four sections: I. Setup Information, II. Data Fields, III. General Information, and IV. Examples. This report and the Instructions for Committee Members and Requestors Instructions (included in Chapter 5) will be placed in the HAZMIN® Plans folder, along with an "index" page. Therefore, any employee in HAZMIN® will be able to click on the <Plans> button and read/print any of the documents.

Section I. Setup Information

This section addresses only fields that will be loaded by set-up personnel. Setting up MSDSs for loading is the job responsibility of LOGICAL's set-up personnel, not that of data enterers and proofers.

Information on Items Previously Entered

The following are listed mainly for informational purposes, covering items that have already been previously entered.

Product Name – The product or trade name identified on the paper MSDSs for the material. The Product Name does not need to be unique (i.e., you can have several MSDSs with the same Product Name). It can be up to 105 alpha-numeric characters long.

HAZMIN® Number – The number automatically assigned to the MSDSs by the system. This is a sequential number starting with 1. The number will be incremented by one for each new MSDS created. This number is constant through Pending, Current, and Non-Current statuses of an MSDS. The largest possible number that can be assigned is approximately 2,100,000,000. This number is displayed for users only.

Company MSDS Number – The alphanumerical fields used to store an internal (your company's) MSDS number or code. This field name is user-defined, so your company may call it something else.

Current Company Name – The most current known company information available for the company that is responsible for the MSDSs. It is one of the criteria used in identifying a unique MSDS and is required. The Current Company Name is validated and can be referenced by multiple MSDSs. A Current Company Name can have up to 105 characters. This "set" of fields has been created to allow your internal staff or LOGICAL to record the most current information available from any source in regard to changing company names, addresses, and telephone numbers. Current Company Name information may be updated whenever the need arises.

Company Short Name – A brief name for the company providing the material. A short name is assigned by the company using the software, in order to "consolidate" companies that have more than one name or division. For example, PPG Industries has plants in a few different cities, but the short name, PPG, would remain the same for all locations, and would be entered on all PPG MSDSs. To more easily obtain a list of all PPG products in the database, one is able to query by Company Short Name. A company's short name can be up to 30 characters long.

Current Company Name Validation:

> **Current Company Address –** Current Company addresses. There are two fields: "Address First Line" and "Address Second Line". The "Address First Line" field is reserved for the P.O. Box address, and the "Address Second Line" field is reserved for the Street address. Each field is a maximum of 35 characters.
>
> **Current Company City –** City name of up to 30 characters.
>
> **Current Company State –** Two-character U.S. postal state code abbreviation.
>
> **Current Company Postal Code –** Five-character Zip Code and four-character Extension.
>
> **Current Company Country –** Three-character code from American National Standards Institute (ANSI) electronic data interchange (EDI) Standard.
>
> **Current Company Phone Numbers (Emergency and Information) –** Twenty-character fields, allow for extensions and foreign telephone numbers.

Coordinator Company Note – This is a note field that can contain up to 105 characters. This field displays for the MSDS entry personnel only when they are validating a Current Company. It is intended for information as to when and from where the information came. If the MSDS entry personnel called the manufacturer and obtained a newer telephone number and/or address correction, a note concerning this may be entered in this area. This field will not display or print as part of the MSDS.

Information Found on the Paper Copy of MSDS

The following fields are intended for information exactly as it is found on the paper copy MSDS.

Company – The company name is 105 characters. The number of manufacturers/suppliers entered for a single MSDS is unlimited. This manufacturer/supplier company information is not validated. The exact information should be entered for each MSDS.

Manufacturer/Supplier Company Name – This company name can have up to 105 characters. Enter the information as it is found on the paper MSDS. (**Important**: Manufacturer/Supplier Company Name = Paper MSDS Manufacturer/Supplier Company.)

MSDS Address – Street or post office box address. There are two fields; one for P.O. box and one for Street address. Each field is 35 characters.

MSDS City – City name of up to 30 characters.

MSDS State – Two-character U.S. postal state code abbreviation.

MSDS Postal Code – Five-character zip code and four character extension.

MSDS Country – Three-character code from ANSI EDI Standard.

MSDS Information Phone Number – Twenty-character field that allows for extensions and foreign phone numbers.

MSDS Fax Phone Number – Twenty-character field that allows for extensions and foreign phone numbers.

MSDS Emergency Phone Number – Twenty-character field that allows for extensions and foreign phone numbers.

Manufacturer Checkbox – Check this box if the MSDS company name is a manufacturer.

Supplier Checkbox – Check this box if the MSDS company name is a supplier.

(**Important**: You may enter as many Manufacturer/Supplier Companies as required for a specific MSDS. For any given company, you may check both the manufacturer and supplier checkboxes when it applies.)

Stock ID – Your company's numbers for internal dispensing of the material. This allows for unlimited listing of Stock ID numbers. Each Stock ID number entry is 30 characters. You may want to leave the Stock ID blank if you do not have information to complete all of this validation. The program will automatically add information if the Stock ID is partially entered.

Manufacturer Product Code(s) – The manufacturer's product code(s) are entered in these fields. Each code can be up to 30 characters. Some MSDSs may have dozens of product codes associated with it. This is very important information for obtaining revisions to MSDSs.

Universal Product Code(s) (UPC) – The alphanumeric version of UPCs. You can enter as many UPC codes as required. Each code can be up to 30 characters.

Synonym – Name and phrases used to identify a material. Additional names and chemical synonyms provided on the original MSDS may be entered in this field. There is no limit to the number of synonyms that can be entered on a single MSDS. This "field" is also often used for "nicknames." Each synonym can be up to 80 characters.

MSDS Information

Entry Recommendation for Dates – We recommend that a date always be entered in the "Revised Date" field when a date of any kind is given. For example, if only a prepared date is listed, it should not be entered *only* into the prepared date field, *it should be entered into the revised date field as well*. This makes running a query easier for the user, as you will only have to choose one date field to query by, rather than all three. The MSDSs contained in your database should be consistent in that they all have a date in the "Revised Date" field.

Prepared Date – Should always be in this format: MM-DD-YYYY. This field is for the date the paper MSDS was prepared by the manufacturer or supplier. Often this date will be listed as "creation date" on the paper MSDS.

Revised Date – Should always be loaded in this format: MM-DD-YYYY. This field is for the date the paper MSDS was revised by the manufacturer or supplier. This date will be more current than a Prepared Date.

Printed Date – Should always be loaded in this format: MM-DD-YYYY. This field is for the date the paper MSDS was printed by the manufacturer or supplier. On some MSDSs, this may be the only date you can find.

Manuf. MSDS Number – The manufacturer's or supplier's specific product code number is in this field. For most manufacturers, this number is specific to only one product, and it is how they identify their MSDSs (much like we do with our MSDS #). This number will not be listed on every paper MSDS, but if it is, it can be very helpful in obtaining updated versions of the MSDS. Up to 30 characters may be entered.

Formula – The molecular formula for the product is entered in this field. Some very interesting "containing" queries (a report based on specific criteria) can be done on this field if the information is available and entered correctly. Up to 30 characters can be entered. Be aware of the differences of O (letter) and 0 (number). These characters can be easily confused in a product formulation.

Keyword – A classification for the product that is meaningful to the company using the software. This field allows up to 30 characters, so several keywords can be entered for a single MSDS. Some examples are "Paint," "Soap," "Solvent," etc.

Group ID – This may be just a sequential number or it may have a special meaning to the company or facility using the software. It is used in identifying a group of MSDSs.

User Fields –

User-Defined Field One: Name (UDEF1) – The name of the first user-defined field, which is assigned by the company using the software. This name may be up to 30 characters.

User-Defined Field Two: Name (UDEF2) – The name of the second user-defined field. This name may be up to 30 characters.

(**Note**: Once the user-defined fields have been named, the names assigned will display both on the screen and on paper reports.)

Section II. Data Fields

All data entry personnel check the Product Name, Formula, and Current Company, and Company information for spelling and validity.

Match the product name with the paper MSDS. When there is a typo or any other mistake, consult a data proofer or a supervisor. No trademarks (™, ©, ®, or *) can be used in this section. The only exception would be the M & T* Company. This is the only company that we know of at this time that uses an asterisk in their product names. The product names are entered as follows: M&T*...(product name).

Data entry personnel check the manufacturer/supplier information to see that it matches the hardcopy. Data proofers check everything, including addresses and phone numbers.

*REMEMBER! You are *proofing* this page; all the information has already been entered. If you run into any problems or discrepancies, please consult a data proofer, set-up personnel, or a supervisor.

