

University of California
Environmental Health & Safety

Chemical Inventory Management System

System Analysis And Design



CONFIDENTIAL

Joint Development Project

UCSF & UC Davis



Project Orientation

The University of California Medical Center campuses at UCSF and UC Davis are required to make large periodic chemical inventory reports to various governmental agencies. This function, known as the business plan, requires data on each chemical, its location, use, responsible person and other detailed information. The reporting requirements are becoming more complex and more agencies and regulators are requesting or requiring more and different reporting ability.

The campuses find that the existing 3rd generation computer language based applications being have become inadequate. This project then, is an initial system analysis and design. It is limited to the chemical inventory function in a first release product, with integration to the chemical purchase and chemical waste flows left to a future expanded project.

It is based on specifications provided by Ara Tahmassian and interviews with stakeholders in the project at UC Davis, UCSF and other knowledgeable parties, including UCSF EH&S employees who were present at previous investigations or attempts at such an application. The fact that it has not yet been fully attempted or completed attests to the scope and difficulty of this project. The guiding principle was to determine a clear understanding of the perceived problem or need, to understand the current systems and to propose multiple implementation options that address the various expressed needs and desires. Although this document is a traditional water fall system design, implementation can and should not be conservative, but use rapid application development and prototyping methods wherever useful.

No attempt was made to define a specification which includes all options, solutions or features suggested, hinted at or preferred by every party in a first release product. But, every one's input was recorded and specifications ranked in importance, which are subject to confirmation by the project sponsors. Where there were difference in features or importance, such as preferred implementation platforms, all alternatives meeting the specifications requirement are presented as alternative implementations when possible and or listed in the priority ranking.

This is a dynamic document and subject to revisions and updates, which will be released to the distribution recipients. Readers and users should confirm that they have the latest data in a table fields and design or other detail areas before executing critical decisions or implementations.

This particular project is an integral part of the overall chemical and hazardous chemical materials management and waste management, the 'Chemical Materials Flow.' This entire life cycle is acknowledged in the documentation, but this first implementation specifications scope does not attempt to include these features. *That is there is no* design for linkage to hazardous chemical material waste system or any planned automated system to capture data of incoming chemicals at the purchase order level. The design is intended to be scaleable and extensible enough to later link with these functions.

This documentation can be used as a reference starting point and base guide line for the development of chemical inventory functions and later possible integration to a full life cycle of chemical materials management.

After review and completion of any agreed changes, sponsors and stakeholders are encourage to sign the Design And Implementation Agreement in order to bring closure on an first release and have a common agreement on the product.

Michael Ayres, Programmer/Analyst UCSF

June 1, 1997



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July 28, 1997

University of California
Attn: Michael Ayers
Environmental and Health Safety
50 Medical Way
San Francisco, CA 94143-0942

Dear Michael:

Thanks for the opportunity to review the system analysis and design specification for the Chemical Information & Inventory Management Database. The document is very impressive and is a tremendous specification for getting this project built correctly. As I mentioned on the phone, we are very excited to work on this job. During our work with the LA County Fire Department we reviewed these exact same issues, including looking at the MSDS chemical information database (which we also found deficient in some ways). It is also a happy coincidence that I have a Bachelor's degree in Chemistry and experience working as a research chemist.

I'm attaching a copy of our proposal to do this work. We propose to do the development on a T&M, not to exceed basis. Under this type of contract, we manage the work tightly and do not exceed the original budget without your prior approval in writing.

- The proposal consists of the following components (all produced using a Delphi project costing tool that we wrote):
- A summary sheet that provides project overview data. Our estimated cost for this job is \$48,786.
- A project plan consisting of a set of tasks and deliverables with associated costs and durations (in months).
- A detailed description of each of our proposed deliverables.
- A maintenance report showing the estimated on-going maintenance requirements, the estimated number of residual defects broken down by defect category, and the estimated number of annual support call you can expect to receive about the software.

I look forward to working with you on this exciting project. Is the 15th of August a valid estimated start date?

Sincerely
William H. Roetzheim
Marotz, Inc.

William H. Roetzheim
Chief Executive Officer

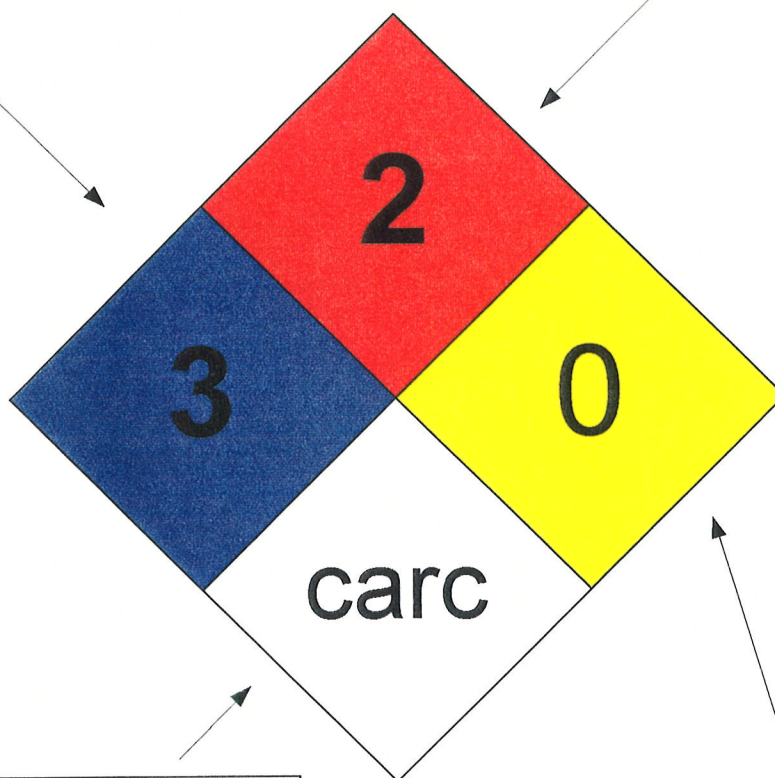
37% FORMALDEHYDE

HEALTH HAZARD

- 0 - Ordinary combustible hazards in a fire
- 1 - Slightly hazardous
- 2 - Hazardous
- 3 - Extreme Danger
- 4 - Deadly

FIRE HAZARD

- 0 - Will not burn
- 1 - Will ignite if preheated
- 2 - Will ignite if moderately heated
- 3 - Burns readily at ambient conditions
- 4 - Extremely flammable



SPECIFIC HAZARD

OXY	Oxidizer
Acid	Acid
ALK	Alkali
Cor	Corrosive
Use No Water	

REACTIVITY

- 0 - Stable and not reactive with water
- 1 - Unstable if heated
- 2 - Violent chemical change
- 3 - Shock and heat may detonate
- 4 - May detonate

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1. Executive Summary

It is the analysts' belief that this project will require a sustained commitment of all parties through the entire project life cycle and that the work be shared across operational and disciplinary lines.

The recommendation is:

- To formalize a project team and divide the project into manageable tasks
- To engage a project partner (such as DeVries Consulting of San Jose, CA.) to produce the software product against an initial local dbf table database, designed such that it could be later used against either an Oracle, Sysbase or Microsoft SQL Server back end.
- An assigned chemical safety specialist is needed to work with the database administrator(s) and administrative group to coordinate population of the database.
- To begin the project with a deliverable date of a first operational release in six or months or less, which may not have a fully detail defined chemical materials database.

It's estimated the programming costs, if contracted to a consulting partner, to be about 500 hours or approximately \$50,000. Additionally the implementation of SQL RMBDS back end will add additional costs or time usage of FTEs of about 1/4 to 1/3 FTE for database administration. Choices of the back end database will also have a cost affects too, such as software purchase, training and ongoing database administration, which will vary at different site level locations.

The costs of populating approximately 15,000 core chemical materials detail information is estimated to be between 80 hrs/1,000 chemicals at 5 minutes per chemical. If all 15,000 chemicals had to be entered through the interface, that would be about 1,200 hours or six to eight months for 1 FTE (temp) at a full time rate, allowing that the info is readily available for data entry on each chemical

A detailed project management Gantt chart is depicted in chapter 7, implementation.

After reviewing the document, executives and other stakeholders are invited to sign the design and implementation agreement as an acknowledgment of commitment to fulfillment of this project.

2. Project Definition

“To satisfy the reporting requirements of various interested parties...”

UC San Francisco and UC Davis are both campuses of the University of California system and are both Medical Centers. *In this document, references to singular name and nouns such as University of California, University, campus, or system may refer to these campuses either collectively or individually.*

Problem Statement

There is a flow of chemical, hazardous and non hazardous, materials that come onto the campus and flow through the campus systems: research labs, clinical settings, administrative or other departments. The university is required to report on this material both in periodic inventories and hazardous materials waste disposal processes. The current systems are perceived as inadequate and inflexible enough to meet the increasing demands for reports by more and more agencies and information systems management of these chemical materials.

Background

The intent of the California legislature in enacting the business plan law found in The California Code of Regulations, Title 19, Chapter 2, Subchapter 3¹ includes a need too create an inventory of hazardous materials and to develop a minimum statewide standard for reporting chemical inventories. No standard format yet exists and in its absence, local agencies have developed their own formats, resulting in a proliferation of incompatible formats for inventory reporting.

Local agencies responsible for implementing state hazardous waste laws, including the City and County of San Francisco, San Mateo County, Yolo County Office of Emergency Services and Merced County, require annual or other periodic inventory reports listing specified doses of hazardous chemicals; these materials are listed by building and room. Additionally, other state and federal regulatory agencies increasingly have an interest in obtaining information on storage and handling of hazardous materials.

¹ See appendix exhibit #1.

The San Francisco campus uses SFS Chemical Safety's ICS (Inventory Collection System), a commercial CLIPPER application. Davis campus is currently using a program called the Hazardous Materials Handler, manufactured by MSDS, Inc. Both sites find their present systems, although generally satisfying reporting requirements, limited and believe that a chemical tracking system with many more useful features would greatly improve the chemical tracking process.

Project Objectives and Scope

Business Objective: To improve EH&S's ability to satisfy reporting and other requirements of various interested parties, including:

- Local agencies such as the 'Business Plan' of cities and counties
- Local emergency response agencies such as fire departments
- Other campus organizations such as Facilities Management
- EH&S departmental needs for implementation of safety programs and for access to health and safety information on chemicals.

Project Objective: To develop a relational database software system which uses existing EHASMIS² location and contact global tables to:

- Track chemical product inventory items at the lab level, of approximately 100,000 entries, with detail information as specified
- Maintain a synonym listing of core chemicals
- Maintain a base chemical database of 15,000 or more chemicals, with associated regulatory and hazard classification info as specified
- Remain flexible and extensible for changing needs and requirements

Project Scope: Although the entire scope of hazardous chemical flow from capture of inventory data at the lab level through disposal in the hazardous materials management process is touched on in the analysis, this project scope covers:

² EHASMIS is the current Environmental Health and Safety Management Information System which uses global or enterprise wide master tables for commonly used data, such as the contacts and PI pick list and rooms and building pick list.

- The computerized portion of the chemical inventory system flow beginning at data entry and through management of data and periodic and ad-hoc reporting
- It does not address the process of obtaining the source documentation of the description, number, amount and location of inventoried chemicals at the lab site level. An example of a data source document is the "Chemical Inventory/MSDS Request Form" used at the USSF campus.³ This source data acquisition at the lab site part of the process is administered by the Chemical Inventory System manager or compliance specialist. Although, a description of this data gathering process is shown in the *present systems*, below. Additionally, specifications and functional requests, described below, include a Internet WEB client module which would address the automated system data gathering at the lab site directly into the inventory system.
- It does not cover the hazardous materials disposal process, other than anticipating future links to this process

Method of Study

The project uses a standard generalized systems analysis and design approach, setting out to research and document the problem/need, current system, business function needs, proposal for new system, alternative implementations and recommendation.

The approach is to set definitive intermediate deliverables, with incremental increases in features and functionality. The primary research method has been interviews of key personnel, review of existing systems, determination of specifications requirements and review procurement if possible of external sources of chemical inventory databases to populate the chemical list tables.

The project is found to be a complete system redesign and redevelopment of the existing intermediate (partially manual and partially automated) systems.

³ See appendix exhibit #2.

System Charter

To produce a computerized chemical inventory tracking system suitable for use by the University, including hardware and software platforms, which will meet all current reporting requirements, with flexibility and extensibility to meet ever increasing accounting demands in the future. The system must be able to handle large inventory files of 100,000 records or more and provide details on each chemical product, (selected from a comprehensive reliable list) its characteristics, location, state and amounts and should meet all the required specifications described in this document in the time frame described.

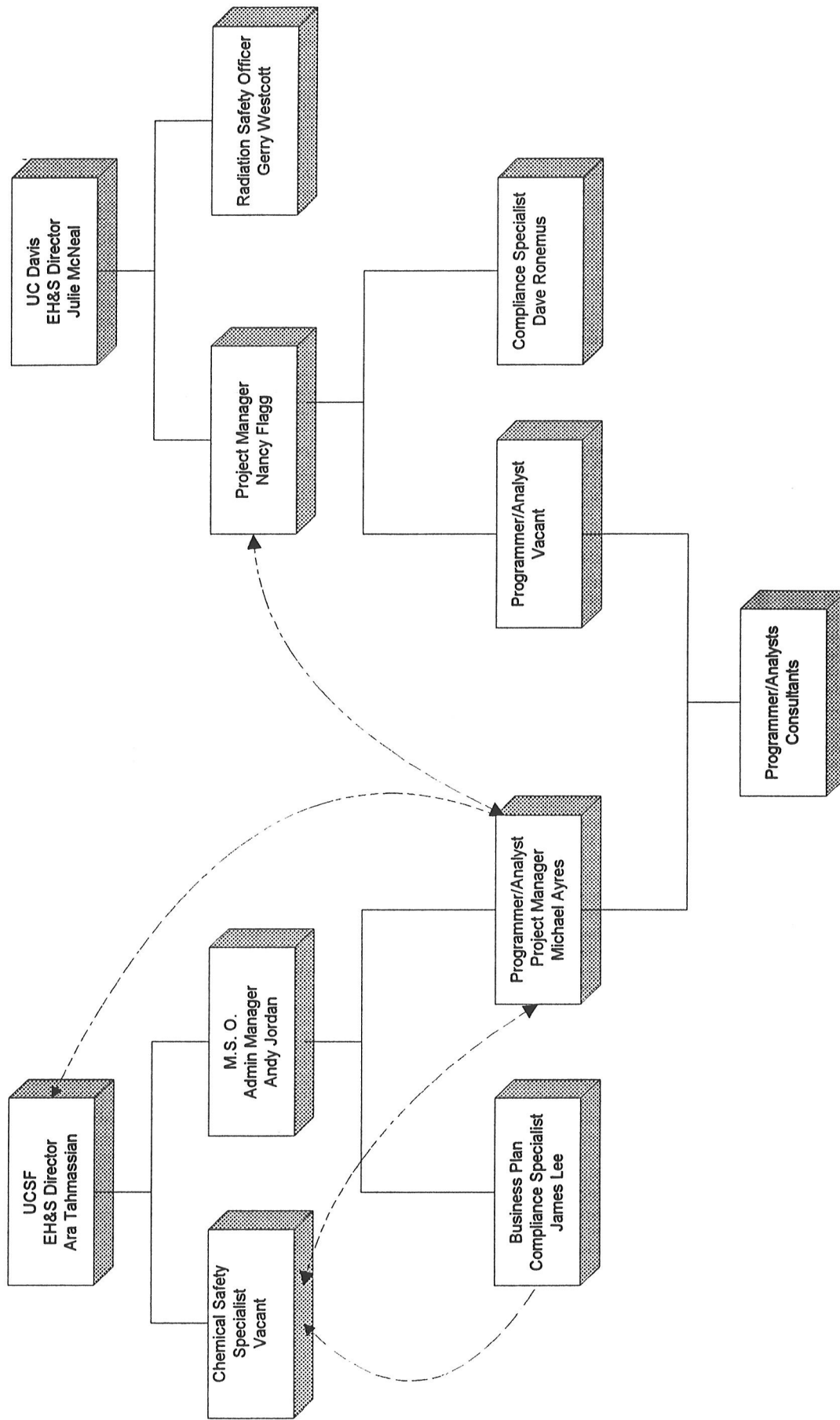
Stakeholder Review

UC San Francisco:

<u>Ara Tahmassian</u>	Director Environmental Health & Safety
<u>Michael Ayres</u>	Programmer/Analyst & Project Technical Manager EH&S
<u>Richard McGuire</u>	Former Technical Dev. Group
<u>James Lee</u>	Administrative Assistant, Chemical Inventory Compliance Operations

UC Davis:

<u>Julie McNeal</u>	Director Environmental Health & Safety
<u>Nancy Flagg</u>	Project Manager, EH&S
<u>Vacant</u>	Programmer Analyst, EH&S
<u>Dave Ronemus</u>	Environmental Compliance Specialist, EH&S
<u>Jerry Westcott</u>	Radiation Safety Officer, EH&S



UCSF-UCDavis
Chemical Inventory System
Stakeholder Review
Figure 1

3. System Requirements

Reporting and Regulators

The primary driving force behind the initiation of this software development project is the need for the University to report on chemicals at all of its sites. There are reporting thresholds on the type, hazard level, and amounts, both individual containers and accumulated totals. There are various reporting periods.

For example, UCSF has been reporting every two years and in an agreement with the city of San Francisco has divided its buildings and locations into four groups, reporting on one of the four groups every six months. Davis has been reporting every year; San Francisco will be moving to this annual reporting cycle soon too.

But there are other agencies that are beginning to require reporting on chemical inventories as societal interest and concern focuses more on hazardous chemicals and their proper management.

The existing reporting requirements in the 'Business Plan' are changing too. For example, a new single page report is being implemented,⁴ a single page(s) listing for a given chemical for all of its locations, rather than sorted by location and all the various chemicals at that location as in the past.

CUPA, Certified Unified Program Agency

The state of California sometimes passes the authority for implementing reporting requirements to lower level qualifying agencies, such as county or city governments,

Rather than detail here all of the reports that may be required in the life time of the software, it can be summarized that the system must be able to generate a variety of reports, including by not limited to sorting, grouping and organizing by;⁵

- Chemical
- Hazard classification

⁴ See exhibit 3 in Appendix

⁵ See Initial Specifications of 12/15/96 by Ara Tahmassian

- NFPA rating
- Physical state
- Agencies of jurisdiction
- Safety procedures
- Link to product MSDS sheet
- Location (Campus, Building, Room)
- Container size
- Responsible party
- Inventory date
- Inventory period/unit
- Usage

Additional detailed specifications are contained the proposal section and specifications in the appendices.

The Chemical Data Warehouse

The system is not limited conceptually to a list of chemical products in the labs, but is to be full chemical/chemical products data warehouse. It should be able to handle a list of 15,000 to 20,000 chemicals, with all the associated data such as hazard classification, regulating agencies, etc.⁶ The chemical data warehouse should also include a corresponding list of chemical products (synonyms) for each chemical. This is to be used as the pick list of chemical items to enter into the inventory.

Mitigate Chemical Inventory Levels

Hazardous materials management includes the goal to mitigate the purchase, storage, use and waste disposal of chemicals. An up to date comprehensive inventory system helps in preparing to meet this goal. For example, a researcher might be able to

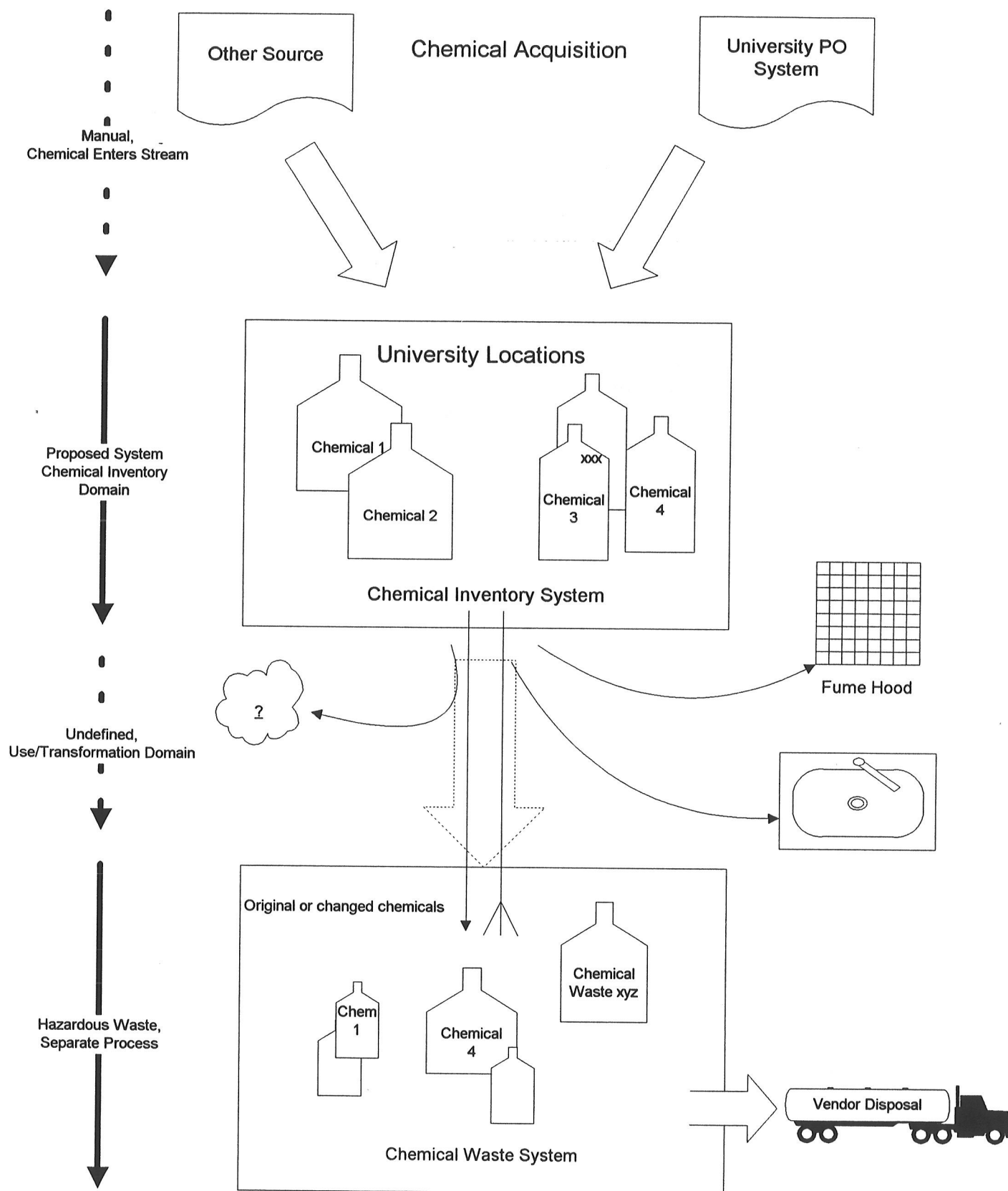
⁶ Ibid.

'borrow' a needed small amount from another researcher's chemical inventory rather than purchasing a new product.

The Chemical Materials Flow

The chemical materials flows begin when an investigator or other chemical user purchases/orders/acquires a chemical. This is usually through the University purchase order system, but a chemical could appear by other means. The chemical is stored and used until either used up and moved into the chemical waste system. A full featured chemical life-cycle tracking system would include at least these features:

- Capture of data on chemicals coming into campus at time of purchase
- Maintaining inventory levels
- Capturing change into Hazardous Waste
- Tracking of chemical into waste stream and disposal, where chemical is either used, changed into other waste chemical or moved into the waste cycle in original state
- Estimating Usage



Chemical Materials Flow
Figure 2

MSDS - Material Safety Data Sheets

A Material Safety Data Sheet is published by chemical manufacturers for each chemical product or material. EH&S is the responsible party/depository on the campus for this data and must provide copies or request by users. The system should be able to direct the user to the requested MSDS.

An optimized solution would provide an image/print out of the most recent MSDS on demand. However, interim solutions include:

- Faxing or mailing a copy to the requester
- Linking the user to the manufacturer's Internet World Wide Web site, when applicable
- Providing the Internet World Wide Web URL for the manufacturer

See Appendix C for examples and details on MSDS.

Regulatory Compliance

A. See attached chart of regulations driving chemical inventories.

B. Attached charts of Chemical Tracking Cycle and data structure could be used as guidelines for development of business requirements for chemical tracking.

UC Davis is required under Chapter 6.95 of the state Health and Safety Code to complete a "business plan", an annual inventory of hazardous materials on campus. All departments and units must submit lists of amounts of chemicals over specified thresholds, indexed by building and room number. All hazardous materials in quantities exceeding one pound for solids, one gallon for liquids and any amount of compressed gasses must be included. Additionally, all quantities of chemicals listed as acutely hazardous materials (AHMs) by the Environmental Protection Agency must be listed.

UCSF's compliance is handled through regulations of the Business Plan by the City and County of San Francisco.

A unique feature of the University system is the need to track small amounts of thousands of chemicals in many locations as compared to some existing commercial systems which are designed for tracking large amounts of fewer chemicals in fewer locations.

Since there are different reporting thresholds for different agencies, the system needs to be flexible and comprehensive in recording and reporting ability of amounts.

Interface Requirements

- The system interface(s) should be Windows 95 or Windows NT with contemporary design using grid pages/edit pages, push buttons, radio buttons, check boxes, pop down lists where ever multiple choices are needed. Such lists should be kept in separate database lookup lists for easy change.
- Multiple users should be able to access and use the different parts of the system simultaneously - a chemical materials list; a chemical product (synonym) list and inventory items. Searching and selecting from these large lists should be optimized by indexes or other performance techniques

System Performance Requirements

- The system should support multiple concurrent client users with a quick response time for inventory files of over 100,000 inventory items, core chemical list of 15,000 or more chemicals and a product list possibly two to three times as large as the core chemical list. The system should operate in both network environments at the UCSF and Davis EH&S sites.
- The system should allow for selection and entry of inventory items even if all the core chemical data on the product is not yet available.
- The system database should be a contemporary relational database with a fast client front end.
- The software design should be modular and well documented, with flexibility for future expansion or modification if needed,
- The system should have referential integrity to prevent deletion of products for which there is an inventory item and chemical materials for which there is a product.
- The system should have a minimal audit trail to record last change of at least the three main tables capturing the user name, date and time when record was modified.

Classification of Requirements

1. Must Have


- Compatibility with existing or concurrent planned environment and platforms at UCSF & Davis
- Ability to handle the table size/performance as described in user specifications
- Ability to track all chemicals and characteristics as described in System Requirements
- Ability to generate all existing required reports and additional reports as needed
- Linkage to MSDS, if only separate lookup system and fax, mail or some delivery system

2. Should Have

- Fully developed base chemical materials characteristics, EPA#, hazard class, agencies, etc.
- Web Client for local lab inventory maintenance functions
- Client/Server database back end, like Oracle, Sybase or MS SQLServer
- Ability to be installed at different local sites and attached to different SQL back ends, such as Oracle Sybase OR MS SQL

3. Nice To Have

- Fully life cycle from procurement to waste disposal
- Bar code or other automated entry and tracking system
- MSDS print out on demand
- Capture of chemical into system at point/moment of purchase

To: Julie McNeal
From: Ara Tahmassian 
Date: - December 15, 1996
Subject: Chemical Management Database

CC: Michael Ayers, Andrew Jordan

Enclosed is a draft of my thoughts on the chemical inventory program. I tried to come up with a fancy acronym but the best I could do was CITIMS could you give it a shot!

The suggestions in the enclosure are based on a review of my many notes from various Systemwide Task Forces and UCSF-EH&S discussions, as well as those with vendors.

I would like to suggest that we use this as a starting point for our further needs review and discussions. Please review and return with any comments or suggestions you have and I will send a revised one out.

I think we can get a good start on this by segmenting what goes out to the campus and what stays at EH&S. In addition many of the data elements are readily available and we can use them for developing the "pick screens".

Chemical Inventory Tracking and Information Management System (CITIMS)

A. *Introduction*

The need for a comprehensive **Chemical Inventory Tracking and Information Management System (CITIMS)** Database is based on the need to satisfy the requirements of various interested parties. These include:

- Local Agencies requiring comprehensive chemical inventories as part of the "Business Plan".
- Local Emergency Response Agency's (e.g. Fire Department) need for easy access to location of hazardous materials during an emergency.
- EH&S need to know location of hazardous materials in order to implement the appropriate safety programs for each site.
- Other Campus organizations need to have access to information on the types and quantities of hazardous materials stored at various locations. A routine user is Facilities Management for occupancy classification purposes (e.g. H-7).
- Users need to have easy access to certain health and safety information on chemicals.

The wide range of users and their specific needs creates a complex system. However it is possible to review the entire package as a series of smaller systems which are interrelated. This will enable the design of an ideal database which has the capability of satisfying all the clients utilizing it.

B. *System Description*

The ideal database must be able to provide answers for the following questions for a given chemical:

1. ***What is it? (e.g. name, synonym, chemical formula)***
2. ***Who owns it? (e.g. P.I., Administrative Unit)***
3. ***Where is it used or stored? (e.g. building, room)***
4. ***What is its physical state? (e.g. solid)***
5. ***What is its hazard classification? (e.g. flammable)***
6. ***What is its NFPA rating? (e.g. Health 1, Reactivity 2)***
7. ***What is the container? (e.g. type, size)***
8. ***What agencies have jurisdiction over it? (e.g. DTSC, DPW)***

9. What are the appropriate safety procedures? (e.g. MSDS access)

10. How much of it is stored/used at a site? (e.g. receipt, usage)

C. Conceptual Database

A conceptual database designed to provide the answers raised in Section B above must be a relational database capable of full communication between all data elements.

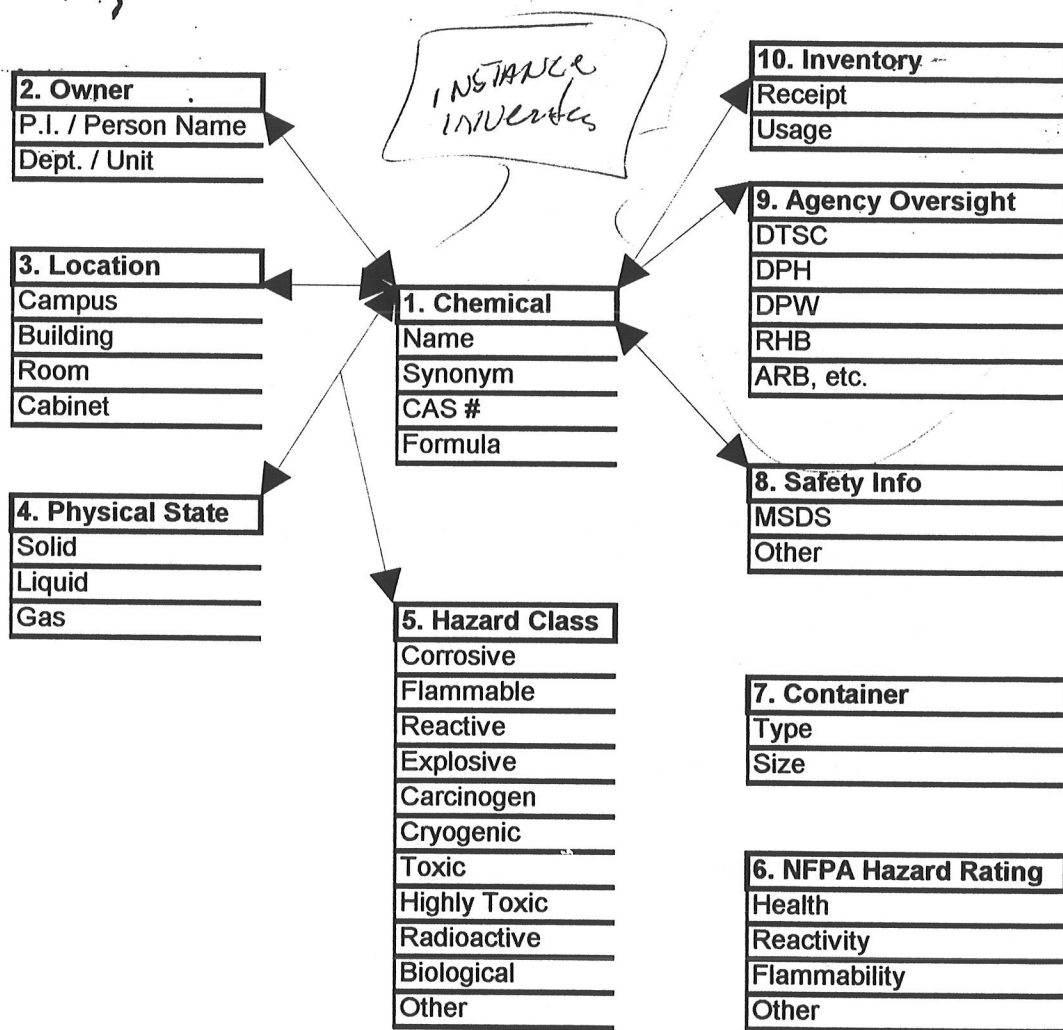


Figure C1: Conceptual Design Element of CITIMS Database

Notes:

1. The arrows are for demonstrative purposes and all elements are to be fully interrelated in the actual design.
2. The items listed are examples and are not an exhaustive review of all fields and data elements needed.

D. Administrative Capabilities

Data Entry

The data entry for chemical inventory should be designed to allow for manual, electronic or bar-code scanner assisted entry. It should also be able to provide on-line access to users for updating the information.

Certain sets of data (e.g. chemical classification) is best if managed centrally by EH&S to insure data integrity.

Reports

The program should have report generating capabilities incorporated into the design which will enable the user to generate various reports. These should be such that both individualized (e.g. room by room, chemical-by-chemical) or summary (e.g. floor of a building) reports may be generated.

Sub-Segments

To make the program more manageable it is possible to design the system such that each component will only be accessible to those who have a need for it. As an example regulatory oversight information is primarily an EH&S need and may be kept out of the segment to which the P.I. has access to.

INTEROFFICE MEMORANDUM

TO: JULIE MCNEAL, UCD
FROM: ARA TAHMASSIAN, UCSF *ara*
SUBJECT: CHEMICAL DATA BASE
DATE: JANUARY 13, 1997
CC: ANDY JORDAN, MICHEAL AYRES, RICHARD MCGUIRE

Enclosed is a draft of the proposal to start work on the application. The proposed approach will enable us to start work on the data library without worrying (at this stage) about the final application details.

Realistically, at this point I believe we are on our own and cannot expect any real input or participation from other campuses. If there is a general agreement on the proposed protocol. I would like to set the ball in motion. Please review and let me know what do think.

Chemical Information & Inventory Management Database

Introduction

The development of a comprehensive Chemical Inventory and Management Database (CIIMD) has been discussed over the past year. The discussions have identified the need and basic requirements of the system. These have included the ten (10) basic elements that need to be incorporated into the design which will satisfy most of the basic needs of UCSF & UCD. As the development progresses further elements might be identified and incorporated into the system.

Elements of CIIMD

The design of the database must be flexible so that:

- these elements can be designed in order of priority set based on need
- it is a relational database linking all elements of the CIIMD
- allow for addition of new elements as they are identified

The ten (10) elements identified are:

1. *Chemical information (name, CAS #, etc.)*
2. *Owner information (P.I., department, etc.)*
3. *Location information (building, room, etc.)*
4. *Physical state (solid, gas, etc.)*
5. *Hazard class (corrosive, flammable, radioactive)*
6. *NFPA rating (health, reactivity, etc.)*
7. *Container information (type, size, etc.)*
8. *Safety information (MSDS, etc.)*
9. *Agency oversight listing (DTSC, RHB, EPA, etc.)*
10. *Inventory control (receipt, usage, disposal, etc.)*

Implementation Strategy

The full development and implementation of CIIMD will require a phased approach. Each phase will require analysis and input by a cross section of EH&S experts and specialists. To start the implementation of the design process it is recommended that CIIMD be divided into a number of phases. Initial phases will focus on design of the data fields and population of the data. This approach will provide the mechanism for data entry while the structural design of the application is in progress. The net benefit will be substantial savings in time.

When completed CIIMD will satisfy three basic needs:

- allow for management of inventory of hazardous materials
- provide health and safety information to users and EH&S for safe management and handling of chemicals
- provide information for a range of regulatory compliance and management requirements. These will include items such as reporting Cal-OSHA registered carcinogens, air or water emissions, SFMO classification.

Phase I

Phase I of the design should start with the development of:

- data elements required to satisfy the needs of the management program. The initial data should be limited to those which are common to both campuses, this means the inventory specific data should be the last items.
- data entry screens to allow for population of the data fields. As the data will be available in a variety of hard copy and electronic formats, this should be such that it allows for both modes of data entry.

Based on this criteria the initial data set should include the specific elements described in the following (the numbers corresponds to the elements described above):

1. Chemical information

This element should include the following specific fields:

Chemical (product) name- single name for each chemical and must be an alpha numerical field (e.g. Acetone)

Formula- alpha numerical field [e.g. (CH₃)₂CO]

CAS Number- a unique numerical value for each (e.g. 67-64-1)

Synonyms- a single or combination of synonyms in an alpha numerical field (e.g. Dimethyl Ketone, 2-Propane)

4. Physical state

The field has three basic preset information, one of which will apply to each chemical. These are:

Solid

Liquid

Gas

5. Hazard class (corrosive, flammable, radioactive)

This field identifies the specific hazards of the chemical. A chemical may fall under more than one category (e.g. flammable and highly toxic). Therefore, it might be necessary to a major hazard and sub-hazard categories.

The classification could include the following;

Flammable

Corrosive

Reactive

Explosive

Carcinogen

Cryogenic

Toxic

Highly toxic

Radioactive
Biological
Water reactive
Peroxide former
Highly volatile
etc. (EH&S expert groups to identify what other classifications they need)

6. NFPA rating (health, reactivity, etc.)

The NFPA rating system is based on four classifications;

Health- an alpha numerical field with numbers set at 0,1,2,3,4

Flammability- an alpha numerical field with numbers set at 0,1,2,3,4

Reactivity- an alpha numerical field with numbers set at 0,1,2,3,4

Other- this a description of other hazards and could act as the place where sub hazards from element 5 above are placed.

9. Agency oversight listing

This element lists all the agencies which have oversight over a given chemical. It should be noted that chemicals are subject to multiple agency oversight and thus the format must allow for this. The agencies currently identified are:

All those specified in "Chemical List of Lists"

Local chemical inventory agency (e.g. SFDPH)

Radiologic Health Branch

CDC

NIH

Local water authority (e.g. DPW)

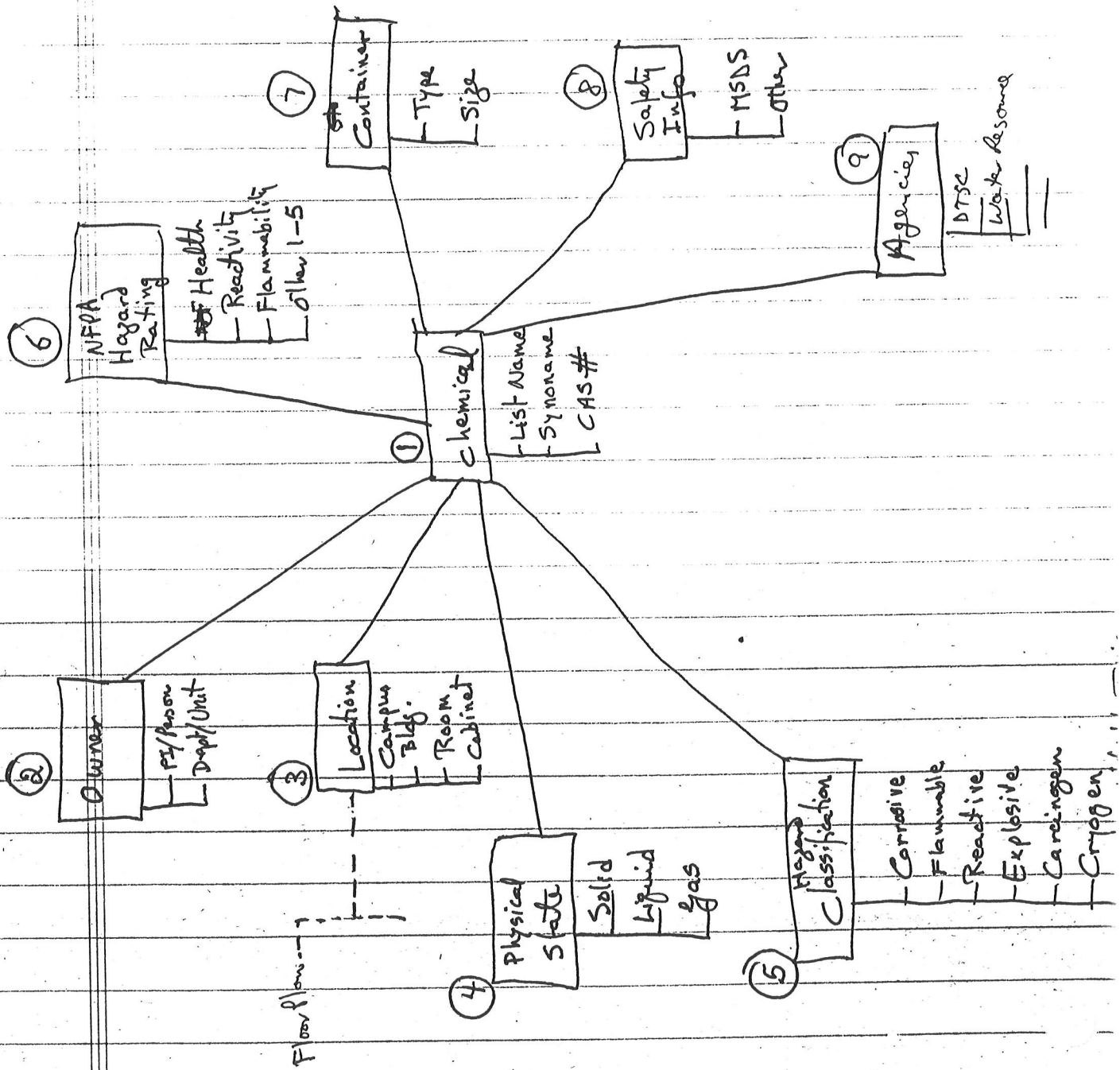
SFMO

Others as defined by the EH&S experts.