Data Entry Rules

Valid Qualifiers for Numeric Values –

HAZMIN® V5.x

LT Less Than

LE Less Than or Equal To

GT Greater Than

GE Greater Than or Equal To

EQ Equal To

BET Between

APX Approximate or 'ca'

Use only letters in qualifier fields. The software will accept only the qualifiers it is programmed to. The valid qualifiers will appear on a drop down menu. Click on the down arrow (▼) next to the qualifier field.

Entering Nonnumeric Information – Information such as Not Applicable (N/A), Not Available, Not Determined (N/D), None, Nil, Not Established (N/E), Negligible, and No Data Available (N/DA) should be entered on the note field.

(**Note**: If the MSDS uses abbreviations (e.g., NA or NE), and there is not an explanation (legend) on the paper MSDS, DO NOT assume what the abbreviations mean. Enter NA or NE in the note field.)

Entering Balance, Trace, and Nil (for Components) – Balance (BAL), Trace (TRC), and Nil (NIL) should be entered in the note field. LOGICAL strongly recommends that customers develop their own standard on what numeric value they would assign for a component's percentage when given as Trace or Nil, unless there is a reference on the paper MSDS.

It is also recommended that users try to calculate the percentage for components given as Balance, and enter it as a < or > %. This will be very helpful for environmental reports.

Understanding Format of Fields

Many of the following fields contain numerical information and share one particular format: (1) one 3-letter qualifier field, (2) two fields for numerical values, and (3) one 30-character field.

For example, a typical completed line from the data section might read:

(Field Title)	(Qualifier)	(Value 1)	(Value 2)	(Note)
pH	BET	6.15	6.90	At 100% concentration

This entry tells us the pH for the product is between 6.15 and 6.90 at 100 percent concentration. "pH" is the field title. "BET" (Between) is a qualifier. Value One is 6.15 and Value Two is 6.90. The field note contains the information "At 100% concentration."

One or two of the numerical values *must* be filled in, depending on the qualifier used. The only exceptions are when BAL, TRC, and NIL are used. When the additional information does not fit in the note field, it may be included in the Text Sections and referenced in the note field.

Some fields have additional information that is required such as "@ a certain temperature," whether the temperature is given in degrees Centigrade or Fahrenheit,

whether the data are by Weight or Volume, etc. If additional information is required in a "set" of data fields, it will be identified.

Numerical fields have room for up to 10 digits (including minus signs and decimal points).

(**Note**: If no value is entered in the numerical field(s) or the note field, that field will not display or print. If the manufacturer has provided information such as "Not Given" or "Not Applicable" for a field, you must enter that information in the respective note field so that it will display/print.)

Boiling Point – The temperature (in degrees) at which a liquid changes to a vapor state, at a given pressure. The Boiling Point field includes a field to identify if the temperature given is in Centigrade or Fahrenheit.

Specific Gravity – The weight of a material compared to the weight of an equal volume of water. This is an expression of a material's density.

Water always equals 1 for specific gravity, but you do not have to enter WATER=1 in the note field, because it is already programmed in the computer. Often the MSDS will list Bulk or Loose Density and not give a Specific Gravity. If this is the case, use the following conversion factors:

Conversions: Weight per Gallon (lb/gal): divide by 8.345

Lb/cu ft: divide by 62.42

After converting, put the value given on the hard copy in the note field.

Specific gravity may also be found as the DENSITY. Usually there are no units given, so there would not be a conversion process. When a unit is given and it needs to be converted, then do so with the proper conversion formula. "DENSITY" must be written in the note field if it was given as DENSITY.

MSDSs for gases, such as a LIQUID AIR MSDS, may look confusing and usually are. The LIQUID DENSITY in one of these MSDSs is actually the specific gravity, by using the conversion for lb/cu ft (divide by 62.42). These GAS MSDSs often give Specific Gravity (Air=1). This is Vapor Density NOT Specific Gravity (Water=1).

Vapor Density – The weight of a vapor or gas compared to the weight of an equal volume of air. Vapor Density should always be identified as Air=1. Vapor Specific

Gravity is an alternative name for this field. It is common for an MSDS to have the value given as Heavier or Lighter than Air.

Instead of a number being given, sometimes they will tell us that the rate is LIGHTER THAN or maybe HEAVIER THAN air, because air is always equal to one in the vapor density section, i.e., HEAVIER THAN AIR:

(Qualifier)	(Value)	(Notes)
GT	1	HEAVIER THAN AIR
LT	1	LIGHTER THAN AIR

For LIQUID AIR MSDSs, the vapor density is a little unusual, because it is given as SPECIFIC GRAVITY (AIR=1), but this is not the specific gravity because AIR = 1, not H_2O=1, so you must enter it as vapor density. There are no conversions for this process. You do not have to enter AIR=1 in the note field, because it is already programmed in the computer.

Evaporation Rate – The rate at which a particular material vaporizes, a comparison to the rate of vaporization of a known material. This value has no unit because it is a comparison. The most common "known materials" are water, ether, butyl acetate, and n-butyl acetate. The comparison chemical is very important and should always be entered in the note field.

Instead of a number being given, sometimes we will be told that the rate is SLOWER THAN or maybe GREATER THAN a given component (i.e., SLOWER THAN ETHER):

(Qualifier)	(Value)	(Note)
LT	1	ETHER = 1, SLOWER
GT	1	ETHER = 1, FASTER

Ether is being used as an example, but there are other components such as WATER, ETHYL ETHER (EE), BUTYL ACETATE (BuAc), etc.

If the value is given as "Same as Water" (i.e., Evaporation Rate [Ether=1]: Same as Water), enter as:

(Qualifier)	(Value)	(Notes)
EQ	1	WATER=1, SAME

Melting/Freezing Point – The temperature (in degrees) at which a solid melts (Melting); the temperature at which a liquid turns solid (Freezing). The Melting/ Freezing Point field set includes a field to identify if the temperature given is in Centigrade or Fahrenheit. If a value is entered in the field, C or F must be selected.

pH – The measurement of both acidity and alkalinity on a scale with values running from 0 to 14, with 7 representing neutrality, increasing toward alkalinity and decreasing toward acidity. Often an MSDS will identify the concentration of the product in a water solution. This is very important information and should always be entered into the note field if available. It is also not uncommon for the pH to be given as words such as neutral or acidic.

"Essential Neutral" is entered as approximately 7.

"Acidic" is entered as LT 7.

"Neutral" is entered as EQ 7.

Watch for the qualifier to be neutral or essentially neutral. Convert these values to 7.0 as illustrated above. Make sure that the word that was given is put in the note field. Sometimes the pH will be given as aqueous, neat, etc. These must be explained in the note field. (Neat means at full strength.)

Percent Volatiles – The percentage of a liquid or solid that will evaporate at an ambient temperature of 70 °F. For Percent Volatiles it is very important to know if the percentage was calculated by volume or by weight. This group of fields includes an area in which to identify if the calculations were by weight or volume. Some manufacturers will give the percentage of nonvolatiles. Watch for this and do not mix the two. If the value is for nonvolatiles, subtract the value from 100.

If it is given as by weight, then BY WEIGHT must be put in the note field. Volatile Organic Compound is not the same as % of Volatiles. Volatile Characteristics may also be listed, if they give a percent, use it, but usually the given value is "slight" or "moderate". There is no conversion, but put it in Other Characteristics if there is room.

Vapor Pressure – The pressure exerted by a vapor that is in equilibrium with its solid or liquid form. Vapor Pressure is usually given as millimeters of mercury (mm Hg).

psi or psig or psia times 51.7 = mm Hg

kPa times 7.5 = mm Hg

Mbar times 0.750 = mm Hg

The Vapor Pressure set of fields includes a field for a temperature value and a field to identify if the temperature given is in degrees Centigrade or Fahrenheit. Vapor Pressure can vary greatly depending on the temperature of the testing.

Always enter the unit mm Hg in the note field. You must also enter the original value in the note field. *When a temperature is given, put the number in the box supplied, and enter whether it is in Deg. C. or F.*

The vapor pressure may sometimes be found in scientific notation, such as: 4 x 10(-5). In order for you to put this in the number field, you will need to move the decimal point right or left depending on if the sign is positive or negative (i.e., 4 x 10(-5) = .00004; 4 x 10(5) = 400000). Scientific notation may be found in places other than the vapor pressure section, so be aware of this process. If the vapor pressure is given for each component listed, enter the values in the "Vapor Pressure" field in the Component pages.

Saturated Vapor Concentration – The concentration of vapor at equilibrium with the liquid phase at 20 °C (68 °F) and standard atmospheric pressure expressed in milliliters per cubic meter (expressed in parts per million). This concentration may be calculated from the Vapor Pressure of the liquid at 20 °C (68 °F).

VOC Content – The amount in pounds per gallon or grams per liter of Volatile Organic Compounds in the product. Chemicals with VOC information are usually in the family of highly evaporative organic materials used in paints, solvents and related formulations. This group of fields includes an area in which to identify if the quantity was given by pounds or grams.