Action Plan

To start the process, it is recommended that work on the design of Phase I begin as soon as possible. The project could progress as follows:

- *start the development of the core fields for the core chemical information list. While this is in progress, both UCD & UCSF compile a list of their chemical lists from their existing inventories available electronically. These could form the basis for the initial populating of the tables*
- *obtain a listing of the data fields available in existing chemical inventory databases at UCD & UCSF. This will determine which fields are developed next, with the priority being given to those which can be populated quickly from existing databases*
- *while this is in progress, EH&S experts start work on the details of the fields of other elements of CIIMD*
- *in parallel with the development efforts, sources of the remaining data elements could be identified. The priority should be given to identifying electronically available sources first. Where electronic data are not available a comprehensive hard copy data library will be compiled for data entry.*



Chemical Inventory System Specifications

Management/Project Considerations:

- meets regulatory requirements >>> **40CFR350-373, 29CFR 1910.1200, Title19 CCR-haz mat labeling, La Follette Bill (AB3777)-AHM data collection and Chemical Hygiene Plan inventory requirements.**
- fulfills Yolo Co. annual inventory requirements with minimal manipulation of data
- Preprogrammed reports for Community-Right-To-Know, CUPA, CHP, thresholds.
- Easy to generate special reports in variety of formats (lab use, risk assessments, etc)
- prefer to finish chemtrack and use it, rather than design a new program. Packaged product is second choice.
- links to Fire Dept and to their Toms Emergency Chemical database for emergency access.
- Program must be able to integrate with planned campus data warehouse. ODC-compatible is a requirement. Campus may use Oracle. Oracle preferred since we have Chemtrack in Oracle and campus license.
- links to BUA master tables. How adjust chemtrack to pull from master tables (or be master tables).
- MINIMIZE system and data maintenance by EH&S. Do not want to hire chemist to verify data entry and do not want system maintenance to be full-time job.
- compatible with our rad materials system and not duplicative
- allow variety of input options: bar code and scan, web, direct entry, spreadsheet or hand listing transfers. Should not involve large expense to dept or to EH&S. Laptops, barcodes and scanners are expensive.
- good program design and then publicity to get people to WANT to use the system. Identify what needs of theirs it fulfills.
- Work with manufacturers to see how much they can do for us. Can Fisher spell-check synonyms? One-time or ongoing? Cost? For pure chemicals only.
- MINIMIZE data entry requirements by the user. Don't make data requirements so cumbersome that it is a disincentive to use.
- design for integration with hazardous waste module. Lab use of material should translate into hazardous waste pickups or disposal records. Use common tables in database, common fields.
- security measures so that one lab can't view chemicals of another lab, but Fire and EH&S can still access.
- can use IBM and Mac platforms
- Michael to see Catherine's binder of Chemtrack design and pilot user comments.

Detail Program Considerations:

- Program written in common, not obscure language.
- tracks real-time, accurate chemical inventory, not snapshot. Record primary containers in and then out.
- tracks materials by container (lowest level) and then by room, bldg, etc.
- Easy to learn program and easy to use.
- How deal with chemicals mixed with others and put into secondary container? Track only primary container?
- expandable: able to add or edit fields and tables readily
- How enter chemicals if mixed solutions from manufacturer?
- Data fields. See written comments to Michael. Client structure chart from Catherine identifies needs but need to have minimal user entry required. Also, data fields from Michael are good. Add waste disposal info.
- able to search chemicals by hazard class and other fields
- MSDS access and printing of MSDS. Would be a selling point for the system.

UC DAVIS

		OCCUPATIONAL SAFETY AND HEALTH Industrial Hygiene				
State Regulations	Purpose	Civil Liability	Administrative Liability	Criminal Sanctions	Additional Remedies	
Title 8 CCR: Cal - OSHA Section 5191 Lab Safety	Establishes standards for safe laboratory chemical use and chemical hygiene plans.	\$70000 maximum per violation	\$70000 maximum per violation	\$70000 and 1 yr. prison maximum per violation	Injunctions, C/A's, citizen lawsuits	
Title 8 CCR: Cal - OSHA Section 2303 - IIPPs (Injury/Illness Prevention Plans)	Establishes standards for employer implementation of safety plans, which must address training, communications, signage, worker notification and disciplinary requirements.	\$10000 maximum fine per violation	\$10000 maximum fine per violation	No	Injunctions, admin. orders	
		HAZARDOUS MATERIALS MANAGEMENT				
Federal Regulations	Purpose	Civil Liability	Administrative Liability	Criminal Sanctions	Additional Remedies	
Emergency Planning and Community Right-to-Know Act of 1986 (SARA Title III) 40 CFR 350-373	Creates methodology for industry to report inventories and releases of hazardous chemicals; sets up structure for smaller governmental units to utilize this data in emergency response planning. Also provides for trade secret protection and disclosure of hazardous substance activity for Federal land transfers.	\$75000 maximum per violation per day	\$75000 maximum per violation per day	\$20000 fine and/or 1 yr. in prison maximum per violation	Injunctions, citizen lawsuits, compliance orders	
Hazard Communications Standard: 29 CFR 1910.1200	Establishes criteria to evaluate dangers posed by hazardous materials; requires employers to provide hazardous materials information to employees.	No statutory civil liability	\$10000 maximum fine per violation	No	Injunctions, compliance orders	
State Regulations	Purpose	Civil Liability	Administrative Liability	Criminal Sanctions	Additional Remedies	
CA Health and Safety Code Ch. 6.95 (AB 2185, Section 25500 et seq.) Business and Area Plans	Requires employers to compile and submit lists of hazardous materials present at businesses to local and state agencies for use in emergency response planning.	\$2000 maximum fine per day per violation	\$5000 maximum fine per day per violation	\$25000 maximum fine and/or 1 year in prison per day per violation	Injunctions, TROs (temporary restraining orders)	
Title 19 CCR: Office of Emergency Services	Sets requirements for labeling, testing and registration of hazardous materials. Enables interagency coordination during emergency response operations.	No	No	\$200 fine and/or up to 180 days in prison maximum	None	
La Follette Bill (AB 3777) Acutely Hazardous Materials	Requires businesses to report any quantity of listed materials and to devise a Risk Minimization and Prevention Plan (RMPP). Incorporated into CA Health and Safety Code as Chapter 6.95.	No	\$25000 maximum per day per violation	1 year maximum in prison per violation	No	

Abbreviations:

AB - Assembly Bill (California)

CCR - California Code of Federal Regulations

OSHA - Occupational Safety and Health Administration

C/A - Cleanup and Abatement Order

SARA - Superfund Amendments and Reauthorization Act

Regulations driving chemical inventor, programs(computerized)

Prepared by EH and S: 4/28/95

RESPONSIBILITIES MATRIX FOR CHEMICAL TRACKING

Page 2

OCCUPATIONAL SAFETY AND HEALTH Industrial Hygiene					
Responsibilities					
State Regulations	UC Davis Administration	Department	Principal Investigator or Supervisor	Individuals	EH & S
Title 8 CCR: Cal - OSHA Section 3203 - IIPPs (Illness/Injury Prevention Plans)	Ultimate legal responsibility, delegate authority, ensure program implementation	Formulate IIPP and submit to EH&S, report workplace injuries	Provide and document employee safety training, discipline	Know and follow IIPP policies, wear protective gear, report injuries	Review IIPPs, provide information, make recommendations
Title 8 CCR: Cal - OSHA Section 5191 Lab Safety	Legal responsibility, delegate authority, implementation	Ensure that PIs prepare lab safety plans	Prepare and implement lab safety plans	Know and follow lab safety plans	Provide consultation to campus
HAZARDOUS MATERIALS MANAGEMENT					
Federal Regulations	UC Davis Administration	Department	Principal Investigator or Supervisor	Individuals	EH & S
Emergency Planning and Community Right-to-Know Act of 1986 (SARA Title III) 40 CFR 350-373	Ultimate legal responsibility for program, delegate authority, ensure program implementation	Ensure that all PIs and supervisors submit hazardous materials inventories, ensure emergency planning, notify EH&S of releases	Submit annual hazardous materials inventories to EH&S, report releases of hazardous materials to EH&S immediately	Comply with regulations, assist with compilation of data by supervisors and PIs	Compile and furnish hazardous materials data to regulators, act as liaison, notify agencies of unauthorized spills
Hazard Communications Standard: 29 CFR 1910.1200	Ultimate legal responsibility for program, delegate authority, ensure program implementation.	Ensure that PIs make information on hazardous materials available to employees.	Make information available to employees	Read hazardous materials information.	Assist departments in making hazardous materials information available to employees.
State Regulations	UC Davis Administration	Department	Principal Investigator or Supervisor	Individuals	EH & S
CA Health and Safety Code Ch. 6.95 (AB 2185, Section 25500 et seq.) Business and Area Plans	Ultimate legal responsibility for program, delegate authority, ensure program implementation	Oversight of supervisors and PIs, notify property owners of UC Davis' use of hazardous materials in non-UC owned facilities	Submit annual inventories, inform EH&S of use of new materials	Assist with compilation of data, report releases to supervisor	Compile and furnish campus data annually to regulators, report releases, provide information to campus
Title 19 CCR: Office of Emergency Services	Ultimate legal responsibility, delegation of compliance authority, ensuring program implementation	Ensure all hazardous materials are properly labeled	Properly label hazardous materials and waste containers	Properly label hazardous materials and waste containers	Provide information to campus, serve as regulatory liaison
La Follette Bill (AB 3777) Hazardous Materials	Ultimate legal responsibility, delegation of compliance authority, ensuring program implementation	Oversight of supervisors and PIs, supervise department data collection	Submit inventories, inform EH&S of use of new materials	Assist with compilation of data, report releases to supervisor	Act as liaison to regulators, compile and report data, assist with preparation of RMPP

Chemical Report for CAS Number 000794-93-4

Chemical Names:

Methanol, [[6-[2-(5-nitro-2furanyl)ethenyl]-1,2,4-triazin-3-yl]imino]bis-

Panfuran S

Panfuran S (containing dihydroxymethylfuratrizine)

Regulatory Summary:

- | | |
|--|--|
| <input type="checkbox"/> DOT Hazardous Material | <input type="checkbox"/> Ozone Depleting Chemical |
| <input type="checkbox"/> RCRA Hazardous Waste | <input type="checkbox"/> Permissible Exposure Limits |
| <input type="checkbox"/> CERCLA Hazardous Substance | <input checked="" type="checkbox"/> OSHA, IARC, NTP Carcinogen |
| <input type="checkbox"/> SARA Extremely Hazardous Substance | <input type="checkbox"/> NFPA Hazardous Material Ratings |
| <input type="checkbox"/> SARA Toxic Release Chemical | <input type="checkbox"/> NIOSH Recommendations |
| <input type="checkbox"/> Clean Air Act Hazardous Air Pollutant | <input checked="" type="checkbox"/> State Lists |

(Note: If a list has more than one chemical, only data for the FIRST chemical is displayed. View electronically for all data.)

Environmental Law Data:

(Data not requested or no data available.)

Carcinogen Status:

OSHA Carcinogen? No
IARC Rating: 2B
NTP Rating: None

NFPA Ratings:

(Data not requested or no data available.)

Clean Air Act Data:

(Data not requested or no data available.)

NIOSH Recommendations:

(Data not requested or no data available.)

State List Data:

California Proposition 65 code: C

Pennsylvania Haz. Substance code: S

California Environmental Protection Agency

Air Resources Board • Department of Pesticide Regulation • Department of Toxic Substances Control • Integrated Waste Management Board
Office of Environmental Health Hazard Assessment • State Water Resources Control Board • Regional Water Quality Control Boards

Pete Wilson
Governor



James M. Strock
Secretary for Environmental Protection

OCTOBER 1995

CHEMICAL CROSS-INDEX

The Hazardous Materials Data Management Program is committed to improving the collection, management and dissemination of toxics-related information. The office contracted with the University of California, Davis in 1988 to compile a cross-index of hazardous chemicals regulated by various California state and federal agencies. The cross-index (also known as List of Lists) shows, which of the 16 programs is regulating the chemicals.

Please be aware of new changes on the List of Lists. The List of Lists now shows an (*) asterisk at the beginning of some chemicals. This symbol indicates that a new chemical has been added to the list. The (+) plus sign indicates a chemical on the list has been added to a regulatory program. The (-) minus sign indicates that a particular chemical has been taken off a regulatory program's list.

There is no charge for the hardcopy listing. The List of Lists is available on diskette. You may order it either in ASCII format (it requires 500 KB) or EZ-LOL-Windows. EZ-LOL-Windows will require 3.0 MB of hard disk space. The fee for the diskette is \$50.00.

Send your request with your check to the following address. Checks should be made payable to the Hazardous Materials Data Management Program:

Cal/EPA - DTSC
Hazardous Materials Data Management Program
PO Box 806
Sacramento, CA 95812-0806

This list is updated approximately every six months. Suggestions are welcome regarding additional chemical regulatory programs to incorporate into the list.

If you have questions or comments, contact the Cal/EPA Help Desk at (800) 808-8058 (California only) or (916) 327-1848.

See page 10 of Guide to Toxics Databases



CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY

CHEMICAL LIST OF LIST

BY: CHEMICAL

1 5

5-97

New

Chem	Chemical Name	CAS #	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P
*	1,1'-ETHYLENE-2,2'-BIPYRIDINIUM DIBROMIDE	85-00-7	SEE DIQUAT															
	1,1,1,2-TETRACHLOR-2,2-DIFLUOROETHANE	76-11-9															M	N
	1,1,1,2-TETRACHLORO-2-FLUOROETHANE (HCFC-121A)	354-11-0*																
	1,1,1,2-TETRACHLOROETHANE	630-20-6	C															N
	1,1,1-TRICHLORO-2,2-BIS (P-METHOXYPHENYL) -ETHANE	72-43-5	SEE METHOXYCHLOR															
	1,1,1-TRICHLOROETHANE	71-55-6	B	C	D		F	G		I	J						M	N
	1,1,2,2-TETRABROMOETHANE	79-27-6	SEE ACETYLENE TETRABROMIDE															
	1,1,2,2-TETRACHLORO-1,2-DIFLUOROETHANE (FC 112)	76-12-0																M
	1,1,2,2-TETRACHLORO-1-FLUOROETHANE (HCFC-121)	354-14-3*	D															
	1,1,2,2-TETRACHLOROETHANE	79-34-5	B	C	D		F	G		I	J	K					M	N
	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE	76-31-3	SEE CHLORINATED FLUOROCARBON (FREON 113)															
	1,1,2-TRICHLOROETHANE	79-00-5	B	C	D		F	G		I	J	K					M	N
	1,1-DICHLORO-1,2,2,3,3-PENTAFLUOROPROPANE (HCFC-225	13474-88-9*	D															
CC)																		
	1,1-DICHLORO-1,2,3,3-PENTAFLUOROPROPANE (HCFC-225	111512-56-2*	D															
EB)																		
	1,1-DICHLORO-1-NITROETHANE	594-72-9																M
	1,1-DICHLOROETHANE	75-34-3	B	C			F	G		I	J	K					M	N
	1,1-DICHLOROETHYLENE	75-35-4	B	C	D		F	G		I	J						M	N
	1,1-DICHLOROPROPANE	78-99-9	C															
	1,1-DIMETHYLHYDRAZINE	57-14-7					D	E		G		I	J	K	L	M	N	O
	1,12-BENZOPERYLENE	191-24-2	SEE BENZO (GHI) PERYLENE															
	1,2,3,4,6,7,8-HEPTACHLORODIBENZO-P-DIOXIN	35822-46-9																G
	1,2,3,4,7,8-HEXACHLORODIBENZO-P-DIOXIN	39227-28-6																G
	1,2,3,6,7,8-HEXACHLORODIBENZO-P-DIOXIN	67653-85-7																G
	1,2,3,6,8,9-HEXACHLORODIBENZO-P-DIOXIN	19408-74-3																G
	1,2,3,7,8-PENTACHLORODIBENZO-P-DIOXIN	40321-76-4																G
	1,2,3,7,8-PENTACHLORODIBENZOFURAN	57117-41-6																G

Note: CAS #s followed by an asterisk could not be verified.

Key: + = a regulatory agency addition for a chemical

- = a regulatory agency deletion for a chemical

October 1995

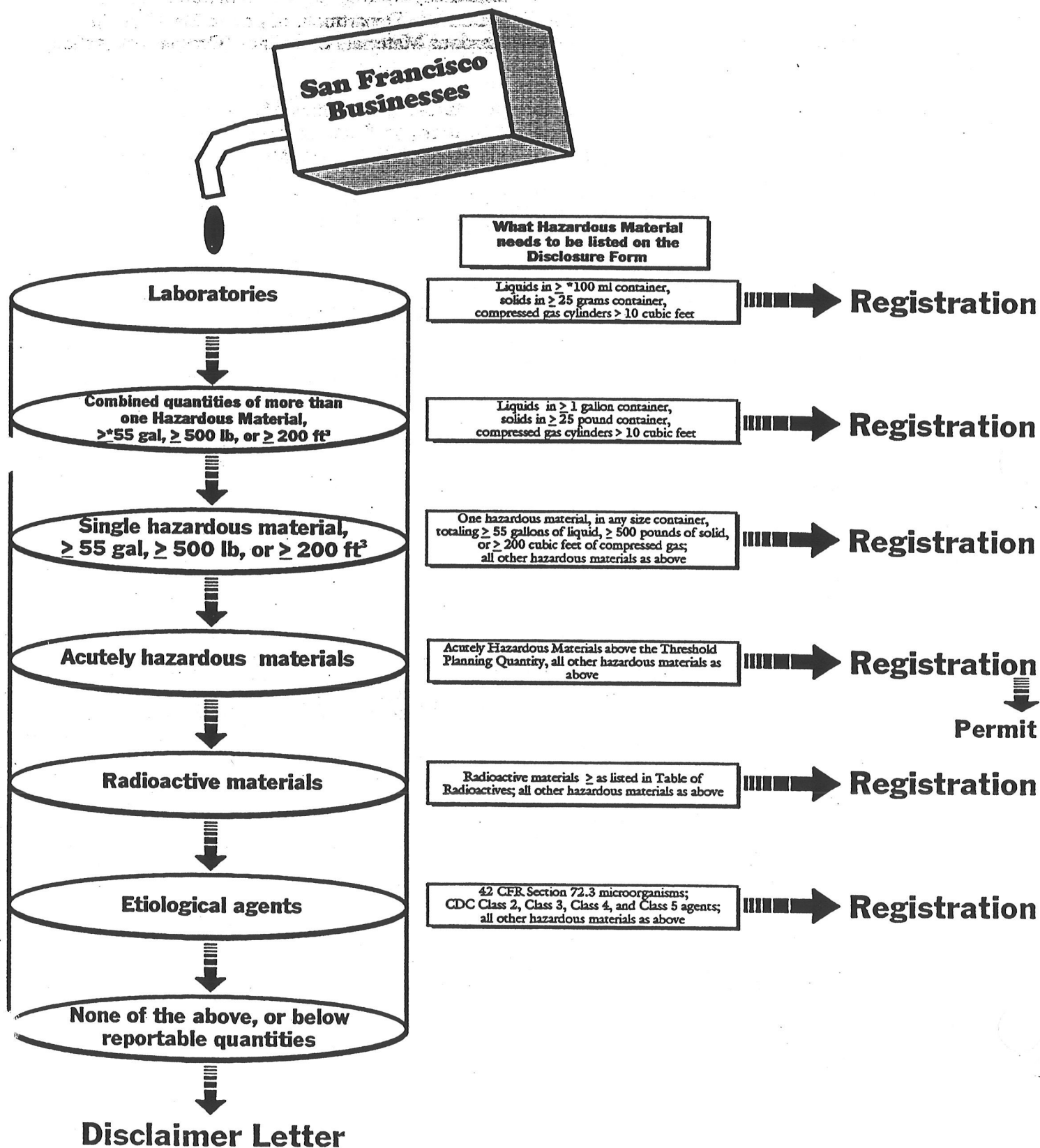
CALIFORNIA ENVIRONMENTAL PROTECTION AGENCY
CHEMICAL LIST OF LISTS

Regulate

Key to the headings in List of Lists

- A: CALIFORNIA OSHA CARCINOGEN USER REGISTER CHEMICALS
Ref: California Occupational Safety and Health Dept.
(510) 577-5165 Date of List May 1994
- B: EPA LIST OF PRIORITY POLLUTANTS
Ref: Environmental Protection Agency (EPA)
(415) 744-1997 Date of List Dec 1992
- C: AB 1803 - WELL MONITORING CHEMICALS
Ref: California Department of Health Services
(916) 323-6111 Date of List Aug 1995
- D: SARA SECTION 313 TOXIC CHEMICALS
Ref: EPA Emergency Planning and Community Right-to-Know Act,
Section 313 (800) 535-0202 Date of List Dec 1994
- E: SARA SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES
Ref: EPA Emergency Planning and Community Right-to-Know Act,
Section 302 (800) 535-0202 Date of List Jun 1995
- F: MCL (MAXIMUM CONTAMINANTS LEVELS) LIST OF CONTAMINANTS
Ref: California Department of Health Services
(510) 540-2177 Date of List Nov 1994
- G: AB 2588 - AIR TOXICS "HOT SPOTS" CHEMICALS
Ref: California Air Resources Board
(916) 322-3807 Date of List Jun 1993
- H: DHS DRINKING WATER ACTION LEVELS
Ref: California Department of Health Services
(510) 540-2177 Date of List Oct 1990
- I: AB 1807 - TOXIC AIR CONTAMINANTS
Ref: California Air Resources Board
(916) 322-8278 Date of List Apr 1993
- J: NESHAP (NATIONAL EMISSION STANDARD FOR HAZARDOUS AIR POLLUTANTS)
SPECIFIC CHEMICALS
Ref: EPA Office of Air Quality Planning and Standards
(919) 541-5647 Date of List Apr 1991
- K: PROPOSITION 65 CHEMICALS
Ref: Office of Environmental Health Hazard Assessment
(916) 445-6900 Date of List Jul 1995
- L: DOT INHALATION HAZARD CHEMICALS
Ref: Department of Transportation
(916) 327-3310 Date of List Mar 1993
- M: PERMISSIBLE EXPOSURE LIMITS FOR CHEMICAL CONTAMINANTS
Ref: Department of Industrial Relations
(415) 703-4050 Date of List May 1995
- N: HAZARDOUS SUBSTANCES LIST (AKA "THE DIRECTOR'S LIST")
Ref: Department of Industrial Relations (CAL/OSHA)
(415) 703-4050 Date of List Jan 1994

DOES MY BUSINESS NEED A CERTIFICATE OF REGISTRATION?



*This symbol (\geq) means "greater than or equal to"

4. Current Systems

UCSF ICS Program

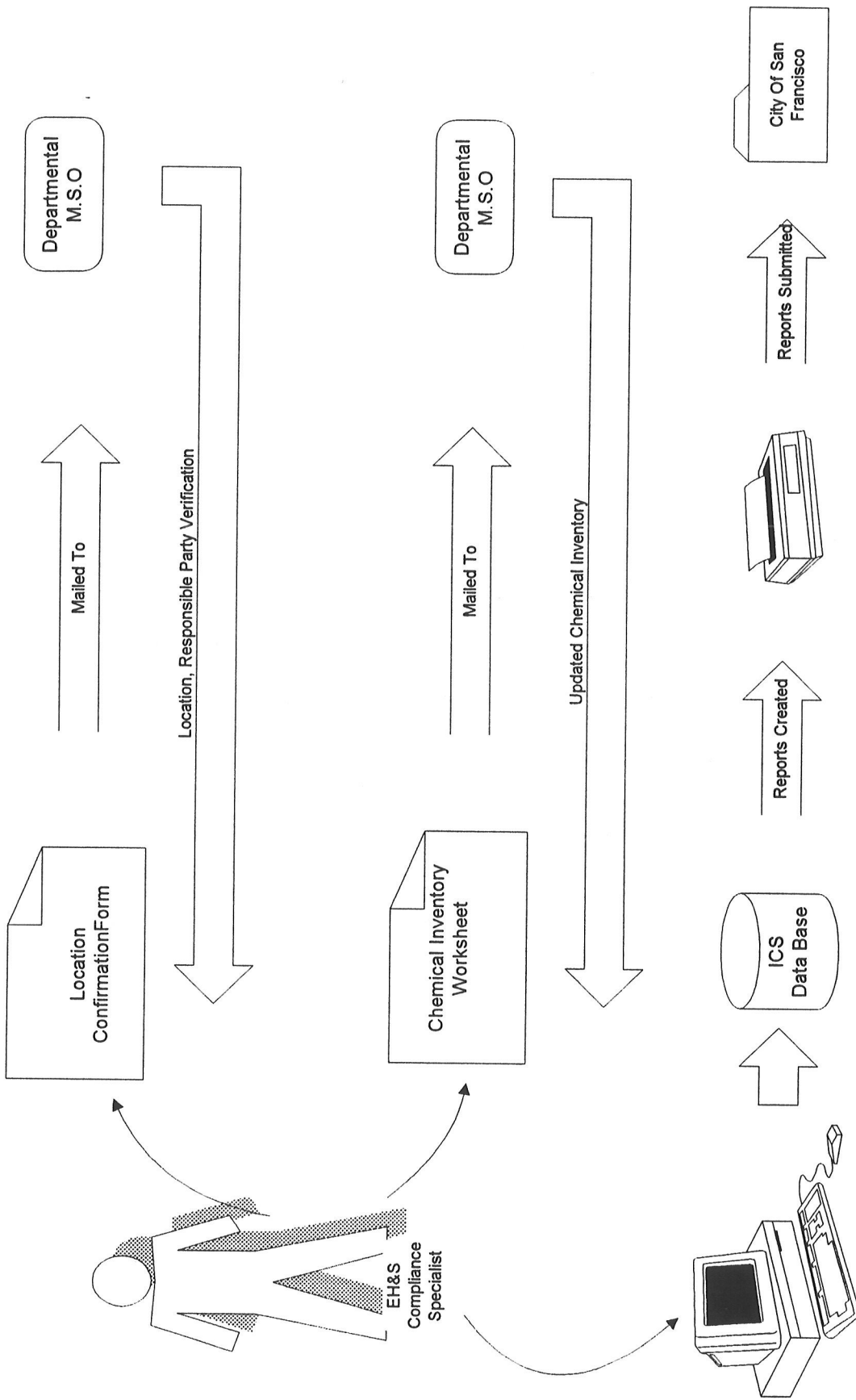
The San Francisco campus uses a semi-automated process. The manual portion is used to capture the inventory data at the lab or room level, 'source data acquisition', shown in figure 3. This is then entered into a commercial CLIPPER application using local dBase tables. The application then generates the necessary reports to fulfill the Business Plan requirements, as shown in figure 4.

The current reporting requirement is once every two years, which is being changed to every year, and is broken up into four groups of buildings, see Chart 1 (UCSF COR groups) in an agreement with the city. This system includes the city's building number, UCSF's Group # and corresponding expiration date, the next 2 year cycle renewal date.

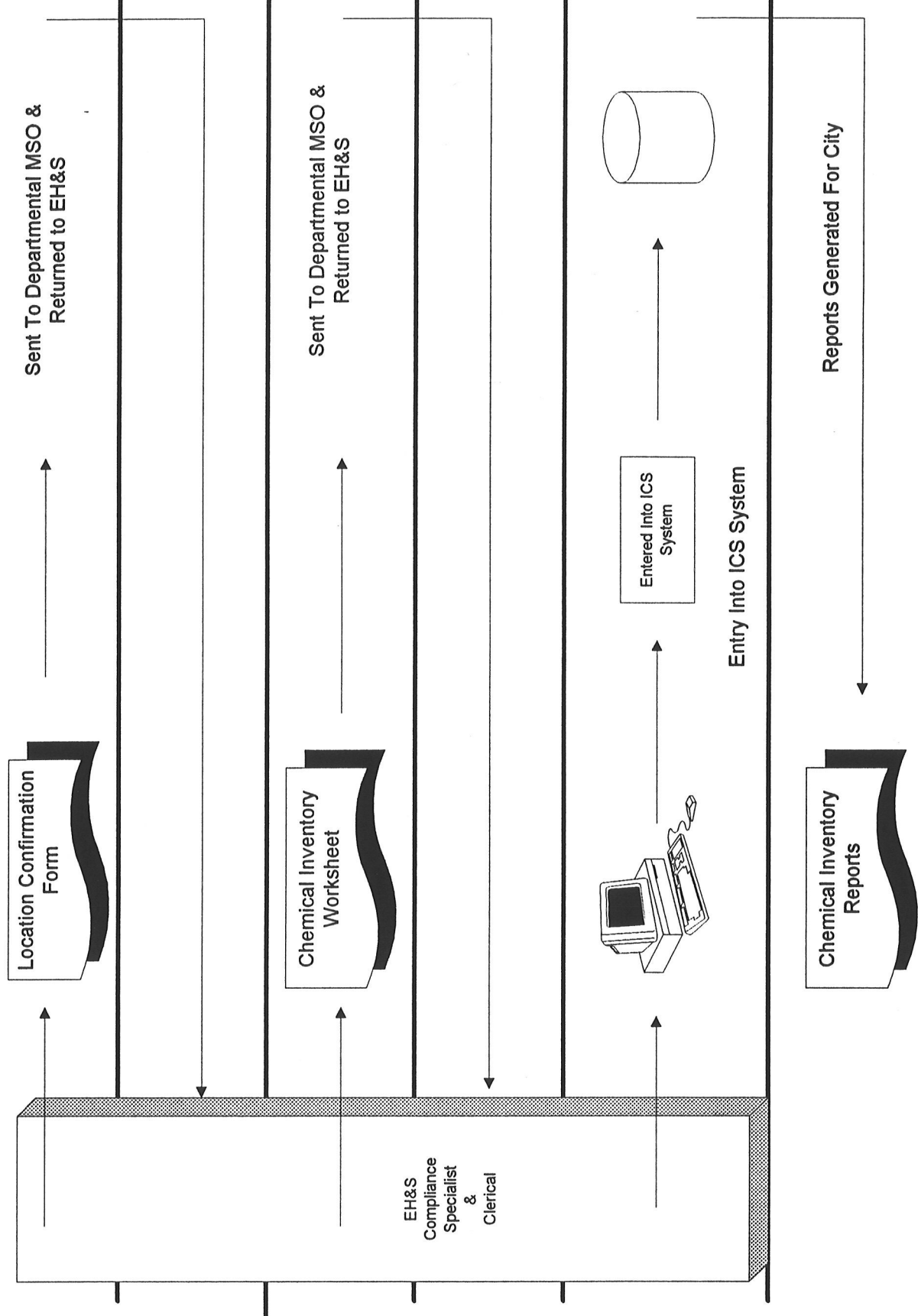
The data is entered in a batch process, where each batch is captured in a temporary file before posting to the main database. Each batch also has the same *inventory unit*⁷ data, that is the inventory period or Group # and the responsible PI. This inventory unit data is first entered and then carried forward in all successive entry of inventory line items. As any of the inventory unit items change, a new batch is started and then submitted for posting.

At the beginning of a new inventory report for a group, the records of previously existing individual inventory line items are brought forward into a new file (by the last group or as required by any new group assignments) in a bulk batch move (using dBase IV, the entire group of individual inventory items are moved in one process) to populate a starting point for the next inventory period. This process is depicted in figure 5.

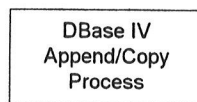
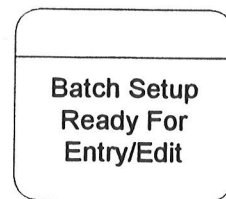
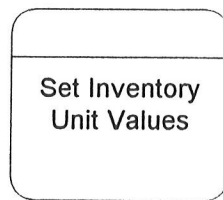
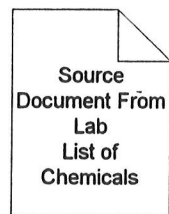
⁷ The *inventory unit* is an abstract grouping of inventory items with the same building, PI and Group #. Should a PI responsible for a particular group change or a building move from one group to another, only the 'inventory unit' info is changed, rather than each inventory line item.



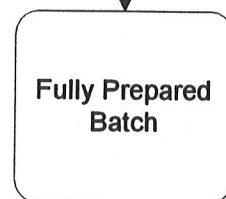
UCSF Business Plan -
Hazardous Chemical Inventory
Process



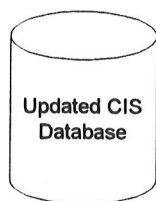
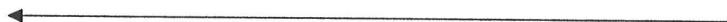
UCSF Current System
Swim Lane - BusPlanSL1



Enter/Edit Inventory Line Items for Group and Period of Inventory Unit



Submit Batch To Inventory



UCSF CIS Program Logical
Process BusPlan SL2

Structure for table H:\EMS\ICS\VER1\NEWINV.DBF
 Table type DBASE
 Number of records 99202
 Last update 02/22/96

eld	Field Name	Type	Length	Dec	Index
1	FACILITY	CHARACTER	50		N
2	PERMIT	CHARACTER	2		N
3	CATEGORY	CHARACTER	2		N
4	DEPT	CHARACTER	50		N
5	BLDG	CHARACTER	20		N
6	ROOM	CHARACTER	6		N
7	FLOOR	CHARACTER	2		N
8	C_LAST1	CHARACTER	20		N
9	C_FIRST1	CHARACTER	20		N
10	C_BOX	CHARACTER	4		N
11	C_PHONE	CHARACTER	10		N
12	R_LAST1	CHARACTER	20		N
13	R_FIRST1	CHARACTER	20		N
14	R_BOX	CHARACTER	4		N
15	R_PHONE	CHARACTER	10		N
16	LOCATION	CHARACTER	25		N
17	CHEMNAME	CHARACTER	50		N
18	CAS	CHARACTER	12		N
19	LSG	CHARACTER	1		N
20	PURE MIX	CHARACTER	1		N
21	MANUFACT	CHARACTER	40		N
22	PROD_NO	CHARACTER	15		N
23	CONT_TYPE	CHARACTER	2		N
24	MAXQTY	NUMERIC	8	2	N
25	ANNUAL	NUMERIC	8	2	N
26	MSDS	CHARACTER	1		N
27	WASTECODE	CHARACTER	3		N
28	UNITS	CHARACTER	10		N
29	REC_DATE	DATE	8		N
30	COMMENT	CHARACTER	50		N
31	MIX_CODE	NUMERIC	6		N

** Total **

481

Structure for table:

H:\CHEMINV\PRODUCT.DBF

Number of data records:

9952

Date of last update:

01/02/96

Code Page:

437

Field	Field Name Dec	Index	Collate	Type	Nulls
1	PRODUCT			Character	No
75	2	PRODUCT_ID		Numeric	No
8	3	CAS		Character	No
12	4	LSG		Character	No
1	5	SYNONYM1		Character	No
75	6	SYNONYM2		Character	No
75	7	SYNONYM3		Character	No
75	8	SYNONYM4		Character	No
75	9	SYNONYM5		Character	No
75	10	SYNONYM6		Character	No
75	11	SYNONYM7		Character	No
75	12	SYNONYM_OF		Numeric	No
8	13	EXPLOSIVE		Character	No
1	14	FLAMMABLE		Character	No
1	15	TEMPERATUR		Character	No
15	16	TOXIC		Character	No
1	17	HIGH_TOXIC		Character	No
1	18	OXIDIZER		Character	No
1	19	COMBUSTIBL		Character	No
1	20	CORROSIVE		Character	No
1	21	CARCINOGEN		Character	No
1	22	ETIOLOGIC		Character	No
1	23	POISON		Character	No
1	24	SPEC_HAZRD		Character	No
20	25	WTR_REACTV		Character	No
1	26	NFPA_FIRE		Character	No
1	27	NFPA_HLTH		Numeric	No
1	28	NFPA_REACT		Numeric	No
1	29	WASTE_NUM		Character	No
6	30	DOT		Character	No
6					

Total **

December 23, 1994

Department of Public Health
City and County of San Francisco
101 Grove Street
San Francisco, CA 94102

Dear Sue Cone,

We have received your letter of December 2, 1994 and accept the listed conditions. Each facility will maintain a separate COR, the CORs will expire in 4 groups at 6 month intervals, and the Hunter's Point COR (# 9793) will expire with the Group 1 facilities. UCSF's CORs and their new expiration dates are listed below.

Period/Cycle

Cycle 1
Group 1

Expires: 6/30/95

9791	Buchanan Den Clinic	12/30/94
8083	Mt Zion Hospital	8/27/95
9792	Mt Zion Hosp / Engin	8/27/95
9752	Mt Zion Research	8/27/95
7653	Laurel Heights	2/26/95
9793	Hunter's Point	12/30/94

6-30-99

Group 2 Expires: 12/30/95

2360	Ambulatory Care	2/26/95
9776	Langley Porter	2/26/95
4755	Long Hospital	4/28/95
14760	Moffit Hospital	4/28/95
9783	Nursing	8/27/95
11162	Heating Plant	8/27/95
9785	Laundry	8/27/95
9285	Millberry Union	8/27/95
10020	Power Plant	8/27/95
10022	Receiving Warehouse	8/27/95

12/30/95

Cycle 3

Group 3

Expires: 6/30/96

9780	Clinical Sciences	11/26/95
9671	EH&S	8/27/95
9349	HSE / HSW / MS	7/29/96
78	Koret	1/29/95
9782	Lab of Radiobiology	8/27/95
9790	Med Rec / Med Rec II	6/23/95
9779	Med Res IV	8/27/95
9788	Proctor	8/27/95
9789	Surge	8/27/95
9781	University Hosn	8/27/95

Group 4 Expires: 12/30/96

3785	SFGH 1	TBD
9757	SFGH 100	TBD
9754	SFGH 20	TBD
9753	SFGH 3	TBD
9755	SFGH 30	TBD
9756	SFGH 40	TBD
11536	SFGH 9	TBD
5439	CRM / Paint Shop	4/30/95
6291	Mission Center Bldg	1/29/95

△ BUILDING: SFGH BLDG 40
FLOOR: 02
ROOM: 225

new page # = 1
repeat defaults
new page for any change in
this header

Department: GLADSTONE
PI/Responsible Person: KARL WEISGRABER
Inventory Coordinator: STEPHEN RUSSELL

Box: 1230
Box: 1230

Phone: (415) 826-7500
Phone: (415) 826-7500

MATL - 15


CAS <

CHEMICAL/PRODUCT NAME CAS No.	MANUFACTURER	PRODUCT NUMBER	CONT TYPE	MAXIMUM QUANTITY STORED	ANNUAL USAGE	UNITS	CALIF. WASTE CODE
HYDROGEN PEROXIDE 772841	SIGMA CHEMICAL CO	H-1009	C1	200.00	500.00	ml	N/A
HYDROGEN PEROXIDE 772841	FISHER SCIENTIFIC	H325-100	C1	200.00	500.00	ml	N/A
HYDROXYLAMINE HYDROCHLORIDE 5470111	J.T. BAKER CHEMICAL	I-2196	B1	2.00	4.00	lbs	N/A
HYDROXYLAMINE HYDROCHLORIDE 5470111	ALDRICH CHEMICAL	25558-0	C1	200.00	400.00	gm	N/A
HYDROXYLAMINE HYDROCHLORIDE 5470111	J.T. BAKER CHEMICAL	2196-1	C1	1000.00	2000.00	gm	N/A
IMIDAZOLE 288324	J.T. BAKER CHEMICAL	5-N811	B1	200.00	400.00	gm	N/A
IODOACETAMIDE 144489	SIGMA CHEMICAL CO	I-6125	C1	50.00	100.00	gm	N/A
ISOAMYL ALCOHOL 123513	J.T. BAKER CHEMICAL	9038-1	B1	2.00	10.00	l	N/A
LITHIUM HYDROXIDE, MONOHYDRATE 1310663	J.T. BAKER CHEMICAL	P406-07	C1	1.00	2.00	kg	N/A
LITHIUM SULFATE 10377487	SIGMA CHEMICAL CO	L-8645	C1	1.00	2.00	kg	N/A
MAGNESIUM ACETATE 16674785	FISHER SCIENTIFIC	M13-500	C1	2.00	4.00	kg	N/A
MAGNESIUM CHLORIDE 7791186	SIGMA CHEMICAL CO	M-0250	B1	200.00	400.00	gm	N/A
MAGNESIUM SULFATE, ANHYDROUS 7487889	FISHER SCIENTIFIC	M-65	B1	1000.00	2000.00	gm	N/A
MALEIC ACID 110167	SIGMA CHEMICAL CO	M-0375	C1	1.00	3.00	kg	N/A
MANGANESE CHLORIDE 13446349	SIGMA CHEMICAL CO	M-3634	C1	1000.00	2000.00	gm	N/A
METHANOL 67561	FISHER SCIENTIFIC	A412-4	B1	8.00	40.00	l	N/A
MONOETHANOLAMINE 141435	J.T. BAKER CHEMICAL	9314-01	B1	1.00	2.00	l	N/A
MOPS, SODIUM SALT 789803739	SIGMA CHEMICAL CO	M-9381	C1	200.00	400.00	gm	N/A
N,N'-METHYLENE-BIS-ACRYLAMIDE 110269	LKB	1820-102	B1	50.00	100.00	gm	N/A
N,N'-METHYLENE-BIS-ACRYLAMIDE 110269	SIGMA CHEMICAL CO	M7256	C1	50.00	100.00	gm	N/A
N-BROMOSUCCINIMIDE 128085	SIGMA CHEMICAL CO	B-9252	B1	50.00	100.00	gm	N/A
NICKEL CHLORIDE, HEXAHYDRATE 7791200	SIGMA CHEMICAL CO	N-5756	B1	10.00	10.00	gm	N/A

PERMIT SCHEDULE

[illegible]

November 7, 1995

TO: Supervisors
FROM: Sonia Helbano 
RE: Chemical Inventories

The City and County of San Francisco requires UCSF to submit updated chemical inventories for several buildings on campus in order to renew its Hazardous Materials Certificate of Registration. To help expedite this I am sending you a copy of the inventories you submitted previously. Also included is a blank inventory for one of your rooms-- i.e. new room, or a room for which no inventory was previously submitted.

For the City and County of San Francisco the following quantities must be listed:
solid: 25 grams or more;
liquids: 100 milliliters or more;
compressed gases or compressed liquids: 10 cubic feet or more @STP.

1. If there are no changes, simply indicate so on the old inventory sheet for that room and return to me.
2. If there have been changes of 25% or less in the quantity ONLY of the chemicals listed on the previous inventory can be returned as if there were no changes.
3. If there are no chemicals in addition to old ones, use a blank inventory sheet and attach it to old inventory and return to me.
4. If some chemicals are gone, simply cross them out on the original inventory and return to me.

These inventories are due in the Assistant Director's office at M1316, on November 17, 1995. If you have any questions, please feel free to call me at 476-1310. Thank you for your help.

cc: Paulette Gregg
CVRI, Asst. Director

Instructions

Disclosure Form For Hazardous Chemical Materials

The information provided on the Disclosure Form will be available to emergency response personnel in the event of a hazardous materials emergency at your facility or in your neighborhood. This information is also required by federal, state, and local laws to be made available to the public upon request. Therefore, you must provide complete and accurate information for each material listed on the Disclosure form.

What Is A Hazardous Material?

A hazardous material is any material that poses a present or potential hazard to human health and safety or to the environment. A material is considered hazardous because of its quantity, concentration, or physical or chemical characteristics.

Hazardous materials include many common (like paint) and uncommon materials that are used in large and small manufacturing processes, service and maintenance industries, and in other types of businesses.

Chemical Materials That Need To Be Listed

1. Include hazardous chemical materials as defined below. Hazardous chemicals include *hazardous wastes*, custodial products, compressed gases (such as **oxygen** and **acetylene**), and common products such as paints.

Hazardous chemicals stored in **underground storage tanks** should not be included on this form. List these chemicals on the *Disclosure Form For Hazardous Chemicals In Underground Storage Tanks* on page 47.

If you are applying for a Certificate of Registration for temporary storage, you will need to list the chemicals that will be stored temporarily.

If you operate a business that can be classified as a *Freight-Forwarding and Freight Transportation Service* as defined on page 5, then the hazardous chemicals that are stored for less than 30 days do *not* need to be included. Include those hazardous chemicals that are stored on site on a regular basis for maintenance and operation.

2. Include all hazardous **liquids** that you have on site that are in containers with a capacity greater than or equal to 1 gallon.

If you operate a laboratory, include hazardous liquids that are used as a part of the function and are in containers with a capacity greater than or equal to 100 ml. Other hazardous liquids found in the laboratory, such as building maintenance supplies need to be included and reported according to the

requirements for non-laboratories.

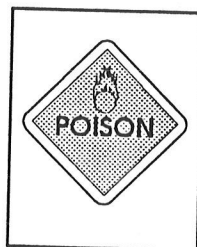
3. Include all hazardous **solids** that are in containers with a capacity greater than or equal to 25 pounds.

If you operate a laboratory, include hazardous **solids** that are used as a part of the laboratory function and are in containers with a capacity greater than or equal to 25 grams. Other hazardous solids need to be included and reported according to the requirements for non-laboratories.

4. Include all **compressed gases** that are in containers with a capacity greater than or equal to 10 cubic feet.
5. Include all **Acutely Hazardous Materials**, regardless of container size, if they are handled in quantities greater than or equal to the amounts listed on page 68.
6. If you are designating any of the information as a Trade Secret, do not list the material(s) along with the rest of the products. List the material(s) affected on a separate sheet of *Disclosure Form For Hazardous Chemical Materials*. Write *Trade Secrets* at the top of the form.

Practical Ways To Recognize A Hazardous Material?

- By the symbols found on diamond-shaped labels. The materials is hazardous if its lab contains diamond symbols such as a skull and crossbones or flames. Look for symbols, like the following on the container labels:



- By the words and phrases found on a label. A material must be considered hazardous if any of the following words or phrases appear on the container or label:

Words

Carcinogen
Caution
Combustible
Corrosive
Danger
Flammable
Hazard

Irritant
Oxidizer
Poison
Reactive
Sensitizer
Toxic
Warning

Phrases

Avoid contact (with skin or eyes)

Do not store or use near heat

Use with adequate ventilation

Avoid breathing vapors

Wear protective equipment (gloves, goggles, respirator)

- Other phrases may indicate that the product may be harmful to humans or the environment.

Using The Disclosure Form For Hazardous Chemical Materials

1. Items listed on this form are tied to a **room**. This means that all materials entered on a single sheet (front and back) are found in the same **room**, as specified in Numbers 1-8.
2. If there is more than one room at your facility, use a **separate sheet for each room** of the facility.
3. Hazardous chemical materials stored **outside** need to be listed on a **separate** form. All materials stored outside can be listed on a single form. **The location of the hazardous chemicals stored outside must be indicated on the General Site Map.**
4. If additional spaces are needed, make extra copies of the back page.
5. A sample *Disclosure Form For Hazardous Chemical Materials* has been

included on page 81 for your reference.

Item # Instructions:

- 1 Room Name or Number. Enter the name or the number of the room for which the listed hazardous chemicals on this single sheet are located. The name or the number listed must be identical to that labeled on the structure itself and on the facility map. If your business occupies only a single room, enter *NA*.
- 2 Description of Room. Describe the primary activity conducted in the room. If your business occupies only a single room, enter *NA*.
- 3 Floor. Identify the floor on which the room is located. Use the codes listed. If the room is on a mezzanine, enter the number of the floor below the mezzanine followed by the code *M*. For example, if the room is located on the mezzanine between the 2nd and 3rd floor, enter *02M*.
- 4 Building. If there is more than one building in the facility, enter the name of the building in which the room is located. The name listed must be identical to that labeled on the structure itself and on the facility map. If your facility contains only one building, enter *NA*.
- 5-10 Section. Division. Business Name. Address. Person In Charge. Phone Number.
Enter the appropriate information or *NA*.
- 11 Item #. Number each material consecutively, starting with #1.
- 12 Form. Check in the appropriate column to indicate the physical state of the product, whether it is a solid, liquid, or gas.
- 13 Brand Name. If the material is a commercial product, enter the manufacturer's brand name or trade name exactly as it appears on the label of the container.

INSTRUCTIONS

General: A Hazardous Materials Inventory is to be completed on a room by room basis.

- * Please complete all fields.
- * Please Type or print.

Chemical/Product Name: If the material is a commercial product, enter the complete name which appears on the label of the container.

- * If the material is a product or mixture made on the premises, include the word "In-house" or the name assigned to the product which appears on the label.
- * If the material is a waste, include the word "Waste."

Manufacturer Name: Enter the complete name of the manufacturer (e.g. J.T. Baker as opposed to "Baker" which is a different chemical company). If the company division is listed, please include that information.

Product Number: Enter the product/catalogue number. This number is necessary to obtain an MSDS.

Maximum Quantity Stored At Any Time: Enter the estimated maximum quantity of the material which will be present in the room at any time during the year. Be sure to include the correct units (e.g. gallons, pounds, cubic feet, grams or liters).

Annual Usage: Enter the estimated total quantity used during the next one-year period. Enter the units as above.

Container Type(s): Enter the codes from the table below. If the product is packaged in several containers, record "type" of the container/material closest to the product.

<u>Code</u>	<u>Type</u>	<u>Code</u>	<u>Type</u>
A1	Metal Container (less than 10 gallons)	F	Compressed Gas Cylinder
A2	Metal Container (10 to 110 gallons)	G	Fixed Storage Tank, Above Ground
A3	Aerosol Container	H	Underground Storage Tank
B1	Glass Container (1 gallon or less)	I	Portable Storage Tank, (Greater than 110 gals.)
B2	Glass Container (more than 1 gallon)	J	Bins or Boxes
C1	Plastic Containers (less than 10 gallons)	K	Bags
C2	Plastic Containers (10 to 110 gallons)	M	Sump
D1	Fiber Containers (less than 10 gallons)	O	Open Process Tank
D2	Fiber Containers (10 to 110 gallons)	P	Machinery Tank
E	Wood Containers	Q	Other (Specify)

CA Waste Number: If you have "waste" materials that would be collected by EH&S, enter the California Waste Category Number 551, or if you wish to be more specific a comprehensive list is available through EH&S.

MSDS: Enter "N" (No) to indicate that you do not have a MSDS in your lab/department. Enter "Y" (Yes) to indicate that you have the MSDS available.

L/S/G: Enter the physical state of the material; liquid (L), solid (S), and gas (G).

CHEMICAL INVENTORY / MSDS REQUEST FORM

★ SEE INSTRUCTIONS ON REVERSE SIDE ★
L = Liquid; S = Solid; G = Gas

DATE: ____/____/____		University of California, San Francisco; Environmental Health & Safety (EH&S); Box 0942; 476-1300										
Campus:	Building:	Floor:	Room No.									
Department:	PI/Responsible Person:	Box:	Phone:									
	Inventory Coordinator:	Box:	Phone:									

Group #: _____

Appr. DE _____

FOR EH&S USE ONLY

[illegible]

Departmental MSO Listing

University of California, San Francisco

Department	MSO Name	School	Phone	Fax	Box	Address	Electronic Mail Address
ANATOMY	Donna Leonhardt	M	476-9415	476-4845	0452	MS-1334	ANAMSO@UCSSFVM.UCSF.EDU
ANESTHESIA	Alexis Purcell	M	476-2131	476-9516	0648	CS-450	
ANIMAL CARE	Margaret Warren	A	476-8060	476-2090	0564	MR-407	MAGGIE@UCSSFVM.UCSF.EDU
BIOCHM BIOPH	Wayne Smiley	M	476-1179	476-0961	0448	MS-964	
CANCER RESCH I	Margaret O'Halloran	M	476-1998	476-6997	0128	M-1282	MARGE@UCSSFVM.UCSF.EDU
CARDIOVASC	Lee Gately	M	476-2411	476-2283	0628	M-380	
CLIN PHARM	Deborah Petrie	P	476-2352	476-6632	0622	C-152	
D PUB HLTH	Nichole Child	D	476-9875	476-0858	0758	D-3236	NICOLE@UCSSFVM.UCSF.EDU
DENTAL CLIN	Cathy Sandeen	D	476-1101	476-3448	0636	D-4010	SANDEEN@UCSSFVM.UCSF.EDU
DERMATOLOGY	Theodora Johnson	M	476-9835	476-6184	1214		
EPID & BIostat	Wanda Halvorson	M	476-2830	476-6014	0560	MU-420B	WANDAH@UCSSFVM.UCSF.EDU
FAM & COM MED	Karla West	M	476-0503	476-6051	0900	A C9	KMW@UCSSFVM.UCSF.EDU
GALLO CLINIC RESEARC	Susan Allinsmith	M	206-5464	-		SFGH Bldg 1 Rm	
GLADSTONE FOUNDATION	Deborah Addad	M	695-3850	-	1230	SFGH Bldg 40 Rm	
GROWTH & DEV	Davina Gardner	D	476-3018	476-1499	0640		
HOOPER	Joyce Futa	M	476-6764	476-6185	0552	HSW-1540	
HORMONE	Pat Shannon	M	476-0991	731-3612	0534	HSW-1090	
HUGHES MED	John Kennedy	M	476-9664	566-4969	0724	U-426	
LAB MEDICINE	Karen Newhouse	M	476-8974	476-9625	0134	L-518B	NEWHOUSE@LABMED.UCSF.EDU
LAB OF RADIOBIO	Penelope Tucker	M	476-1639	476-7102	0750	LR-102	PENNY@RADLAB.UCSF.EDU
MEDICINE	Sheila Mahoney	M	476-0938	476-9531	0120	M-984	
METABOLIC	John Maynard	M	476-5667	476-1660	0540	HSW-1143	JTM@UCSSFVM.UCSF.EDU
MICROB & IMMUNO	Patricia Clausen	M	476-8199	476-0939	0414	S-447	
NEUROLOGY	Marianne Smylie	M	476-9207	476-3428	0114	M-794	
NEUROSURGERY	Nancy Loewe	M	476-8866	753-1772	0112	M-787	
NRS ADMIN	Helen Birkeland	N	476-4430	476-9707	0602	N-319X	
NRS FAM HLTH	Karen Mah-Hing	N	476-1137	753-2161	0606	N-411C	
NRS GEN ACAD	Jeffrey Kilmer	N	476-0600	476-9707	0602	N-319J	
NRS LEARN RS	Jim Grout	N	476-4851	476-8899	0604	N-707	
NRS MH&CN	Eva Doering	N	476-2079	476-6042	0608	N-505Y	
NRS PHYS NRS	Phyllis Tsujihara	N	476-4206	476-8899	0610	N-611E	
NRS SOC BEHV	Meredith O'Connor	N	476-1851	476-1253	0612	N-631	
NUCLEAR MEDICINE	Dorothy Price	MC	476-1521	-	0252	L-340	JOHNOC@UCSSFVM.UCSF.EDU
OBGYN & REPRO	John O'Connor	M	476-5904	476-1811	0556	M-1479	
OPHTHALMOLGY	Thelma Desouza	M	476-1921	476-0336	0730	K-301	
ORAL MAX SURG	Michael Braisted	D	476-8227	476-6305	0440	C-522	MKBOS@UCSSFVM.UCSF.EDU

IMPORTANT NOTICE

DATE: April 19, 1995

TO: Department Managers
Mount Zion Medical Center of UCSF

FROM: Ara Tahmassian, PhD.
Director of Environmental Health and Safety

RE: Chemical Inventory

Our records indicate that your chemical inventory needs to be updated/completed. Reporting is required for the following amounts:

solids - 25 grams (0.06 pounds) or more.
liquids - 100 mls (0.025 gallons) or more.
compressed gases or liquids - 10 cubic feet or more at STP

The following attachments should assist you in completing the inventory:

- 1) List of rooms for which you are responsible
Please indicate any additions or deletions
- 2) Chemical Inventory for listed rooms
Please indicate any additions, deletions, or changes in excess of 20%
- 3) Chemical Inventory form with instructions
Please complete a new form for all NEW rooms.

Please update your chemical inventory and return the attached forms before May 19, 1995.

In order to meet the deadline required by Hazardous Materials Ordinance (Article 21 of the San Francisco Health Code), please submit all inventories by the May 19th deadline. If this deadline cannot be met, please contact the Mount Zion Chemical Inventory Coordinator at EH&S, 476-1300.



NEWS

October 1, 1996

DEPARTMENT OF PUBLIC HEALTH
BUREAU OF ENVIRONMENTAL HEALTH MANAGEMENT
101 GROVE ST. ROOM 220
SAN FRANCISCO, CA 94102

HAZARDOUS MATERIALS REGULATION IN SAN FRANCISCO IS CHANGING! A few years ago, the State of California passed legislation that mandated the consolidation of several environmental programs including hazardous materials storage, hazardous waste generation and treatment, above ground storage tanks, acutely hazardous materials, and underground storage tanks. As the implementing agency for these programs, the Department of Public Health (DPH) was required to apply to the State to be certified as a Unified Program Agency (CUPA). Our application was successful and as of July 1, 1996, the City and County of San Francisco was officially certified as one of the first two CUPAs in the State. We are required to begin operation as a CUPA by July 1, 1997.

In order to operate as a CUPA, we find it necessary to make some changes in the way hazardous materials and wastes are regulated in the City. This Newsletter serves as an early alert that these changes will be occurring. We will continue to keep you updated throughout the CUPA implementation process which includes amendment of the SF Health Code. As a regulated business in the City, some of the changes that you will notice include:

- State mandated inspections of your facility for all CUPA program elements will be conducted by a single CUPA inspector. This should reduce the number of individual inspections you receive, especially for those of you who are regulated under several CUPA program elements.
- Certificates of Registration will be valid for one year rather than two years.
- Regulation by a CUPA requires that that you receive a single annual bill for all CUPA program elements. In order to facilitate this single bill concept, current fee structures will require modification to eliminate per hour inspection fees for routine compliance inspections.
- On behalf of the State, we will be required to collect a Service Charge which will be assessed on all businesses regulated under CUPA. (The current State Service Charge is \$20 per year plus additional fees for hazardous waste treatment and underground storage tanks.) The Service Charge fees will be utilized by the State Department of Toxic Substances Control to consolidate, coordinate, and make consistent, CUPA activities throughout the State.



HAZARDOUS MATERIALS REGISTRATION-- The State has also finalized a new form for reporting hazardous materials inventory. This form has gone through extensive public review and comment and has been several years in development. The new form requires you to list one chemical per page rather than the multiple chemicals per page currently allowed. *At this time, you do not need to use this new inventory form for Hazardous Materials Registration.* However, if you already have a copy of the new form, you may use it if you wish to do so. Please note that we will not accept any version of the State form that has been modified by other counties. You can find the new State Inventory Reporting Form in the California Code of Regulations, Title 19, Chapter 2, Subchapter 3.

The Hazardous Materials Advisory Committee (HMAC), a 21-Member Committee established by the Board of Supervisors, is currently soliciting new members. The HMAC advises the Director of Health on any issues regarding hazardous materials and wastes. There are currently several vacancies on the Advisory Committee including 2 for industry representatives. Please consider participation in the HMAC – It provides an excellent opportunity to have an official voice in planning for program changes. If you think you might be interested in HMAC participation or would like more information, please feel free to call Mr. Barney Popkin, HMAC Co-Chairperson at 222-8351.

CLASSIFIED

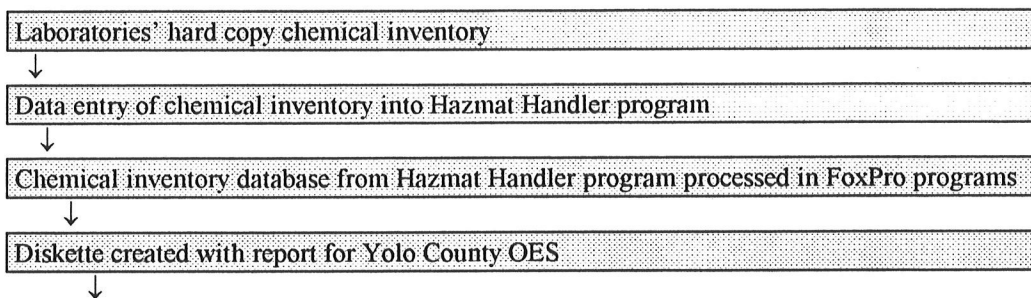


Facility ID # 9779
Ara Tahmassian PhD Director EH&S
UCSF / Medical Research IV
709 Parnassus Av
San Francisco, CA 94143

UC Davis Systems

1. Hazardous Material (MSDS) Handler

In the current system used at Davis, EH&S reviews the data from the lists submitted by campus departments and units and enters the data into a program called Hazmat Handler. This is logically similar to UCSF's process, except that the output from the inventory system is sent to a sub-process FoxPro system, which manipulates the data and units of measure and generates the final reports. Once the conversion is complete, EH&S submits both a hard copy and a diskette containing the formatted data to the county.



Yolo County Office of Emergency Services

2. Chem Track

Davis acquired the ChemTrack system from UC Berkeley-Lawrence labs and is in the process of modifying the the McIntosh version to a PC platform. It is in a test phase of allowing PIs to remotely update their lab inventory via modem connection. This system requires a 486 PC at lab site. The test results have not yet been incorporated into this analysis

Capture of Chemical Inventory at P.O. stage

The complete life cycle of the chemical flow includes a desirable feature of capturing data on acquisition of a chemical at the purchase order level. Davis has experimented with visiting the accounting department to get this information. One vendor has told UCSF they would include a PI ID#, furnished by the University, for each purchase by that PI. However, as described earlier, the scope of this design begins at data entry into the system after the source lab level inventory has been obtained.

Hazardous Materials Inventory 1993 Instructions

INTRODUCTION

Due to more stringent reporting requirements established by the local emergency response organizations who receive this data, we are asking you to provide more detailed information on all hazardous materials stored in your facilities at the Davis campus, as well as emergency contact information. This information will be kept confidential and stored in a computerized hazardous materials inventory program for ready access in the event of an emergency.

This inventory packet is designed to help you collect information on any hazardous material which is stored or handled at one or more buildings or facilities assigned to your department. In order to meet federal Laboratory Safety standards and the Chemical Hygiene Plan, your department should already maintain a complete chemical inventory for all your facilities.

A hazardous material is defined as any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant or potential hazard to human health or safety or to the environment if released into the environment. The MSDS for the material would help you identify any hazardous properties of the chemical. A short list of commonly used hazardous materials would include oxygen and other compressed gases, gasoline, propane, motor oil, carbon dioxide gas, paint, cement, solvent, chlorine, ammonia, various chemical wastes, etc.

Please read these instructions before starting your inventory, and complete these forms to the best of your knowledge. In order to meet reporting deadlines, please return the forms to: **HAZMAT Inventory -- Environmental Health and Safety** no later than **Friday, February 12, 1993**. If you have any questions, please call Sally Lee at 752-8194.

PACKET CONTENTS

This packet contains the following materials:

- **Instructions** for completing the forms.
- **Department Information Form**, for collecting departmental contact information.
- **Inventory Form**, for collecting your chemical information.
- **The Inventory Code Table**, which is also printed on the back of the Inventory Form, provides the coding scheme for the various fields on that form.

- **Department Building Inventory**, based on information provided from the 1992 inventory. Please use it as a guide for reviewing facilities which may have stored chemicals in the past twelve months, and update facility changes as necessary.

DEPARTMENT INFORMATION FORM:

NOTE: A separate Department Information Form should be completed if the department's emergency contact information changes. This may happen, for example, if you have two or more facilities for which two different staff members have oversight, or if you have two different laboratories managed by two different principal investigators.

DEPT NAME: Enter your department name.

ADMIN. CONTACT and WORK PHONE: Enter the first and last name of the Administering Official (e.g. Chairperson, Management Services Officer, Principal Staff Assistant) and his or her work telephone number.

MAIN and ALT. EMERG. CONTACT, TITLE, WORK PHONE, and 24-HOUR PHONE: Enter the first and last name of the Main and Alternate Emergency Contact persons, their respective working titles, work telephone numbers, and a 24-hour telephone number where they may be reached in the event of an emergency. This telephone number may be a home telephone number, or a 24-hour pager number. These contacts will act as a referral if emergency responders need assistance in responding to a release of hazardous materials at your facility.

CERTIFICATION STATEMENT: Provide the signatures and dates of the preparer of the forms, and of the Administering Official.

INVENTORY FORM:

NOTE: A separate Inventory Form should be completed if the department's building or facility name changes. This may happen, for example, if your department has laboratories in different buildings. Please make as many copies of this form as necessary.

Enter the appropriate information in the **DEPARTMENT, BUILDING, PREPARER**, and preparer's **PHONE** fields. **NOTE:** If you know your building's Zone Number or Temporary Building (TB) identifier, please include this information in the **BUILDING** field.

COMMON NAME: Enter the common name of the chemical or waste.

CHEMICAL NAME: Enter the chemical name of the substance using the proper chemical terminology. Avoid the use of trade names. For mixtures, list the chemical names of the three most hazardous components and their respective percentages of total weight.

TRADE SECRET: If you believe that submission of this chemical information involves the release of trade secret information, check this box and enter the general chemical class in the **CHEMICAL NAME** field.

PHYSICAL FORM: Referring to the Inventory Code Table, indicate if this chemical is a (S)olid, (L)iquid, (G)as, or (D)ust.

PHYSICAL TYPE: Referring to the Inventory Code Table, indicate if this chemical is (P)ure, a (M)ixture, or (W)aste.

STORAGE CONTAINER CODE: Referring to the Inventory Code Table, indicate the type of container used to store this chemical.

STORAGE PRESSURE CODE: Referring to the Inventory Code Table, indicate the pressure conditions under which this chemical is stored.

STORAGE TEMPERATURE CODE: Referring to the Inventory Code Table, indicate the temperature conditions under which this chemical is stored.

MAXIMUM ONE-TIME AMOUNT: Enter the maximum amount of this chemical which has been stored at any one time in this building or facility by your department during the past twelve months. Note that this figure should reflect storage, not usage!

DAILY AVERAGE AMOUNT: Enter the average daily amount that has been stored during the past twelve months.

UNITS: If the chemical is a solid, enter the amount as "lb" (pounds); if it is a gas, enter the amount as "ft³" (cubic feet); if it is a liquid, enter the amount as "gal" (gallons); and if it is a radioactive material, enter the amount as "mCi" (millicuries).

DAYS ON-SITE: Enter the number of days the chemical is on site.

USAGE CODE: Referring to the Inventory Code Table, indicate the most common use for this chemical. If the Usage Code is "Other" (#99), please describe. If the Usage Code is "Waste" (#45), indicate the **ANNUAL AMOUNT GENERATED** in the past 12 months, and the **WASTE CODE**, referring to the Inventory Code Table.

LOCATION: Enter all room numbers in the building or facility where this chemical is kept under the given storage conditions. Please also indicate the location in the room building (e.g. storage cabinet by east door).

HAZARDOUS MATERIALS INVENTORY CODES

PHYSICAL FORM	PHYSICAL TYPE
S Solid	P Pure
L Liquid	M Mixture
G Gas	W Waste
D Dust	

STORAGE PRESSURE	STORAGE TEMPERATURE
1 Room (ambient) Pressure	4 Room (Ambient) Temperature
2 Greater than Ambient Press	5 Greater than Ambient Temperature
3 Less than Ambient Pressure	6 Less than Ambient Temperature
	7 Cryogenic Conditions

STORAGE CONTAINER	
A Aboveground Tank	J Bag
B Underground Tank	K Box
C Tank Inside Building	L Cylinder
D Steel Drum	M Glass Bottles/Jugs
E Plastic/Non-Metallic Drum	N Plastic Bottles/Jugs
F Can	O Tote Bin
G Carboy	P Tank Wagon
H Silo	Q Rail Car
I Fiber Drum	R Other

UNITS	
lb	pound
gal	gallon
ft3	cubic feet
mCi	millicurie

USAGE	
01 Additive	26 Herbicide
02 Adhesive	27 Insecticide
03 Aerosol	28 Instructional
04 Anesthetic	29 Lubricant
05 Bactericide	30 Medical Aid or Process
06 Blasting	31 Neutralizer
07 Carrier/Processing Solvent	32 Painting
08 Catalyst	33 Pesticide
09 Cleaning	34 Plating
10 Coolant	35 Preservatives
11 Cooling	36 Intermediate Process
12 Distillation	37 Raw Material
13 Drilling	38 Refining
14 Drying	39 Sealer
15 Emulsifier	40 Spraying
16 Etching	41 Sterilizer
17 Experimental	42 Storage
18 Fabrication	43 Stripper
19 Fertilizer	44 Washing
20 Finished Product	45 Waste
21 Formulation	46 Water Treatment
22 Fuel	47 Welding/Soldering
23 Fungicide	48 Well Injection
24 Grinding	99 Other – specify
25 Heating	

WASTE CLASSIFICATION	
TOX	Toxic
IGN	Ignitable
COR	Corrosive
REA	Reactive
EHM	Extremely Hazardous Material

DEPARTMENT INFORMATION

DEPT. NAME:

ADMIN. CONTACT:

WORK PHONE:

MAIN EMERG. CONTACT:

TITLE:

WORK PHONE:

24-HOUR PHONE:

MAIN EMERG. CONTACT:

TITLE:

WORK PHONE:

24-HOUR PHONE:

THE EMERGENCY CONTACT PERSONS LISTED ABOVE ARE ABLE TO PROVIDE EMERGENCY ASSISTANCE FOR THE FOLLOWING BUILDINGS OR FACILITIES:

BUILDING NAME

**ZONE + NUMBER
IF AVAILABLE**

I certify that the information in this report is accurate and complete to the best of my knowledge.

Signature of Preparer

Date

Signature of
Administering Official

Date

DEPARTMENT: _____

BUILDING: _____

PREPARER: _____

PHONE: _____

CHEMICAL DESCRIPTION						EH&S U		
COMMON NAME:					Trade Secret?	Physical Form (S/L/G/D)	Physical Type (P/M/W)	CAAN#
CHEMICAL NAME:					<input type="checkbox"/> Yes			CAS#
					<input type="checkbox"/> No			
If mixture, list the 3 most hazardous components: % by wgt					Storage Container Code	Storage Pressure Code	Storage Temp. Code	Phys Haz
								F / P / R
								Health Haz
								Imm / Delay
Maximum One-time Amount	Daily Average Amount	Units (lbs/gal ft3/mCl)	# Days On-Site	Usage Code	If Usage Code is "Other" (#99), describe:			
					If Usage Code is "Waste" (#45), Waste Code:			
					Annual Amount gen.			
LOCATION:								

CHEMICAL DESCRIPTION						EH&S Use		
COMMON NAME:					Trade Secret?	Physical Form (S/L/G/D)	Physical Type (P/M/W)	CAAN#
CHEMICAL NAME:					<input type="checkbox"/> Yes			CAS#
					<input type="checkbox"/> No			
mixture, list the 3 most hazardous components: % by wgt					Storage Container Code	Storage Pressure Code	Storage Temp. Code	Phys Ha
								F / P / R
								Health Haz
								Imm / Delay
Maximum One-time Amount	Daily Average Amount	Units (lbs/gal ft3/mCl)	# Days On-Site	Usage Code	If Usage Code is "Other" (#99), describe:			
					If Usage Code is "Waste" (#45), Waste Code:			
					Annual Amount gen.			
LOCATION:								

CHEMICAL DESCRIPTION						EH&S Use		
COMMON NAME:					Trade Secret?	Physical Form (S/L/G/D)	Physical Type (P/M/W)	CAAN#
CHEMICAL NAME:					<input type="checkbox"/> Yes			CAS#
					<input type="checkbox"/> No			
If mixture, list the 3 most hazardous components: % by wgt					Storage Container Code	Storage Pressure Code	Storage Temp. Code	Phys Haz
								F / P / R
								Health Haz
								Imm / Delay
Maximum One-time Amount	Daily Average Amount	Units (lbs/gal ft3/mCl)	# Days On-Site	Usage Code	If Usage Code is "Other" (#99), describe:			
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LOCATION:								

HAZARDOUS MATERIALS INVENTORY CODES

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STORAGE CONTAINER	
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F Can	O Tote Bin
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H Silo	Q Rail Car
I Fiber Drum	R Other

UNITS	
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ft3	cubic feet
mCi	millicurie

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03 Aerosol	28 Instructional
04 Anesthetic	29 Lubricant
05 Bactericide	30 Medical Aid or Process
06 Blasting	31 Neutralizer
07 Carrier/Processing Solvent	32 Painting
08 Catalyst	33 Pesticide
09 Cleaning	34 Plating
10 Coolant	35 Preservatives
11 Cooling	36 Intermediate Process
12 Distillation	37 Raw Material
13 Drilling	38 Refining
14 Drying	39 Sealer
15 Emulsifier	40 Spraying
16 Etching	41 Sterilizer
17 Experimental	42 Storage
18 Fabrication	43 Stripper
19 Fertilizer	44 Washing
20 Finished Product	45 Waste
21 Formulation	46 Water Treatment
22 Fuel	47 Welding/Soldering
23 Fungicide	48 Well Injection
24 Grinding	99 Other – specify
25 Heating	

WASTE CLASSIFICATION	
TOX	Toxic
IGN	Ignitable
COR	Corrosive
REA	Reactive
EHM	Extremely Hazardous Material

12/21/94

Hazardous Material Inventory
University of California, Davis
Quantity Reported by BUILDING in 1994

Building Name: ACADEMIC SURGE

Department: ENGIN: MECHANICAL & AERONAUTICAL

Contact 1: RON PURNELL ASSOC DEV ENGIN 9167526158

Contact 2: YASUHIRO KAWAHARA 9167528253

Area: ROOM 1307

ALUMINUM/SILICON POWDER	3.00 LBS
NITROGEN	254.00 FT3
RPM UNIVERSAL GEAR LUBRICANT	5.00 GAL

Department: ENTOMOLOGY

Contact 1: MICHAEL PARRELLA CHAIRPERSON 9167520475

Contact 2: DEEDEE KITTEMAN MSO 9167520475

Area: ROOM 1124

CARBON DIOXIDE	0.00 FT3
SODIUM CYANIDE	4.00 LBS
SODIUM HYDROXIDE	0.26 GAL

Department: WILDLIFE & FISHERIES BIOLOGY

Contact 1: JOSEPH CECH CHAIR & PROFESS 9167523576

Contact 2: MARJORIE KIRKMAN MSO 9167526584

Area: ROOM 1328

2-PROPANOL	1.06 GAL
2-PROPANOL	1.06 GAL
CALCIUM SULFATE	8.00 LBS
FORMALDEHYDE SOLUTION	1.06 GAL
SODIUM PHOSPHATE (TRIBASIC)	1.00 LBS

Area: ROOM 1332

CHLOROFORM	0.01 GAL
ETHYL ALCOHOL	10.00 GAL
FORMALDEHYDE	3.43 GAL
MERCURIC CHLORIDE	0.07 LBS
NITRIC ACID	0.08 GAL
SODIUM AZIDE	0.55 LBS
SULFURIC ACID	1.00 GAL

Area: ROOM 1368

PHENOL	0.79 GAL
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Area: ROOM 1377

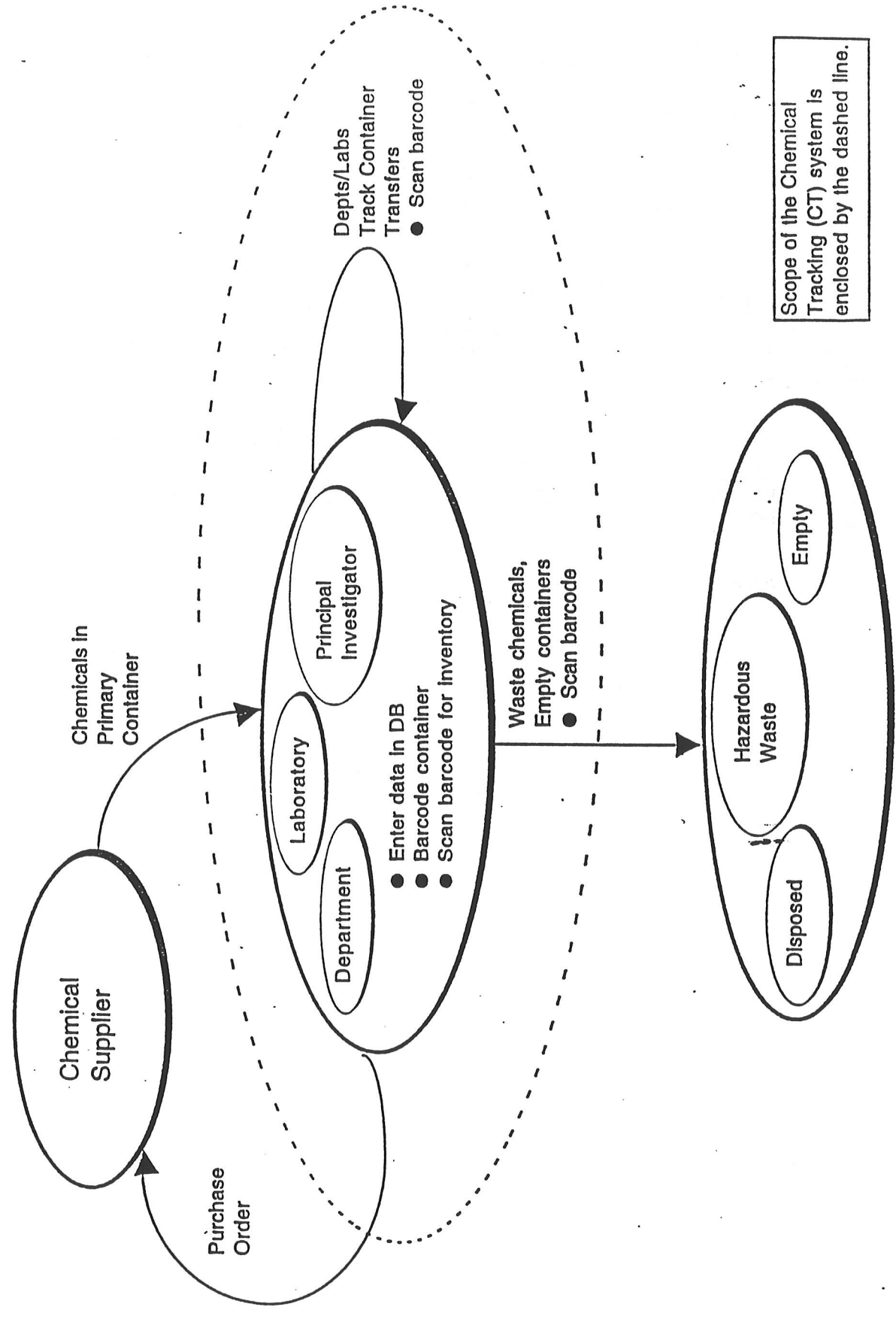
ETHANOL	75.00 GAL
---------	-----------

Area: ROOM 1381

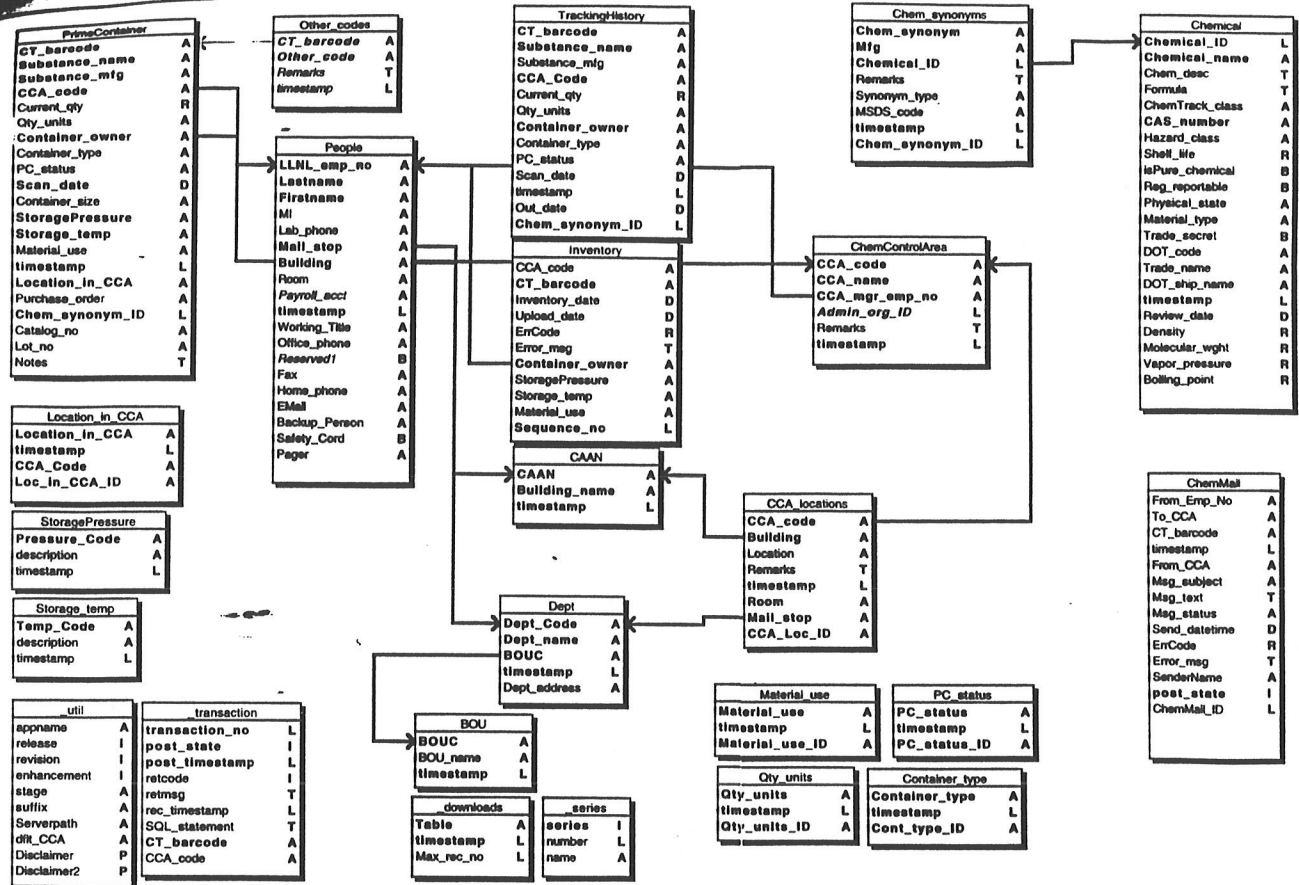
ACETONE	0.50 GAL
NITRIC ACID	0.06 GAL
POTASSIUM FERRICYANIDE	2.00 LBS

Area: ROOM 1384

LLNL's Ct. track system Chemical Tracking Cycle diagram for deployment at U.C. Davis.