VOC Without H2O / Exempt – The amount in pounds per gallon or grams per liter (after removing Water) of Volatile Organic Compounds in the product. The government has exempted some VOC chemicals from VOC reporting. Chemicals with VOC information are usually in the family of highly evaporative organic materials used

in paints, solvents, and related formulations. This group of fields includes an area in which to identify if the quantity is in pounds or grams.

VOC Percent – The percentage of the product that is made up of Volatile Organic Compounds. Chemicals with VOC information are usually in the family of highly evaporative organic materials used in paints, solvents, and related formulations. This group of fields includes an area in which to identify if the calculations were given by weight or volume. The VOC information is very seldom provided by component so, unless an MSDS specifies otherwise, the information is for the product.

Pour/Softening Point –

Pour Point – The lowest temperature at which a substance flows.

Softening Point – The temperature (or range of temperatures) at which a substance softens.

The data entry person will have a choice of entering either Pour Point or Softening Point. When an MSDS is displayed or printed, the specific title is displayed. It is extremely rare to find both on a single MSDS.

The Pour/Softening Point field set includes an area in which to identify if the temperature given is in Centigrade or Fahrenheit. If a value is entered in the field, either a C or an F must be selected.

Viscosity – The measure of resistance to change of form or the tendency of a fluid to resist internal flow without regard to its density. The default units for this field are in centistokes (cST). If this value is given in some units other than centistokes, you should document the different units in the note field.

Molecular Weight – The weight of a molecule of a substance in relation to the weight of a hydrogen atom. Another definition is the weight of a molecule based on the sum of the atomic weights of the atoms that make up the molecule.

Also can be given as FORMULA WEIGHT. If it is, then enter in the note field that it is FORMULA WEIGHT. Molecular weight is usually given at the top of the paper. You have to search for it sometimes, just keep your eye out for it.

(**Warning**: This has NOTHING to do with the weight of the product [i.e., 12 lb/gal or 12 lb/cu ft].)

Octanol/Water Partition Coefficient – The Octanol-Water Partition Coefficient is a parameter, expressed as a log value, used to evaluate the environmental pollution and exposure hazard potential of an organic compound.

Odor Threshold – The lowest concentration of a substance's vapor, in air, that can be smelled. This value is always given in ppm.

Solubility in Water – Usually a term or numerical value expressing the percentage of a material, by weight, dissolving in water at ambient temperature. This field scrolls to allow up to 105 characters. This information can be very useful in spill cleanup and for determining extinguishing agents for the material.

Often the following terms are used:

Negligible – Less than 0.1 percent Slight – 0.1 to 1.0 percent

Moderate – 1 to 10 percent Appreciable – More than 10 percent

Complete – Soluble in all proportions

First, enter the term or phrase to describe the solubility in water. If there is a specific temperature or % by weight, then specify that after the term or phrase given (Example: Soluble @ 100% by weight.). Solubility in water may not be the only way you find this, it may also be found as MISCIBILITY IN WATER; this can be entered as the solubility.

Reactivity in Water – Identifies if the product is reactive to water. This field allows for a maximum of 105 characters. Typical values are No or Yes.

Solubility in Solvent – When this information is given, it is usually a list of solvents that the material will dissolve in. Some manufacturers may identify the solvents using the terms listed under Solubility in Water. This field scrolls to allow up to 105 characters.

Appearance/Odor – A brief description of the odor and appearance of a material to assist with identification. This field also can contain information that does not fit in any of the fields described above. This field scrolls to allow up to 105 characters.

You will usually have plenty of space left over after the Appearance and Odor has been entered, so you may use the rest of this field for Other Characteristics that are listed on the MSDS. You can also use this field for any note you could not fit in the note fields for any of the fields described above.

Physical State – There are three "states" to select from. Usually this information will clearly be defined in the Appearance information. If it is not defined, follow the following criteria:

Solid: Has a Shape and a definite quantity (pounds, grams, etc.)

Liquid: Has No Shape and a definite quantity (gallons, liters, etc.)

Gas: Has No Shape and No definite quantity.

Health/Safety Data (Hazard Ratings) – LOGICAL has provided two "sets" of fields to enter rating systems. The first set is similar to the Hazardous Materials Information System (HMIS) rating system, and the second set is similar to the National Fire Protection Association (NFPA) rating system. These groups of fields are used to identify the hazards of the product in regards to Health, Flammability, and Reactivity. Most rating systems are based on a value of 0 to 4, with 4 being the most severe or dangerous. There is also a field for "Other" information.

There are a number of different rating systems established. Two of the most common are HMIS and NFPA. Many manufacturers such as J.T. Baker have established their own. It is up to your company to decide which rating systems to use and to train employees on the differences between the systems.

There is a box to be checked for materials that cause chronic effects. Sometimes, (H*) is displayed on the paper MSDS under the health hazard rating. This is a specific detail that indicates that the product can cause chronic effects.

Source field (Src) for Personal Protective Equipment (PPE) – Allows you to select from a validated list of sources. It is very important to identify the source of the information. Many MSDSs are currently missing this information, so the company using the software may want to assign their own values.

Personal Protective Equipment field (PPE) – This area is available for the entry of the appropriate PPE required for the safe use of the product.

Target Organs – This field is really for a "list" of organs, and the data to be entered are determined by LOGICAL employees who read the MSDS carefully to provide a list of organs that are affected by the product. This is a special service provided for customers who hire LOGICAL for this purpose. The data entry person selects the organs from a validated list of human body organs. As many organs as are required can be selected for a specific MSDS. Each target organ can be up to 80 characters. Target Organs are only loaded by data entry personnel if they are clearly identified

by a "Target Organ" title on the MSDS. The target organ will be highlighted if it should be loaded.

Fire and Department of Transportation (DOT) –

Closed Cup Flash Point (a.k.a. **Flash Point Closed**)– The lowest temperature at which a liquid in a closed cup will produce enough flammable vapor to form an ignitable mixture with air. This field set includes a field to identify if the temperature given is in Centigrade or Fahrenheit. If a value is entered in the field, either C or F must be selected.

A number of different types of tests are used to establish this limit. If the test method is identified, it should be entered in the note field. The following are some common examples that may help you to know if the information is for Closed Cup or Open Cup:

ASTM D 56 = TAG CLOSED CUP (TCC)

ASTM D 3278, ASTM D 3242 & ASTM 3828 = SETAFLASH CLOSED CUP

ASTM D 93 = PENSKY-MARTENS

CLEVELAND CLOSED CUP (C.C.C.)

When the flash point is given just as N/A, N/D, etc., then this goes for both the CLOSED CUP and the OPEN CUP. However, if there is a number given without it specifying whether it is OPEN or CLOSED CUP, then the number will go in the first qualifier you come to, which is the CLOSED CUP. This is only when CLOSED or OPEN CUP is not specified. If CLOSED or OPEN CUP is specified, then enter the flash point in the corresponding field.

If they give you what the CUP is, then you must use the note field to explain what CUP was used, or the other references that may be given.

Open Cup Flash Point (a.k.a. **Flash Point Open**) – The lowest temperature at which a liquid in an open cup will produce enough flammable vapor to form an ignitable mixture with air. This field set includes a field to identify if the temperature given is in Centigrade or Fahrenheit. If a value is entered in the field, either C or F must be selected.

There are a number of different types of tests used to establish this limit. If the test method is identified, it should be entered in the note field. The following are some

common examples that may help you to know if the information is for Closed Cup or Open Cup:

ASTM D 1310 & ASTM D 3143 = TAG OPEN CUP (TOC)

ASTM D 92 = CLEVELAND OPEN CUP (COC)

Auto-Ignition – The lowest temperature at which a substance will catch fire and continue to burn. This field set includes a field to identify whether the temperature given is in Centigrade or Fahrenheit. If a value is entered in the field, either C or F must be selected.

Fire Point – The temperature at which a substance will sustain fire and continue to burn. This field set includes a field to identify whether the temperature given is in Centigrade or Fahrenheit. If a value is entered in the field, either C or F must be selected.

Lower Explosion Limit (LEL) / Lower Flammable Limit (LFL) – The low-end range of vapor concentrations in air, which will explode if heat is added. This information is usually given as a percentage. If other information is provided, enter it in the note field.

If the LEL is listed for each of the individual components, enter the values in the LEL fields in the Component Pages.

If the Flammable limits are given as N/A, N/D, etc., then this would be entered in both UEL and LEL. These are usually clarified whether or not it is the UEL or LEL.

Upper Explosion Limit (UEL) / Upper Flammable Limit (UFL) – The high-end of the range of vapor concentrations in air, which will explode if heat is added. This information is usually given as a percentage. If other information is provided, enter it in the note field.