Scope of the Chemical Tracking (CT) system is enclosed by the dashed line.



5. Proposed System

Three Layer Data Architecture

Conceptually, the data requirements translate into a three layer data architecture:

- **Layer 1 - Chemical Material Table Set**

This layer is a core level table set of chemicals with linkage to relational tables with ancillary data, such as the hazard class, regulating agencies, etc. These will often be many to one relationship to the core chemical, as for example regulatory agencies which will vary from none to several for various chemicals. In this case, a linking table is used. Terminology used for this layer is 'Chemical Material'

- **Layer 2 - Chemical Products Table set**

This layer is another table set, analogous to synonyms of and is in many to one relationship to a given Chemical Material. There will normally be at least one instance of a 'Chemical Product' for each Chemical Material. An example is Fisher Chlorine Deluxe in a one gallon bottle. This is linked to the Chemical Material chlorine. Allied's Chlorine Royal in a half gallon bottle is also linked to the same Chemical Material chlorine too. This table has a link or Internet World Wide Web Universal Resource Locator to the manufacturer and the MSDS entity.

- **Layer 3 - Inventory Items Table Set**

This layer is the table set of actual inventory items, referred to as an 'Inventory Item' where actual inventory instances are recorded. The associated relational tables include links to the location, PI and 'Inventory Unit' tables. In entering inventory items, the Chemical Product is selected from a pick list from layer two.

See figures 6 through 10 for schematics of data structure.

Chemical Waste

The system will include fields to sub categorize *Chemical Materials* by hazard and other classifications. Also, the *Chemical Products* table will have a field designator and interface control function to indicate if a chemical is an original chemical or waste product. In this sense, it will be a database of chemical waste. Individual chemical process by-products could also be included in the layer two products table.

UCSF uses a DBase chemical waste pick up tracking system, which however uses its own chemical, PI and location list. It is not presently able to connect or interface with this proposed system and the design does not include an interface or integration to existing chemical waste system at either campus.

MSDS Linkage

Federal regulators require a MSDS (Material Safety Data Sheet) on most of the chemical products that will be processed by the system. Since the system in the broadest sense is more than just an inventory, but also a chemical data warehouse, it is desirable to have some linkage or connection to a product's MSDS. However, a manufacturer product's MSDS is private property and proprietary. EH&S at neither campus has computer digital data on any MSDS sheets. Most manufacturer's provide MSDS at Internet sites or on CDROM's, but these are in unformatted text files and are under copyright.

The system can provide a field at the layer two product level with the location of the MSDS, which can then be accessed through the appropriate media. There is no direct on line access to an electronic MSDS available at this time.

Local Client

Layer 2, *Chemical Product* tables set, and layer ¹~~3~~, *Chemical Material* tables set, will be maintained exclusively by EH&S personnel and thus belong to the local client functionality exclusively. The local client has three general screen forms, matching the database layer structure:

- Interface form(s) to maintain the Chemical Material tables set
- Interface form(s) to maintain the Chemical Product tables set (synonyms)
- Interface forms(s) to maintain the Chemical Inventory tables set

File Structure: There are differing requirements and needs on how long records should be maintained. And it can be expected that in the future, reporting requirements may change as different agencies come into play. According, the most favorable and flexible design is to allow the system users to create, use and report on separate inventory

files, which can be selected by the standard Window's type file open, save dialogs. One large file only could be used or one could create four separate files, one for each 'group' at UCSF, named perhaps like "grp1_97.dbf" or "SMC_97.dbf"

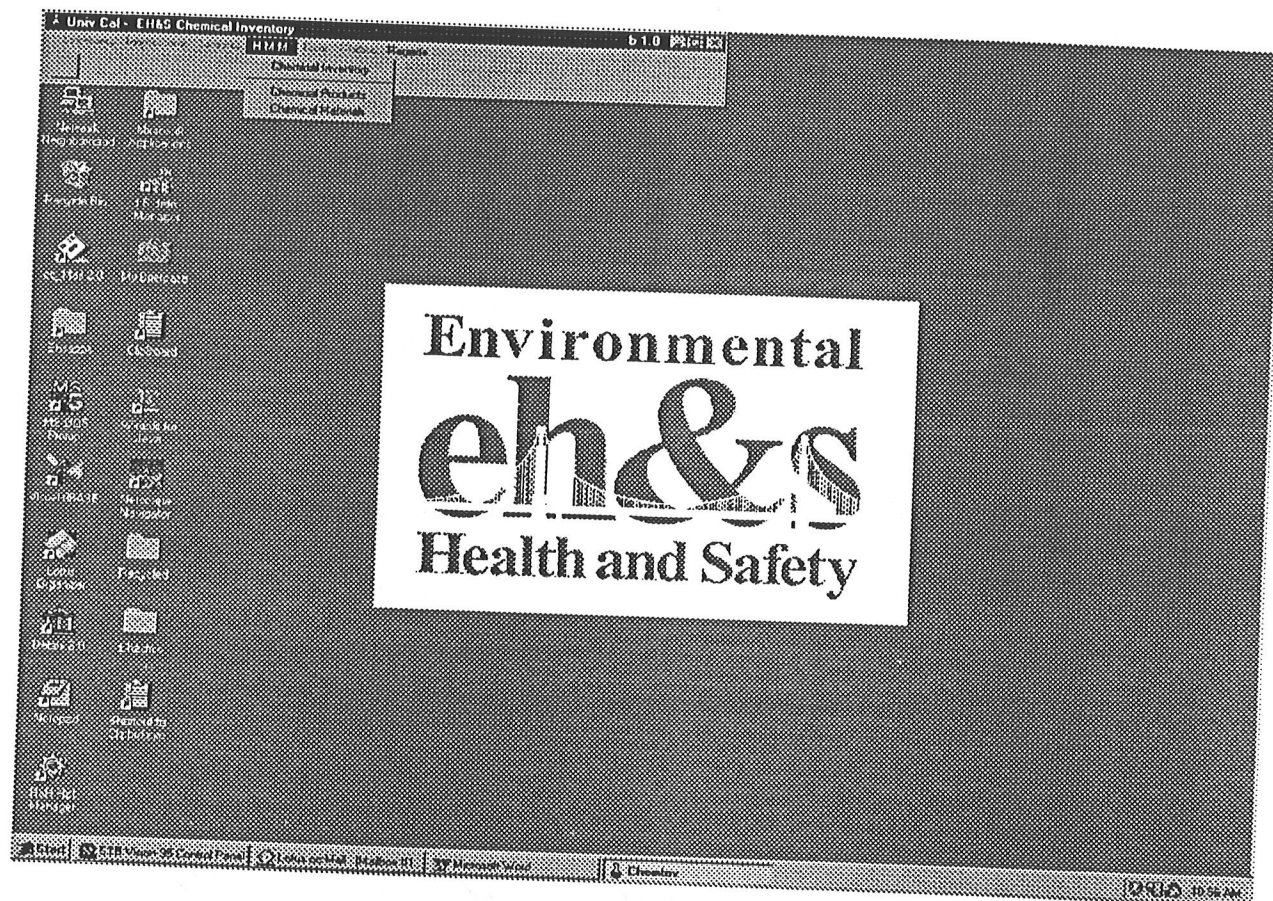
Bulk Inventory Moves The system should allow the user to select ranges of inventory items to be moved in batch into another file, or to delete large selected groups/ranges of inventory item records.

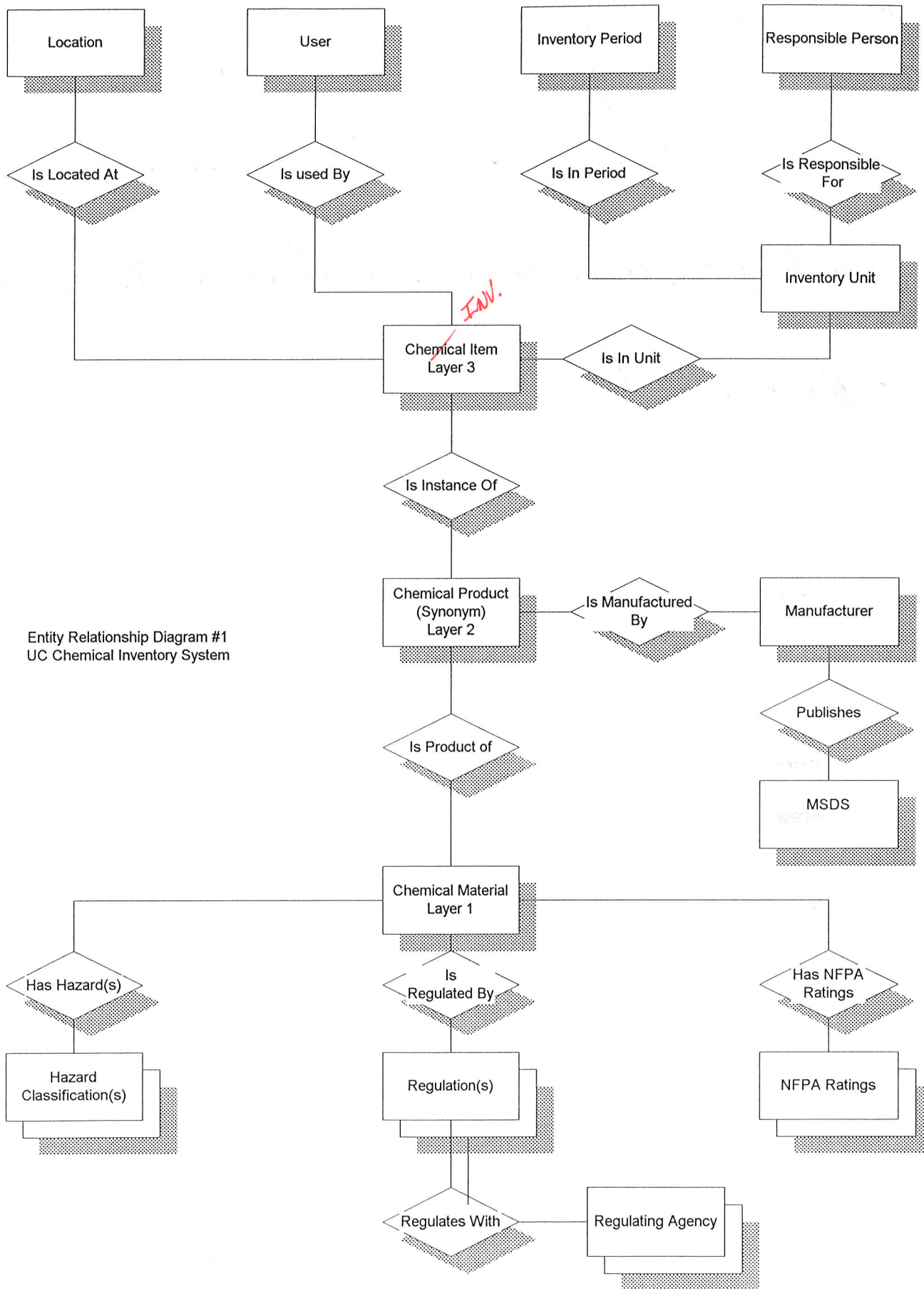
Lab Level Web Client

The World Wide Web client is designed for use by a Web Browser such as Microsoft Internet Explorer or Netscape Navigator. Since this would be used by PIs or other inventory managers, it is at the 3rd level, inventory items only. Products and chemical materials are managed by EH&S at levels 1 and 2. Since there can be no guarantee that every lab or chemical inventory location unit will initially have a WEB client or will use it, the local client remains for now the fail safe method to enter and maintain data. The WEB client must have features to;

- Provide authentication of user being actual correct lab and authorized user
- Display only records for that lab and user
- Possible for either change review by EH&S before posting
- Some administrative method or policy to maintain reliability in turning over inventory maintenance functions to lab level.

7-29-97 Debate Jerry W. and T.
whether focus in comply with Bureau Plan or
give campus users method to keep their inventory



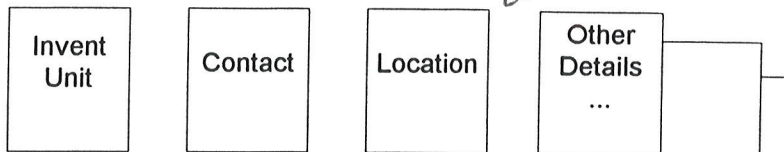


- (1) Business plan only requires aggregate totals
option to aggregate or enter 50 entries

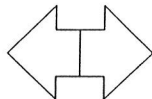
Jerry W. object is to provide PI (Users) way to
do their ~~test~~ inventories

Qua T. object is to fulfil Business Plan needs
operator call

Inventory Items Level



Data Entry
Local/Remote
Client



Inventory Items

Reports

*- not on hand
- annual usage*

expiration date

(1) 50 units of small vials optional not classified yet

Picks From

of containers fields

One

Products Level

One

WD-40 Grand Auto Gre

MSDS

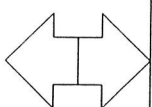
Chemical Products

(=Synonyms)

Reports



Data Entry
Local Client Only



MSDS Source

CAS #

Many

1 ?

WAX mat

Core-Material Level

M One

~~*MSDS*~~

CAS #

(Hazardous) Chemical Materials

Hazardous Classifications

Other Related Info

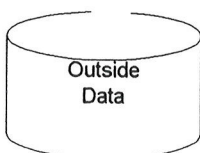
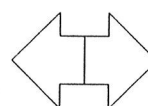
Reporting Requirements Regulators

Related Info

Reports



Data Entry
Local Client Only



Outside Data

UCSF - UC Davis
Database Design 3 Layer Model

EHASMIS Global Tables

Inventory Unit
<u>InvPerID</u>
Name
Contact_id
RespPer_id

Inventory Period
<u>InvPer_ID</u>
InvPerName
StartDate
SubDate
ApprvDate

InventoryItem
<u>ehs_idnumb</u>
Size
Container...
Mfg_id
room_id

Synonyms Products
<u>Matrl_id</u>
Product_id

Manufacturer
<u>Product_id</u>
Mfg_id
Name
Address
...
cross index for alias mfg name

HazMaterial
<u>Matrl_id</u>
Name
characteristics

Haz_Class
<u>Matrl_id</u>
Haz_Class
NFPA_Rate
NFPA_Rpt

IsRegBy
<u>Linking table</u>

Other Detail
<u>Regulate</u>
Reg Agencies & Codes

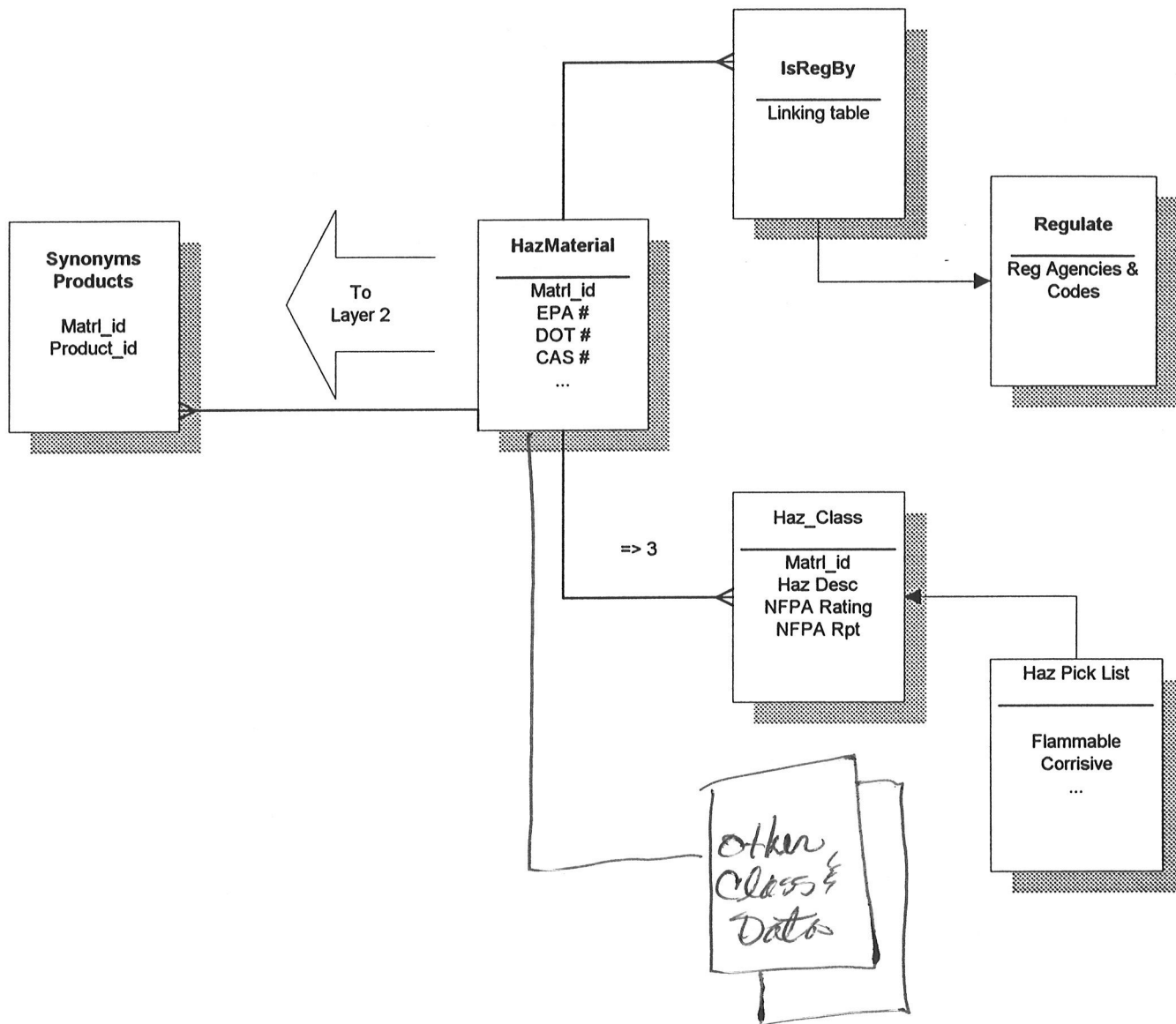
Contacts

Contacts

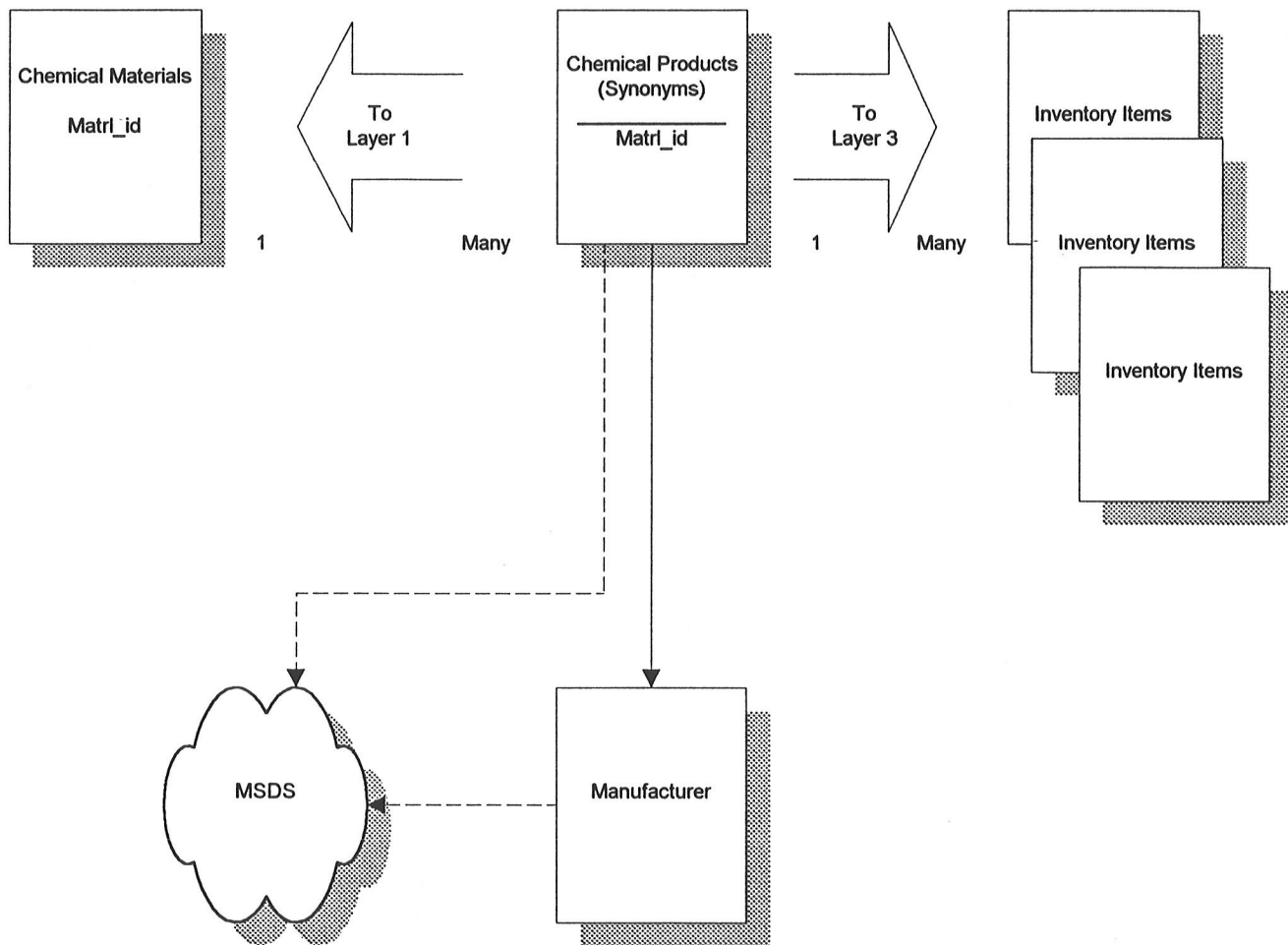
Buildings

Rooms

UCSF - UC Davis
Chemical Inventory System
Database Tables
Overall View

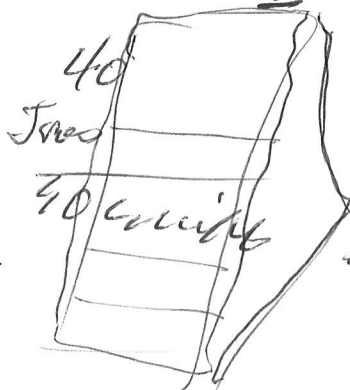
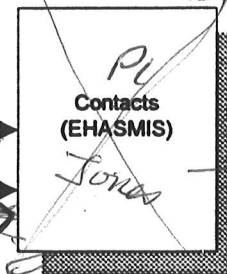
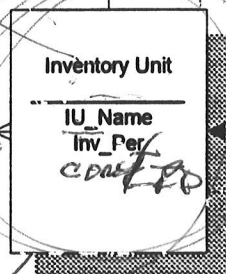
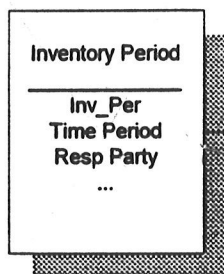
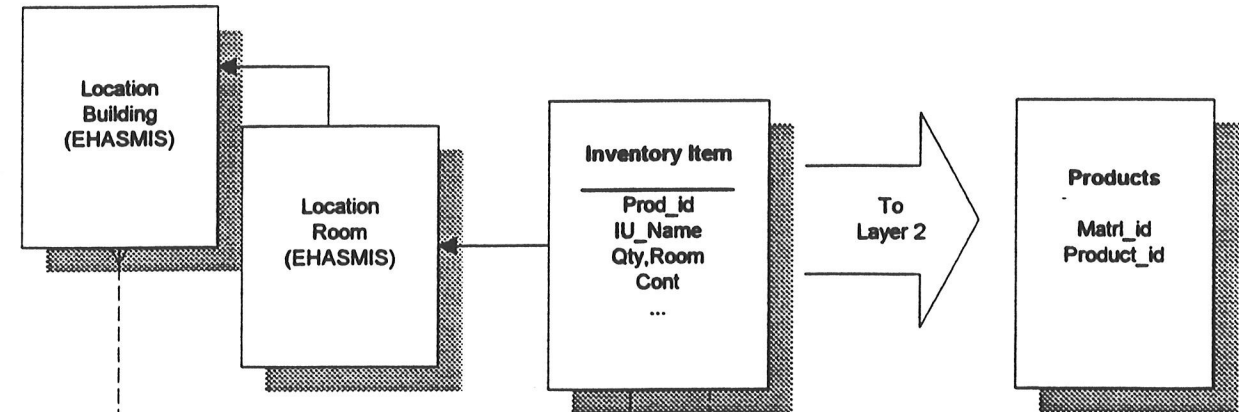


UCSF - UC Davis
Chemical Inventory System
Database Tables
Layer 1 View
Chemical Materials



UCSF - UC Davis
Chemical Inventory System
Database Tables
Layer 2 View
Chemical Products

coord ≠ resp.



UCSF - UC Davis
Chemical Inventory System
Database Tables
Layer 3 View
Inventory Items

Handwritten: 501, 502, 503

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Environmental Health & Safety

5/16/97

Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\hazclass.dbf

Hazard classifications for given chemical - linked back to hazmatrl via matl_id foreign key

Field Name	Length	Type	Dec	Index	Description
HAZ_CLASS	30	C	0	N	Hazard Classification Type
MATL_ID	9	N	0	y	Matl_id, foreign key to hazmatrl
NFPA_RATNG	1	N	0	N	NFPA Rating for this hazard class
NFPA_RPT	1	L	0	N	Reportable to NFPA ?

73 records

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5/15/97

Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\hazclass.dbf

Hazard classifications for given chemical - linked back to hazmatrl via matl_id foreign key

Field Name	Length	Type	Dec	Index	Description
HAZ_CLASS	30	C	0	N	Hazard Classification Type
MATL_ID	9	N	0	y	Matl_id, foreign key to hazmatrl
NFPA_RATNG	1	N	0	N	NFPA Rating for this hazard class
NFPA_RPT	1	L	0	N	Reportable to NFPA ?

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Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\hazslist.dbf

Pick List table of hazard classifications

Field Name	Length	Type	Dec	Index	Description
HAZ_CLASS	30	C	0	Y	Pick List Hazard Class

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Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\hazmatrl.dbf

Table of layer 1, core chemical materials

Field Name	Length	Type	Dec	Index	Description
CAS_NUMB	25	C	0	N	CAS Number
DOT_NUMB	10	C	0	N	Dept of Transportation #
EPA_NUMB	10	C	0	N	Enivironmental Protection Agency #
HZC_FLAMM	1	L			Hazard Class of Flammable
HZC_HGLVOL	1	L			Start Date of this ivnentory period
MATL_ID	9	N	0	N	Unique system id no, primary key: UC #
MATLNAME	80	C	0	Y	Full chemical name
RPER_ID	9	N		N	NFPA Reactivity Rating: 0-4
SOURCE	10	C	0	N	Souce of obtaining this record: data entry, Fisher, etc.

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Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\idnumlist.dbf

Table with list of system id # to be assigned

Field Name	Length	Type	Dec	Index	Description
CURR_IDNO	9	N	0	N	Last Current ID # Used
ID_NO_TYPE	10	C	0	N	ID Number Type, table for which id is used

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Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\invperd.dbf

Inventory periods table

Field Name	Length	Type	Dec	Index	Description
APPRV_DATE	8	D	0	N	Approval date for this inventory period
INV_PER	25	C	0	Y	Name of this inventory period, key
STRT_DATE	8	D	0	N	Inventory period's starting date
SUBMT_DATE	8	D	0	N	Submission date for this inventory period

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Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\invtitem.dbf

Table of actual inventory line items

*may-amt
est annual*

Field Name	Length	Type	Dec	Index	Description
CABINET	10	C	0	N	Cabinet/Location in room
CONT_SIZE	10	N	0	N	Container size
CONT_TYPE	10	C	0	N	Container type
CONTACT_ID	9	N	0	N	Contact/PI ID# (this is optional/redundant as Inventory unit links to responsible party)
CURR_AMT	10	N	2	N	Current Amount
DEPT_ID	8	N	0	N	Department ID # (Optional as inventory unit may have dept id info already)
INVUNIT_ID	3	N	0	N	ID # of Inventory Unit to which this item belongs, foreign key to invunit
LSTCNG_DTE	8	D	0	N	Date of last editing of this record
LSTCNG_TIM	10	C	0	N	Last time of change to this record
LSTCNG_USR	10	c	0	N	Last user to change this record
MXANUL_AMT	10	N	2	n	Maxiumum annual amount retained
PROD_ID	9	N	0	Y	Product ID #, key
ROOM_ID	9	N	0	N	Room ID#, foreign key to rooms
STATE	10	C	0	N	State: Solid, Liquid or Gas
UNIT_MEASU	10	C	0	N	Unit(s) of Measure

second

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5/16/97

Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\invunit.dbf

An Inventory Unit, abstract organizing and reportinting entity for aggregate of inventory items

Field Name	Length	Type	Dec	Index	Description
INV_PER	25	C			Description of inventory unit
IU_NAME	25	C	0	N	Inventory Unit to which this inventory item belongs
PI_ID	9	N			Hazard Class of Water Reactive
RPER_ID	9	N	0	N	Responsible person for this inventory unit

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5/13/97

Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\isregby.dbf

Linking table between hazmatrl table and regulate.dbf, the regulations for a given chemical

Field Name	Length	Type	Dec	Index	Description
MATL_ID	9	N	0	Y	Material ID #, foreign key
REG_ID	8	N	0	N	Regulation ID #, foreign key

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Environmental Health & Safety

5/13/97

Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\manflist.dbf

Manufacturer table, links to products table

Field Name	Length	Type	Dec	Index	Description
ADDRESS1	35	C	0	N	Manufacturer address 1
ADDRESS2	35	C	0	N	Manufacturer address 2
CITY	25	C	0	N	Manufacturer City
CRSREF_ID	9	N	0	N	Cross Reference to another Manf_id if using an alias manufacturer name
MANF_ID	9	N	0	Y	Manufacturer ID #, key
MANUFACT	40	C	0	Y	Manufacturer Name
PHONE	15	C	0	N	Manufacturer Phone
STATE	2	C	0	N	Manufdacturer State
ZIP	10	C	0	N	Manufacturer Zip Code

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Environmental Health & Safety**

5/16/97

Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\products.dbf

Table of chemical products, actual items linked to an inventory item, also like synonym list

Field Name	Length	Type	Dec	Index	Description
CATEGORY	10	C	0	N	Category of Product, Orig, Chem Waste, etc.
LSTCNG_DTE	8	D	0	N	Last date of change/edit of this record
LSTCNG_TIM	10	C	0	N	Last time of change to this record
LSTCNG_USR	10	C	0	N	Last user to change this record
MANF_ID	9	N	0	Y	Manufacturer ID #, foreign key
MATL_ID	9	N	0	Y	Material ID #, key
PRDCTNAME	125	C	0	N	Product Name
PROD_ID	9	N	0	Y	Product ID #, key
SOURCE	10	C	0	N	Source of this record, EHASMIS or some other source
TYPE	10	C	0	N	Type of Product, Agriculture, Research, Animal ?

University of California
Environmental Health & Safety

5/13/97

Chemical Data Dictionary

h:\ehasmis\cheminv\datafiles\regulate.dbf

List of regulations, links to hazmartl by isregby linking table

Field Name	Length	Type	Dec	Index	Description
AGENCY_PHON	12	C	0	N	Regulating Agency Phone #
LTR_CODE	1	C	0	N	Code abbreviation for this regulation/agency
NAME	100	C	0	Y	Name of Regulation
REG_AGENCY	65	C	0	N	Name of regulating agency
REG_ID	8	N	0	Y	Regulation ID#

6. Recommendation

Alternatives Considered

1) Complete the modifications to and Implement the Chemtrack system from UC Davis.

Some pros for this choice are:

- Davis has already invested some time in modifying the program to the PC platform
- It uses an Oracle back end, already used by the Davis campus in general and at EH&S
- It has remote connectivity via modem to local lab sites for lab level inventory maintenance in beta testing.

Some cons for this choice

- There are no current 4th Dimension programming expertise or Oracle database administration personnel at either campus, although Davis does have Oracle installed. 4th Dimension is a proprietary non main stream language.
- There is no estimate or feasibility study to determine the possibility of completing this project
- The remote modem connectivity doesn't use current and future technology such as a internet WEB enabled client running on any client machine, and requires a specific host machine (486 PC) at the lab site.
- The ORACLE tables are not used by UCSF and if used, would mean replication of location and PI data currently in local DBase tables at both sites.

2) Evaluate, purchase and customize (if needed) a commercial application that will fit Davis and UCSF specifications and needs.

Pros for this choice:

- No need to reinvent the wheel if a system already exists.

- Possible quicker installation and implementation
- Out source maintenance and upgrade to vendor

Cons for this choice:

- Commercial system may not be right fit and none have been found so far. Loss of control of details and nuances of functionality.
- Modifications would be expensive and dependent on vendor.
- System might not interface with existing tables, proprietary tables and other systems
- Could be very expensive

3). Design new system using Delphi or C++ front end

Pros for this choice

- Maximum control in design, modification and maintenance of system
- Complete customization to University needs and specifications and interface with existing and planned systems.
- Mainstream standard languages with solid connectivity to various back ends or local tables

Cons for this choice

- Time consuming process to start from scratch, design, code and implement system
- Challenge to engineer commercial level software in departmental setting and available resources
- Risk in ability to complete project on time and meeting specifications

Alternative Implementations

1) Oracle client/server back end.

Pros for this choice

- Oracle is a popular, reliable, high quality state of the art relational database system, which will meet all departmental database needs well into the future
- Full features with business rules, stored procedures, triggers, referential integrity built in.
- Davis uses Oracle at campus level and EH&S has Oracle database on its Sun platform.

Cons for this choice

- Oracle requires trained personnel for database administration when used for departmental wide future database. Introduces complete new element into project scope
- UCSF has no experience or expertise in ORACLE.
- Expensive to install, maintain and operate on department wide basis

2) Sybase client/server back end

Pros for this choice

- Sybase is a popular, reliable, high quality relational database system, which will meet departmental database needs
- Full features with business rules, stored procedures, triggers, referential integrity built in.
- UCSF has site license for reduced purchase price

Cons for this choice

- Also requires trained personnel for database administration when used for departmental wide future database.
- Neither campus has any current expertise or experience in Sybase
- Somewhat expensive to install, maintain and operate on department wide basis

3) Microsoft SQL Server back end

Pros for this choice

- Microsoft SQL Server is becoming a popular, reliable, high quality relational database system, which will meet departmental database needs into the future.
- Full features with business rules, stored procedures, triggers, referential integrity built in.
- UCSF has site license for reduced purchase price and already has it, which comes with Windows NT Server 4.0
- Reportedly somewhat easier to administer than ORACLE and possibly Sybase; inexpensive

Cons for this choice

- Neither campus has any current expertise or experience in Microsoft SQL Server
- Davis does not have an existing NT platform on which to run SQL Server
- Introduces additional element to project, which will require additional training and maintenance efforts.

4) Local dbf tables

Pros for this choice

- Both campuses have existing systems in local dbf tables for easy and full integration with current systems
- Easy to use and implement. UCSF has technical skills in place and support through consultants readily available
- No additional costs or training and relatively easy to support and maintain

Cons for this choice

- Some automated features such as business rules, referential integrity harder to implement or have to be coded in client.
- Small to medium scale desktop which may not scale to very large heavily used systems
- Doesn't position or bring departments into future evolving systems or match University systems which often use Oracle (Davis), Sybase or Microsoft SQL Server.

SQL Database Back End Implementation

There are a few noteworthy issues concerning the use of SQL database back end:

- Coordination of SQL global pick list tables with existing local EHASMIS tables. Since the existing EHASMIS system uses the global pick list tables such as locations and contacts/PI, which are used by this Chemical Inventory system, duplicate and synchronized copies of these tables will have to be maintained at both the local table level and the SQL level. Eventual full departmental migration to SQL in the EHASMIS application UCSF is another long term project.
- Implementation costs of SQL alternatives varies at different local sites. UC Davis already uses Oracle tables; UCSF has MS SQL already available and ready to install. The final recommendation does call for initial local tables with optional back end to be selected site by site.
- Cost estimates were difficult to fix. Consequently, the Weighted List Analysis of Alternative Databases is not yet complete. It is clear that there is an additional overhead in database system administration for the larger SQL back ends and a best estimate has been used.

Recommendation

Of the alternatives considered, a custom development in Delphi 3.0 front end against a flexible optional SQL back end seems the best overall fit. DeVries Consulting concurs with an initial design in local dbf tables, with design provisions that local implementers (users) of the system could configure the database connectivity to a back end SQL server of their choice, i.e. Oracle, Sybase, MS SQL Server, etc, as long as it was compatible with the database engine. It's recommended to use the Borland 3.0 DBE, which is standard ODBC compliant and has advanced technical features to assure easy connectivity to the SQL back end.

DRAFT ESTIMATES
Alternative Weighted List Analysis

Database Alternative Implementations

Item	*	Priority Level	Oracle		Sybase		MS SQL Server		Local Tables	
			Score	Wt Scr	Score	Wt Score	Score	Wt Scr	Score	Wt Scr
Power, scalability	3	3	5	15	4	12	4	12	3	9
Ease of Support, Admin	3	3	1	3	2	6	3	9	4	12
Integration With Existing Tables	3	3	1	3	1	3	1	3	5	15
Est Costs \$										
Software/Installation (1)		3	\$10,000	-30	\$5,000.00	-15	\$500.00	-1.5	0	0
Weekly Admin Hrs (2)		3	10	-3	10	-3	7	-2.1	4	-1.2
Training (3)		1	\$4,800.00	-14.4	\$2,000.00	-6	\$2,000.00	-6	0	0
Total				-26.4		-3		14.4		34.8

(1) (Score/1000 * Priority Level)
(2) (Score/10 * Priority Level) -
(3) (Score/1000 * Priority Level) -

Will vary at different site locations

May vary at different site locations

UCSF - UC Davis

Environmental Health & Safety
Chemical Inventory System

Alternative Weighted List Analysis

General System Alternatives

Requirement	*	Priority Level	UCD Chemtrack		Commercial Appl		Custom Devlpmt		Comment
			Score	Wt Scr	Score	Wt Scr	Score	Wt Scr	
Power, Scability. Flexibility	3	3	3	9	3	9	5	15	
Ease of Support, Admin	3	3	2	6	2	6	5	15	No 4th Dimension Support for Chemtrack
Meets specifications	3	3	3	9	3	9	5	15	
Easily modified	3	3	3	9	2	6	5	15	
Have Source Code	3	3	5	15	2	6	5	15	
Purchase Costs \$ (1)	3	3	0	0	\$10,000	-30	0	0	
Development Costs \$ (2)	3	3	\$25,000	-15	0	0	\$50,000	-30	
Totals				33		6		45	

(1) (Score/1000 * Priority) -

(2) (Score/5000 * Priority) -

7. Implementation

Main Project Elements

The entire project can be roughly viewed as consisting of two broad elements or tracks and several stages, some of which can be concurrent and other consecutive: development of the system software, screens, functions, etc. and population of the chemical database tables.

Because of the very large tasks of populating and associating hazard classifications and regulatory coverage at the layer 1, chemical materials level and linking products (synonyms), layer 2, to the materials table, the recommended implementation strategy is to provide all existing functionality at layer 3, inventory items and reporting first. This way, the new system can be delivered and reproduce the existing systems even while the full layer 3 and 2 database tables are not fully populated.

A. Software System

Begin development of the software application screens, forms, processes and algorithms. The table structures are generally in place and programming can proceed, based on this specification, even if the tables are only populated partially or with test data.

Additionally, the system can be operational even if all the hazard class, regulatory and other ancillary data are not completed at the chemical materials layer 1 level, as long as the connection up through the product to the inventory item is established. Of course, full reporting and analysis on the characteristics would not be available.

Programming should be modular, with a top down prototype incremental approach. For example, the framework, entry, exit, and return calls can all be implemented and tested before all the details are finished. When details of an implementation algorithm are not finalized, an object model, prototype development can be used where the appearance, call, return, all public methods, data members can be stub tested before the final implementation code is implemented.

1. Develop the layer 2 and 3, product and inventory item form(s) and functionality. In this way, the current functionality of existing systems will be matched first, with the corresponding reporting ability.
2. Develop the layer 1 core chemical material form(s) and functionality.
3. Develop the WEB client in coordination with further detail specifications.

B. Database Data Population

This is a large and essential critical aspect of the project and may be completed over stages. At this point, we have been unable to locate a single source of all the needed ancillary chemical data will ever be found. Rather, elements and pieces might be found from different sources and ultimately, a large amount will be have to manually entered into the ancillary tables manually after the interface are completed.

1. Data transfer from existing systems

- Population of layer 3 chemical inventory items with snap shots of last existing inventories as starting point for first inventories in new system
- Population of layers 1 & 2 products pick list and matching layer 1 chemical materials from existing systems.