USA Flame Test – This is a flame test that qualifies a material in inches in the range encountered on MSDSs. A volatile, combustible material is mixed with an oxidizer (air, oxygen, etc.) and ignited. The speed of the flame advance relative to the unburned gas in a test chamber (laminar flame speed is measured in inches/seconds).

Essentially, it is a measurement of how fast a material burns. Organic fuels have a range of 0.8 to 80 in./sec (2 to 200 cm/sec). An average value is 16 in./sec. This field may also contain additional information concerning the testing environment.

OSHA Flammability Class – This field is to list the Occupational Safety and Health Administration (OSHA) Flammability Class for the material. The following is a list of possible values:

Class I A Flammable Liquid

Class I B Flammable Liquid

Class I C Flammable Liquid

Class II Combustible Liquid

Class III A Combustible Liquid

Class III B Combustible Liquid

(**Note**: It is not unusual to have the MSDS read "IIIB" or "3B" instead of "Class III B Combustible Liquid.")

Preparer Information – The name of the person who prepared or signed the MSDS, along with his/her title, phone number, or any other preparer information.

Include the person's status with his/her company and also the company's name if it is different than the manufacturer on page 1. Also include the telephone number if it is different than the manufacturer's number.

If you are lucky, you will come across typed out names, but that is usually not the case. If a signature is illegible, try to at least include the initials of the person. If the name is illegible, use the grief sheet located in the folder you are working out of to explain that it is illegible. The grief sheet can be used to tell the customer that there is something wrong with the MSDS, such as a cut off section, an unexplained number, etc. The grief sheet is not to be used for things you cannot figure out. In these cases, be sure to ask someone, whether it is a supervisor or a data proofer.

Prepared/Revised Date –

Date Prepared/Revised – The month, date and year the MSDS was prepared or revised by the manufacturer or supplier. This field is located on the "Product Info" page.

These dates can be located all over the page of the paper MSDS, and usually there are more than just one, but sometimes, there are none. Below is the list of choices to pick from.

On Paper As:	Should be Entered In:
Last Revision Date / Review Date	Revised field
Updated / Changed Date	
Date Prepared / Effective Date / Issue	Prepared field
Date / Valid Date	
Date Printed	Printed field

If none of the above dates are found, you may also use the date the MSDS was received by the company (it is usually stamped). This would be entered in the Prepared field. Do not confuse this date with LOGICAL's stamped date.

If there is no date anywhere, enter: 01-01-1960 into the Prepared field. The company using the software may also choose another date older than 01-01-1960. Entering this predetermined date allows you to query for all MSDSs by the date, being able to retrieve a list of older MSDSs in your database, and therefore knowing which MSDSs need to be updated. If the date is left blank, it would not show up on a query done by the date. (**Note**: If a month and year is given without a day, fill in the first day of the month [e.g., September 1999 = 09/01/1999].)

Do not use copyright dates on the paper MSDS.

(**Important**: If Last Revision Date / Review Date / Updated / or Changed Date are not given on the paper MSDS, but a date prepared is, be sure to enter the date prepared into the Revised field, as well as the Prepared field. Enter the date in both places. The reason for this is explained in the next paragraph.)

The revised date is a required field for LOGICAL MSDS Data entry. Because this field is always entered, it makes running a query easier, since all the dates are separate query options. Knowing that the Revised field always contains the MSDS date, you can always choose "Revised Date" for your query criteria.

DOT Information –

UN Number – A 4-digit number to identify a material and type of shipment. UN is associated with descriptions considered appropriate for international and domestic shipments.

NA Number – A 4-digit number to identify a material and type of shipment. NA is associated with descriptions not recognized for international shipments other than Canada.

DOT Hazard Class – The hazard class corresponding to each proper shipping name. This field may contain up to 105 characters.

Materials and items on the Hazardous Materials Table are assigned to one of nine hazard classes. In place of a hazard class, an item or material can be assigned a division, which is a subcategory of a class. For example, within Class 6, there are two divisions: 6.1, Poisonous substances and 6.2, Infectious substances. When an item or material presents more than one type of hazard, the primary hazard is used to identify the hazard class or division. Hazard class or division, along with packaging group, are often considered together for purposes of compliance with DOT hazardous materials regulations.

The following is the list, along with the associated label:

1 – EXPLOSIVE

1.1 – EXPLOSIVE 1.1

1.2 – EXPLOSIVE 1.2

1.3 – EXPLOSIVE 1.3

1.4 – EXPLOSIVE 1.4

1.5 – EXPLOSIVE 1.5

1.6 – EXPLOSIVE 1.6

2.1 – FLAMMABLE GAS

2.2 – NON-FLAMMABLE GAS

2.3 – POISON GAS

3 – FLAMMABLE LIQUID

4.1 – FLAMMABLE SOLID

4.2 – SPONTANEOUSLY COMBUSTIBLE

4.3 – DANGEROUS WHEN WET

5.1 – OXIDIZER

5.2 – ORGANIC PEROXIDE

6.1 – POISON (or KEEP AWAY FROM FOOD)

6.2 – INFECTIOUS SUBSTANCE

7 – RADIOACTIVE

8 – CORROSIVE

9 – CLASS 9 (used for miscellaneous entries)

Note that the explosives also are accompanied by an appropriate compatibility group letter. For example, 1.1A – EXPLOSIVE 1.1A.

New MSDSs will have numbers (e.g., 6.1, 8, 3.2). Most MSDSs that we are currently loading will still have the words. If they give a value such as CLASS 6.2, just enter the 6.2 in the field (the name of the field is CLASS).

DOT Packing Group (a.k.a. **PK Group)** – Dangerous goods, for packing purposes, may be assigned to one (or more) packaging groups, according to the degree of danger they present. There are three possible Packing Groups: I, II, or III.

Packing Group I – Great Danger

(Group I Example): Picric Acid – explosive by impact

Packing Group II – Medium or Moderate Danger

(Group II Example): Toluene – a flammable and toxic substance

Packing Group III – Minor Danger

(Group III Example): Pine oil – an irritant

The packing group and the hazard class or division are often considered together for compliance with DOT hazardous materials regulations. Packaging groups are not assigned for some hazard classes or divisions.

DOT RQ (lb) – The "RQ" is the least amount of a material that must be reported to the National Response Center (800/424-8802) if it is released in the environment. If the RQ is stated as 1 pound, this means a release of one or more pounds must be reported.

The gradations above one pound are 10, 100, 1,000, and for the least hazardous materials, 5,000 lb. This information could be given as kilograms that would convert to:

Pounds	Kilograms
1	0.454
10	4.54
100	45.4
1,000	454.0
5,000	2,270.0

DOT Label – The shipping label that is required to be applied to each "package" as specified in the 49 Code of Federal Regulations 172.402 through 172.450. This field scrolls up to 105 characters.

DOT Miscellaneous Information (a.k.a. **Misc.**) – This field is for additional transportation information that may be given on some MSDSs. This information may include exceptions, exemptions, hazard name, technical name, etc. The field can contain up to 105 characters.

DOT Proper Shipping Name – The name of the hazardous material shown in section 172.101 of the Hazardous Materials Transportation Regulation. This field can be up to 105 characters long.

Sometimes you will run across an MSDS that has a line trying to explain what all of the hazardous information is, when really it just looks like a long line of unexplainable information. For example, you see something like this:

DOT HAZARD/CLASS/LABEL/PLACARD: FLAMMABLE.

If something like this appears, then the FLAMMABLE, which is given, will be accepted as the DOT LABEL, and should be entered in the corresponding fields. We know it is a DOT Label because "Flammable" is no longer a DOT Class.

(Enter as follows): DOT LABEL: FLAMMABLE

Component Information

This page will display as many times as possible to enter all required component information.

Near the top of the component page, you will see a row of buttons. These buttons resemble the buttons on your VCR or CD player. Below is a list of these buttons, along with their functions:

|◄ Finds the first component listed

◄ Places the cursor at the previous component

► Places the cursor at the next component

►| Finds the last component listed

+ To insert a component

- To delete a component

▲ "Edit" – Allows you to make changes to the component page after it has been saved.

✔ "Post Edit" – Saves the changes you have made to a component page.

✕ "Undo" – Erases the most recent change you have made to a component page, before saving.

Component Name – The chemical name for the ingredient. This field allows for up to 80 characters. There should always be something entered in this section, IF there is any chemical name information.

DO NOT enter: HAZARDOUS INGREDIENTS: NONE GIVEN.

DO NOT use the note: FOR ALL COMPONENTS: PERCENT BY WEIGHT.

DO NOT enter "SEE TEXT FOR ADDITIONAL COMPONENT INFORMATION" on the last component line.