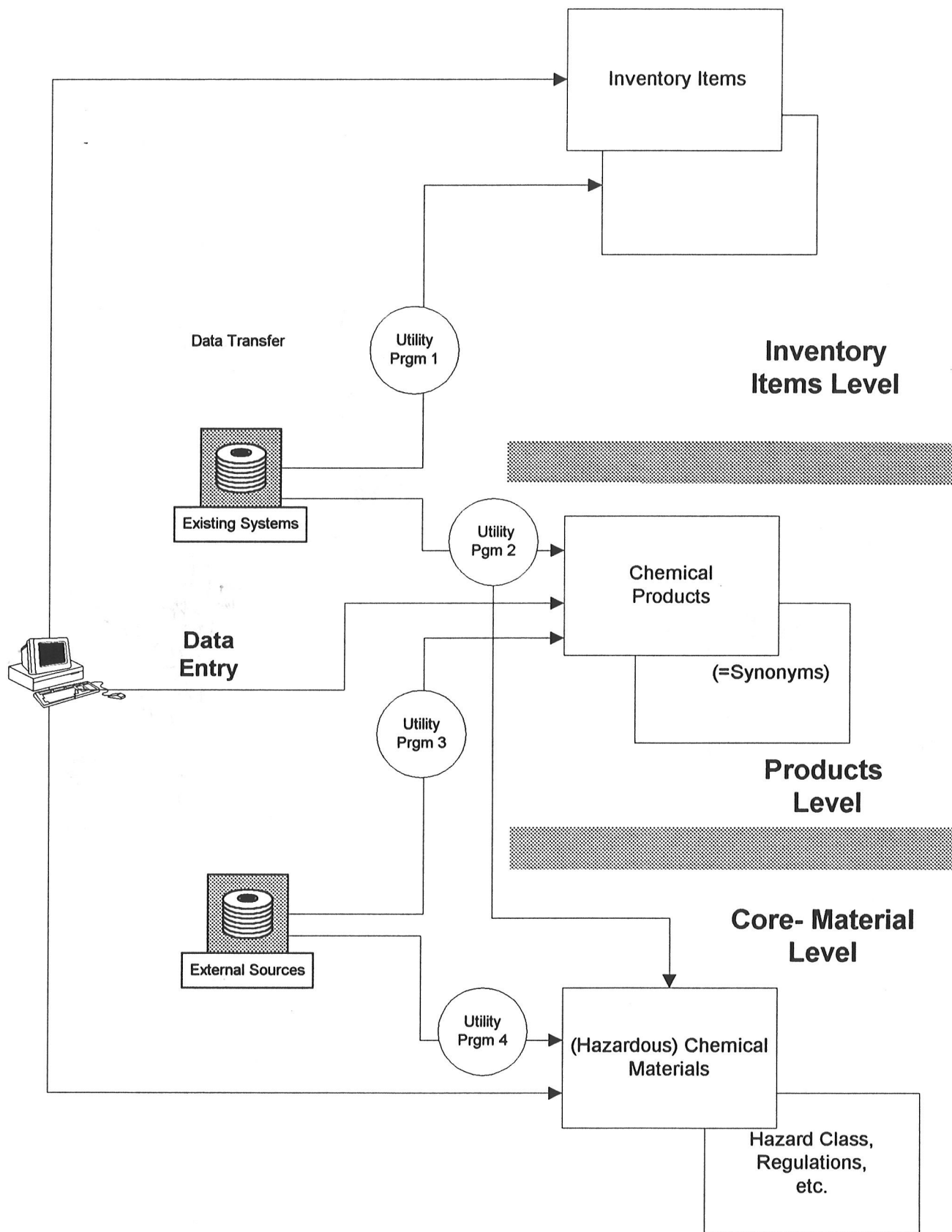
Note that while a data transfer from the existing ICS system at UCSF can capture a representative population of all the current chemical listed, there is no differentiation between a chemical synonym, layer 2, and layer 1 base chemical material. Additionally, there is no info on manufacturers other than a name.

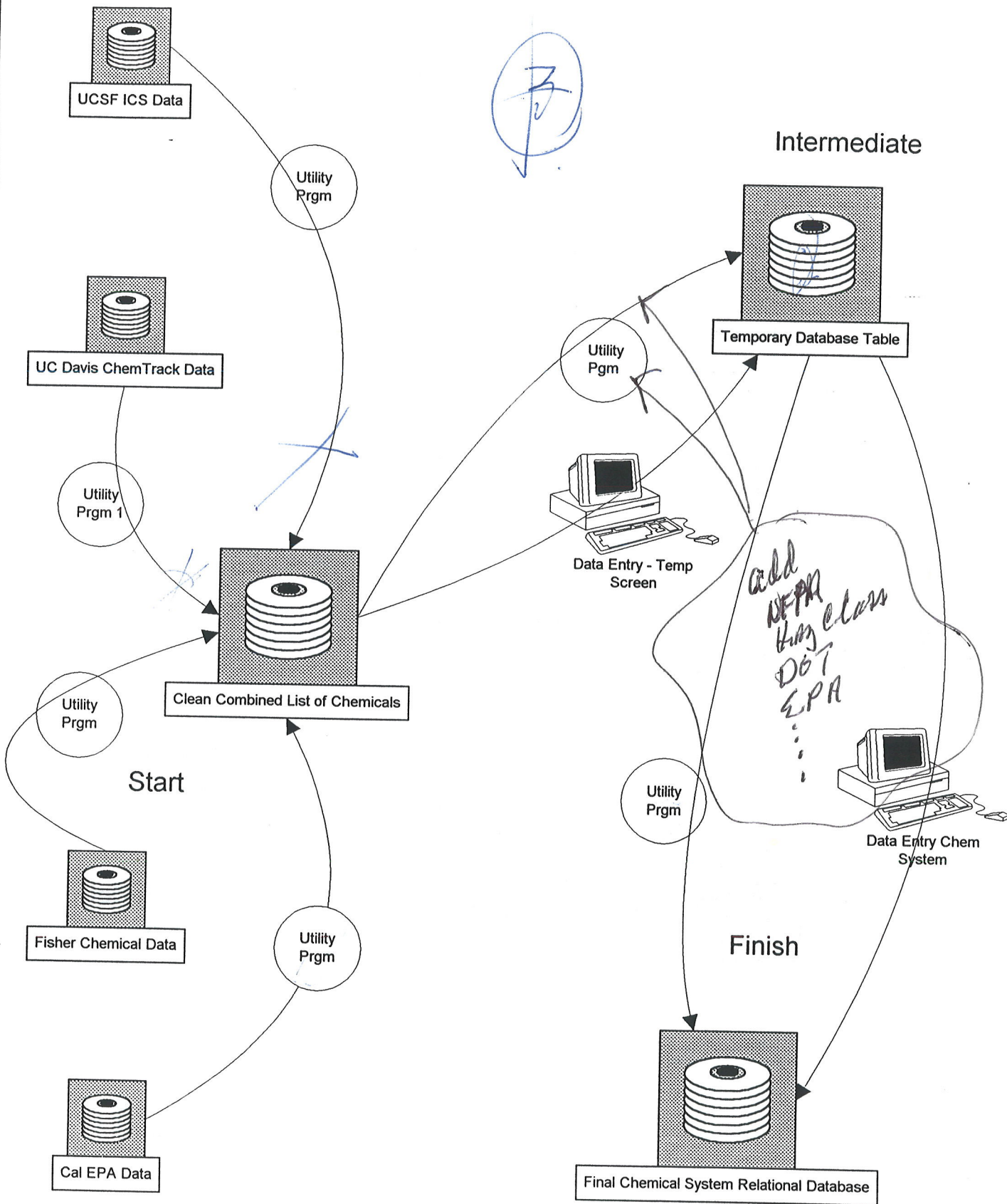
2. Refined and validated population of the chemical products pick list at layer 2 and chemical materials at layer 1 from outside sources or local data entry

3. Completion of layer 1, chemical materials, hazard class and regulation information

See figure 7-1 for a depiction of the this data population process.

In an alternative data population process, all of the source chemical data is loaded into one clean, but incomplete, list as a first step. This table has temporary fields for accumulation and storage of hazard class and regulatory info in single long character fields, which is entered by data entry and or automated. Once this temporary table is completed, another utility program parses this data and builds the end product relational database tables. This process is depicted in figure 7-2.





ID	Task Name	Duration	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
1	Project Design & Specifications	29d												
2	Complete Database Table Design	29d												
3	Complete User Specifications	25d												
4	Final Approval/Agreement on Design/Sp	0d												
5	Populate Chemical Database	106d												
6	Bring forward current inventory	106d												
7	Populate Level 2 Products	106d												
8	Populate Level 3, Base Chem Materials	106d												
9	Population of complete set of some data	0d												
10	Code Software	64d												
11														
12	Inventory Items Form(s)	64d												
13	Chemical Products Form(s)	64d												
14	Chemical Materials Form(s)	64d												
15														
16	Beta Release: Replicate Current Systems	60d												
17	Beta Test Period	60d												
18														
19	In Production Use	20d												

Project: Chemical Inventory Business

Date: Mon 6/2/97

Task

Progress

Milestone

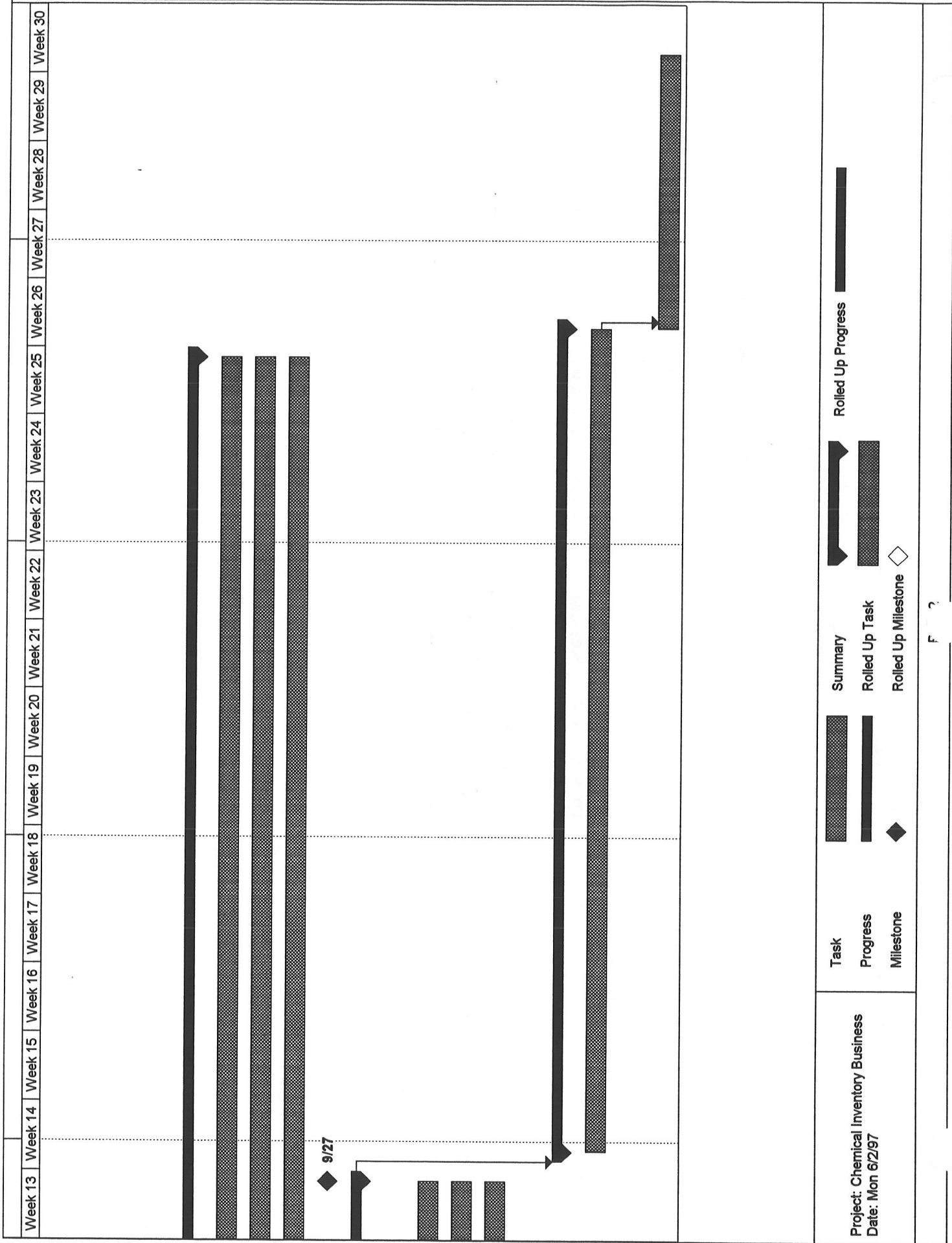
Summary

Rolled Up Task

Rolled Up Milestone

Rolled Up Progress

Page 1



UC - EHS
Chemical Inventory System

Project Manger: Michael Ayres
UCSF Site Manager:
UC Davis Site Manager: Nancy Flagg
UCSD Site Manager:

June 2, 1997
10:41 AM

Item/Task	Resp Party	Hours			Est. Hry Rate	Start Date	Finish Date	Total Amount
		Tot Est	To Date	To Compl				
1 COMPLETE DESIGN & SPECIFICATIONS	MA							
Complete Database Table Design	MA	100	75	25				
Complete User Specifications/Sys Specs	MA							
UCSF	Ara T., MA	40	20	20				
UC Davis	Nancy F.	20	15	5				
1 Subtotal		160	110	50				
2 SOFTWARE DEVELOPMENT	MA, Conslt							
Layer 3 Inventory Item Form(s)		160	8	152				
Layer 2 Chemical Products Forms (Synonyms)		160	8	152				
Layer 1 Chemical Materials Forms		180	8	172				
Integrate Into Overall Design, Misc.		20	1	19				
Standard Reports		40	0	40				
2 Subtotal		560	25	535				
3 POPULATE CHEM DATABASE								
A - Bring Forward Current Inventories								
1 - Layer 3, 1 existing inventory @ 50k								
a. Data Entry via Application	CL, CSS, BPCS	160	0	160				
b. Utility Program partial transfer	P/A, CSS, BPCS	40	6	34				
2 - Layer 2, 1 Inv chemical products @ 50k								
a. Data Entry via Application	CL, CSS, BPCS	160	0	160				
b. Utility Program partial transfer	P/A, CSS, BPCS	40	6	34				

UC - EHS
Chemical Inventory System

Project Manger: Michael Ayres
UCSF Site Manager:
UC Davis Site Manager: Nancy Flagg
UCSD Site Manager:

June 2, 1997
10:41 AM

Item/Task	Resp Party	Hours		Est. Hry Rate	Start Date	Finish Date	Total Amount
		Tot Est	To Date				
A. Subtotal		400	12	388			
B - From External Sources							
1 -Populate layer 2, Products Fisher 20k, Cal EPA ?k							
a. Data Entry via Application	CL	500	0	500			
b. Utility Program partial transfer	P/A, CSS	45	3	42			
2 - Populate layer 1, Materials Fisher 20k, Cal EPA ?k							
a. Data Entry via Application		1000	0	1000			
b. Utility Program partial transfer		60	3	57			
B Subtotal		1605	6	1599			
3 Subtotal		2005	18	1987			

Grand Total 2725 153 2572

CL = Clerical
CSS = Chemical Safety Specialist
BPCS = Business Plan Compliance Specialist
P/A = Programmer Analyst
Conslt = Consulting Partner

Stakeholders Design & Implementation Agreement

The specifications, recommendations and implementation outlined are agreeable, with the attached comments or exceptions:

Ara Tahmassian

Julie McNeal

Nancy Flagg

Greg DeVries, DeVries Systems

8. Appendix A - Interview Notes

Interviews Summary

Joint Department Meeting UC Davis/UCSF 3/11/97

Ara Tahmassian, Director EH&S UCSF

Ara Tahmassian, with Julie McNeal, is the main project sponsor. Execution of the business plan under the current system has become a time consuming process for the department and the demands from other agencies are just increasing. Also, there is the possibility that a successful project software might be useful at other campuses or location. This is a high priority project that has been discussed for some time and attempted before

As the director of EH&S at UCSF, Tahmassian is the final responsible party for the university's compliance with the various regulating and other agencies wanting chemical inventory information. A new system will assure the department's compliance ability and lay the foundation for meeting the increasing demands by requesting agencies. The current data gathering and reporting has proven to be very time consuming for the department. The proposed improved system will reduce the person hours needed to complete the inventories, provide more flexible reporting ability and the ability to report on new and different categories, such as hazard class, or NFPA rating.

Ara is one of the main sponsoring clients of the project and has provided initial detailed documentation for the systems specifications, located in the user requirements section above. In summary his general specifications include;

- What is the chemical (name, etc) ?
- Who owns it?
- Where is it?
- What is its state?
- What is its hazard classification?
- What is its NFPA rating
- What is it stored/shipped in and how much?
- What are the safety procedures?
- What agencies have jurisdiction over it?

Julie McNeal, Director EH&S UC Davis

Yolo and Merced counties impose on the University the obligation to file annual reports listing all hazardous chemicals on the campus, by building and room. Since the University does not have an existing computer system for this, the county has imposed a system, *Hazardous Material Handler*. The business plan reports are provided to OES, Office of Emergency Services.

While this system satisfies the county, it is designed from California State standards and doesn't meet other needs of the University. These include Environmental Impact Reports, tracking of chemical discharge into the sewage system and various other governmental and regulator agency requests for reports and information about chemicals on the campus. The department and University has an interest in being a 'good citizen' by providing timely and up-to-date chemical information to interested parties, besides the functionality for the department.

The fire department does not get chemical info directly from the system, but from the county. Actually, EH&S might bring printed reports of chemical storage to the scene of a fire. It would also be useful to track a chemical to type of research to a particular PI.

The department does now attempt to capture information about the purchase of chemicals by manually checking the bills of purchase in the University accounting department. It would be good to capture the purchase of a chemical by a PI or other user directly at the purchasing department. Also, the system ought to allow a PI to enter the info on their local chemical inventory into the new system remotely from the lab.

Chem Track: EH&S is currently modifying a chemical inventory system *Chem Track* from a McIntosh platform to run on a PC platform. This application is written in 4th Dimesnion and was brought over from the Lawrence Berkeley Lab. This system uses a remote site modem connection for the PI to update their inventory in a batch file method. Four PIs are currently testing this procedure.

Davis reports annually on all buildings on amounts over the threshold reporting amounts

Nancy Flagg, Project Manager at UC Davis

Nancy provided the attached sheet of specification. The present Business Plan requirements are for hazardous chemicals only, but there is a need for record keeping for all chemicals. Also, there is a need for historical retention of chemicals at the University at any given past historical time for inquiries for exposure history during some historical period.

There is a priority for getting the project done quickly. PIs or other chemical users should be able to use the system themselves in their labs, as their lab chemical inventory system, which in turn is used by the overall campus chemical inventory system. It would be good if the system interfaced with the chemical hazardous waste disposal stream too.

Gerry Westcott, Radiation Safety Officer at UC Davis

Although not directly involved in the project, Gerry may act as internal consultant with his database system knowledge and skills. The current Business Plan operation tracks only hazardous chemicals and the new system should allow to only track hazardous chemicals only (or to differentiate the extremely hazardous chemicals to be reported on). He, as other stakeholders at UC Davis, envisions a **Internet WEB client at the laboratory site where the PI or chemical holder can update his or her chemical inventory directly to the EH&S Business Plan database.** The application would not only provide EH&S the reporting features needed for the Business Plan, but would provide a service for the PI for managing their lab chemical inventory.

He wants the system to interface with hazardous materials waste management system. The system could have the ability to download chemical database info from other UC campuses too. Since the Davis campus and EH&S already use an ORACLE back end, the system ought to use ORACLE too.

The chemical database pick list ought to be populated from chemicals from other UC campuses too.

Hazardous Material Management UC Davis

The UC Davis fire department does not have a prepared list of building/rooms and chemicals. The department has reviewed chemical purchase orders at the campus accounting office in order to capture info on chemicals coming onto the campus early.

However, it would be much more efficient to have the end user of chemicals, 1,500 or more, update their chemical inventory directly from the lab (WEB Client) into the EH&S Business Plan database. The hazardous materials disposal process is concerned too with, *Waste Minimization*, that is functions, procedures or policies that would tend to minimize the total amount of any given chemical on the campus. An example of this might be to encourage chemical users to check for the existence of chemical already on the campus in another lab before ordering new amounts. The Department of Toxic Substance Control (DTSC) also has reporting requirements.

A new UC Davis accounting system will show on the Purchase Order if a chemical produces a waste, in which case a surcharge is added to recover the cost of processing the waste stream. It would be good to have the chemical inventory system interface with the hazardous materials waste display stream too.

Dave Ronemus, Business Plan Manager at UCDavis

The universities are obligated to report the Business Plan chemical inventory reports under California State Health & Safety Code, California Code 25,000-25,500 (AB 37-77). Yolo county implements this State legislation. The reporting requirements covers all chemicals with MSDS documentation and puts chemicals into categories and requires reporting of covered chemicals:

=> 55gals

=> 500 lbs

=> 200 cubic feet.

The regulation and software (MSDS Handler) mandated by Yolo country are suited for industrial settings there there are large amounts, but a small variety and limited locations. In the university setting, we have the opposite situation, small amounts and a wide variety in many locations. Yolo county implements the State regulations by requiring reporting above 1 gallon or 1 pound. Remote sites in Solono County also account for about 2% of the University's reporting volume. The output of the MSDS handler software is processed through a FoxPro system that changes the units and generates the final reports,

A new reporting form is being developed by the State and is already in use by Yolo county. Later, the State will be requiring reporting on one sheet(s) per chemical, listing all of its locations, rather than by location by chemical.

Richard McGuire, Technical Development Group, UCSF

The essential functional requirements of the system are to report on chemicals stored on University sites, including where, who, what container size and how much. There are various regulatory agencies requiring different types of reports, with different thresholds and different hazard class of chemicals. In addition, the regulations are constantly changing and will only increase in the years ahead.

Reporting criteria generally revolves around the chemical material type or hazard classification and the amounts, maximum annual and current amount. For example, for amounts => 1 gal or if all container amounts => 50 gal

The two main reporting events are:

- The, soon to be annual, Business Plan report to the City and County of San Francisco of premises classified as a lab with reportable chemicals and amounts
- Reports of Lab Classification for the fire marshal when a lab is remodeled.

Although the University currently has a permit process for use of hazardous radioactive and hazardous biological materials, there is no formal permit for other hazardous or potentially hazardous materials such as chemicals; except that carcinogens are registered and tracked.

James Lee, Administrative Assistant, Business Plan Compliance UCSF

San Mateo County, where UCSF has a few labs to report, will be requiring the new single page state format. The City of San Francisco will require the new single page format for amounts => 55 gallons.

9. Appendix A - Business Plans

Note: Section 2721, Area Plan Maintenance was repealed

Section 2722, Procedures and Protocols for Emergency Rescue Personnel.

Area plans shall include procedures and protocols to ensure the health and safety of emergency response personnel, such as, but not limited to:

- (a) guidelines for approach, recognition, and evaluation of releases and threatened releases of hazardous materials by emergency response personnel: and
- (b) monitoring and decontamination guidelines for emergency response personnel and equipment

Authority cited: Section 25503, Health and Safety Code.
Reference: Section 25503, Health and Safety Code.

Section 2723, Pre-Emergency Planning.

Area plans shall include, but not be limited to:

- (a) provisions for pre incident surveys of business sites by first responders for the purpose of site familiarization, if deemed necessary by the administering agency
- (b) provisions for pre-emergency planning and coordination among emergency responders within the jurisdiction of an administering agency. Pre-emergency planning shall include coordination of emergency response and emergency assistance between contiguous jurisdictions;
- (c) procedures to access local, state and federal funding and emergency response assistance;
- (d) provisions for access to state approved and permitted hazardous waste disposal facilities and emergency response contractors; and
- (e) development of an integrated response management system providing standardized organizational structure, terminology, and procedures for use during any release or threatened release of hazardous materials.

Authority cited: Section 25503, Health and Safety Code.
Reference: Section 25503, Health and Safety Code.

Section 2724, Notification and Coordination

Area plans shall include, but not be limited to:

- (a) provisions for notification of, and coordination with, emergency response personnel, such as, but not limited to: law enforcement, fire service, medical and

- (2) provisions for joint field or table-top exercises, with affected organizations, and the participation of business representatives.

Authority cited: Section 25503, Health and Safety Code.

Reference: Section 25503, Health and Safety Code.

Section 2726. Public Safety and Information.

Area plans shall include, but not be limited to:

- (a) site perimeter security procedures for use during a release or threatened release of hazardous material;
- (b) provisions for informing business personnel and the affected public of safety procedures to follow during a release or threatened release of a hazardous material;
- (c) designation of responsibility for the coordinated release of safety information to the public and to the local Emergency Broadcast System;
- (d) provisions for informing medical and health facilities of the nature of the incident and the substance(s) involved in an incident; and
- (e) provisions for evacuation plans. Evacuation planning shall provide for the following elements:
 - (1) determination of the necessity for evacuation;
 - (2) centralized coordination of information with local law, fire, public health, medical, and other emergency response agencies.
 - (3) timely notification of the affected public, including release of messages prepared pursuant to subsections (c) and (d) of this section;
 - (4) properties of hazardous materials, such as quantity, concentration, vapor pressure, density, and potential health effects;
 - (5) possible release scenarios;
 - (6) facility characteristics, topography, meteorology, and demography of potentially affected areas;
 - (7) ingress and egress routes and alternatives;
 - (8) location of medical resources trained and equipped for hazardous material response;
 - (9) mass-care facilities, reception areas, and sheltering; and
 - (10) procedures for post-emergency period population recovery.

Authorities cited: Section 25503 and 25517.5, Health and Safety Code.

CALIFORNIA CODE OF REGULATIONS
TITLE 19
CHAPTER 2
SUBCHAPTER 3

- (2) The two types of information collected on the form are: information required by state and federal laws including information required in 1991 Uniform Fire Code, Section 80.103, subdivision(c), and locally collected information defined by the administering agency.
 - (3) The inventory shall include, at a minimum, the completed Business Owner/Operator Identification Page and the Chemical Description Page(s) of the inventory form. The Business Owner/Operator Identification Page is provided only once in the inventory and includes all the business identification information. The Chemical Description Page allows one hazardous material per page side and should be repeated as often as necessary to report each hazardous material handled at quantities equal to or greater than those specified in subsection (a), in each building or outside/adjacent area.
 - (4) An Annotated Site Map shall be included with the inventory if required by the administering agency. An optional Annotated Site Map (OES Form 2732 (map)(04/96)) is provided as Appendix E of this article. Administering agencies may modify the optional Annotated Site Map as they see necessary.
 - (5) The Fire Code hazard classes shall only be identified on the Chemical Description Page of the California Hazardous Materials Inventory Reporting Form if the local fire chief deems it necessary to comply with the requirements of a Hazardous Materials Inventory Statement as stated in the 1991 Uniform Fire Code, Section 80.103, subdivision(c).
- (b) Hazardous materials considered to be trade secrets shall be clearly marked as such on the Chemical Description Page.
- (c) Businesses shall report mixtures that are hazardous materials by their common name (the common name or trade name of the mixture as a whole). Hazardous components in the mixture shall be identified by chemical name, percent weight, and CAS numbers (refer to MSDS or, in case of trade secrets, refer to manufacturer).
- (d) Prior to March 1, 1997, each business shall submit an inventory of hazardous materials to an administering agency, utilizing the forms required in subsection (a) of this section. After the first submittal, each updated inventory shall be submitted on or before March 1, and annually thereafter. It shall include the following elements regardless of any changes that have or have not occurred since the previous year's submission:
- (1) Business Owner/Operator Identification Page for specified reporting year.
 - (2) Chemical Description Page for federally listed Extremely Hazardous Substances (EHS) handled at quantities equal to or greater than applicable federal threshold planning quantities or 500 pounds, whichever is less.
 - (3) Chemical Description Page for materials handled in quantities equal to or greater than 10,000 pounds.

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- (1) local emergency response personnel;
- (2) the administering agency and the State Office of Emergency Services pursuant to Article 2 of this subchapter
- (3) persons within the facility who are necessary to respond to an incident;
- (b) identification of local emergency medical assistance appropriate for potential accident scenarios;
- (c) mitigation, prevention, or abatement of hazards to persons property, or the environment;
- (d) immediate notification and evacuation of the facility; and
- (e) Identification of areas of the facility and mechanical or other systems that require immediate inspection or isolation because of their vulnerability to earthquake related ground motion

Authority: Sections 25503 and 25517.5, Health and Safety Code.
Reference: Sections 25503 (b) (2), 25504 (b), and 25507; Health and Safety Code

Section 2732. Training.

- (a) The business plan shall include a training program which is reasonable and appropriate for the size of the business and the nature of the hazardous materials handled. The training program shall take into consideration the responsibilities of the employees to be trained. The training program shall, at a minimum, include:
 - (1) methods for safe handling of hazardous materials
 - (2) procedures for coordination with local emergency response organizations
 - (3) use of emergency response equipment and supplies under the control of the handler; and
 - (4) all procedures required by Section 2731 of this Article
- (b) The business plan shall include provisions for ensuring that appropriate personnel receive initial and refresher training.

Authority: Section 25503, Health and Safety Code.
Reference: Section 25504 (c), Health and Safety Code

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APPENDIX A

California Hazardous Materials Inventory Reporting Form - Business Owner/Operator Identification Page

CALENDAR YEAR BEGINNING (1)		ENDING (2)		(3) PAGE 1 OF	
BUSINESS NAME (4)				BUSINESS PHONE: (5)	
SITE ADDRESS (6)					
CITY (7)		STATE (8)	CA	ZIP (9)	
DUN & BRADSTREET (10)		SIC CODE (4 DIGIT#) (11)			
OPERATOR NAME (12)		OPERATOR PHONE (13)			

OWNER INFORMATION

OWNER NAME (14)		OWNER PHONE (15)	
OWNER MAILING ADDRESS (16)			
CITY (17)		STATE (18)	
		ZIP (19)	

ENVIRONMENTAL CONTACT

CONTACT NAME (20)		CONTACT PHONE (21)	
MAILING ADDRESS (22)			
CITY (23)		STATE (24)	
		ZIP (25)	

Primary

EMERGENCY CONTACTS

Secondary

NAME: (26)		NAME: (31)	
TITLE: (27)		TITLE: (32)	
BUSINESS PHONE: (28)		BUSINESS PHONE: (33)	
24-HOUR PHONE: (29)		24-HOUR PHONE: (34)	
PAGER #: (30)		PAGER #: (35)	

ACUTELY HAZARDOUS MATERIALS (AHM)

ON SITE AHM (36) ☐ Yes ☐ No If yes, and above Threshold Planning Quantities, attach a sheet of paper with a general description of the process and principal equipment.

ADDITIONAL LOCALLY COLLECTED INFORMATION

(37)	

Certification: I certify under penalty of law that I have personally examined and am familiar with the information submitted in this inventory and believe the information is true, accurate, and complete.

Print Name of Document Preparer (38) _____

Signature of Owner/Operator (39) _____

Date (40) _____

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DATA ELEMENT BOXES

INFORMATION REQUIRED

- | | |
|--------------------------------|---|
| 9. Zip | Enter the zip code for the facility. The extra 4 digit zip may also be added. |
| 10. Dun & Bradstreet | Enter the Dun & Bradstreet number for the facility. The Dun & Bradstreet number may be obtained by calling (610) 882-7748 |
| 11. SIC Code | Enter the primary Standard Industrial Classification 4 Digit Code for the facility. NOTE: If code is more than 4 digits, report only the first four. |
| 12. Operator Name | Enter the name of the business operator. |
| 13. Operator Phone Number | Enter business operator phone number if different from business phone, area code first, and any extension. |
| 14. Owner Name | Enter name of business owner if different from business operator name. |
| 15. Owner Phone | Enter the owner's phone number if different from business phone, area code first, and any extension. |
| 16. Owner Mailing Address | Enter the owner's mailing address if different from business site address. |
| 17. City | Enter the name of the city for the owner's mailing address. |
| 18. State | Enter the 2 character state abbreviation for the owner's mailing address. |
| 19. Zip | Enter the zip code for the above address. The extra 4 digit zip may also be added. |
| 20. Environmental Contact Name | Enter the name of the person, if different from the Business Owner or Operator, who receives all environmental correspondence and will respond to enforcement activity. |

DATA ELEMENT BOXES

INFORMATION DESCRIPTION

Chemistry (IUPAC) name found on the Material Safety Data Sheet (MSDS).

NOTE: If the chemical is a mixture, do not complete this field; complete the "common name" field instead.

9. Common Name

Enter the common name or trade name of the hazardous material or mixture containing a hazardous material.

10. CAS #

Enter the Chemical Abstract Service (CAS) number for the hazardous material. For mixtures, enter the CAS number of the mixture if it has been assigned a number distinct from its components. If the mixture has no CAS number, leave this column blank and report the CAS numbers of the individual hazardous components in the appropriate section below.

11. Trade Secrets

Check "Y" for yes if the information in this section is declared a trade secret, as defined in Chapter 6.95, Section 25511, Health and Safety Code, and "N" for no if it is not. **NOTE:** If yes, disclosure of the designated Trade Secret information is bound by Health & Safety Code Section 25511.

12. EHS

Check "Y" for yes, if the hazardous material is an Extremely Hazardous Substance (EHS), as defined in 40 CFR (Code of Federal Regulations), Part 355, or "N" for no if it is not. If the material is a mixture containing an EHS, leave this section blank.

13. Fire Code Hazard Class

Fire Code Hazard Classes describe to first responders the type and level of hazardous materials which a business handles. This information shall only be provided if the local fire chief deems it necessary to comply with the 1991 Uniform Fire Code, Section 80.103, subdivision(c). A list of the various hazard classes and instructions on how to determine which class a material falls under are included in Appendix I. If a material has more than one applicable hazard class, include all. Contact administering agency to determine if you need to complete.

14. Type of Material

Check the one box that best describes the type of hazardous material: pure, mixture or waste. If waste material, check only that box. **NOTE:** If mixture or waste, complete boxes 29 - 32.

15. Radioactive

Check "Y" for yes, if the hazardous material is radioactive, or "N" for no if it is not.

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INFORMATION DESCRIPTION

24. Avg. Daily Amount
- For each building, calculate the average daily amount of the hazardous material or mixture containing a hazardous material that you project to be on hand during the course of the year. Calculations may be based on previous year's inventory by totaling all daily amounts and dividing by the number of days the chemical is projected to be present on the site. This amount should be consistent with the units reported in box 22. NOTE: This amount should not exceed that of maximum daily amount.
25. Annual Waste Amount
- If the hazardous material being inventoried is a waste, provide an estimate of the annual amount handled.
26. Storage Container
- Check all boxes that describe the type of storage containers in which the hazardous material is stored. NOTE: If appropriate, you may choose more than one.
27. Storage Pressure
- Check the one box that best describes the pressure at which the hazardous material is stored.
28. Storage Temperature
- Check the one box that best describes the temperature at which the hazardous material is stored
29. % Weight
- Enter the percentage weight of the hazardous components in a mixture. If a range of percentages is available, report the highest percentage in that range.
30. Component
- When reporting a hazardous material that is a mixture, list up to five chemical names of hazardous components in that mixture by percent weight (refer to MSDS or, in the case of trade secrets, refer to manufacturer). When reporting waste mixtures, mineral and chemical composition should be listed.
31. EHS
- Check "Y" for yes if the component of the mixture is considered an Extremely Hazardous Substance as defined in 40 CFR, Part 355, or "N" for no if it is not.
32. CAS #
- List all Chemical Abstract Numbers (CAS) as they relate to the hazardous components in the mixture.
33. Additional Locally Collected Information
- This space and only this space is to be used for the administering agencies to collect any additional information they feel necessary to meet the requirements of their individual programs. Contact administering agencies for guidance on information to be included in this section.

DATA ELEMENT BOXES

- 31. Secondary Contact Name
- 32. Secondary Contact Title
- 33. Secondary Business Phone
- 34. Secondary 24-hour Phone
- 35. Secondary Pager Number
- 36. Acutely Hazardous Materials
- 37. Locally Collected Information

INFORMATION REQUIRED

Enter the name of facility official that can be contacted in the event that the primary contact is not available. The contact shall have **FULL** facility access, site familiarity, and authority to make decisions for the business regarding incident mitigation.

Enter the title of the secondary contact.

Enter the business number for the secondary contact, area code first, and any extension.

Enter a 24-hour phone number for the secondary contact. The 24 hour phone number must be one which is answered 24 hours a day and if not the contact's home phone number, then the service answering the phone must be able to immediately contact the above stated individual.

Enter the pager number for the secondary contact, if available.

Indicate whether Acutely Hazardous Materials (AHM), as defined in Section 25532 of the Health and Safety Code, are handled in quantities equal to or greater than Threshold Planning Quantities (TPQ) listed in 40 CFR Section 355, Appendix A. Doing this will meet the requirements of Section 25533 (a) of the Health and Safety Code to register as a handler of AHM. On another sheet of paper, enter information on process and equipment such as operating temperature and pressure ranges, capacities, product characteristics, and critical process points for which AHM's are involve

This space and only this space is to be used for administering agencies to collect any additional information necessary to meet the requirements of their individual programs. Contact administering agency for guidance on

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APPENDIX C

California Hazardous Materials Inventory Reporting Form - Chemical Description Page

(1) ☐ ADD ☐ DELETE ☐ REVISE

PAGE (2) OF (3)

BUSINESS NAME (4)
CHEMICAL LOCATION (5)
MAP# (6) GRID # (7)

CHEMICAL NAME (8) TRADE SECRET (11) ☐ Y ☐ N
COMMON NAME (9) *EHS (12) ☐ Y ☐ N
CAS # (10) *IF EHS BOX IS "Y"
FIRE CODE (13) ALL AMOUNTS MUST BE IN LBS
HAZARD CLASSES*

*COMPLETE BLOCK (13) IF REQUESTED BY THE LOCAL FIRE CHIEF - REFER TO INSTRUCTIONS.

TYPE (14) ☐ PURE ☐ MIXTURE ☐ WASTE RADIOACTIVE (15) ☐ Y ☐ N (16)
PHYSICAL STATE (17) ☐ SOLID ☐ LIQUID ☐ GAS CURIES
FED HAZARD CATEGORIES (18) ☐ FIRE ☐ REACTIVE ☐ PRESSURE RELEASE ☐ ACUTE HEALTH ☐ CHRONIC HEALTH

STATE WASTE CODE (19) UNITS* (22) ☐ GAL ☐ CU FT MAX DAILY AMT (23)
DAYS ON SITE (20) ☐ LBS ☐ TONS *If EHS, amounts must be in lbs. AVG DAILY AMT (24)
LARGEST CONTAINER (21) ANNUAL WASTE AMT (25)

STORAGE CONTAINER (26) ☐ ABOVE GROUND TANK ☐ CAN ☐ BOX ☐ TANK WAGON
☐ UNDER GROUND TANK ☐ CARBOY ☐ CYLINDER ☐ RAIL CAR
☐ TANK INSIDE BUILDING ☐ SILO ☐ GLASS BOTTLE ☐ _____
☐ STEEL DRUM ☐ FIBER DRUM ☐ PLASTIC BOTTLE
☐ PLASTIC/NONMETALLIC DRUM ☐ BAG ☐ TOTE BIN

STORAGE PRESSURE (27) ☐ AMBIENT ☐ ABOVE AMBIENT ☐ BELOW AMBIENT

STORAGE TEMPERATURE (28) ☐ AMBIENT ☐ ABOVE AMBIENT ☐ BELOW AMBIENT ☐ CRYOGENIC

(29) %WT	(30) HAZARDOUS COMPONENT	(31) EHS	(32) CAS#
1 <input type="text"/>	<input type="text"/>	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="text"/>
2 <input type="text"/>	<input type="text"/>	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="text"/>
3 <input type="text"/>	<input type="text"/>	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="text"/>
4 <input type="text"/>	<input type="text"/>	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="text"/>
5 <input type="text"/>	<input type="text"/>	<input type="checkbox"/> Y <input type="checkbox"/> N	<input type="text"/>

(33) ADDITIONAL LOCALLY COLLECTED INFORMATION

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APPENDIX H

DATA DICTIONARY CHEMICAL DESCRIPTION PAGE [OES FORM 2731 (04/96)]

FIELD NAMES	FIELD LENGTH	FIELD TYPE	REFERENCE TABLE
1. Not required for electronic data collection			
2. Not required for electronic data collection			
3. Not required for electronic data collection			
4. Business Name	50	Alpha/Numeric	
5. Chemical Locatio	70	Alpha/Numeric	
6. Map#	8	Alpha/Numeric	
7. Grid#	8	Alpha/Numeric	
8. Chemical Name	60	Alpha/Numeric	
9. Common Name	60	Alpha/Numeric	
10. CAS	15	Alpha/Numeri	CAS
11. Trade Secret	1	Alpha	Y/N
12. EHS	1	Alpha	Y/N
13. Fire Code Hazard Class	60	Alpha/Numeric	
14. Type	1	Alpha	P=Pure/M=Mixture/W=Waste
15. Radioactive	1	Alpha	Y/N
16. Curies	7	Numeric	5.2 implied decimal
17 Physical State	1	Alpha	S=Solid/L=Liquid/G=Gas
18. Hazardous Categories	1	Alpha	F=Fire
Hazardous Categories	1	Alpha	R=Reactive
Hazardous Categories	1	Alpha	P=Pressure Release
Hazardous Categories	1	Alpha	A=Acute Health
Hazardous Categories	1	Alpha	C=Chronic Health
19. State Waste Code	3	Alpha/Numeric	
20. Days on Site	3	Numeric	
21. Largest Container	10	Numeric	
22. Units	1	Alpha	G=Gal/P=Lbs/C=Cu Ft/T=Tons
23. Max. Daily Amount	10	Numeric	
24. Avg. Daily Amount	10	Numeric	
25. Annual Waste Amount	10	Numeric	
26. Storage Container	1	Alpha	A=Above Ground Tank
Storage Container	1	Alpha	B=Below Ground Tank
Storage Container	1	Alpha	C=Tank Inside Building
Storage Container	1	Alpha	D=Steel Drum
Storage Container	1	Alpha	E=Plastic/Nonmetallic Drum
Storage Container	1	Alpha	F=Can
Storage Container	1	Alpha	G=Carboy
Storage Container	1	Alpha	H=Silo
Storage Container	1	Alpha	I=Fiber Drum
Storage Container	1	Alpha	J=Bag
Storage Container	1	Alpha	K=Box
Storage Container	1	Alpha	L=Cylinder
Storage Container	1	Alpha	M=Glass Bottle
Storage Container	1	Alpha	N=Plastic Bottle
Storage Container	1	Alpha	O=Tote Bin
Storage Container	1	Alpha	P=Tank Wagon

APPENDIX F
INSTRUCTIONS TO COMPLETE THE CALIFORNIA
ANNOTATED SITE MAP

Attach a map of the facility using the standard grid. As a minimum, the map should show the following:

1. Site Layout

- Scale of map
- Site Orientation (north, south, etc.)
- Loading areas
- Parking lots
- Internal roads
- Storm and sewer drains
- Adjacent property use
- Locations and names of adjacent streets and alleys
- Access and egress points and roads

2. Facility

- Location of each storage area
- Location of each hazardous material handling area
- Location of emergency response equipment. For example, equipment for fire suppression, approach and mitigation, protective clothing, medical response, etc.

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APPENDIX G

DATA DICTIONARY
BUSINESS OWNER/OPERATOR IDENTIFICATION PAGE
[OES FORM 2730 (04/96)]

FIELD NAMES	FIELD LENGTH	FIELD TYPE	REFERENCE TABLE
1. Year Beginning	8	Date	MM/DD/YYYY
2. Year Ending	8	Date	MM/DD/YYYY
3. Page 1 of	5	Number	
4. Business Name	50	Alpha/Numeric	
5. Business Phone	15	Alpha/Numeric	
6. Site Address	35	Alpha/Numeric	
7. Business City	2	Alpha/Numeric	
8. Business State	2	Alpha	CA
9. Business Zip	9	Alpha/Numeric	Zip + 4
10. Dun & Bradstreet	15	Alpha/Numeric	Dun & Brad
11. SIC Code	4	Alpha/Numeric	SIC
12. Operator Name	35	Alpha/Numeric	
13. Operator Phone	15	Alpha/Numeric	
14. Owner Name	35	Alpha/Numeric	
15. Owner Phone	15	Alpha/Numeric	
16. Owner Mailing Address	35	Alpha/Numeric	
17. Owner City	20	Alpha/Numeric	
18. Owner State	2	Alpha	
19. Owner Zip	9	Alpha/Numeric	Zip + 4
20. Environmental Contact Name	35	Alpha/Numeric	
21. Environmental Contact Phone	15	Alpha/Numeric	
22. Environmental Mailing Address	35	Alpha/Numeric	
23. Environmental City	20	Alpha/Numeric	
24. Environmental State	2	Alpha	
25. Environmental Zip	9	Alpha/Numeric	Zip + 4
26. Primary Contact Name	35	Alpha/Numeric	
27. Primary Contact Title	35	Alpha/Numeric	
28. Primary Business Phone	15	Alpha/Numeric	
29. Primary 24-Hour Phone	15	Alpha/Numeric	
30. Primary Pager Number	17	Alpha/Numeric	
31. Secondary Contact Name	35	Alpha/Numeric	
32. Secondary Contact Title	35	Alpha/Numeric	
33. Secondary Business Phone	15	Alpha/Numeric	
34. Secondary 24-Hour Phone	15	Alpha/Numeric	
35. Secondary Pager Number1	7	Alpha/Numeric	
36. AHM On Site	1	Alpha/Numeric	Y/N
37. Locally Collected Info	100	Alpha/Numeric	
38. Name Document Preparer	35	Alpha/Numeric	
39. Date Signed	8	Date	MM/DD/YYYY

3. **Flammable and Combustible Liquids**

A. **Flammable liquids:**

CLASS I-A liquids include those having flash points below 73 degrees F. and having a boiling point below 100 degrees F.

CLASS I-B liquids include those having flash points below 73 degrees F. and having a boiling point at or above 100 degrees F.

CLASS I-C liquids include those having flash points at or above 73 degrees F. and below 100 degrees F.

B. **Combustible liquids:**

CLASS II liquids include those having flash points at or above 100 degrees F. and below 140 degrees F.

CLASS III-A liquids include those having flash points at or above 140 degrees F. and below 200 degrees F.

CLASS III-B liquids include those liquids having flash points at or above 200 degrees F.

4. **Flammable Solids**

A. **Organic solids.** Examples: camphor, cellulose nitrate and naphthalene.

B. **Inorganic solids.** Examples: decaborane, lithium amide, phosphorous heptasulfide, phosphorous sesquisulfide, potassium sulfide, anhydrous sodium sulfide and sulfur.

C. **Combustible metals (except dusts and powders).** Examples: cesium, magnesium and zirconium.

D. **Combustible dusts and powders (including metals).** Finely divided flammable solids which may be dispersed in air as a dust cloud. Examples: wood sawdust, plastics, coal, flour and powdered metals (few exceptions).

5. **Oxidizers**

A. **Gases.** Examples: oxygen, ozone, oxides of nitrogen fluorine and chlorine (reaction with flammables is similar to that of oxygen).

B. **Liquids.** Examples: bromine, hydrogen peroxide, nitric acid, perchloric acid and sulfuric acid.

C. **Solids.** Examples: chlorates, chromates, chromic acid, iodine, nitrates, nitrites, perchlorates and peroxides.

Classification of liquid and solid oxidizers according to hazard:

CLASS 4: An oxidizing material that can undergo an explosive reaction when catalyzed or exposed to heat, shock or friction. Examples: ammonium perchlorate, ammonium permanganate, guanidine nitrate, hydrogen peroxide solutions more than 91 percent by weight, perchloric acid solutions more than 72.5 percent by weight and potassium superoxide.

chlorate, zinc nitrate, zinc peroxide, zinc permanganate and zirconium nitrate.

Note: Examples are based upon NFPA Standard No. 43-A.

6. Organic Peroxides

Organic peroxides are flammable compounds which contain the double oxygen or peroxy (-O-O-) group and are subject to explosive decomposition. They are available as:

- A. Liquids
- B. Pastes
- C. Solids (usually finely divided powders)

Classification of organic peroxides according to hazard:

UNCLASSIFIED: Peroxides which are capable of detonation. These peroxides present an extremely high explosion hazard through rapid explosive decomposition and are regulated in accordance with Article 77 as required for Class A explosives.

CLASS I: Class I peroxides are capable of deflagration, but not detonation. These peroxides present a high explosion hazard through rapid decomposition.

Examples: acetyl cyclohexane sulfonyl 60-65 percent concentration by weight, fulfonyl peroxide, benzoyl peroxide over 98 percent concentration, t-butyl hydroperoxide 90 percent, t-butyl peroxyacetate 75 percent, t-butyl peroxyacetate 75 percent, t-butyl peroxyisopropylcarbonate 92 percent, diisopropyl peroxydicarbonate 100 percent, di-n-propyl peroxydicarbonate 98 and di-n-propyl peroxydi-carbonate 85 percent.

CLASS II: Class II peroxides burn very rapidly and present a severe reactivity hazard. Examples: acetyl

peroxide 25 percent, t-butyl hydroperoxide 70 percent, t-butyl peroxybenzoate 98 percent, t-butyl peroxy-2-ethylhex-anoate 97 percent, t-butyl peroxyisobutyrate 75 percent, t-butyl peroxyisopropyl-carbonate 75 percent, t-butylperoxypivalate 75 percent, dybenz-o-yl peroxydicarbonate 85 percent, di-sec-butyl peroxydicarbonate 98 percent, di-sec-butyl peroxydicarbonate 75 percent, 1,1-di-(t-butylperoxy)-3,5,5-trimethycyclohexane 95 percent, di-(2-ethylhexyl) peroxydicarbonate 97 percent, 2,5-dimethyl-2-5 di (benzoylperoxy) hexane 92 percent and peroxyacetic acid 43 percent.

CLASS III: Class III peroxides burn rapidly and present a moderate reactivity hazard. Examples: acetyl cyclohexane sulfonal peroxide 29 percent, benzoyl peroxide 78 percent, benzoyl peroxide paste 55 percent, benzoylperoxide paste 50 percent, cumene hydroperoxide 86 percent, di-(4-butylcyclohexyl) peroxydicarbonate 98 percent, t-butyl peroxy-2-ethylhexanoate 97 percent, t-butyl peroxyneodecanoate 75 percent, decanoyl peroxide

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- Gases - arsine, chlorine trifluoride, cyanogen, diborane, fluorine, germane, hydrogen cyanide, nitric oxide, nitrogen dioxide, ozone, phosphine, hydrogen selenide and stibene.
- Liquids - acrolein, acrylic acid, 2-chloroethanol (ethylene chlorohydrin), hydrazine, hydrocyanic acid, 2-methylaziridine (propylenimine), 2-methylactonitrile (acetone cyanohydrin), methyl ester isocyanic acid (methyl isocyanate), nicotine, tetranitromethane and tetraethylstannane (tetraethyltin).
- Solids - (acetato) phenylmercury (phenyl mercuric acetate), 4-aminopyridine, arsenic pentoxide, arsenic trioxide, calcium cyanide, 2-chloroacetophenone, aflatoxin B, decaborane (14), mercury (II) bromide (mercuric bromide), mercury (II) chloride (corrosive mercury chloride), pentachlorophenol, methyl parathion, phosphorus (white), and sodium azide.
- B. Toxic materials. Examples:**

- Gases - boron trichloride, boron trifluoride, chlorine, hydrogen fluoride, hydrogen sulfide, phosgene, silicon tetrafluoride.
- Liquids - acrylonitrile, allyl alcohol, alpha-chlorotoluene, aniline, 1-chloro-2,3-epoxypropane, chloroformic acid (allyl ester), 3-chloropropene (allyl chloride), o-cresol, crotonaldehyde, dibromomethane, diisopropylamine, diethyl ester sulfuric acid, dimethyl ester sulfuric acid, 2-furaldehyde (furfural), furfuryl alcohol, phosphorus chloride, phosphoryl chloride (phosphorus oxychloride), and thionyl chloride.
- Solids - acrylamide, barium chloride, barium (II) nitrate, benzidine, p-benzoquinone, beryllium chloride, cadmium chloride, cadmium oxide, chloroacetic acid, chlorophenylmercury (phenyl mercuric chloride), chromium (VI) oxide (chromic acid, solid), 2,4-dinitrotoluene, hydroquinone, mercury chloride (calomel), mercury (II) sulfate (mercuric sulfate), osmium tetroxide, oxalic acid, phenol, P-phenylenediamine, phenylhydrazine, 4-phenylmorpholine, phosphorus sulfide, potassium fluoride, potassium hydroxide, selenium (IV) disulfide, and sodium fluoride.

2. **Radioactive Materials**

A. Common radiation source materials. More than 100 radioisotopes are in common usage in various medical and industrial test and measuring situations. Most emit beta and gamma radiation. Some emit alpha radiation also. Some emit beta or gamma radiation exclusively. Examples of alpha, beta, gamma emitters: americium-241, bismuth-210, polonium-210, radium-226, uranium-238. These are the heavier isotopes as indicated by high numbers.

Examples of Beta emitters: calcium-45, carbon-14, hydrogen-3, nickel-63, sulfur-35, tungsten-185, and zinc-65.

Examples of Gamma emitters: beryllium-7, germanium-71, iron-55, palladium-13, praseodymium-143, promethium-147 and tin-113.

B. Fissile materials. Fissile materials are materials which may undergo a fission reaction, and are usually found only at

reactor sites, or as part of a nuclear weapon. Fissile materials may emit alpha, beta, gamma and neutron radiation. Examples: plutonium-238, plutonium-239, plutonium-241, uranium-233 and uranium-235.

Note: Uranium (and certain other radioactive metals) are combustible in solid and finely divided form, as well as chemically toxic. When radioactive materials burn, the product of combustion (other than heat) will be radioactive as well.

3. **Corrosives**

- A. **Acids.** Examples: chromic, formic, hydrochloric (muriatic greater than 15 percent), hydrofluoric, nitric (greater than 6 percent), perchloric and sulfuric (4 percent or more).
- B. **Bases (alkalis).** Examples: hydroxides - ammonium (greater than 10 percent), calcium, potassium (greater than 1 percent), sodium (greater than 1 percent) and certain carbonates - potassium.
- C. **Other corrosives.** Examples: bromine, chlorine, fluorine, iodine and ammonia.

Note: Corrosives which are oxidizers; e.g., nitric acid, chlorine, fluorine; or are compressed gases, e.g., ammonia, chlorine, fluorine; or are water-reactive, e.g., concentrated sulfuric acid, sodium hydroxide, are physical hazards in addition to being health hazards.

4. **Other Health Hazards**

- A. **Carcinogens or suspect carcinogens.** Substances which produce or are suspected of producing or inciting cancer (see definitions, Article 9). Examples: asbestos, benzene, beryllium, carbon tetrachloride, chloroform, diazomethane, P-dioxane, ethylene dichloride, polychlorinated biphenyls (PCBs) and vinyl chloride.
- B. **Target organ toxins.** Substances which cause damage to particular organs or systems (see definition, Article 9).
Examples:
 - Hepatotoxins (chemicals which produce liver damage): carbon tetrachloride and nitrosamines.
 - Nephrotoxins (chemicals which produce kidney damage): halogenated hydrocarbons and uranium.
 - Neurotoxins (chemicals which produce their primary toxic effects on the nervous system): mercury and carbon disulfide.
 - Blood or hematopoietic system toxins (chemicals which decrease hemoglobin function, deprive the body tissues of oxygen): carbon monoxide and cyanides.
 - Pulmonary damage agents (chemicals which irritate or damage the lungs): silica and asbestos.
 - Reproductive toxins (chemicals which affect the reproductive capabilities including chromosomal damage [mutations] and effects on fetuses [teratogenesis]): lead and DBCP.
 - Cutaneous hazards (chemicals which affect the dermal layer [skin]): ketones and chlorinated compounds.

HAZARDOUS MATERIALS REGISTRATION

Compliance Guidelines and
Application for San Francisco Businesses

1997 Version

San Francisco Department of Public Health
Hazardous Materials Division

101 Grove Street, #220
San Francisco, CA 94102
(415) 554-2775

Due In 45 Days

(Failure to submit application by this date
will result in fines and penalties.)

City and County of San Francisco

Department of Public Health



Dear Business Owner:

If you operate a business that handles, sells, stores, or uses hazardous materials in quantities exceeding the thresholds, you are required by the Hazardous Materials Ordinance (Article 21 of the San Francisco Health Code) to register your hazardous materials by obtaining a Certificate of Registration.

The purpose of this law is to protect the health and safety of the community and of the San Francisco emergency response personnel, such as fire fighters and paramedics. The information that you provide to the Health Department in your application will be stored in a city wide computer system and will be available to emergency responders in the event of an emergency at your facility or in your neighborhood. The information will enable emergency responders to assess and quickly and safely resolve incidents where hazardous materials may be involved.

By obtaining the Certificate, your business will have satisfied some of the requirements of the Hazard Communication Standard and the requirements of the federal and state Community Right To Know laws. The application process will help you reduce the amount of hazardous materials you use and the hazardous wastes you produce. Compliance with the Ordinance may also result in lower operation and insurance costs for your business.

Please read the instructions carefully and complete the forms thoroughly. If you have questions, the staff of the Hazardous Materials Division (at 554-2724) will be available to assist you.

Thank you for your participation in making San Francisco a safe and healthful place to live and work.

Sincerely,

A handwritten signature in black ink, appearing to read "Sandra R. Hernández".

Sandra R. Hernández, M.D.
Director of Health

Important Instructions

This booklet contains the forms that you will need to complete in order to register your hazardous materials and obtain a Certificate of Registration.

When you get this booklet, please call the Health Department at 554-2775 to schedule a Hazardous Materials Registration appointment. Only a limited number of appointments will be available each day. Do not wait until your 45-Day Due Date to make an appointment. You will be given an appointment that is on or before the 45-Day Due Date that appears on the enclosed invoice and on the mailing labels. If your application is found to be incomplete at the time of your appointment, you will need time to complete your packet before the 45 day due date. There is a penalty for submitting the required information after the due date.

Part 1 of this booklet describes how your business is affected by the San Francisco Hazardous Materials Ordinance. This part of the booklet provides definitions and other information that you will need in order to comply with the requirements of the Ordinance. You will need to read this section before completing the application forms so that the forms can be completed appropriately.

Part 2 of this booklet contains an outline of the entire Hazardous Materials Registration process. This outline will provide an idea of what you can expect to happen during the registration process. This section (yellow section) also contains all of the forms that you need to complete in order to obtain a Certificate of Registration. Complete and make a copy of each form for your records. Bring the originals with you to your Hazardous Materials Registration appointment.

Part 3 contains the instructions for completing the forms contained in Part 2 of this booklet.

You must submit the application materials (the yellow pages of this booklet) at the time of your Hazardous Materials Registration appointment. Failure to appear at the appointment and submit the application materials or the processing fee by the 45-Day Due Date will result in substantial fines and penalties. Use the yellow Application Checklist and Filing Form on page ii to assist you in submitting a complete application packet.

The Hazardous Materials Division staff of the San Francisco Department of Public Health is available to answer questions that you may have regarding the hazardous materials registration process. If you need assistance, please contact the staff at:

**San Francisco Department of Public Health
101 Grove Street, #220, S.F., CA 94102
(Corner of Grove and Polk, across the street from City Hall)
(415) 554-2775**

Thank you for your cooperation.

Application Checklist & Filing Form

Business Name & Address: _____
(Affix Mailing Label here)

MARK ONLY ONE ITEM TO INDICATE PURPOSE OF APPLICATION	<input type="checkbox"/> Initial Application <input type="checkbox"/> Change of Information <input type="checkbox"/> Change of Ownership	<input type="checkbox"/> Temporary Registration <input type="checkbox"/> Biennial Renewal
--	--	--

- Do you have underground storage tanks? ___ Yes ___ No, How many? ___
- Do you have Acutely Hazardous Materials? ___ Yes ___ No
- Are you a Freight Forwarding & Freight Transportation service? ___ Yes ___ No

1. _____ Call Health Department (554-2775) for an appointment. (Date _____ Time _____)

2. Complete and make a copy of the yellow section: (Check each item either Yes or NA)
 Yes NA
 - _____ Certificate Of Registration Application Form (page 19).
 - _____ Facility Maps (page 21-23).
 - _____ Emergency Response Plan (page 25-34).
 - _____ Employee Training Plan (page 35).
 - _____ Hazardous Materials Reduction Plan (page 37).
 - _____ Acutely Hazardous Materials Registration Form(s) (page 39).
 - _____ Disclosure Form For Hazardous Chemical Materials (page 41).
 - _____ Disclosure Form For Etiologic Agents (page 43).
 - _____ Disclosure Form For Radioactive Materials (page 45).
 - _____ Disclosure Form For Materials In Underground Tanks (page 47).
 - _____ Disclaimer Letter For Hazardous Waste Reduction Plans (page 49).

You must bring a copy of each item checked Yes to your Hazardous Materials Registration appointment.

3. Total Quantity of Hazardous Chemical Materials: _____ gallons
 (Calculate by adding all of the Subtotals (Item #23) _____ pounds
 found on the Disclosure form for Hazardous _____ cubic feet
 Chemical Materials.)

4. _____ Make check payable for \$340 to the San Francisco Department of Public Health. (This Processing Fee must be paid at the time of your appointment. To determine other Registration Fees, see page 103).

5. Appear at the Health Department for the scheduled appointment. **Bring with you:** the yellow section of this booklet, the fees, and **this form**. *Failure to appear for appointment and to submit application materials and fees on time will result in fines and penalties.*

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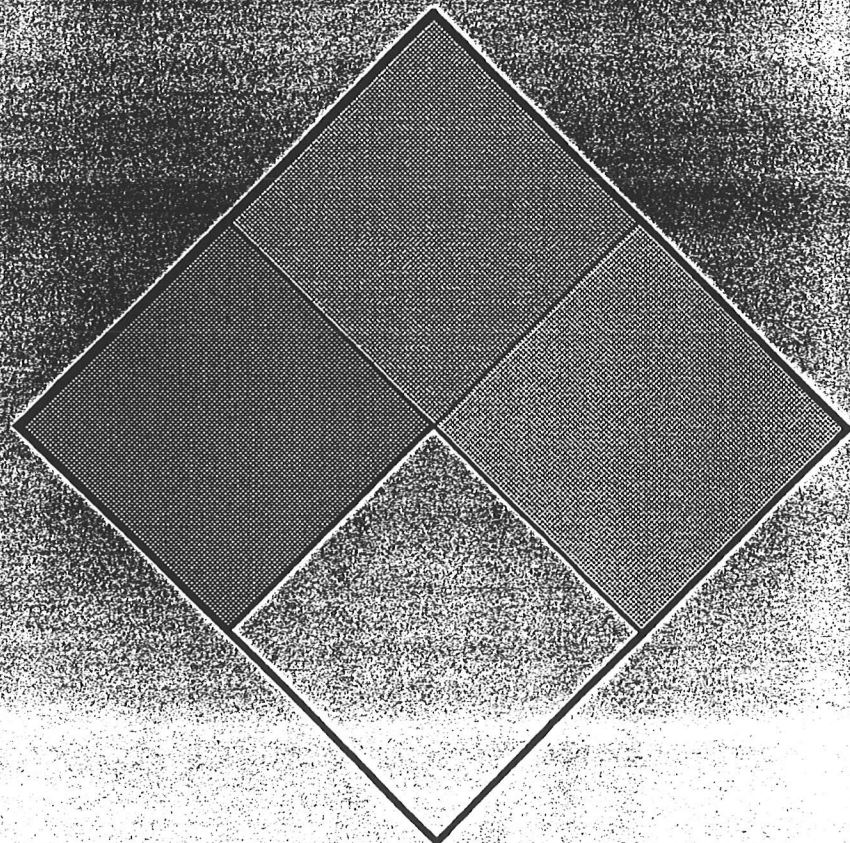
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PART 1

HOW IS MY BUSINESS AFFECTED?

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What Is A Certificate of Registration?

Federal, state, and local laws require businesses handling hazardous materials to register with a local agency. In San Francisco, the San Francisco Department of Public Health is the local agency. The law governing this is the Hazardous Materials Ordinance (Ordinance), Article 21 of the San Francisco Health Code.

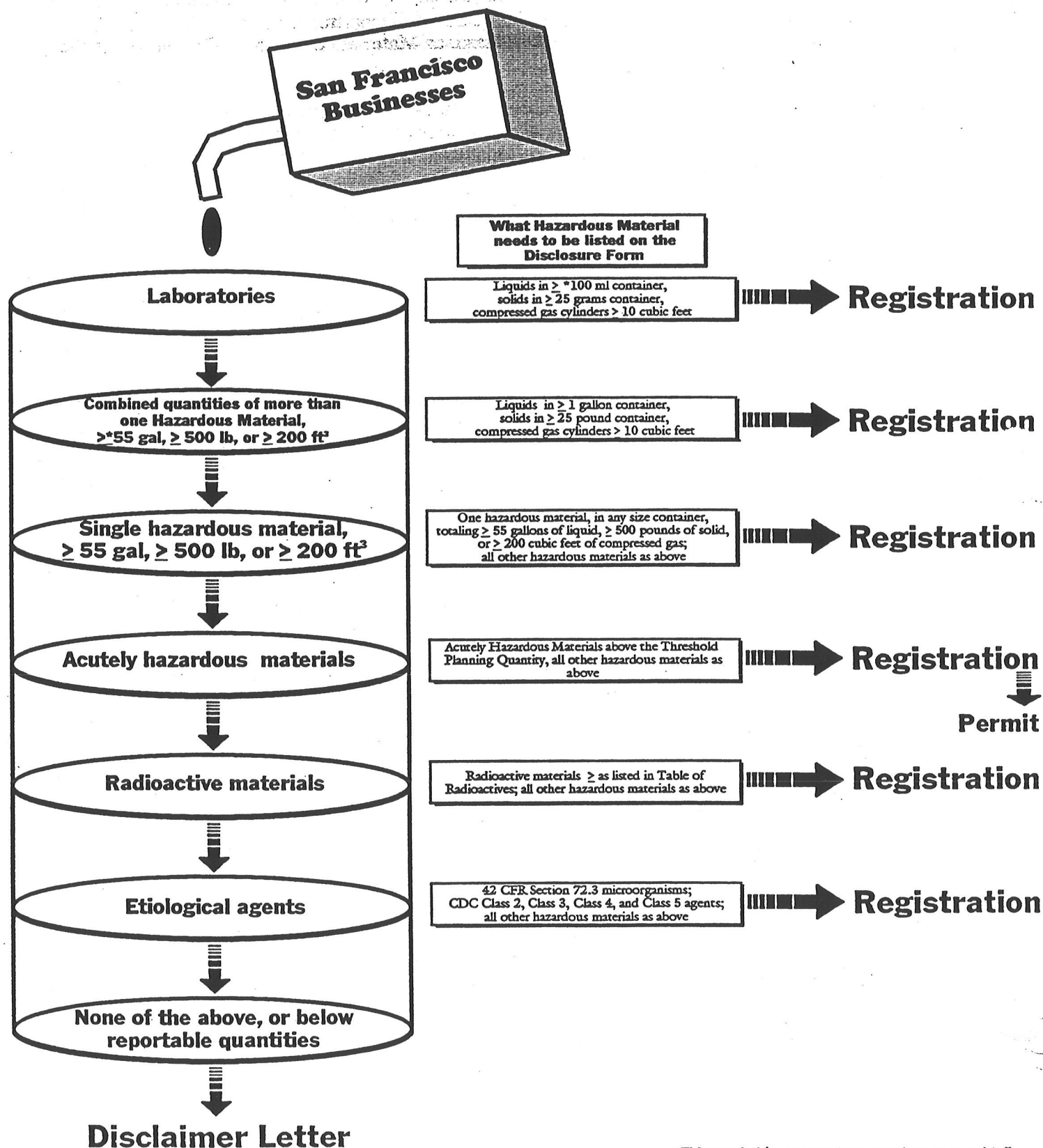
A *Certificate of Registration* is a document issued to a business that has met the requirements listed in the Ordinance. The Certificate is proof that the business has reported its hazardous materials with the San Francisco Department of Public Health. Having this certificate also means that the business operator is aware of his/her obligation to comply with the requirements of the San Francisco Building, Electric, Department of Public Works, Fire, and the City Planning Codes and the California Hazard Communication Standard.

A Certificate of Registration will be issued to a business when it has:

- Submitted a complete Certificate of Registration application packet
- Paid the required fees

A Certificate of Registration is valid for two years. The business operator shall apply for a renewal no later than 30 days prior to the expiration date.

DOES MY BUSINESS NEED A CERTIFICATE OF REGISTRATION?



If your business establishment* handles, sells, stores, or uses hazardous materials* located in an aboveground storage facility or in an underground storage tank* and if you meet any of the following criteria, then you will need to apply for a Certificate of Registration. Evaluate your business against these criteria in the order listed below.

A Certificate of Registration is required if: *(See diagram on page 2)*

1. You operate a laboratory*; or
2. At any one time during the year, you were to combine together all of the **hazardous liquids** in containers with a capacity equal to or greater than 1 gallon and the total quantity is greater than or equal to 55 gallons; or
3. At any one time during the year, you were to combine together all of the **hazardous solids** in containers with a capacity equal to or greater than 25 pounds and the total quantity is greater than or equal to 500 pounds; or
4. At any one time during the year, you were to combine together all of the **compressed gases** in containers with a capacity equal to or greater than 10 cubic feet and the total quantity is greater than or equal to 200 cubic feet; or
5. At any one time during the year, you store a **single hazardous material** or a mixture containing a hazardous material (including all container sizes) in amounts greater than or equal to either 55 gallons of liquids, 500 pounds of solids, or 200 cubic feet of compressed gases; or
6. You handle, sell, store, or use **Acutely Hazardous Materials*** at any one time during the reporting year in quantities greater than or equal to the amounts given on the list of *Acutely Hazardous Materials* (page 68); or
7. You handle, sell, store, or use **radioactive materials** or mixtures containing radioactive materials in quantities equal to or greater than those listed in the *Table of Radioactive Materials* on page 90.
8. You handle, sell, store, or use any one etiologic agent as defined on page 83.

If your business meets any of the above eight criteria, then you will need to obtain a Certificate of Registration by completing Part 2 of this booklet.

If your business **does not** meet the criteria above, then complete the *Disclaimer Letter* on page 17 and return it to the Health Department to indicate that you are not required to obtain a Certificate of Registration. The Health Department will conduct an investigation of your facility to verify the Disclaimer.

* See following pages for definition.

Definitions

What Is A Business Establishment?

The Ordinance applies to San Francisco business establishments that handle, sell, store, or use hazardous materials exceeding threshold quantities. Your business may consist of more than one establishment. Each one of the your business establishments must apply for a separate Certificate of Registration. To determine the number of Certificates your business needs, review the following definitions:

*A **business** means an employer, self-employed individual, trust, firm, joint stock company, corporation including a government corporation, partnership, association, city, county, city and county, district, the state and any agency, department, office, board, commission, or bureau of state government, including, but not limited to, the campuses of the California Community Colleges, the California State University, and the University of California, and the federal government, to the extent authorized by federal law. For the purpose of the application of this Ordinance to the City and County of San Francisco, business includes any Office or Department under any elected or appointed official or under any Board or Commission.*

*A **business establishment** is a business that is conducted on the same parcel of property under the same ownership and is entitled to use the building(s), structure(s), and surrounding land area not separated by a public street, alley, sidewalk or other public place or right-of-way even if connected by underground or overhead structures, such as bridges or passageways. All business operations at that location must be under the control of the same primary response person and must be accessible from the same public street entrance.*

What Is A Laboratory?

To determine if your business operates a laboratory, review the following definition:

*A **laboratory** is a business or part of a business that is operated by scientists or engineers, or by students or technicians under supervision. for the purposes of investigating physical, chemical, or biological properties of substances; development of new or improved chemical processes, products, or applications; analysis, testing, or quality control; or instruction and practice in a natural science or in engineering. These operations are characterized by the use of a relatively large and variable number of chemicals on a scale in which the containers used for reactions, transfers, and other handling of chemicals are normally small enough to be easily and safely manipulated by one person.*

What Is A Freight Forwarding & Freight Transportation Business?

A Freight Forwarding & Freight Transportation business is a business establishment that undertakes the transportation of hazardous materials from the shippers to receivers for a charge covering the entire transportation, packs, crates, prepares for shipping, handles, or otherwise stores hazardous materials in transit for a period of less than 30 days. These businesses include but are not limited to those listed under Codes 4231, 4731 and 4783 of the Manual of Standard Industrial Classification Codes.*

If you operate a Freight Forwarding & Freight Transportation Business as defined above, then you are required to obtain a Certificate of Registration for storing those hazardous materials that are in transit. There will be a flat fee covering the registration of these materials.

In addition, you are required to register hazardous materials not in transit and exceeding threshold quantities, such as those used for maintaining your establishment. You will be charged the applicable Registration Fee(s) (for aboveground and/or underground storage) for these materials.

You will be issued one Certificate of Registration covering all of the hazardous materials at the facility.

What Is A Temporary Certificate of Registration?

A *Temporary Certificate of Registration* is needed for businesses that handle, sell, store, or use hazardous materials in quantities equal to or greater than the established thresholds at a location for less than 90 days.

The requirements for obtaining a Temporary Certificate of Registration are the same as those for a Certificate of Registration. However, you will not be required to submit your emergency response plan. You will be required to certify, at the time of registration and on a form provided by the Health Department, that an emergency response plan is in effect at the temporary site. You will be required to submit the emergency response plan only upon request.

The registration fee for a Temporary Certificate of Registration is \$170. A Temporary Certificate of Registration is valid for 90 days.

Temporary sites may be subject to inspections by the Health Department and the San Francisco Fire Department.

*Published by the United States Office of Management and Budget, 1987 Edition.

What Is A Hazardous Material?

A hazardous material is any material that poses a present or potential hazard to human health and safety or to the environment. A material is considered hazardous because of its quantity, concentration, or physical or chemical characteristics.

Hazardous materials include many common (like paint) and uncommon materials that are used in large and small manufacturing processes, service and maintenance industries, and in other types of businesses.

Practical Ways To Recognize A Hazardous Material

- By the symbols found on diamond-shaped labels. The material is hazardous if its label contains diamond symbols such as a skull and crossbones or flames. Look for symbols, like the following on the container labels:



- By the words and phrases found on a label. A material must be considered hazardous if any of the following words or phrases appear on the container or label:

Words

Carcinogen
Caution
Combustible
Corrosive
Danger
Flammable
Hazard

Irritant
Oxidizer
Poison
Reactive
Sensitizer
Toxic
Warning

Phrases

Avoid contact (with skin or eyes)

Do not store or use near heat

Use with adequate ventilation

Avoid breathing vapors

Wear protective equipment (gloves, goggles, respirator)

- Other phrases may indicate that the product may be harmful to humans or the environment.

Other Ways To Identify A Hazardous Material

1. In general, the following materials must be considered as hazardous:
 - All compressed gases, except compressed air.
 - Materials that contain greater than or equal to 1 % of a hazardous substance.
 - Materials that contain greater than or equal to 0.1% of any carcinogen.
 - Hazardous waste
2. If a material appears on any of the following lists, it must be considered hazardous. There is no single list. These references are available for public inspection at 101 Grove St., Room 220:
 - a. Department of Transportation, Title 49, code of Federal Regulations: parts 100 through 199
 - Lists of hazardous materials and identification numbers (Sec. 172.101, Sec. 172.102, and appendix A)
 - Definitions of hazardous materials (Sec. 173.53 -- 173.1300)
 - *Explosives
 - *Flammable, combustible, and pyrophoric liquids
 - *Flammable solids
 - *Oxidizers
 - *Organic peroxides
 - *Corrosives
 - *Compressed gases
 - *Poisons
 - *Irritants
 - *Etiologic Agents
 - *Radioactive materials
 - *Other Regulated Materials
 - b. The Director's List, Title 8, California Code of Regulations, Sec. 339.
 - c. Hazardous Waste, Title 22, California Code of Regulations.
 - Hazardous and extremely hazardous wastes or materials: Sec. 66680.
 - Criteria for extremely hazardous wastes or materials: Sec. 66720.
 - Extremely hazardous persistent & bioaccumulative wastes: Sec. 66723.
 - d. Environmental Protection Agency, Toxic Pollutants, Title 40, Code of Federal Regulations, Sec. 401.15.
 - e. Toxic and hazardous substances, Title 29, code of Federal Regulations, Part 1910, Subpart Z.
 - f. Radioactive Materials, Title 10, Code of Federal Regulations, Chapter 1, Part 30, Part 40, or Part 70.
 - g. Carcinogens
 - Carcinogens requiring registration with CAL-OSHA: California Code of Regulations, Title 8, Sec. 5208-5215, 5219.
 - International Agency for Research on Cancer (IARC) Monographs.
 - Proposition 65 Carcinogens, Title 22, CCR, Section 12000 (b).
 - National Toxicology Program (NTP), Annual Report on Carcinogens.

What Is An Underground Storage Tank?

An underground storage tank means any one or combination of tanks, including pipes connected thereto, which is used for the storage of hazardous materials and which is substantially or totally beneath the surface of the ground. An Underground Storage Tank does not include any of the following:

1. A tank with a capacity of 1,100 gallons or less which is located on a farm and which stores motor vehicle fuel used primarily for agricultural purposes and not for resale.
2. A tank which is located on a farm or at the residence of a person, which has the capacity of 1,100 gallons or less, and which stores home heating oil for consumptive use on the premises where stored.
3. Structures such as sumps, separators, storm drains, catch basins, oil field gathering lines, refinery pipelines, lagoons, evaporation ponds, well cellars, separation sumps, lined and unlined pits. Sumps which are part of a monitoring system required under Section 25291 or 25292 of the California Health and Safety Code and sumps or other structures defined as underground storage tanks under Subchapter IX (commencing with Section 6991) of Chapter 82 of Title 42 of the United States Code) are not exempted by this section.
4. Hydraulic lift tanks with a capacity of less than 110 gallons.
5. A liquified asphalt tank.
6. A liquified petroleum gas tank.
7. A septic tank.
8. A wastewater treatment tank except a tank which is part of an underground storage tank system.
9. A pipeline located in a refinery or in an oil field.
10. Tanks and catch basins designed for storm water collection.
11. Tanks containing radioactive materials that are regulated by other federal, state, or local agency such as spent fuel pools, radioactive waste storage tanks, and similar tanks.
12. An emergency containment tank kept emptied to receive accidental spills and approved for such use by the appropriate local agency.
13. Drums which contain 55 gallons or less of material and are located in basements.
14. Underground storage tanks containing hazardous wastes if the person owning or operating the underground storage tank has been issued a hazardous waste facilities permit or an interim status for underground storage tank by the California EPA, Department of Toxics Substance Control.

If your business operates an underground storage tank, you need to apply for a *Certificate of Registration*. In addition, you will need to apply for an *Underground Tank Operating Permit*. You will receive an application packet for the *Underground Storage Tank Operating Permit* when you submit your application for a *Certificate of Registration*. Tanks that are not in use must be closed or monitored and registered with the Health Department.

What Is An Acutely Hazardous Material?

The State of California has established a list of hazardous chemicals (see diagram below and the list on page 68) that represent a significant hazard should they be released into the environment. For each material, the State has also established Threshold Planning Quantities (TPQ) (see page 68).

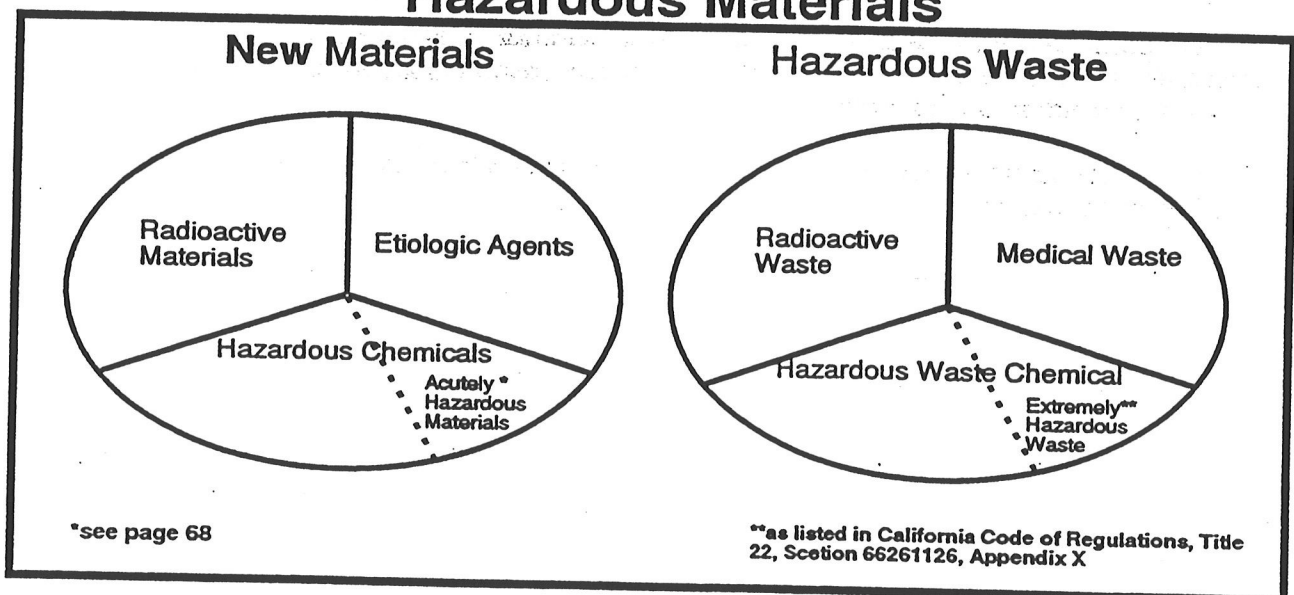
If you have one of these materials, but in quantities less than the listed TPQ, then you do not need to complete an Acutely Hazardous Material Registration Form. However, you do need to list the material on the *Disclosure Form For Hazardous Chemical Materials* (page 41) along with your other hazardous chemicals.

If your business handles, sells, stores, or uses materials on the list in amounts equal to or greater than the TPQ, then you will need to meet two additional requirements:

1. Complete the *Acutely Hazardous Hazardous Materials Registration Form* on page 39 (in addition to listing the Acutely Hazardous Material(s) on the *Disclosure Form For Hazardous Chemical Materials*), and
2. Apply for an Acutely Hazardous Materials Permit. Application for an Acutely Hazardous Materials Permit involves:
 - Submitting a copy of the Material Safety Data Sheet for each item listed on the *Disclosure Form For Hazardous Chemical Materials*,
 - Paying the Acutely Hazardous Materials Permit Fee.