The only time parentheses can be used on a component line is when the information located in the parenthesis is part of the component name. Such things as solvent, base metal, formula, etc., cannot be put on the component line in parentheses. You must make a note line for it, along with any other component information that is necessary.

Entering Component Names – First, click on the "+" symbol, found near the top left side of the screen. This will place you into "insert mode." Click on the "..." symbol located near the end of the component name field. This will bring up the Component Name Validation window. Follow the steps listed below:

Component Name Validation

1. Begin by searching for the specific component name you want to enter. Searches can be done for All names, names that Begin With, or names that Contain certain criteria specified by you. Click on (or type) A, B, or C to pick the type of search you prefer.
2. Type in part of the component name you want to enter in the space provided, where the cursor has been placed. The search will bring up component names that are specific to your search. For example, if you chose a "Begins With" search and you typed "Nitro," you would be provided with a list of valid component names beginning with "Nitro," such as "Nitrogen," "Nitrocellulose," etc.
3. Now that you have a list of component names to choose from, scroll down through the list until you have found the component name you want to enter. After you have found it, click on it. It will be highlighted and a black arrow will appear at the left margin, notifying you that it has been preselected. Click on the "Select" button with the green check mark to select it. You will be returned to the MSDS Component Page, and the component name you chose will appear in the component name field. You are now ready to continue entering the rest of the component information.

(**Important**: Be sure to click on the "Post Edit" (✔) button after you have entered all information for the component. This will retain the entry you have done.)

4. Click on the "+" symbol again and then the "..." symbol to begin the process over again for another component name.

Removing Component Names – If the need should arise for you to remove a component name from an MSDS, simply go to the page where the component name you wish to delete is located. Click on the "—" symbol. A pop-up menu will appear, asking you to confirm whether or not you wish to delete it. If you are certain you want to delete it, click "Yes." The component name is removed from the MSDS. Please be aware that the component name was not deleted from the component name validation table in this manner, only from the MSDS.

Putting Component Names in Order – There is a specific order for components to be entered, and that is mainly how they appear on the paper MSDS. Many components are listed in order of amount (from the biggest to the smallest amount) contained in the product. This is very similar to how ingredients are listed on a package of food, such as cereal.

There is a special function within the component pages to more easily arrange the components into their proper order. This comes in especially handy when working with update MSDSs, when there is information already entered in the MSDS. Use the following steps:

1. Begin by placing the cursor onto a *component name* field. Use the keys "Alt" and "A" in conjunction with each other (Alt+A). This will open the window you will use to move the component names.
2. You will notice that a component name is highlighted. By clicking the up arrow (to move the name up), or the down arrow (to move the name down), you will be able to rearrange the components.
3. Note after you have clicked the up and/or down arrows that the order of the list of component names has been altered. Be sure to arrange this list in the order you want the component names to be listed in.
4. After you are completely satisfied with the order of the components, click the "Save" button with the green checkmark.
5. You will be placed back into the first MSDS component page. You can double-check the order of the components by clicking the "Forward" button. It will display one component page at a time for you.

Product (Field) – This is an area in which to specify that the current component name is also the Product Name. Only one component per MSDS can be identified as the Product. Enter "T" (for True) if they have identified it as the product; otherwise, leave it blank.

Hazardous (Field) – This is an area in which to indicate if the component has been identified as hazardous on the manufacturer's MSDS. Any number of components can be identified as hazardous. This field is always left blank because different manufacturers are often inconsistent in identifying hazardous chemicals. A certain component could be marked as "hazardous" on one MSDS and on another MSDS would not be labeled "hazardous."

Trade Secret (Field) – This is an area in which to specify if the component has been classified a trade secret by the manufacturer. A manufacturer may want to do this to protect a product from being illegally copied. Enter "T" (for True) if they have identified it as a trade secret; otherwise, leave it blank.

Confidential (Field) – This is an area in which to note if the component has been named as a confidential component of the product. If a component is designated as confidential by the company using the software, only users with special security can see the component name, Chemical Abstract Service (CAS) number, and percentage. This component information would not be on the paper MSDS, or it would not be confidential. Often, customers may need to sign a nondisclosure agreement to obtain confidential information. Enter "T" (for True) if it is confidential; otherwise, leave it blank.

Component Note Line – This field is provided for additional information that is given for the component name. This field can contain up to 80 characters.

Percent – The percentage of the material represented by the component. This field allows a qualifier and up to two numeric values. In addition to the standard qualifiers, the component qualifiers (BAL, NIL, and TRA) are allowed. (See list of qualifiers.)

Balance (BAL), Trace (TRA), and Nil (NIL) should be entered in the note field. LOGICAL strongly recommends that the customers develop their own standard on what numeric value they would assign for a component's percentage that is given as Trace or Nil, unless these are a reference to what is on the paper MSDS.

It is also recommended that they try to calculate the percentage for components given as Balance and enter it as a > or < %. This will be very helpful for environmental reports.

If information is given for the *complete product*, enter the product name as a component. The PEL and Threshold Limit Values (TLVs) located on other pages are for the product, which should be entered along with the CAS number, which is sometimes located at the top of the page in Section 1 of the paper MSDS. Only enter the

information for the product if it is complete (has CAS number and/or exposure limits).

If a component is given as 95 percent or more, then this usually refers to the product, even though the name may be different. The component's name is probably a synonym for the product name.

Do not use the product name as a component (not including pure chemicals) unless the product name, CAS number, and/or Exposure Limits are listed in the Components text section. Shell MSDSs are a good example of when you would load the Product Name as a component.

If the percent is something other than a number, then it can be explained on the note line. Percent is always assumed to be by Weight, so if it is given by Volume, you MUST explain that on the note line. Very occasionally, this value is given in PPM (e.g., 4 PPM). To convert, move the decimal point four places to the left. This would be entered as 0.0004%. Enter the PPM value on the note line as it is given on the MSDS.

CAS Number – The Chemical Abstract Service (CAS) Registry Number for the component. CAS is a Columbus, OH, organization that indexes information published in the Chemical Abstracts by the American Chemical Society.

How a CAS number should look: The format of a CAS number is 999999-99-9. CAS numbers start at 50,000. If the number is under 50,000, it is not a CAS number. CAS numbers usually include dashes on the paper MSDSs. Dashes are ALWAYS in the following locations within a CAS number:

999999-99-9

99999-99-9

9999-99-9

999-99-9

99-99-9

(**Note**: The CAS algorithm has been built into the system to warn you if an invalid CAS number has been entered.)

Searching for a CAS Number by Component Name: If you happen to come across an invalid or illegible CAS number, there is a helpful function built into the software that allows you to look up CAS numbers for a specific component. Simply right click with the cursor on the appropriate component name field. A pop-up menu will appear, from which you would choose the "Name Lookup" option. (You could also do an Alt+N instead of right clicking.) A "page" from the Regulated Substance Database will open, and it will contain the component name you searched by, along with the correct CAS number. It should be logged that you found the CAS number this way, so that the customer may be notified about it.

Searching for a Component Name by CAS Number: If you have a component name that is difficult to read, but you are able to clearly read the CAS number, you can look up the component name by the CAS number. Just right click with the cursor on the appropriate CAS number field.

A pop-up menu will appear, from which you would choose the "CAS Lookup" option. (You could also do an Alt+L instead of right clicking.) A "page" from the Regulated Substance Database will open, and it will contain the CAS number you searched by, along with the correct component name and other regulatory information. Be careful with this information because a CAS number can have as many as 30 names. Match it as closely as possible to what you can read of the component name on the paper MSDS. It should be logged that you found the name this way, so that the customer may be notified about it.

Vapor Pressure – The pressure exerted by a vapor that is in equilibrium with its solid or liquid form.

This is the same "group" of fields provided for the product in the Physical & Chemical I page, except this set is for the *individual component*. Individual Vapor Pressures are generally found on paint and coating MSDSs. Vapor Pressure is usually given as millimeters of mercury (mm Hg). LOGICAL recommends that your company decide on a standard and convert to it. Almost all Vapor Pressures provided on MSDSs are given as mm Hg.

Lower Explosion/Flammable Limit (LEL) – The low-end range of vapor concentrations in air, which will explode if heat is added. This information is usually given as a percentage. If other information is provided, enter it in the note field.

This is the same "group" of fields provided for the product in the Fire and DOT Information page, except this set is for the individual component. Individual LELs are generally found on paint and coating MSDSs.

WHMIS Classification – The Canadian Workplace Hazardous Materials Information System (WHMIS) Class. The field allows up to 30 characters.