You will receive an application for the Acutely Hazardous Materials Permit at your Hazardous Materials Registration appointment.

Hazardous Materials



How Much Does It Cost?

There are five types of fees involved in the Hazardous Materials Registration process:

1. Processing Fee. This is a flat fee of \$340. All businesses applying for a *Certificate of Registration* are required to pay this fee and one or more of the following Registration Fees.
2. Registration Fee For Aboveground Storage. This fee is based on the total quantity of hazardous chemicals (including Acutely Hazardous Materials) stored aboveground at a facility. It can be calculated using the fee chart on page 104 and the total maximum quantity of hazardous liquids, solids, and compressed gases stored aboveground. (Etiologic agents, radioactive materials, and materials stored in underground tanks are not included in the calculation of this fee.)
3. Registration Fee For Underground Storage. This is a flat fee of \$170/site for underground storage tank operators.
4. Registration Fee For A Temporary Storage Site. This is a flat fee of \$170/site.
5. Registration Fee For A Freight Forwarding and Freight Transportation Service. This is a flat fee of \$170/site.

The Processing Fee must be paid at the time of your initial Hazardous Materials Registration appointment. The Registration Fees may be paid at the time of your appointment or upon receipt of a Notice of Payment Due. All fees except the Registration Fee For A Temporary Storage Site are due biennially.

A worksheet for calculating your total fees has been included in this booklet on page 103. Prior to submitting your application, you may estimate the fees using the worksheet.

Since a portion of your fee is dependent upon the quantity of hazardous materials that you have, measures you take to reduce the amount of hazardous material may lower your fees. (Hazardous materials reduction is also required by law.)

Under certain circumstances, other fees may apply. In addition, enforcement actions will result in fines and penalties.

What Are The Penalties For Non-Compliance?

Failure to complete and submit all required materials and fees by the 45-Day Due Date will result in the following:

1. A penalty of \$340.00 will be charged. This fee is in addition to the initial \$340.00 processing fee. Submission of all registration materials, fees, and penalties will be due within 30 days.
2. An inspector from the Health Department may investigate the facility. All violations of the Hazardous Materials Ordinance will be subject to further enforcement action. A site investigation fee of \$170.00 will be charged.
3. Failure to respond within the thirty days will result in an order to appear before the Director of Public Health. The Director may administer civil penalties of \$2,000.00 per day per violation.

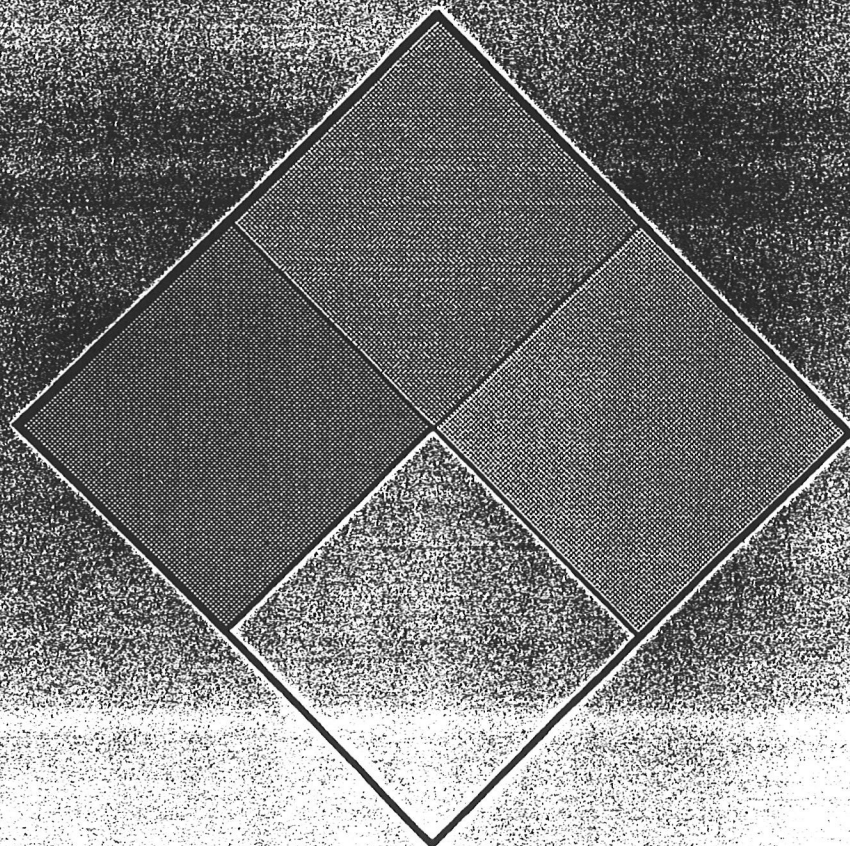
All Disclaimer Letters will be verified by an investigation of the facility. If a Disclaimer letter is submitted and the business is found to handle, sell, store, or use above threshold quantities of hazardous materials fees and penalties will be assessed.

In addition to the above stated penalties, the Director may also seek criminal penalties which may be levied at \$25,000 for each day of violation, or by imprisonment in the county jail for not more than one year. If the conviction is for a second violation, the person may be punished by a fine of no more than \$50,000 per day of violation, or by imprisonment in the state prison for 16, 20, or 24 months or in the county jail for no more than one year, or by both fine and imprisonment.

PART 2

APPLICATION MATERIALS

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18.	Disclaimer Letter For Hazardous Waste Reduction Plans	49



(Make additional copies of this front page if chemical product are stored in more than one room in the facility. Use this front page for each room where chemicals are stored and used.)

[illegible]

Disclosure Form for Hazardous Chemical Materials (Continued)

(Make additional copies of this front page if chemical product are stored in more than one room in the facility. Use this front page for each room where chemicals are stored and used.)

Page 1 of 1

[illegible]

23. Subtotals: _____ gal. _____ lb. _____ qt.

23. Subtotals:

gal. _____ lb. _____ qt' _____

Id.

代

* Specific Location Codes

R = Storeroom
C = Storage Cabinet
S = Storage Shelf
FC = Flammable Storage Cabinet
FB = Spray Booth
FR = Flammable Storeroom
C = Corrosive Cabinet

Container Codes

C1 = Plastic Cont. <10 gal.
 C2 = Plastic Cont. 10-110 gal.
 F1 = Fiber Containers, <1 gal
 F2 = Fiber Containers, 10-110
 W = Wood Container
 CG = Compressed Gas Cylinder
 G = Fixed Above Ground Tank
 I = Portable Tank, >110 gal
 J = Bins or Boxes
 K = Bags
 L = Pits, Ponds, I
 M = Sumps

N1 = Railcar, Tanker
N2 = Railcar, Other
U = Open Process Tank
P = Machinery Tank
Q = Other (Specify)

***Storage Pressure & Temp. Codes

PRESSURE
1 = Ambient Pressure
2 = Greater than ambient
3 = Less than ambient

TEMPERATURE
4 = Room temperature
5 = Greater than room temperature
6 = Less than room temperature
7 = Cryogenic conditions

**** Hazards Codes

F = Fire
P = Sudden Release of Pressure
R = Reactive
A = Imr
C = De

Instructions

Hazardous Materials Reduction Plan

(Before completing the Hazardous Materials Reduction Plan, determine if you are required to prepare any one of the Hazardous Waste Reduction Plans (see Chapter 29). If you are required to prepare one or more of the Hazardous Waste Reduction Plans, then you must submit a Hazardous Materials Reduction Plan as part of your registration application.)

One way to protect the environment from the damage caused by hazardous materials is to eliminate or reduce the amount of hazardous materials used. The Ordinance requires businesses to identify hazardous materials reduction measures that are technically and economically feasible.

After carefully analyzing your work processes, describe in a Hazardous Materials Reduction Plan how your business intends to reduce hazardous materials usage. The Hazardous Materials Reduction Plan should contain the following points:

- ☐ The hazardous materials that will be eliminated or reduced in quantity.
- ☐ The means by which your business will reduce or eliminate the usage.
- ☐ A maximum projected reduction.
- ☐ A time frame in which this maximum reduction will occur.
- ☐ An estimated annual reduction rate.

Listed below are questions that you should consider as you try to analyze your hazardous material usage.

- Can you change the way you do some of your work so that you won't have to use hazardous materials?
- Can you substitute the use of non-hazardous materials in any of your work processes?
- Do you end up with a surplus of hazardous materials because you are buying the same product from more than one manufacturer?
- Are you buying more than you need?
- Are you keeping hazardous materials that you have not used for some time?
- Can you change the way you do a job so that fewer hazardous materials will be used?
- Can you change the equipment that you use so that fewer hazardous materials will be used in the process?

Instructions

Acutely Hazardous Materials Registration Form

If you store Acutely Hazardous Materials (See definition on page 9) then you must complete this form and submit a copy of it along with the registration application. A list of the Acutely Hazardous Materials is found on page 68.

Complete one form for each Acutely Hazardous Material that you have. Make additional copies of this form if necessary.

Under the section **Process Description**, describe the processes in which the named Acutely Hazardous Material is used and list the equipment used in the processes.

Be sure to sign and date this registration form because it is a separate registration required by State law.

Part 3: Instruction for Application Materials

The List of Acutely Hazardous Materials (AHM) (alphabetical order)

CAS No.	CHEMICAL NAME	PHY STA	Threshold Planning Quantity (TPQ)	
			(gallons)	(pounds)
75-86-5	Acetone Cyanohydrin	L	130	
1752-30-3	Acetone Thiosemicarbazide	S		1000
107-02-8	Acrolein	L	72	
79-06-1	Acrylamide	S		1000
107-13-1	Acrylonitrile	L	1505	
814-68-6	Acrylyl Chloride	L	11	
111-69-3	Adiponitrile	L	125	
116-06-3	Aldicarb	S		100
309-00-2	Aldrin	S		500
107-18-6	Allyl Alcohol	L	141	
107-11-9	Allylamine	L	79	
20859-73-8	Aluminum Phosphide	S		500
54-62-6	Aminopterin	S		500
78-53-5	Amiton	L		500
3734-97-2	Amiton Oxalate	S		100
7664-41-7	Ammonia	G		500
300-62-9	Amphetamine	L	132	
62-53-3	Aniline	L	118	
88-05-1	Aniline, 2,4,6-Trimethyl-	L	63	
7783-70-2	Antimony Pentafluoride	L	19	
1397-94-0	Antimycin A	S		1000
86-88-4	ANTU	S		500
1303-28-2	Arsenic Pentoxide	S		100
1327-53-3	Arsenous Oxide	S		100
7784-34-1	Arsenous Trichloride	L	28	
7784-42-1	Arsine	G		100
2642-71-9	Azinphos-Ethyl	S		100
86-50-0	Azinphos-Methyl	S		10
98-87-3	Benzal Chloride	L	48	
98-16-8	Benzenamine, 3-(Trifluoromethyl)-	L	46	
100-14-1	Benzene, 1-(Chloromethyl)-4-Nitro-	S		500
98-05-5	Benzenearsonic Acid	S		10
3615-21-2	Benzimidazole, 4,5-Dichloro-2-(Trifluoromethyl)-	S		500
98-07-7	Benzotrichloride	L	44	
100-44-7	Benzyl Chloride	L	55	
140-29-4	Benzyl Cyanide	L	59	
15271-41-7	Bicyclo(2.2.1)Heptane-2-Carbonitrile, 5-Chloro-6-(((Methylamino) Carbonyl)Oxy)lmino), (1s-(1alpha, 2-beta, 4-alpha,5-alpha, 6E))	S		500
534-07-6	Bis(Chloromethyl) Ketone	S		10
4044-65-9	Bitoscanate	S		500
10294-34-5	Boron Trichloride	L	45	
7637-07-2	Boron Trifluoride	G		500
353-42-4	Boron Trifluoride Compound With Methyl Ether (1:1)	L		1000
28772-56-7	Bromadiolone	S		100
7726-95-6	Bromine	L	19	
1306-19-0	Cadmium Oxide	S		100
2223-93-0	Cadmium Stearate	S		1000
7778-44-1	Calcium Arsenate	S		500
8001-35-2	Camphechlor	S		500
56-25-7	Cantharidin	S		100
51-83-2	Carbachol Chloride	S		500
26419-73-8	Carbamic Acid, Methyl-,O-(((2,4-Dimethyl- 1,3-Dithiolan-2-yl) Methylene)Amino)-	S		100

The List of Acutely Hazardous Materials (AHM)
(alphabetical order)

CAS No.	CHEMICAL NAME	PHY STA	Threshold Planning Quantity (TPQ)	
			(gallons)	(pounds)
1563-66-2	Carbofuran	S		10
75-15-0	Carbon Disulfide	L	954	
786-19-6	Carbophenothion	L	47	
57-74-9	Chlordane	L	77	
470-90-6	Chlorfenvinfos	L	44	
7782-50-5	Chlorine	G		100
24934-91-6	Chlormephos	L	48	
999-81-5	Chlormequat Chloride	S		100
79-11-8	Chloroacetic Acid	S		100
107-07-3	Chloroethanol	L	50	
627-11-2	Chloroethyl Chloroformate	L	87	
67-66-3	Chloroform	L	812	
542-88-1	Chloromethyl Ether	L	9	
107-30-2	Chloromethyl Methyl Ether	L	11	
3691-35-8	Chlorophacinone	S		100
1982-47-4	Chloroxuron	S		500
21923-23-9	Chlorthiophos	L	45	
10025-73-7	Chromic Chloride	S		1
62207-76-5	Cobalt, ((2,2-(1,2-Ethanediy)bis (Nitrilome-thylidyne))			
	Bis (6-Fluorophenolato))(2-) -N,N',O,O)-	S		100
10210-68-1	Cobalt Carbonyl	S		10
64-86-8	Colchicine	S		10
56-72-4	Coumaphos	S		100
5836-29-3	Coumatetralyl	S		500
95-48-7	Cresol, o-	S		1000
535-89-7	Crimidine	S		100
4170-30-3	Crotonaldehyde	L	141	
123-73-9	Crotonaldehyde, (E)-	L	141	
506-68-3	Cyanogen Bromide	S		500
506-78-5	Cyanogen Iodide	S		1000
2636-26-2	Cyanophos	L	95	
675-14-9	Cyanuric Flouride	L		100
66-81-9	Cycloheximide	S		100
108-91-8	Cyclohexylamine	L	1362	
17702-41-9	Decaborane(14)	S		500
8065-48-3	Demeton	L	51	
919-86-8	Demeton-S-Methyl	L	50	
10311-84-9	Dialifor	S		100
19287-45-7	Diborane	G		100
111-44-4	Dichloroethyl Ether	L	988	
149-74-6	Dichloromethylphenylsilane	L	101	
62-73-7	Dichlorvos	L	85	
141-66-2	Dicrotophos	L	10	
1464-53-5	Diepoxybutane	L	54	
814-49-3	Diethyl Chlorophospate	L	51	
1642-54-2	Diethylcarbamazine Citrate	S		100
71-63-6	Digitoxin	S		100
2238-07-5	Diglycidyl Ether	L	95	
20830-75-5	Digoxin	S		10
115-26-4	Dimefox	L	54	
60-51-5	Dimethoate	S		500
2524-03-0	Dimethyl Phosphorochloridothioate	L	46	
77-78-1	Dimethyl Sulfate	I	45	

Part 3: Instruction for Application Materials

The List of Acutely Hazardous Materials (AHM) (alphabetical order)

CAS No.	CHEMICAL NAME	PHY STA	Threshold Planning Quantity (TP)	
			(gallons)	(pounds)
75-78-5	Dimethyldichlorosilane	L	55	
57-14-7	1,1-Dimethyl hydrazine	L	152	
99-98-9	Dimethyl-p-Phenylenediamine	S		10
644-64-4	Dimetilan	S		500
534-52-1	Dinitrocresol	S		10
88-85-7	Dinoseb	S		100
1420-07-1	Dinoterb	S		500
78-34-2	Dioxathlon	L	48	
82-66-6	Diphacinone	S		10
152-16-9	Diphosphoramidate, Octamethyl	L	11	
298-04-4	Disulfoton	L	53	
514-73-8	Dithiazanine Iodide	S		500
541-53-7	Dithiobiuret	S		100
316-42-7	Emetine, Dihydrochloride	S		1
115-29-7	Endosulfan	S		10
2778-04-3	Endothion	S		500
72-20-8	Endrin	S		500
106-89-8	Epichlorohydrin	L	102	
2104-64-5	EPN	S		100
50-14-6	Ergocalciferol	S		1000
379-79-3	Ergotamine Tartrate	S		500
1622-32-8	Ethanesulfonyl Chloride, 2-Chloro	L	39	
10140-87-1	Ethanol, 1,2-Dichloro-, Acetate	L	93	
563-12-2	Ethion	L	99	
13194-48-4	Ethoprophos	L	110	
538-07-8	Ethylbis (2-Chloroethyl)Amine	L	55	
371-62-0	Ethylene Fluorohydrin	L	1	
75-21-8	Ethylene Oxide	L	147	
107-15-3	Ethylenediamine	L	1342	
151-56-4	Ethyleneimine	L	72	
542-90-5	Ethylthiocyanate	L	1196	
22224-92-6	Fenamiphos	S		10
122-14-5	Fenitrothion	L	46	
115-90-2	Fensulfothion	L	50	
4301-50-2	Fluenetil	S		100
7782-41-4	Fluorine	G		500
640-19-7	Fluoroacetamide	S		100
144-49-0	Fluoroacetic Acid	S		10
359-06-8	Fluoracetyl Chloride	L		10
51-21-8	Fluorouracil	S		500
944-22-9	Fonofos	L	52	
50-00-0	Formaldehyde	L	74	
107-16-4	Formaldehyde Cyanohydrin	L		1000
23422-53-9	Frometanate Hydrochloride	S		500
2540-82-1	Fromothion	L	9	
17702-57-7	Formparanate	S		100
21548-32-3	Fosthietan	L	46	
3878-19-1	Fuberidazole	S		100
110-00-9	Furan	L	64	
13450-90-3	Gallium Trichloride	S		500
77-47-4	Hexachlorocyclopentadiene	L	7	
4835-11-4	Hexamethylenediamine, N,N'-Dibutyl-	L		500
302-01-2	Hydrazine	L	119	

The List of Acutely Hazardous Materials (AHM)
(alphabetical order)

CAS No.	CHEMICAL NAME	PHY STA	Threshold Planning Quantity (TPQ)	
			(gallons)	(pounds)
74-90-8	Hydrocyanic Acid	G		100
7647-01-0	Hydrogen Chloride (Gas Only)	G		500
7664-39-3	Hydrogen Fluoride	G		100
7722-84-1	Hydrogen Peroxide (Conc. greater than 52%)	L	82	
7783-07-5	Hydrogen Selenide	G		10
7783-06-4	Hydrogen Sulfide	L	66	
123-31-9	Hydroquinone	S		500
13463-40-6	Iron, Pentacarbonyl-	L	8	
297-78-9	Isobenzan	S		100
78-82-0	Isobutyronitrile	L	158	
102-36-3	Isocyanic acid, 3,4-Dichlorophenyl Ester	S		500
465-73-6	Isodrin	S		100
55-91-4	Isofluorophate	L	11	
4098-71-9	Isophorone Dissocyanate	S		100
108-23-6	Isopropyl Chloroformate	L	112	
119-38-0	Isopropylmethylpyrazolyl Dimethylcarbamate	L	56	
78-97-7	Lactonitrile	L	140	
21609-90-5	Leptophos	S		500
541-25-3	Lewisite	L	0.6	
58-89-9	Lindane	S		1000
7580-67-8	Lithium Hydride	S		100
109-77-3	Malononitrile	S		500
12108-13-3	Manganese, Tricarbonyl Methylcyclopentadienyl	L	9	
51-75-2	Mechlorethamine	L	1	
950-10-7	Mephosfolan	L		500
1600-27-7	Mercuric Acetate	S		500
7487-94-7	Mercuric Chloride	S		500
21908-53-2	Mercuric Oxide	S		500
10476-95-6	Methacrolein Diacetate	L		1000
760-93-0	Methacrylic Anhydride	L		500
126-98-7	Methacrylonitrile	L	75	
920-46-7	Methacryloyl Chloride	L	11	
30674-80-7	Methacryloyloxyethyl Isocyanate	L		100
10265-92-6	Methamidophos	S		100
558-25-8	Methanesulfonyl Fluoride	L		1000
950-37-8	Methidathion	S		500
2032-65-7	Methiocarb	S		500
16752-77-5	Methomyl	S		500
151-38-2	Methoxyethylmercuric Acetate	S		500
80-63-7	Methyl 2-Chloroacrylate	L	51	
74-83-9	Methyl Bromide	G		1000
79-22-1	Methyl Chloroformate	L	49	
60-34-4	Methyl Hydrazine	L	69	
624-83-9	Methyl Isocyanate	L	63	
556-61-6	Methyl Isothiocyanate	S		500
74-93-1	Methyl Mercaptan	G		500
3735-23-7	Methyl Phenkapton	L		500
676-97-1	Methyl Phosphonic Dichloride	S		100
556-64-9	Methyl Thiocyanate	L	1128	
78-94-4	Methyl Vinyl Ketone	L	1	
502-39-6	Methylmercuric Dicyanamide	S		500
75-79-6	Methyltrichlorosilane	L	50	
1129-41-5	Metolcarb	S		

Part 3: Instruction for Application Materials

The List of Acutely Hazardous Materials (AHM)
(alphabetical order)

CAS No.	CHEMICAL NAME	PHY STA	Threshold Planning Quantity (TPQ)	
			(gallons)	(pounds)
7786-34-7	Mevinphos	L	48	
315-18-4	Mexacarbate	S		500
50-07-7	Mitomycin C	S		500
6923-22-4	Monocrotophos	S		10
2763-96-4	Muscimol	S		500
505-60-2	Mustard Gas	L	47	
13463-39-3	Nickle Carbonyl	L	0.1	
54-11-5	Nicotine	L	12	
65-30-5	Nicotine Sulfate	S		100
7697-37-2	Nitric Acid	L	80	
10102-43-9	Nitric Oxide	G		100
98-95-3	Nitrobenzene	L	1001	
1122-60-7	Nitrocyclohexane	L	57	
10102-44-0	Nitrogen Dioxide	G		100
62-75-9	Nitrosodimethylamine	L	120	
991-42-4	Norbormide	S		100
	Organorhodium Complex (PMN-82-147)	S		10
630-60-4	Ouabain	S		100
32135-22-0	Oxamyl	S		100
78-71-7	Oxetane, 3,3-Bis (Chloromethyl)	L		500
2497-07-6	Oxydisulfoton	L		500
10028-15-6	Ozone	G		100
1910-42-5	Paraquat	S		10
2074-50-2	Paraquat Methosulfate	S		10
56-38-2	Parathion	L	10	
298-00-0	Parathion-Methyl	S		100
12002-03-8	Paris Green	S		500
19624-22-7	Pentaborane	L	99	
2570-26-5	Pentadecylamine	S		100
79-21-0	Peracetic Acid	L	49	
594-42-3	Perchloromethylmercaptan	L	36	
108-95-2	Phenol	S		500
4418-66-0	Phenol, 2,2'-Thiobis(4-Chloro-6-Methyl)-Phenol,			
	2,2'-Thiobis (4-Chloro-6-Methyl)-	S		100
64-00-6	Phenol,3-(1-Methylethyl)-, Methylcarbamate	S		500
58-36-6	Phenoxarsine, 10,10'-Oxydi-	S		500
696-28-6	Phenyl Dichloroarsine	L	36	
59-88-1	Phenylhydrazine Hydrochloride	S		1000
62-38-4	Phenylmercury Acetate	S		500
2097-19-0	Phenylsilatrane	S		100
103-85-5	Phenylthiourea	S		100
298-02-2	Phorate	L	1	
4104-14-7	Phosacetim	S		100
947-02-4	Phosfolan	S		100
75-44-5	Phosgene	G		10
752-11-6	Phosmet	S		10
13171-21-6	Phosphamidon	L	1	
7803-51-2	Phosphine	L	81	
2703-13-1	Phosphonothioic Acid, Methyl-, O-Ethyl O-(4- (Methylthio)			
	Phenyl) Ester	L		500
50782-69-9	Phosphonothioic Acid, Methyl-, S-(2-Bis(1- Methylethyl)Amino)			
	Ethyl O-Ethyl Ester	L	12	
2665-30-7	Phosphonothioic Acid, Methyl-, O-(4-Nitrophenyl) O-Phenyl Ester	L		500

The List of Acutely Hazardous Materials (AHM)
(alphabetical order)

CAS No.	CHEMICAL NAME	PHY STA	Threshold Planning Quantity (TPQ)	
			(gallons)	(pounds)
3254-63-5	Phosphoric Acid, Dimethyl 4-(Methylthio) Phenyl Ester	L	47	
2587-90-8	Phosphorothioic Acid, O,O-Dimethyl-S-(2-Methylthio) Ethyl Ester	L		500
7723-14-0	Phosphorus	S		100
10025-87-3	Phosphorus Oxychloride	L	37	
10026-13-8	Phosphorus Pentachloride	S		500
1314-56-3	Phosphorus Pentoxide	S		10
7719-12-2	Phosphorus Trichloride	L	77	
57-47-6	Physostigmine	S		100
57-64-7	Physostigmine, Salicylate (1:1)	S		100
124-87-8	Picrotoxin	S		500
110-89-4	Piperidine	L	140	
23505-41-1	Pirimifos-Ethyl	L	106	
10124-50-2	Potassium Arsenite	S		500
151-50-8	Potassium Cyanide	S		100
506-61-6	Potassium Silver Cyanide	S		500
2631-37-0	Promecarb	S		500
106-96-7	Propargyl Bromide	L	0.8	
57-57-8	Propiolactone, Beta-	L	53	
107-12-0	Propionitrile	L	75	
542-76-7	Propionitrile, 3-Chloro-	L	104	
70-69-9	Propiophenone, 4-Amino	S		100
109-61-5	Propyl Chloroformate	L	55	
75-56-9	Propylene Oxide	L	140	
75-55-8	Propyleneimine	L	1499	
2275-18-5	Prothoate	S		100
129-00-0	Pyrene	S		1000
140-76-1	Pyridine, 2-Methyl-5-Vinyl-	L	62	
504-24-5	Pyridine, 4-Amino-	S		500
1124-33-0	Pyridine, 4-Nitro-, 1-Oxide	S		500
53558-25-1	Pyriminil	S		100
14167-18-1	Salcomine	S		500
107-44-8	Sarin	L	1	
7783-00-8	Selenious Acid	S		1000
7791-23-3	Selenium Oxychloride	L	25	
563-41-7	Semicarbazide hydrochloride	S		1000
3037-72-7	Silane, (4-Aminobutyl)Diethoxymethyl-	L		1000
7631-89-2	Sodium Arsenate	S		1000
7784-46-5	Sodium Arsenite	S		500
26628-22-8	Sodium Azide (Na(N ₃))	S		500
124-65-2	Sodium Cacodylate	S		100
143-33-9	Sodium Cyanide (Na(CN))	S		100
62-74-8	Sodium Fluoroacetate	S		10
13410-01-0	Sodium Selenate	S		100
10102-18-8	Sodium Selenite	S		100
10102-20-2	Sodium Tellurite	S		500
900-95-8	Stannane, Acetoxytriphenyl	S		500
57-24-9	Strychnine	S		100
60-41-3	Strychnine, Sulfate	S		100
3689-24-5	Sulfotep	L	50	
3569-57-1	Sulfoxide, 3-Chloropropyl Octyl	L		500
7446-09-5	Sulfur Dioxide	G		500
7783-60-0	Sulfur Tetrafluoride	G		100
7446-11-9	Sulfur Trioxide	S		100

Part 3: Instruction for Application Materials

The List of Acutely Hazardous Materials (AHM)
(alphabetical order)

CAS No.	CHEMICAL NAME	PHY STA	Threshold Planning Quantity (TPQ)	
			(gallons)	(pounds)
7664-93-9	Sulfuric Acid	L	122	
77-81-6	Tabun	L	1	
13494-80-9	Tellurium	S		500
7783-80-4	Tellurium Hexafluoride	G		100
107-49-3	TEPP	L	10	
13071-79-9	Terbufos	L	11	
78-00-2	Tetraethyllead	L	7	
597-64-8	Tetraethyltin	L	10	
75-74-1	Tetramethyllead	L	6	
509-14-8	Tetranitromethane	L	37	
10031-59-1	Thallium Sulfate	S		100
6533-73-9	Thallous Carbonate	S		100
7791-12-0	Thallous Chloride	S		100
2757-18-8	Thallous Malonate	S		100
7446-18-6	Thallous Sulfate	S		100
2231-57-4	Thiocarbazine	S		1000
39196-18-4	Thiofanox	S		100
297-97-2	Thionazin	L		500
108-98-5	Thiophenol	L	56	
79-19-6	Thiosemicarbazide	S		100
5344-82-1	Thiourea, (2-Chlorophenyl)-	S		100
614-78-8	Thiourea, (2-Methylphenyl)-	S		500
7550-45-0	Titanium Tetrachloride	L	7	
584-84-9	Toluene 2,4-Diisocyanate	L	49	
91-08-7	Toluene 2,6-Diisocyanate	L	10	
110-57-6	Trans-1,4-Dichlorobutene	L	51	
1031-47-6	Triamiphos	S		500
24017-47-8	Triazofos	L	48	
76-02-8	Trichloroacetyl Chloride	L	36	
115-21-9	Trichloroethylsilane	L	49	
327-98-0	Trichloronate	L	45	
98-13-5	Trichlorophenylsilane	L		500
1558-25-4	Trichloro(Chloromethyl)Silane	L		100
27137-85-5	Trichloro(Dichlorophenyl)Silane	L	39	
998-30-1	Triethoxysilane	L	69	
75-77-4	Trimethylchlorosilane	L	141	
824-11-3	Trimethylolpropane Phosphite	S		100
1066-45-1	Trimethyltin Chloride	S		500
639-58-7	Triphenyltin Chloride	S		500
555-77-1	Tris(2-Chloroethyl)Amine	L	10	
2001-95-8	Valinomycin	S		1000
1314-62-1	Vanadium Pentoxide	S		100
108-05-4	Vinyl Acetate Monomer	L	129	
81-81-2	Warfarin	S		500
129-06-6	Warfarin Sodium	S		100
28347-13-9	Xylylene Dichloride	S		100
58270-08-9	Zinc, Dichloro(4,4-Dimethyl-5((((Methylamino)Carbonyl)			
	Oxy)Imino)Pentanenitrile)-(T-4)-	S		100
1314-84-7	Zinc Phosphide	S		500

Instructions

Disclosure Form For Hazardous Chemical Materials

The information provided on the Disclosure Form will be available to emergency response personnel in the event of a hazardous materials emergency at your facility or in your neighborhood. This information is also required by federal, state, and local laws to be made available to the public upon request. Therefore, you must provide complete and accurate information for each material listed on the Disclosure Form.

Chemical Materials That Need To Be Listed:

1. Include hazardous chemical materials as defined on page 6. Hazardous chemicals include *hazardous wastes*, custodial products, compressed gases (such as oxygen and acetylene), and common products such as paints.

Hazardous chemicals stored in **underground storage tanks** should *not* be included on this form. List these chemicals on the *Disclosure Form For Hazardous Chemicals In Underground Storage Tanks* on page 47.

If you are applying for a Certificate of Registration for temporary storage, you will need to list the chemicals that will be stored temporarily.

If you operate a business that can be classified as a *Freight-Forwarding and Freight-Transportation Service* as defined on page 5, then the hazardous chemicals that are stored for less than 30 days do *not* need to be included. Include those hazardous chemicals that are stored on site on a regular basis for maintenance and operation.

2. Include all hazardous **liquids** that you have on site that are in containers with a capacity greater than or equal to 1 gallon.

If you operate a laboratory, include hazardous **liquids** that are used as a part of the laboratory function and are in containers with a capacity greater than or equal to 100 ml. Other hazardous liquids found in the laboratory, such as building maintenance supplies need to be included and reported according to the requirements for non-laboratories.

3. Include all hazardous **solids** that are in containers with a capacity greater than or equal to 25 pounds.

If you operate a laboratory, include hazardous **solids** that are used as a part of the laboratory function and are in containers with a capacity greater than or equal to 25 grams. Other hazardous solids need to be included and reported according to the requirements for non-laboratories.

4. Include all **compressed gases** that are in containers with a capacity greater than or equal to 10 cubic feet.
5. If you are completing this application because you handle, sell, store, or use a single hazardous material in amounts greater than or equal to either 55 gallons of a liquid, 500 pound of a solid, or 200 cubic feet of a compressed gas, then you will need to list:
 - The hazardous material, regardless of container size, that exceeded the threshold, and
 - Other hazardous materials that are in containers greater than or equal to 1 gallon,

25 pounds, or 10 cubic feet.

6. Include all **Acutely Hazardous Materials**, regardless of container size, if they are handled in quantities greater than or equal to the amounts listed on pages 68.
7. If you are designating any of the information as a Trade Secret, do not list the material(s) along with the rest of the products. List the material(s) affected on a separate sheet of *Disclosure Form For Hazardous Chemical Materials*. Write *Trade Secrets* at the top of the form.

Using The Disclosure Form For Hazardous Chemical Materials:

1. Items listed on this form are tied to a **room**. This means that all materials entered on a single sheet (front and back) are found in the same **room**, as specified in Numbers 1 - 8.
2. If there is more than one room at your facility, use a **separate sheet for each room** of the facility.
3. Hazardous chemical materials stored **outside** need to be listed on a **separate form**. All materials stored outside can be listed on a single form. **The location of the hazardous chemicals stored outside must be indicated on the General Site Map.**
4. If additional spaces are needed, make extra copies of the back page.
5. A sample *Disclosure Form For Hazardous Chemical Materials* has been included on page 81 for your reference.

<u>Item #</u>	<u>Instructions:</u>
1	<u>Room Name or Number.</u> Enter the name or the number of the room for which the listed hazardous chemicals on this single sheet are located. The name or the number listed must be identical to that labeled on the structure itself and on the facility map. If your business occupies only a single room, enter <i>NA</i> .
2	<u>Description of Room.</u> Describe the primary activity conducted in the room. If your business occupies only a single room, enter <i>NA</i> .
3	<u>Floor.</u> Identify the floor on which the room is located. Use the codes listed. If the room is on a mezzanine, enter the number of the floor below the mezzanine followed by the code <i>M</i> . For example, if the room is located on the mezzanine between the 2 nd and the 3 rd floor, enter <i>02M</i> .
4	<u>Building.</u> If there is more than one building in the facility, enter the name of the building in which the room is located. The name listed must be identical to that labeled on the structure itself and on the facility map. If your facility contains only one building, enter <i>NA</i> .
5 - 10	<u>Section. Division. Business Name. Address. Person In Charge. Phone Number.</u> Enter the appropriate information or <i>NA</i> .
11	<u>Item #.</u> Number each material consecutively, starting with #1.
12	<u>Form.</u> Check in the appropriate column to indicate the physical state of the product, whether it is a solid, liquid, or gas.

- 13 **Brand Name.** If the material is a commercial product, enter the manufacturer's brand name or trade name exactly as it appears on the label of the container. A product is considered a different hazardous chemical and must be listed as a separate item if it has a different manufacturer's name. For example, water-based paint made by Manufacturer X is not the same chemical as water-based paint made by Manufacturer Y.
- Paints can be grouped as:
- Water-based paint
 - Oil-based paint
- All water-based paints, regardless of color, can be listed as a single item if they are manufactured by the same company. The same rule applies to oil-based paints.
- If the material is a product or mixture made on the premises, include the word *In-House* or the name that appears on the label.
- If the material is a waste, include the word *waste*.
- If a product I.D. Code # is available, include the number.
- 14 **Product Category.** Enter a name that will indicate the common use of the material or the chemical composition of the material. Some common categories include: paint, adhesive, glue, acid, etc.
- 15 **Specific Location.** Enter one of the codes from the bottom of the form, if applicable.
- 16 **Container Type(s).** Enter the code(s) from the bottom of the form. Use more than one code if applicable. If you use *Other*, specify the type of container.
- 17 **Maximum Quantity Stored At Any Time.** Enter the maximum quantity of this product or material which will be present on the premises at any one time during the year. This is the amount for which the Certificate will be issued. Enter the quantity in **gallons** (or liters), **pounds** (or grams), or **cubic feet** only. The amount of compressed gases stored must be entered in **cubic feet**. cryogenic materials such as liquid nitrogen may be reported in gallons. If you do not know the volume in cubic feet, use the enclosed conversion table (see page 79) or call your distributor for the information.
- 18 **Annual Usage.** Enter the estimated total quantity used or produced in a one-year period. If the material is a waste, enter the estimated total quantity which will be produced. The estimated quantity should be based on written records. Enter the quantity in **gallons** (or liters), **pounds** (or grams), or **cubic feet** only.
- 19 **Storage Pressure and Temperature.** Enter a code from the bottom of the form for each storage condition.
- 20 **Hazards.** Check the appropriate column(s). The codes are defined at the bottom of the page. You may find the primary hazard on the container label and or in the Material Safety Data Sheet. You may also call the manufacturer for assistance.

The following is a brief description of the codes:

F = Includes products that are flammable, combustible, oxidizer, or pyrophoric. Look for the word *flammable*, or *combustible* in the "Fire and Explosion Data" section of the Material Safety Data Sheet. A liquid is a fire hazard if it has a flashpoint of less than 200°F. Also look at the "Reactivity Data" section of the Material Safety Data Sheet to see if the product is an *oxidizer* or a *pyrophoric* (which is a chemical that will ignite spontaneously in air at a temperature of 130°F or below).

P = Includes products that are compressed or explosive.

R = Includes products that are unstable. These products will vigorously polymerize, decompose, condense, or will become self-reactive under conditions of shock, pressure, or temperature. Organic peroxides and water reactive materials are included.

A = Includes products that are identified in the "Health Hazard" section of the Material Safety Data Sheet as *highly toxic*, *toxic*, *irritant*, *sensitizer*, or *corrosive*.

C = Includes products that cause cancer (called carcinogens), or harm to a body organ (such as the liver) over a long-term exposure.

- 21 CA and Federal Waste #s. If the material is a waste, enter the California Waste Category Number and the Federal Hazard Category.

The *CA Waste Category Number* can be determined in either of two ways:

- Look at Item I (State Waste No.) on current file copies of the *Uniform Hazardous Waste Manifest*.
- Look on page 80, where the *California Waste Codes* are reprinted.

The *Federal Waste Hazard Categories* can be found in:

- Section 261 of Title 40 of the Code of Federal Regulations.
- Section 66261.126 of Title 22, Article 5, Chapter 11 of the California Code of Regulations.
- The biennial report booklet (EPA Form 8700-13 A/B, 5/80) published by the Environmental Protection Agency for hazardous waste generators.

- 22 Office Use Only. Leave blank.

- 23 Subtotals. Add up the maximum quantity of liquids, solids, and compressed gases that have been listed on each page. If you have been entering quantities in *liters* and *grams*, covert the liters and grams into *gallons* and *pounds* prior to entering the subtotals. To change:

- Liters into gallons: multiply the total quantity in *liters* by 0.264
- Grams into pounds: multiply the total quantity in *grams* by 0.0022

The subtotals must be entered in terms of gallons, pounds, and cubic feet. No other units will be accepted.