If a material is a controlled product, it would have one or more of the following classifications:

Class A	Compressed Gas
Class B-1	Flammable Gases
Class B-2	Flammable Liquids
Class B-3	Combustible Liquids
Class B-4	Flammable Solids
Class B-5	Flammable Aerosols
Class B-6	Reactive Flammable Materials
Class C	Oxidizing Material
Class D, Div.1	Materials Causing Immediate & Serious Toxic Effects
Class D-1A	Very Toxic Material
Class D-1B	Toxic Material
Class D, Div.2	Materials Causing Other Toxic Effects
Class D-2A	Very Toxic Material
Class D-2B	Toxic Material
Class D-3	Biohazardous Infectious Material
Class E	Corrosive Material

EPCRA 313 Chemical (a.k.a. **SARA 313**) – This field is to identify if the component has been identified as a 313 reportable chemical. If it has been identified, a T (for True) should be entered in the field; otherwise, leave it blank. By law, the manufacturer must identify if a material contains a 313 reportable chemical. However,

many chemicals are added and removed every year from the 313 List. If the MSDS is not today's date, a chemical may not be marked. They also don't always identify some of the heavy metal compounds that are reportable, but are not on the 313 List.

EPCRA EHS (a.k.a. **SARA 302**) – This field is to identify if the component is identified as a SARA Extremely Hazardous Substance. It is sometimes referred to on a MSDS as "SARA 302 Extremely Hazardous Substance." If it *has* been identified, a T (for True) should be entered in the field. If it *is stated that it is not reportable,* an F (for False) should be entered. If it has not been identified either way, leave it blank.

EPCRA TPQ – This field is used in conjunction with the EPCRA EHS field. There cannot be a TPQ unless the component is an EHS. The TPQ is almost always given in pounds. Record the number amount in this field.

Exposure Limits

OSHA PEL PPM – The permissible exposure limit established by OSHA regulatory authority. This may be a maximum concentration exposure limit or a time-weighted average. The unit is parts per million. If the value is given as a Ceiling or Skin designation, that information should be noted in the Limit Notes.

OSHA PEL MG/M3 – The permissible exposure limit established by OSHA regulatory authority. This may be a maximum concentration exposure limit or a time-weighted average. The unit is milligrams per cubic meter. If the value is given as a Ceiling or Skin designation, that information should be noted in the Limit Notes.

ACGIH TLV PPM – The American Conference of Governmental Industrial Hygienists Threshold Limit Value, a term used to express the airborne concentration of a material to which nearly all persons can be expressed, day after day, without adverse effects. The unit is parts per million. If the value is given as a Ceiling or Skin designation, that information should be noted in the Limit Notes.

ACGIH TLV MG/M3 – The American Conference of Governmental Industrial Hygienists Threshold Limit Value, a term used to express the airborne concentration of a material to which nearly all persons can be exposed, day after day, without adverse effects. The unit is milligrams per cubic meter. If the value is given as a Ceiling or Skin designation, that information should be noted in the Limit Notes.

OSHA STEL PPM – The short-term exposure limit, or maximum concentration for a continuous 15-minute exposure period, with a maximum of four such periods per

day, with at least 60 minutes between exposure periods, provided that the daily TLV – Time-weighted Average is not exceeded. The unit is parts per million.

OSHA STEL MG/M3 – The short-term exposure limit, or maximum concentration for a continuous 15-minute exposure period, with a maximum of four such periods per day, with at least 60 minutes between exposure periods, provided that the daily TLV – Time-weighted Average is not exceeded. The unit is milligrams per cubic meter.

ACGIH STEL PPM – The short-term exposure limit, or maximum concentration for a continuous 15-minute exposure period, with a maximum of four such periods per day, with at least 60 minutes between exposure periods, provided that the daily TLV – Time-weighted Average is not exceeded. The unit is parts per million.

ACGIH STEL MG/M3 – The short-term exposure limit, or maximum concentration for a continuous 15-minute exposure period, with a maximum of four such periods per day, with at least 60 minutes between exposure periods, provided that the daily TLV – Time-weighted Average is not exceeded. The unit is milligrams per cubic meter.

Limit Note – This note field has been added to document additional exposure limit information. Some MSDSs have additional information concerning National Institute for Occupational Safety and Health (NIOSH) and/or Manufacturer Recommended exposure limits. This field can contain up to 80 characters.

(**Note**: Non-numeric information for the exposure limit fields should be entered in the limit note field. The only units that can be entered into these sections are PPM and MG/M3. If there are other limits given, such as million particles per cubic foot (mppcf), then these would be entered in the limit note field. The PEL, TLV, and short-term exposure limit (STEL) are sometimes given as: CEILING, SKIN, DUST, 1986 ACGIH, etc. These references must be put in the limit note line.)

Converting Specific Units Given for Exposure Limits – The PEL, TLV, and STEL may sometimes be found as micrograms/m3, or ug/m^3. To convert this to µg/m^3, you move the decimal point three places to the left (or divide by a thousand).

For example: 10 µg/m^3 = 0.010 mg/m^3

The PEL, TLV, and STEL may also be found as parts per billion (ppb). To convert this to parts per million, you move the decimal point three places to the left (or divide by a thousand).

For example: 10 ppb = 0.010 ppm

Section III. General Information

Entering Numbers

Enter the number as it is found on the paper MSDS, if there is room in the field.

If a number is given as "15," enter as "15"

If a number is given as "15.0," enter as "15.0"

If a number is given as "15.00," enter as "15.00."

How To Enter Numbers When Doing Calculations

To count the number of significant figures in a given measured quantity, observe the following rules.

1. All digits are significant except zeros at the beginning of the number and possible terminal zeros (one or more zeros at the end of a number). 9.12 cm, 0.912 cm, and 0.00912 cm all contain three significant figures.
2. Terminal zeros ending at the right of the decimal point are significant. All digits in 9.00 cm, 9.10 cm, and 90.0 cm are significant.
3. Terminal zeros ending to the left of the decimal point may or may not be significant. With a measurement of 900 cm, you do not know if one, two, or three significant figures were intended. LOGICAL's procedure is to count this as *three* significant figures.

Uncertainty can be removed by using scientific notation.

9.0 x 10(2) shows two significant figures.

9.00 x 10(2) shows three significant figures.

(**Note**: Do NOT convert to scientific notation when loading data. The above is for reference information only.)

Significant Figures in Calculations

When multiplying or dividing measured quantities, you should give as many significant figures in the answer as there are in the measurement with the least number of significant figures. LOGICAL's loading procedures call for everyone to use the *exact same* multiplying or dividing factors. DO NOT DEVIATE from the factors listed earlier in this document.

When adding or subtracting measured quantities, you should give the same number of decimal places in the answer as there are in the measurement with the least number of decimal places.

Symbols

The following unusual usage of the < and > signs have been found on some MSDSs.

Example One	Example Two
Vapor Density	Vapor Density
1<	1>

Example One would be entered as "GT 1".

Example Two would be entered as "LT 1".

Yes, it does make a difference in which side of a number the symbols are placed.

Commonly Found Abbreviations on MSDSs

Degrees Fahrenheit: deg. F or °F

Degrees Celsius: deg. C or °C

Auto ignition: Auto Ign.

Point: Pt.

Boiling Point: Boil. Pt. or B.P.

Closed Cup (Flash Point): C.C. (Flash Pt.)

Evaporation Rate: Evap. Rt.

Freezing Point: Freez. Pt.

Flammable Limits: Flam. Lmts.

Melting Point: Melt. Pt.

Molecular Weight: Mol. Wt.

Open Cup (Flash Point): O.C. (Flash Pt.)

Percent Volatiles: % Volatile.

Softening Point: Soft. Pt.

Specific Gravity: Spec. Grav. or Sp.Gr.

Vapor Pressure: Vapor Pres. or V.P.

Vapor Density: Vapor Dens.

Viscosity: Viscos.

Solubility or Soluble: Sol.

Insoluble: Insol.

Material: Mat.

Hazardous: Hazard. or Haz.

Liquid: Liq.

Percent: %

Weight: Wt.

Permissible Exposure Limits: PEL

Threshold Limit Value: TLV

Short Term Exposure Limit: STEL

CAS Number: C.A.S. #

Data Fields Information

A value given as "Up to 80" is less than or equal to 80 (LE 80).

A value given as 80+ is greater than 80 (GT 80).

If zero is the value given, then enter it as 0.0.

Do not place periods on the data field note lines, unless the paper MSDS has the information ending with periods. This includes "Solubility in Water" and "Appearance/Odor" fields.

Once in awhile, you will run across a foreign-made MSDS. These are usually no different from other MSDSs, except that they use the metric system, which uses commas instead of periods. We do not use the commas, and the information should be entered with a period.

For example: Boiling Point = 212,0 °F (as on foreign MSDS)

The comma between the 2 and 0 is a period in the English system.

Enter as: Boiling Point = 212.0 °F (translation)

If there is something you cannot fit into any field, then circle it and write text on the paper next to it. Make sure that the text has not been done or proofed, because, if it is done, then the information you have circled will not be added. If the text has been both entered and proofed, consult a data proofer or your supervisor.

Unusual Data Examples

As on paper MSDSs:

Vapor Pressure (mm Hg): Same as Water.

Evaporation Rate (Ether=1): Same as Water.

Enter as:

Vapor Pressure: SAME AS WATER

Evaporation Rate: EQ 1 (on note line): WATER=1, SAME

If the paper MSDS identifies that one of the data fields is for the Product, "For Product" does not need to be entered in the note field. All data are considered for the Product. Any time information is identified as being for a single component, that information needs to go in the note field.

Enter Manufacturer's Exposure Limits in the exposure note fields.

Enter NIOSH exposure limits in the exposure note fields.

Set-Up Rule

If there is no emergency Manufacturer/Supplier phone number given, BUT the Chemtrec number is given, USE the Chemtrec number as the emergency phone number.

(**Note**: If no emergency phone number is listed on Page 1 and you see the Chemtrec number on the paper MSDS, please notify a set-up person.)

Section IV. Examples

This section explains how specific information found on MSDSs is interpreted by LOGICAL and how that information is to be entered.

Example 1 (as on MSDS)

Percent / CAS #	Component / Regulatory Limits
100.0%	Standard ATF Special
< 90.0%	Lubricating Base Oil

(The base oil may be a mixture of any of the following: CAS 64741884, CAS 64741895, CAS 64741964, CAS 64741975, CAS 64742525, CAS 64742536, CAS 6472547.)

< 10.0%	Additives

Comment: Enter lubricating base oil as a component with GT 90.00% and the first CAS number. In the note field (start with an *), enter "may contain:".

Enter each of the listed CAS numbers as separate components with GT 90.00%. Use "lubricating base oil" for each component name. Enter as many as needed to get all of the CAS numbers listed into a CAS number field. Be sure to enter "may contain" as a note for each of these components. This is not a good solution for environmental reporting, but it is important to get each CAS number entered with a component name.

(**Note**: If an exposure limit is given, enter it with each duplicate component name. Also enter the percentage for each duplicate component.)

Text loaders should enter the information just as it appears on the MSDS in the appropriate text section.

Example 2 (as on MSDS)

Ingredients:	Percent	CAS No.
Contains two or more of the following Base Oils	> 80.00	
Distillates (Petroleum), Hydrotreated Heavy Naphthenic		64742-52-5
Residual Oils (Petroleum), Solvent-Dewaxed		64742-62-7
Lubricating Oils (Petroleum)	C>25	
Hydrotreated Bright Stock-Based		74623-83-7

(**Comment:** Enter each of the listed BASE OILS as a component with >80.00%. In a note field for each one, enter "MAY CONTAIN".)

Special Instances

If you enter the product name as a component (and it is not a pure chemical) because there is PEL/TLV information or a CAS number, **ENTER the Product Name last**. Some companies list their components with the most hazardous first, then the second most hazardous, etc.

When you get a component such as: "Remaining components not determined hazardous and/or hazardous components less than 1.0% (0.1% for carcinogens)." This

statement has been known to be on Texaco MSDSs. Do not enter this statement on the component note line. *CIRCLE THE ENTIRE NOTE FOR TEXT TO ENTER.*

If you get a component name such as listed below:

A MIXTURE OF SEVERELY SOLVENT REFINED OIL, A SEVERELY HYDRO-TREATED OIL, LITHIUM 12 HYDROXY STEARATE AND A GREASE ADDITIVE

CAS No. - MIXTURE% = 99.9-100

The entire statement should be circled for Text to be entered exactly as it is, in its entirety.

Data loaders should enter these as individual components (*listed below*), with % as BT 99.9-100 for all.

SEVERELY SOLVENT REFINED OIL

SEVERELY HYDROTREATED OIL

LITHIUM 12 HYDROXY STEARATE

GREASE ADDITIVE

For each component, enter this note: *PART OF MIXTURE.

When reports are run in LOGICAL's software, each component will be assumed 100 percent.

If you come across exposure limits that are given as "0" (for PPM and MG/M3), do not enter the zeros in the fields or on the note line. Write on the grief sheet that the exposure limit was given as "0." Leave it blank on the component page.

Main Objective for Component Names

Clean up the component name database as much as possible. The goal is to have only components in the component name fields. As LOGICAL and users attempt to do more advance functions with the components, the existence of "noncomponent" information is becoming more and more a problem.

Examples of specific comments that *should not* be entered in component name fields.

Example 1 -- OSHA 20 Forms (as on paper MSDS)

Section II Hazardous Ingredients

Paints, Preservatives, & Solvents	% TLV
Pigments	N/A
Catalyst	N/A
Vehicle	N/A
Solvents	N/A
Additives	N/A
Others	N/A

In the past, data entry personnel have entered "PAINTS, PRESERVATIVES, & SOLVENTS: NA." as a component. This is no longer done. This entry should be placed in the respective text section.

This requirement is also true for "ALLOYS AND METALLIC COATINGS" and "HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES." Text loaders SHOULD NOT try to recreate the OSHA 20 format (as above).

Example 2 – Ideal Industries, Inc. (as on paper MSDS)

Product consists of: 100

Mineral Oil

- (as Oil Mist)

Paraffin Wax

- (as Fume)

Nonhazardous ingredients*

*Unidentified ingredients are not considered hazardous under the Federal Hazard Communication Standard (29CFR 1910.1200).

Comment: This example should be loaded in the component pages as two components with two notes, as listed below:

(Component Name): MINERAL OIL

(Component Note): AS OIL MIST

(Component Name): PARAFFIN WAX

(Component Note): AS FUME

Text loaders would enter it in its entirety, as it appears on the paper, along with the note: "SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION."

Example 3 – XEROX MSDSs (example of paper MSDS at left; calculations required at right; values to be entered at right in bold; see legend for footnote definitions.)

PAPER	CALCULATIONS	
Ingredients	Enter	
Carrier (>95%)		
Steel powder (>99%)	.99 x 95	> 94.05
Fluoropolymer (<1%)		< 1.0 @
Toner (<5%)		
Styrene/butadiene copolymer (>99%)		< 5.0 ^^
Iron Oxide (15-20%)		< 1.0 +++
Rosin Acid (<5%)	.05 x 5	< 0.25
Carbon Black (<5)	.05 x 5	< 0.25

Comment: This example should be loaded as six components. In each respective component note field, there should be a note. (The example following is for Steel Powder: *CONTAINS > 99% IN CARRIER.)

Legend:

@ The smallest value would be 0.0 times 95.000...1% because less than 1 could be zero and >95 could be 95.000...1, the largest value could be .9999...(< 1%) times 100 because >95 could be a hundred. Between 0.0 and 1 includes everything in the range except 0.0 and 1.0. Between 0 and 1% is the same thing as <1%, and <1% is the simpler statement.

^^ The smallest value would be 0.0 times 99.000...1% because less than 5 could be zero and >99 could be 99.0001, the largest value could be 4.9999...(< 5%) times 100 because >99 could be a hundred. Between 0.0 and 5.0 includes everything in the range except 0.0 and 5.0. Between 0 and 5% is the same thing as <5%, and <5% is the simpler statement.

+++ <5.0% times 15% and <5.0% times 20% could be known as:

BT ([BT 0.0 and 0.75%] and [BT 0.0 and 1.0%]). Since we cannot show between two ranges, <1.0 is the "cleanest" value to use.

WHAT DOES THIS MEAN? If either value contains a "<", the smallest value will be zero, calculate the largest value and use a "<" largest value. There is no example that makes sense for a BT range.

TEXT ENTRY SHOULD ENTER (as follows):

> SEE COMPONENT PAGE(S) FOR ADDITIONAL INFORMATION.
>
> Carrier (>95%): Steel powder, Fluoropolymer.
>
> Toner (<5%): Styrene/butadiene copolymer, Iron Oxide, Rosin Acid, Carbon Black

Example 4 – No Information

If there is no component listed, no chemical name, and no information concerning the Product, such as exposure limits and CAS number, DO NOT ENTER ANYTHING in the component section.

Do not enter "HAZARDOUS INGREDIENTS: NONE".

If the Product Name only has information such as CAS Number: MIXTURE or CAS number: NOT GIVEN, do not enter the name just to have a note that does not mean anything. That information will be entered into text.

(**Note**: We are considering not entering the Product Name even if there is information concerning the product. Of course if the Product Name is a pure chemical such as ACETONE, you would load ACETONE as a component. For now, continue to load the Product if there is meaningful information, such as a TLV or CAS number.)

Component Information Found Outside of Ingredients Section

All component information contained in another text section MUST be added to the component pages. This additional information is usually found in a "Regulatory" text section. If components are given that are not listed in the ingredients text section, they should be added as components. If exact percentages are given in text, and a range is given in the ingredients section, *USE the exact percentages.*

It is very important that all component information be added to the components data section because this is what drives all regulatory reports found in LOGICAL's software.

Do not confuse this information with information concerning DECOMPOSITION components that are usually found in the Health Hazard text section. These decomposition components SHOULD NOT be loaded as components.

The component information found in other text sections should be highlighted. If you find anything highlighted that you do not feel should go into data, ask one of the data proofers why it is highlighted. (Note: All component information found in text sections other than Ingredient text sections must be entered in text.)

Example 1 – CHEVRON (as on paper MSDS)

100% CHEVRON HYJET IV-A

containing

Components	Amount
Additives include the following	< 23.0%

Cycloaliphatic Epoxide < 3.2%

Triaryl Phosphate

The balance of the formulation is tributyl phosphate.

Comment: Load as three components as in the example below:

(Component Name 1)

Cycloaliphatic epoxide

(Percent)

LT 3.2%

(Component 1 Note)

Contained in <23% ADDITIVES

(Component Name 2)

Triaryl Phosphate

(Percent)

LT 23%

(Component 2 Note)

Contained in <23% ADDITIVES

(Component Name 3)

Tributyl Phosphate

(Percent)

GT 77%

(Component 3 Note)

%: Balance

Final Notes: The information contained in this document is a result of LOGICAL's experience gained throughout more than a decade of entering MSDSs. Our highly competent staff continually works together to obtain and uphold these principles of quality.

After all, the greatest purpose of MSDSs is to inform the worker on the job-site of possible dangers and hazards. LOGICAL's goal is to provide this information to them accurately, effectively, and efficiently.

5 Instructions for HAZMIN® Users

The documents included below Requestors Instructions and Instructions for Committee Members as well as the MSDS Loading Information (Section 4) will be placed in the HAZMIN® Plans folder, along with an "index" page. Therefore, any employee in HAZMIN® will be able to click on the Plans button and read / print any of the documents.

Requestor Instructions – Adding a Request

Follow steps 1 through 7 to add a request:

1. Log in with your Username and Password.
2. Click first letter of product name.
3. Find product name on list.
4. Click <*Use Option*> button. Display shows assigned Uses and Requests.
5. Click <*Add Req*> button to add a request.
6. Fill out Request form completely.

Follow the instructions (A through S) below to continue.

A. Request Location – Select your location from the drop down.

B. Specific Use – Select from the drop down.

C. Usage – Select from drop down.

D. Application – Select from drop down.

E. Ventilation – Select from drop down.

F. Disposal – Select from drop down.

G. Process Description – Type a description of how the material will be used in the text box.

H. Size – How many ounces, gallons, pounds, etc.

I. Container Units – Select from drop down.

J. Container Type – Select from drop down.

K. Daily Max Number of Containers Stored

L. Daily Avg. Number of Containers Stored

M. Annual Number of Containers Used

N. SARA Pressure – Select from drop down.

O. SARA Temperature – Select from drop down.

P. SARA Confidential – Select from drop down.

Q. Request Submitter – Person for whom you are filling out Request.

R. Effective Date – Date you start using material.

S. Expiration Date – Date request approval will end.

7. Click <*Submit*> button when all data is correct.

When you have completed the above, the Committee will review your request.

Committee Member Instructions – Approving a Request

Follow steps 1 through 7 to approve a request.

1. Log in with username and password.
2. Select HAZMIN® Function – Reports Request.
3. Click the <*Review*> button. Grid of Pending Requests displays.
4. View the Request by clicking the location name in the Request column.
5. View the MSDS by clicking the product name in the Product column.
6. Select 'A' for Accept or 'R' for Reject in the appropriate column. If you select 'R', you must put a reason in the Rejection Note field.
7. Click <*Submit*> button when done.

Note: To move a rejected Request to Non-Current status, all the columns must contain an 'R'. This allows you to have a history of rejected Requests and why they were rejected.

6 Summary

WVA is currently licensed to use LOGICAL (Logical Technology, Inc., Peoria, IL) COTS software for site hazardous waste material tracking at industrial sites. However, to be useful at WVA, the software, called "Hazardous Materials Information Network" (HAZMIN®), required updating to a more current MS Windows™ and World Wide Web browser-compatible version. During this project, the outdated software was removed from the VAX computer and new MS Windows™-based HAZMIN® installed on the server computer designated as "Vulcan," which uses the existing MSSQL® server for the database. Existing MSDSs were converted to the new version of HAZMIN® and intranet access for the MSDSs was provided. Formal training classes were held for key users and administrators over a 2-day period.

Project Tasks and Deliverables

The following tasks were completed for this project:

- Project meetings were held at WVA with site personnel from Safety Office and Information Systems Directorate, as well as representatives from Logical Technology, Inc. and MSE-TA, Inc. Final project specifications were completed and consensus was obtained on the final task list in mid-October 2001.
- Cost estimates were obtained and MSE developed a software services procurement package, assisted in the selection of a subcontractor, and performed subcontract technical monitoring, which was approved at the end of October 2001, for LOGICAL to complete a list of tasks.
- Under the subcontract, LOGICAL completed the following tasks:
  - Converted a total of 3,023 MSDSs from VAX HAZMIN® to MSSQL® database-compatible format. Of this total, 1,303 were current and 1,723 were pending MSDSs.
  - Installed the MSDSs on the Vulcan MSSQL® server with the assistance of WVA Information Systems Directorate personnel.
  - Installed HAZMIN® client on two machines to allow updating and upgrading MSDSs.
  - Installed the user Web pages on an MS Internet Information System (IIS) web server software package.
  - Integrated e-mail functionality into the WVA intranet to accommodate committee approval.

- All software modules installation was completed by mid-December 2001.
- Provided reporting tools.
- Provided formal classroom training for 120 coordinators, users, and approvers during a 3-day period between 28 January and 1 February 2002.

Project Results

The results of the HAZMIN® software conversion project were well received by users, coordinators, and committee approvers of the new system. Some of the benefits stated by users are; reduced paperwork burden, reduced labor requirements, reduced risk of NOVs due to uncontrolled hazardous materials, and improved tools for expedited reporting to the state.

After installation, the new time saving and paperwork reduction for the administration and distribution of the MSDSs are significant. In addition, the risk exposure to the Arsenal due to uncontrolled substances being issued and used, duplicate amounts being stored at various localities on site, and general lack of tracking of hazardous substances is greatly reduced. The rapid and user friendly procedures that are used to control the issuance of the materials by way of committee member e-mail capabilities is well received by users. The burden of paperwork is reduced, and state reports are easily generated from the toolkit provided with the upgrade.

The software-based reporting functions of the HAZMIN® software suite are being activated as the WVA hazardous materials database is being loaded onto the MSSQL® database server. Currently the system is evolving and improving as the reporting toolkit is being activated, and will increase the value of the system as a cost saver and risk reducer over time. The system has the flexibility for updating by using the two clients that can be used by the coordinators to add new MSDSs, change committee members, and update the software modules.

References

Northrup, Jearldine I., Joyce C. Baird, Phil Darcy, and Don Schiller, *Environmental Management Information System (EMIS) at Watervliet Arsenal, NY,* Technical Report (TR) ERDC/CERL TR-00-28/ADA383234 (U.S. Army Engineer Research and Development Center/Construction Engineering Research Laboratory [ERDC/CERL], October 2000).

Northrup, Jearldine I., Joyce C. Baird, and Don Schiller, *Remote Monitoring of Fluid Storage Tanks at Watervliet Arsenal New York*, USACERL TR 98/108/ADA352918 (CERL, August 1998).

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14. ABSTRACT

The U.S. Army's Watervliet Arsenal (WVA) in New York is faced with increasing environmental regulation and reduced manpower to meet regulatory requirements.

The main task of this project was to update an existing software-based hazardous material tracking software application. The objective of this task was to increase the Environmental Management Information System (EMIS) capabilities to allow hazardous material control, tracking, and reporting. Another main objective was to improve users' right-to-know about potential hazardous material hazards. EMIS is used to centralize, automate, and manage the acquisition, flow, storage, and reporting of environmental information throughout the Arsenal.

After installation, the new time saving and paperwork reduction for the administration and distribution of the MSDSs are significant. In addition, the risk exposure to the Arsenal due to uncontrolled substances being issued and used, duplicate amounts being stored at various localities on site, and general lack of tracking of hazardous substances is greatly reduced. The rapid and user friendly procedures that are used to control the issuance of the materials by way of committee member e-mail capabilities is well received by users. The burden of paperwork is reduced, and state reports are easily generated from the toolkit provided with the upgrade.

15. SUBJECT TERMS
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