COMMON GASES CONVERSION TABLE / WORKSHEET

Name of Gases	Quantity In Pound (LB)	Conversion Factor	Quantity In Cubic Feet (CF)
(1) Acetylene	X	14.7	=
(2) Air	X	13.35	=
(3) Ammonia	X	20.78	=
(4) Argon	X	9.67	=
(5) Butane	X	6.34	=
(6) Carbon dioxide	X	8.13	=
(7) Carbon monoxide	X	13.8	=
(8) Chlorine	X	4.99	=
(9) Ethane	X	12.52	=
(10) Ethylene	X	12.7	=
(11) Fluorine	X	10.2	=
(12) Freon 11	X	2.61	=
(13) Freon 12	X	3.17	=
(14) Freon 22	X	4.43	=
(15) Helium	X	96.71	=
(16) Hydrogen	X	192	=
(17) Hydrogen chloride	X	10.6	=
(18) Hydrogen sulfide	X	10.99	=
(19) Methane	X	23.61	=
(20) Nitrogen	X	13.8	=
(21) Nitrous oxide	X	8.13	=
(22) Oxygen	X	12.08	=
(23) Phosgene	X	3.9	=
(24) Propane	X	8.45	=
(25) Sulfur dioxide	X	5.9	=

California Waste Code

California Restricted Waste

- 711. Liquids with cyanides ≥ 100 mg/L
- 721. Liquids with arsenic ≥ 500 mg/L
- 722. Liquids with cadmium ≥ 100 mg/L
- 723. Liquids with chromium (VI) ≥ 500 mg/L
- 724. Liquids with lead ≥ 500 mg/L
- 725. Liquids with mercury ≥ 200 mg/L

- 726. Liquids with nickel ≥ 134 mg/L
- 727. Liquids with selenium ≥ 100 mg/L
- 728. Liquids with thallium ≥ 130 mg/L
- 731. Liquids with polychlorinated biphenals ≥ 50 mg/L
- 741. Liquids with halogenated organics compounds ≥ 1000 mg/L

- 751. Solids or sludges with halogenated organic compounds ≥ 1000 mg/kg
- 791. Liquids with pH ≤ 2
- 792. Liquids with pH ≤ 2 with metals
- 801. Waste potentially containing Dioxins

California Nonrestricted Wastes Inorganics

- 121. Alkaline solution (pH ≥ 12.5 with metals (antimony, arsenic, barium, beryllium, cadmium, chromium, cobalt, copper, lead, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, and zinc)
- 122. Alkaline solution without metals pH ≥ 12.5
- 123. Unspecified alkaline solution
- 131. Aqueous solution (2-Ph<12.5) containing reactive anions (azide, bromate, chlorate, cyanide, fluoride, hypochlorite, nitrite, perchlorate, and sulfide anions)
- 132. Aqueous solution with metals (\leq restricted levels and see 121)
- 133. Aqueous solution with total organic residues less than 10 percent
- 134. Aqueous solution with total organic residues less than 10 percent
- 135. Unspecified aqueous solution
- 141. Off-specification, aged, or surplus inorganics
- 151. Asbestos-containing waste
- 161. FCC waste
- 162. Other spent catalyst
- 171. Metal sludge (see 121)
- 172. Metal dust (see 121 and machining waste)
- 181. Other inorganic solid waste

- 212. Oxygenated solvents (acetone, butanol, ethyl acetate, etc.)
- 213. Hydrocarbon solvents (benzene, hexane, Stoddard, etc.)
- 214. Unspecified solvent mixture
- 221. Waste oil and mixed oil
- 222. Oil/water separation sludge
- 231. Pesticide rinse water
- 232. Pesticides and other waste associated
- 232. Pesticides and other waste associated with pesticide production
- 241. Tank bottom waste
- 251. Still bottoms with halogenated organics
- 261. Polychlorinated biphenyls and material containing PCBs
- 271. Organic monomer waste (includes unreacted resins)
- 272. Polymeric resin waste
- 281. Adhesives
- 291. Latex waste
- 311. Pharmaceutical waste
- 321. Sewage sludge
- 322. Biological waste other than sewage sludge
- 331. Off-specification, aged, or surplus organics
- 341. Organic liquids (nonsolvents) with halogens
- 342. Organic liquids with metals (see 121)
- 343. Unspecified organic liquid mixture
- 351. Organic solids with halogens
- 352. Other organic solids

Sludges

- 411. Alum and gypsum sludge
- 421. Lime sludge
- 431. Phosphate sludge
- 441. Sulfur sludge
- 451. Degreasing sludge
- 461. Paint sludge
- 471. Paper sludge/pulp
- 481. Tetraethyl lead sludge
- 491. Unspecified sludge waste

Miscellaneous

- 511. Empty pesticide containers 30 gal or more
- 512. Other empty containers 30 gal or more
- 513. Empty containers less than 30 gallons
- 521. Drilling mud
- 531. Chemical toilet waste
- 541. Photochemicals/photoprocessing waste
- 551. Laboratory waste chemicals
- 561. Detergent and soap
- 571. Flash, bottom ash, and retort ash
- 581. Gas scrubber waste
- 591. Baghouse waste
- 611. Contaminated wool from site clean-up
- 612. Household wastes
- 613. Auto shredder waste

Organics

- 211. Halogenated solvents (chloroform, methyl chloride, perchloroethylene, etc.)

Disclosure Form for Hazardous Chemical Materials

(Make additional copies of this front page if chemical product are stored in more than one room in the facility. Use this front page for each room where chemicals are stored and used.)

Page 1 of 2

Room Name or Number Basement		4. Building Pool		7. Business Name	
Description of Room (e.g., paint shop) Basement		5. Section Aquatics		8. Address (Affix Mailing Label Here)	
Floor B B		6. Division Maintenance		9. Person in Charge Mark Long	
01-99 = Floor Number M = Mezzanine BB = Basement RR = Roof XX = Outside				Phone Number 929-0400	
12. Form		13. Brand Name		10. Person Completing Form John Smith	
14. Product Category		15. Specific Location		16. Container Type	
17. Maximum Quantity (Gallons or Liters) (Pounds or Grams)		18. Annual Usage (Gallons or Liters) (Pounds or Grams)		19. Storage (Pounds or Grams)	
20. Hazards F P R A C		21. Waste #s CA & Fed		22. Office Use Only	
✓	Chlorine	SS	F	450	6650 24
✓	Pure Clean	SS	CI	20	80
✓	Waste Water Sludge				14
✓	Sodium Thiosulfate		K		14

23. Subtotals: 20 gal. 1500 lb. 450 ft

* Specific Location Codes FC = Flammable Storage Cabinet FB = Spray Booth FR = Flammable Storage Room SC = Storage Cabinet SD = Storage Shed CS = Corrosive Cabinet		** Container Codes C1 = Plastic Cont. <10 gal. C2 = Plastic Cont. 10-110 gal. D1 = Fiber Containers, <1 gal. D2 = Fiber Containers, 10-110 gal. E = Wood Container F = Compressed Gas Cylinder G = Fixed Above Ground Tank I = Portable Tank, >110 gal. J = Bins or Boxes K = Bags L = Pits, Ponds, Lagoons M = Other (Specify)		*** Storage Pressure & Temp. Codes PRESSURE 1 = Ambient Pressure 2 = Greater than ambient 3 = Less than ambient TEMPERATURE 4 = Room temperature 5 = Greater than room temperature 6 = Less than room temperature 7 = Cryogenic conditions		**** Hazards Codes F = Fire P = Subst. Release of Pressure R = Reactive A = Immediate Acute Health Hazard C = Chronic Health Hazard	
--	--	--	--	--	--	---	--

Hazardous Materials Inventory 1993 Instructions

INTRODUCTION

Due to more stringent reporting requirements established by the local emergency response organizations who receive this data, we are asking you to provide more detailed information on all hazardous materials stored in your facilities at the Davis campus, as well as emergency contact information. This information will be kept confidential and stored in a computerized hazardous materials inventory program for ready access in the event of an emergency.

This inventory packet is designed to help you collect information on any hazardous material which is stored or handled at one or more buildings or facilities assigned to your department. In order to meet federal Laboratory Safety standards and the Chemical Hygiene Plan, your department should already maintain a complete chemical inventory for all your facilities.

A hazardous material is defined as any material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant or potential hazard to human health or safety or to the environment if released into the environment. The MSDS for the material would help you identify any hazardous properties of the chemical. A short list of commonly used hazardous materials would include oxygen and other compressed gases, gasoline, propane, motor oil, carbon dioxide gas, paint, cement, solvent, chlorine, ammonia, various chemical wastes, etc.

Please read these instructions before starting your inventory, and complete these forms to the best of your knowledge. In order to meet reporting deadlines, please return the forms to: **HAZMAT Inventory -- Environmental Health and Safety** no later than **Friday, February 12, 1993**. If you have any questions, please call Sally Lee at 752-8194.

PACKET CONTENTS

This packet contains the following materials:

- **Instructions** for completing the forms.
- **Department Information Form**, for collecting departmental contact information.
- **Inventory Form**, for collecting your chemical information.
- **The Inventory Code Table**, which is also printed on the back of the Inventory Form, provides the coding scheme for the various fields on that form.

- **Department Building Inventory**, based on information provided from the 1992 inventory. Please use it as a guide for reviewing facilities which may have stored chemicals in the past twelve months, and update facility changes as necessary.

DEPARTMENT INFORMATION FORM:

NOTE: A separate Department Information Form should be completed if the department's emergency contact information changes. This may happen, for example, if you have two or more facilities for which two different staff members have oversight, or if you have two different laboratories managed by two different principal investigators.

DEPT NAME: Enter your department name.

ADMIN. CONTACT and WORK PHONE: Enter the first and last name of the Administering Official (e.g. Chairperson, Management Services Officer, Principal Staff Assistant) and his or her work telephone number.

MAIN and ALT. EMERG. CONTACT, TITLE, WORK PHONE, and 24-HOUR PHONE: Enter the first and last name of the Main and Alternate Emergency Contact persons, their respective working titles, work telephone numbers, and a 24-hour telephone number where they may be reached in the event of an emergency. This telephone number may be a home telephone number, or a 24-hour pager number. These contacts will act as a referral if emergency responders need assistance in responding to a release of hazardous materials at your facility.

- **CERTIFICATION STATEMENT:** Provide the signatures and dates of the preparer of the forms, and of the Administering Official.

INVENTORY FORM:

NOTE: A separate Inventory Form should be completed if the department's building or facility name changes. This may happen, for example, if your department has laboratories in different buildings. Please make as many copies of this form as necessary.

Enter the appropriate information in the **DEPARTMENT, BUILDING, PREPARER,** and preparer's **PHONE** fields. **NOTE:** If you know your building's Zone Number or Temporary Building (TB) identifier, please include this information in the **BUILDING** field.

COMMON NAME: Enter the common name of the chemical or waste.

CHEMICAL NAME: Enter the chemical name of the substance using the proper chemical terminology. Avoid the use of trade names. For mixtures, list the chemical names of the three most hazardous components and their respective percentages of total weight.

TRADE SECRET: If you believe that submission of this chemical information involves the release of trade secret information, check this box and enter the general chemical class in the **CHEMICAL NAME** field.

PHYSICAL FORM: Referring to the Inventory Code Table, indicate if this chemical is a (S)olid, (L)iquid, (G)as, or (D)ust.

PHYSICAL TYPE: Referring to the Inventory Code Table, indicate if this chemical is (P)ure, a (M)ixture, or (W)aste.

STORAGE CONTAINER CODE: Referring to the Inventory Code Table, indicate the type of container used to store this chemical.

STORAGE PRESSURE CODE: Referring to the Inventory Code Table, indicate the pressure conditions under which this chemical is stored.

STORAGE TEMPERATURE CODE: Referring to the Inventory Code Table, indicate the temperature conditions under which this chemical is stored.

MAXIMUM ONE-TIME AMOUNT: Enter the maximum amount of this chemical which has been stored at any one time in this building or facility by your department during the past twelve months. Note that this figure should reflect storage, not usage!

DAILY AVERAGE AMOUNT: Enter the average daily amount that has been stored during the past twelve months.

UNITS: If the chemical is a solid, enter the amount as "lb" (pounds); if it is a gas, enter the amount as "ft3" (cubic feet); if it is a liquid, enter the amount as "gal" (gallons); and if it is a radioactive material, enter the amount as "mCi" (millicuries).

DAYS ON-SITE: Enter the number of days the chemical is on site.

USAGE CODE: Referring to the Inventory Code Table, indicate the most common use for this chemical. If the Usage Code is "Other" (#99), please describe. If the Usage Code is "Waste" (#45), indicate the **ANNUAL AMOUNT GENERATED** in the past 12 months, and the **WASTE CODE**, referring to the Inventory Code Table.

LOCATION: Enter all room numbers in the building or facility where this chemical is kept under the given storage conditions. Please also indicate the location in the room building (e.g. storage cabinet by east door).

HAZARDOUS MATERIALS INVENTORY CODES

PHYSICAL FORM	PHYSICAL TYPE
S Solid	P Pure
L Liquid	M Mixture
G Gas	W Waste
D Dust	

STORAGE PRESSURE	STORAGE TEMPERATURE
1 Room (ambient) Pressure	4 Room (Ambient) Temperature
2 Greater than Ambient Press	5 Greater than Ambient Temperature
3 Less than Ambient Pressure	6 Less than Ambient Temperature
	7 Cryogenic Conditions

STORAGE CONTAINER	
A Aboveground Tank	J Bag
B Underground Tank	K Box
C Tank Inside Building	L Cylinder
D Steel Drum	M Glass Bottles/Jugs
E Plastic/Non-Metallic Drum	N Plastic Bottles/Jugs
F Can	O Tote Bin
G Carboy	P Tank Wagon
H Silo	Q Rail Car
I Fiber Drum	R Other

UNITS	
lb	pound
gal	gallon
ft3	cubic feet
mCi	millicurie

USAGE	
01 Additive	26 Herbicide
02 Adhesive	27 Insecticide
03 Aerosol	28 Instructional
04 Anesthetic	29 Lubricant
05 Bactericide	30 Medical Aid or Process
06 Blasting	31 Neutralizer
07 Carrier/Processing Solvent	32 Painting
08 Catalyst	33 Pesticide
09 Cleaning	34 Plating
10 Coolant	35 Preservatives
11 Cooling	36 Intermediate Process
12 Distillation	37 Raw Material
13 Drilling	38 Refining
14 Drying	39 Sealer
15 Emulsifier	40 Spraying
16 Etching	41 Sterilizer
17 Experimental	42 Storage
18 Fabrication	43 Stripper
19 Fertilizer	44 Washing
20 Finished Product	45 Waste
21 Formulation	46 Water Treatment
22 Fuel	47 Welding/Soldering
23 Fungicide	48 Well Injection
24 Grinding	99 Other – specify
25 Heating	

WASTE CLASSIFICATION	
TOX	Toxic
IGN	Ignitable
COR	Corrosive
REA	Reactive
EHM	Extremely Hazardous Material

DEPARTMENT INFORMATION

DEPT. NAME:

ADMIN. CONTACT:

WORK PHONE:

MAIN EMERG. CONTACT:

TITLE:

WORK PHONE:

24-HOUR PHONE:

MAIN EMERG. CONTACT:

TITLE:

WORK PHONE:

24-HOUR PHONE:

THE EMERGENCY CONTACT PERSONS LISTED ABOVE ARE ABLE TO PROVIDE EMERGENCY ASSISTANCE FOR THE FOLLOWING BUILDINGS OR FACILITIES:

BUILDING NAME

ZONE + NUMBER
IF AVAILABLE

I certify that the information in this report is accurate and complete to the best of my knowledge.

Signature of Preparer

Date

Signature of

Administering Official

Date

DEPARTMENT: _____

BUILDING: _____

PREPARER: _____

PHONE: _____

CHEMICAL DESCRIPTION					EH&S Use			
COMMON NAME:					Trade Secret?	Physical Form	Physical Type	CAAN#
CHEMICAL NAME:					[] Yes	(S/L/G/D)	(P/M/W)	CAS#
If mixture, list the 3 most hazardous components: % by wgt					[] No			
					Storage Container Code	Storage Pressure Code	Storage Temp. Code	Phys Haz
								F / P / R
								Health Haz
								Imm / Delay
Maximum One-time Amount	Daily Average Amount	Units (lbs/gal ft3/mCi)	# Days On-Site	Usage Code	If Usage Code is "Other" (#99), describe:			
					If Usage Code is "Waste" (#45),			
					Annual Amount gen.			Waste Code:
LOCATION:								

CHEMICAL DESCRIPTION					EH&S Use			
COMMON NAME:					Trade Secret?	Physical Form	Physical Type	CAAN#
CHEMICAL NAME:					[] Yes	(S/L/G/D)	(P/M/W)	CAS#
mixture, list the 3 most hazardous components: % by wgt					[] No			
					Storage Container Code	Storage Pressure Code	Storage Temp. Code	Phys Haz
								F / P / R
								Health Haz
								Imm / Delay
Maximum One-time Amount	Daily Average Amount	Units (lbs/gal ft3/mCi)	# Days On-Site	Usage Code	If Usage Code is "Other" (#99), describe:			
					If Usage Code is "Waste" (#45),			
					Annual Amount gen.			Waste Code:
LOCATION:								

CHEMICAL DESCRIPTION					EH&S Use			
COMMON NAME:					Trade Secret?	Physical Form	Physical Type	CAAN#
CHEMICAL NAME:					[] Yes	(S/L/G/D)	(P/M/W)	CAS#
If mixture, list the 3 most hazardous components: % by wgt					[] No			
					Storage Container Code	Storage Pressure Code	Storage Temp. Code	Phys Haz
								F / P / R
								Health Haz
								Imm / Delay
Maximum One-time Amount	Daily Average Amount	Units (lbs/gal ft3/mCi)	# Days On-Site	Usage Code	If Usage Code is "Other" (#99), describe:			
					If Usage Code is "Waste" (#45),			
					Annual Amount gen.			Waste Code:
LOCATION:								

HAZARDOUS MATERIALS INVENTORY CODES

PHYSICAL FORM	PHYSICAL TYPE
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L Liquid	M Mixture
G Gas	W Waste
D Dust	

STORAGE PRESSURE	STORAGE TEMPERATURE
1 Room (ambient) Pressure	4 Room (Ambient) Temperature
2 Greater than Ambient Press	5 Greater than Ambient Temperature
3 Less than Ambient Pressure	6 Less than Ambient Temperature
	7 Cryogenic Conditions

STORAGE CONTAINER	
A Aboveground Tank	J Bag
B Underground Tank	K Box
C Tank Inside Building	L Cylinder
D Steel Drum	M Glass Bottles/Jugs
E Plastic/Non-Metallic Drum	N Plastic Bottles/Jugs
F Can	O Tote Bin
G Carboy	P Tank Wagon
H Silo	Q Rail Car
I Fiber Drum	R Other

UNITS	
lb	pound
gal	gallon
ft3	cubic feet
mCi	millicurie

USAGE	
01 Additive	26 Herbicide
02 Adhesive	27 Insecticide
03 Aerosol	28 Instructional
04 Anesthetic	29 Lubricant
05 Bactericide	30 Medical Aid or Process
06 Blasting	31 Neutralizer
07 Carrier/Processing Solvent	32 Painting
08 Catalyst	33 Pesticide
09 Cleaning	34 Plating
10 Coolant	35 Preservatives
11 Cooling	36 Intermediate Process
12 Distillation	37 Raw Material
13 Drilling	38 Refining
14 Drying	39 Sealer
15 Emulsifier	40 Spraying
16 Etching	41 Sterilizer
17 Experimental	42 Storage
18 Fabrication	43 Stripper
19 Fertilizer	44 Washing
20 Finished Product	45 Waste
21 Formulation	46 Water Treatment
22 Fuel	47 Welding/Soldering
23 Fungicide	48 Well Injection
24 Grinding	99 Other — specify
25 Heating	

WASTE CLASSIFICATION	
TOX	Toxic
IGN	Ignitable
COR	Corrosive
REA	Reactive
EHM	Extremely Hazardous Material

10. Appendix C - Misc. Notes

ORACLE

UCSF
BRAD MAR

Quote #: 147219

Page: 1 of 2

Effective Date: 23-APR-97

Customer

ORACLE CONTRACT INFORMATION

[] Agreement:

Effective Date:

DESIGNATED SYSTEM

Make/Model: MS

Media Type: CD STANDARD

Operating System: WINDOWS NT

CSI Number:

Qty Shipped	License Level	Programs	Quantity & License Type	List Each	Disc.	Extended Net
1	Full Use	Oracle Workgroup Server	10 Concur Dev	2,950.00	20%	2,360.00
1	Full Use	Professional Developer/2000	1 Concur Dev	4,390.00	20%	3,512.00
Sub Total:						5,872.00
Initial 1 Year Silver Annual Technical Support				3,440.00	67.6%	1,115.68
12	Training Units			400.00	20%	3,840.00
Total License Fee Due:						5,872.00
Total Technical Support Fee Due:						1,115.68
Total Additional Fees Due:						3,840.00
Total Fees Due:						10,827.68 USD

"Concurrent Devices": the maximum number of input devices accessing the Programs at any given point in time. If multiplexing software or hardware (e.g., a TP Monitor, webserver product) is used, this number must be measured at the multiplexing front-end.

TECHNICAL SUPPORT

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Understanding an

MSDS

CANADIAN CENTRE FOR OCCUPATIONAL HEALTH AND SAFETY



A Material Safety Data Sheet (MSDS) provides basic information on a material or chemical product. This includes the properties and potential hazards of the material, how to use it safely, and what to do in an emergency. The purpose of this document is to assist Canadian employees in understanding and interpreting this type of information.

The MSDS is an essential starting point for the development of a complete health and safety program for the material. MSDSs are prepared by the manufacturer or supplier of the material. They tend to be general in nature, since they provide summarized information which tries to address all reasonably anticipated uses of the material.

The information on MSDSs is organized into sections. The specific names and content of these sections can vary from one supplier's MSDS to another, but are often similar to the 16 sections of the ANSI Standard MSDS, listed below. If you are using a 9-section data sheet, the types of information appearing are addressed in this document, although they may be in a different order and under slightly different headings.

1 CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

The product identifier (normally the product name) appears both on the MSDS and on the WHMIS label. To locate the correct MSDS, always use the product identifier, not a shortened name that may be used at your workplace. Check that the name of the manufacturer and/or supplier matches the label as well. The MSDS and label may also display other identification, such as a product code or catalog number.

The date the MSDS was prepared (or the last time it was reviewed or revised) is also indicated. The data sheet will be updated when new information becomes available. You should check that the MSDS you are using is less than 3 years old. If it isn't, an updated data sheet needs to be requested from the supplier or manufacturer. You can use the manufacturer and/or distributor telephone number(s) provided to obtain more safe handling information if you need it.

2 COMPOSITION, INFORMATION ON INGREDIENTS

Specific potentially hazardous chemical components of the product are listed in this section along with the approximate amount (percentage) of each. CAS numbers for the ingredients are usually included as well. These are unique identifiers for chemicals, assigned by the Chemical Abstracts Service (CAS) of the American Chemical Society. Since a chemical can have many different names, this number can be very useful when trying to find more information.

Exposure limits, if available, are given for each component. Typically these are occupational exposure limits such as TLVs (Threshold Limit Values), published by the American Conference of Governmental Industrial Hygienists (ACGIH). Some manufacturers provide their own recommended exposure limits for their products. Legal (regulated) exposure limits in your jurisdiction (provincial or federal) may be different from those listed on the MSDS. Health and safety professionals use exposure limits as standards when air sampling is conducted.

Other information about the ingredients, for example the LD50 and/or the LC50, may also be included in this section. These values are obtained from toxicity testing using experimental animals and are used to indicate the short-term poisoning potential of a material (the lower the value, the more toxic the material). LD50 (lethal dose 50%) is the amount of a material, given all at once, which causes the death of 50% of a group of test animals. The LD50 can be determined using any route of exposure, but dermal (applied to skin) and oral (given by mouth) LD50s are most common. If the route of exposure is inhalation, the value is called an LC50, which stands for lethal (airborne) concentration 50%.

3 HAZARDS IDENTIFICATION

The Hazards Identification section describes the ways you may be exposed to the material and the harmful health effects it can have. These may include effects that have been observed in experimental animals, if they are considered relevant to people.

Routes of Entry (Primary Routes of Exposure)

This section describes how you can be exposed to the material. In designing ways to minimize exposure, each Route of Entry needs to be considered. Chemicals can cause harm either at the point of contact, by absorption into the body, or both. Chemicals absorbed into the body can affect body systems and organs far away from the point of entry. For example, phenol absorbed through the skin can cause fatal nervous system and kidney injury.

The possible routes of exposure are skin contact, eye contact, inhalation (respiratory system), and ingestion (swallowing). How important each route of entry is for a particular material depends on many factors, such as the physical properties of the material and how it is used.

Effects of Acute Exposure to Product

An acute exposure is one that takes place over a short period of time (minutes, hours or days). Health effects caused by an acute exposure are usually seen at the time of exposure. Sometimes, they may not appear for several hours or even days after an exposure.

You need information on the typical effects of a short-term exposure (signs and symptoms) because they can alert you that you are



being accidentally exposed. Any symptoms you experience which may be associated with use of a material should be reported so that your workplace can be investigated to find out the cause. Possible reasons for the symptoms can vary widely. For example, perhaps the material has passed through your gloves, or the ventilation system is not working effectively. Sometimes the symptoms may not be related to an exposure at work—they may be caused by a cold, for example.

Effects of Chronic Exposure to Product

A chronic exposure is a long-term exposure (months or years). Chronic exposures may be described as prolonged, meaning very long, or repeated, meaning many exposures. Any illness related to a chronic exposure may develop very slowly or may not appear until many years after the exposure has stopped. You should be aware that at the time of the exposure you may experience no warning symptoms, but an illness possibly related to the exposure may appear months or years later. If these types of effects are possible for the material you are handling, it is especially important to minimize your exposure by following established safe handling procedures.

* * * * *

The health effects information in the Hazards Identification section of the MSDS should be considered general since a particular material will not affect everyone the same way. In addition, the way in which a material is used or handled in a particular workplace will influence the degree of the health hazard.

As you read MSDSs from different suppliers, you will see that they are not all written in the same way. Most provide information on health effects which would reasonably be anticipated under conditions of normal use, spills or emergencies. Others provide *worst case* information, describing any known health effect which may possibly occur at any dose, by any route of exposure. Because of these different approaches, one must be cautious in assuming that a certain product is more or less hazardous than another on the basis of information given in this section.

4 FIRST AID MEASURES

The First Aid Measures section describes actions to be taken immediately in case you are accidentally exposed to the material. The purpose of first aid is to minimize injury and future disability. In serious cases, first aid may be necessary to keep the victim alive.

First aid information needs to be known before you start working with the material. There is no time to find and read the MSDS during an emergency. First aid procedures should be periodically reviewed, especially by employees trained to give first aid. All employees should know the location of the facilities and equipment for providing first aid; for example, the eyewash fountains, safety showers and first aid kits.

When medical treatment is necessary, send the MSDS, if it is readily available, to the emergency facility with the victim. If the MSDS is not available, you should send the material's label or a labelled container of the material, if it is small enough. The medical personnel need to know what the material is and what first aid measures have been recommended and used. Occasionally, the MSDS has additional instructions (or a *Note to Physician*) which may be useful to the emergency doctor.

5 FIRE FIGHTING MEASURES

This section describes any fire hazards associated with the material. The information can be used to select the appropriate type of fire

extinguishers and to plan the best response to a fire for a particular work site. Much of the information is intended for firefighters and emergency response personnel. If the material is a potential fire hazard, you should refer to section 7 for special handling precautions.

The information in this section, combined with information from Handling & Storage and the Stability & Reactivity Data sections, can be used in determining where a certain material should be stored (for example, flammable liquids should be stored in specially designed facilities away from incompatible chemicals).

6 ACCIDENTAL RELEASE MEASURES

General instructions for responding to an accidental release or cleaning up a spill are provided in this section. Specific information, such as recommended absorbent materials for spill cleanup, may be included. The information is intended to be used mainly by emergency responders and environmental professionals.

7 HANDLING AND STORAGE

In this section, you will find general precautions necessary for the safe handling of the material, including any equipment that may be required. All possible hazards (fire, reactivity and health) need to be considered when developing safe handling procedures. For example, for dispensing a flammable liquid, the MSDS may suggest electrical grounding and bonding of containers.

Storage recommendations in this section provide a good starting point for deciding where and how materials should be stored. Refer also to the Fire Fighting Measures and the Stability & Reactivity sections of the MSDS.

Much of the information in this section is intended for occupational health and safety professionals or those responsible for designing safe storage/handling facilities.

8 EXPOSURE CONTROLS, PERSONAL PROTECTION

This section provides information which is used to develop procedures and practices for working safely with the material. Most MSDSs are written to address all reasonably anticipated uses of the material. Because they must address such a wide range of usage situations, the information may not be entirely applicable to your job. A health and safety professional can help you in interpreting the information and assessing its relevance.

Engineering Controls

Engineering control systems reduce potential hazards either by isolating the hazard or by removing the hazard from the work environment. They either control the potential hazard at its source (local exhaust ventilation), remove it from the general area (general ventilation) or put up a permanent barrier between the worker and the potential hazard (isolation or enclosure). Engineering control systems are important because they are built into the work process to reduce the hazards automatically.

Substitution of a less hazardous material or industrial process is always the best way to reduce a hazard and should be considered first. Engineering control systems are the next best option and are preferred over other control measures such as the use of personal protective equipment.

You need to make sure that engineering control systems recommended for your job are properly checked and maintained and that they are



operating when you are working with the material. If there are changes in the process or materials, the controls may have to be changed as well.

Personal Protective Equipment

General guidance is provided on the need for and selection of personal protective equipment.

Protective Clothing

Protective clothing includes items such as gloves, aprons, full body suits, and boots. The MSDS should tell you the types of rubbers or other materials that provide the best protection against the product you are using. No one material acts as a barrier to all chemicals. It is also important to consider the temperature conditions and the need for materials not easily cut or torn. Sometimes, the MSDS may simply advise you to use impervious (resistant) materials. In this case, you need to find out which specific materials are best. You may be able to obtain this information from the product supplier or manufacturer or from a protective clothing supplier or manufacturer. It is also important to maintain your protective clothing or gloves properly and replace them when necessary.

Eye Protection

Depending on the job you are doing and the type of material you are handling, you may need various levels of eye protection (e.g. safety glasses, chemical safety goggles, a face shield or some combination of these).

Respiratory Protection

There are many different types of respirators. One type may be effective against some chemicals but may provide little or no protection against others. Selecting the best respirator for you can be quite complicated. Usually a qualified person must carry out a detailed assessment of the workplace, including all chemicals used and their airborne concentrations and forms. Consequently, complete respiratory protection guidelines generally cannot be given on the MSDS.

If respirators are required at your work site, a complete respiratory protection program including respirator selection, fit testing, training and maintenance is necessary. The relevant regulatory and consensus standards should be consulted.

PHYSICAL AND CHEMICAL PROPERTIES

You should check that the description (physical state and appearance) of the material is the same as the material you have. If it isn't, you may not have the correct MSDS. Alternatively, the material may be old or may have decomposed during shipping or storage. In either case, the information on the MSDS may not apply, and you should obtain additional advice.

The rest of the information in this section is used to help determine the conditions under which the material may be hazardous. Technical specialists use this information to develop specific work site procedures for exposure control, storage, handling, spill clean-up, etc.

STABILITY AND REACTIVITY

This section of the MSDS describes any conditions under which the material is unstable or can react dangerously. Unstable materials may break down (decompose) and cause fires or explosions or cause the formation of new chemicals which have different hazards. Conditions such as heat, sunlight, and aging of the chemical may cause unstable chemicals to break down.

Some chemicals are hazardous because they can "polymerize" or undergo a chain reaction. This reaction may generate a lot of heat, may generate enough pressure to burst a container, or may be explosive.

Chemicals that can decompose or polymerize often contain additives called stabilizers or inhibitors which reduce or eliminate the possibility of a hazardous reaction.

Incompatible materials are materials which may react violently or explosively if mixed or brought together. These materials should be stored separately and should not be mixed unless special procedures are followed.

You need to be aware of the information in this section so you can store and handle the material safely and avoid mixing incompatible materials.

TOXICOLOGICAL INFORMATION

This section of the MSDS contains toxicity information, either for the ingredients of the product or the product as a whole. This information can be quite technical and difficult to interpret. If you are uncertain whether the information is relevant to your workplace and your job, you should ask a knowledgeable health and safety professional. When reading about the effects of the material on animals, it is important to remember that the effects are not necessarily the same for people.

Irritancy of Product

Some products can cause irritation (reversible reddening, swelling and pain) if they come into direct contact with the skin, eyes or respiratory tract (nose, breathing airways and lungs). If there is information available about irritancy of the product, for example from tests on experimental animals, it will be indicated in this section.

Sensitization to Product

Sensitization is the development, over time, of an allergic reaction to a chemical. "Sensitizers" may cause a mild response on the first few exposures but, as the allergy develops, the response becomes worse with subsequent exposures. Eventually, even short exposures to low concentrations can cause a very severe reaction.

There are two different types of occupational sensitization: skin and respiratory. Typical symptoms of skin sensitivity are swelling, redness, itching, pain, and blistering. Sensitization of the respiratory system may result in symptoms similar to a severe asthmatic attack. These symptoms include wheezing, difficulty in breathing, chest tightness, coughing and shortness of breath.

Carcinogenicity

Materials are identified as carcinogens if they are recognized as carcinogens by the American Conference of Governmental Industrial Hygienists (ACGIH), or the International Agency for Research on Cancer (IARC). The lists of carcinogens published by these organizations include known human carcinogens and some materials which cause cancer in animal experiments. Certain chemicals may be listed as suspect or possible carcinogens if the evidence is limited or inconclusive.

Reproductive Toxicity

Reproductive toxicity is defined under WHMIS as effects on the reproductive process in adult males and/or females, which may be caused by a substance. Possible reproductive effects include reduced fertility and menstrual changes.



Teratogenicity and Embryotoxicity

A teratogen is a substance which can cause birth defects. An embryotoxin is a substance which can cause toxic effect on the developing embryo. Both teratogenicity and embryotoxicity result from a harmful effect on the embryo or the fetus during pregnancy.

Most chemicals can cause teratogenic/embryotoxic effects if there is an extremely high exposure. In these cases, the exposed person would experience other noticeable signs and symptoms caused by the exposure. Chemicals which cause teratogenic/embryotoxic effects in the absence of other significant harmful effects are regarded as true teratogens/embryotoxins. Pregnant women need to be particularly careful to minimize their exposure to these materials.

Mutagenicity

A mutagen is a substance which can cause changes (mutations) in the DNA of cells. DNA determines the characteristics that children inherit from their parents and also determines how cells in the body divide or reproduce. Mutagenicity is the ability of a substance to cause mutations.

A number of laboratory tests are used to screen chemicals for possible mutagenic effects which may also be linked to carcinogenic, teratogenic or reproductive risks. In themselves, mutagenicity test results may not reliably predict the risk to humans since the human body can eliminate mutagens and repair many mutations. Mutagenicity is included on the MSDS because it is an early indicator of potential hazard.

Name of Toxicologically Synergistic Products

Synergism means that exposure to more than one chemical over the same period of time can result in health effects greater than expected when the effects of exposure to each chemical are added together. Very simply, it is like saying $1 + 1 = 3$. When chemicals are synergistic, the potential hazards of the chemicals should be reevaluated, taking their synergistic properties into consideration. It is important to know whether certain combinations of chemicals may cause health effects which are more severe than might be anticipated by considering the effects of each chemical separately.

* * * * *

If the product you are using contains skin or respiratory sensitizers, carcinogens or reproductive toxins, following safe handling practices and procedures is particularly important so that you minimize your exposure.

12 ECOLOGICAL INFORMATION

No ecological information is specifically required under WHMIS. If included, this section contains data that is useful in evaluating the environmental impact of the material if it is released (e.g. toxicity to fish, birds, plants and micro-organisms). This information is intended mainly for environmental professionals and other company staff evaluating use, disposal or spill control.

13 DISPOSAL CONSIDERATIONS

This section of the MSDS is intended mainly for environmental professionals. General waste disposal information will normally be included. The MSDS does not usually contain all the steps and precautions necessary for adequate hazardous waste disposal. As well, the MSDS often does not give the federal, provincial, or local regulations which must be followed. The appropriate authorities for your area should be contacted for this information.

14 TRANSPORT INFORMATION

This section of the MSDS is intended for those responsible for shipping the material. If there are special precautions necessary during shipment, they will be provided. The TDG (Transportation of Dangerous Goods) PIN number (product identification number) will also be provided if the product meets the TDG criteria. The supplier may also include the TDG classification.

15 REGULATORY INFORMATION

Information in this section is aimed primarily at regulatory compliance personnel. Useful references to applicable health, safety and environmental laws and regulations may be provided, along with information on the regulatory status of the product. The WHMIS classification for the product may also be given.

16 OTHER INFORMATION

This section is used to provide supplementary information which the author of the data sheet considers important for the safe use of the material. Reference sources used in preparing the data sheet are sometimes listed.



It is important to remember that an MSDS is not a complete source of health and safety information on its own but should be seen as a starting point in developing safe handling practices and procedures. Always refer to your company's safety rules and procedures for more information.

The Canadian Centre for Occupational Health and Safety (CCOHS) produces several chemical databases on CD-ROM including a large MSDS database and CHEMINFO, which provides comprehensive, summarized chemical information. Many terms used on MSDSs are explained in the CCOHS publication "The Material Safety Data Sheet—An Explanation of Common Terms." Other publications and databases relating to MSDSs and hazardous materials are also available. For further information, call 1-800-668-4284.

Prepared by the Canadian Centre for Occupational Health and Safety (CCOHS) in collaboration with the Canadian Association of Chemical Distributors (CACD).

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METHYL CHLOROFORMSee 1, 1, 1-TRI-
CHLOROETHANE**METHYL CYANIDE**

See ACETONITRILE

METHYLCYCLOPENTANE $C_5H_9CH_3$

DESCRIPTION: Colorless liquid.

FIRE AND EXPLOSION HAZARDS: Flammable liquid. Vapor forms flammable mixtures with air. Flash point, below 20° F. Flammable limits, 1.0% and 8.4%. Ignition temperature, 614° F (323° C). Liquid is lighter than water (specific gravity, 0.8). Vapor is heavier than air (vapor-air density at 100° F, 2.9) and may travel a considerable distance to a source of ignition and flash back. Boiling point, 161° F. Not soluble in water.

LIFE HAZARD: Narcotic in high concentrations.

PERSONAL PROTECTION: Wear self-contained breathing apparatus.

FIRE FIGHTING PHASES: Use dry chemical, foam, or carbon dioxide. Water spray may be ineffective as an extinguishing agent (see Explanatory), but water should be used to keep fire-exposed containers cool. If a leak or spill has not ignited, use water spray to disperse the vapors and to protect men attempting to stop a leak. Water spray may be used to flush spills away from exposures.

USUAL SHIPPING CONTAINERS: Glass bottles, cans, steel drums.

STORAGE: Protect against physical damage. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room. Separate from oxidizing materials.

REMARKS: Electrical installations in Class I hazardous locations as defined in Article 500 of the National Electrical Code should be in accordance with Article 501 of the Code; and electrical equipment should be suitable for use in atmospheres containing methylcyclopentane. See Flammable and Combustible Liquids Code (NFPA No. 30) and National Electrical Code (NFPA No. 70).

**METHYLDICHLOROSILANE** CH_3HSiCl_2

DESCRIPTION: Colorless liquid with an acrid odor.



FIRE AND EXPLOSION HAZARDS: Flammable liquid. Vapor forms flammable mixtures with air. Flash point, approximately 15° F. Flammable limits, 6.0% and 55%. Ignition temperature, greater than 600° F. Liquid is heavier than water (specific gravity, greater than 1.1). Moist air causes white fumes to be evolved containing hydrogen chloride. Reacts violently with water to form hydrochloric acid (see Hydrogen Chloride). Releases hydrogen in an alkaline mixture.

LIFE HAZARD: Vapor and liquid cause skin burns; toxic on inhalation. Reacts violently with water to form hydrochloric acid (see Hydrogen Chloride).

PERSONAL PROTECTION: Wear full protective clothing.

FIRE FIGHTING PHASES: Use dry chemical or carbon dioxide to extinguish small fires. Flooding with water may be necessary to prevent reignition. Water may be used if large amounts of combustible material are involved and if fire fighters can protect themselves by distance or barriers from the violent methylchlorosilane-water reaction. Water may be used to keep fire-exposed containers cool.

USUAL SHIPPING CONTAINERS: 55-gallon drums; 1-gallon glass bottles.

STORAGE: Protect against physical damage. Outside or detached storage is preferred. Inside storage should be in a standard flammable liquids storage room or cabinet. Separate from oxidizing materials.

REMARKS: Spills can be neutralized by flushing with large quantities of water followed by treatment with sodium bicarbonate. Provide adequate protection against generated hydrogen chloride. Do not allow water to get in container since resulting pressure could cause the container to rupture.

Electrical installations in Class I hazardous locations, as defined in Article 500 of the National Electrical Code, should be in accordance with Article 501 of the Code; and electrical equipment should be suitable for use in atmospheres containing methyldichlorosilane vapors. See National Electrical Code (NFPA No. 70) and Flammable and Combustible Liquids Code (NFPA No. 30).

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**** MATERIAL SAFETY DATA SHEET ****

Sodium Carbonate Monohydrate
89754

**** SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION ****

MSDS Name: Sodium Carbonate Monohydrate
Catalog Numbers:
41948-0010, 41.948.44, 1080209, EK 108 0209

Synonyms:
Disodium carbonate monohydrate
Company Identification: Acros Organics
Janssen Pharmaceuticaal 3a

For information in North America, call: 800-ACROS-01
For information in Europe, call: 0032(0) 14573211
For emergencies in the US, call: CHEMTREC 800-424-9300
For emergencies outside the US, call: 0032(0) 14573299

**** SECTION 2 - COMPOSITION, INFORMATION ON INGREDIENTS ****

CAS#	Chemical Name	%	Einecs#
5968-11-6	Sodium carbonate monohydrate	100	unlisted

**** SECTION 3 - HAZARDS IDENTIFICATION ****

EMERGENCY OVERVIEW

Appearance: Colorless to white crystalline powder or granules. Warning
Concentrated solutions are corrosive. May cause severe eye and skin
irritation and possible burns. May cause severe respiratory and diges-
tive tract irritation.

Target Organs: None.

Potential Health Effects

Eye: Contact with eyes may cause severe irritation, and possible eye
burns.

Skin: Contact with skin causes irritation and possible burns, especially
if the skin is wet or moist.

Ingestion: May cause irritation of the digestive tract.

Inhalation: May cause irritation of the respiratory tract with burning pain in
the nose and throat, coughing, wheezing, shortness of breath and
pulmonary edema.

Chronic:

Not available.
Prolonged or repeated contact with concentrated solutions causes
tissue damage. "Soda ulcers" on the hands and perforation of the
nasal septum have occurred.

**** SECTION 4 - FIRST AID MEASURES ****

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes,
occasionally lifting the upper and lower lids.
Get medical aid immediately.

Skin: Flush skin with plenty of soap and water for at least 15 minutes
while removing contaminated clothing and shoes.
Get medical aid if irritation develops or persists.

Ingestion: Do NOT induce vomiting.
If victim is conscious and alert, give 2-4 cups of milk or water.
Never give anything by mouth to an unconscious person.
Get medical aid.

Inhalation: Remove from exposure to fresh air immediately. If not breathing,
begin artificial respiration. If breathing is difficult, give oxygen.
Get medical aid if cough or other symptoms appear.

Notes to Physician:

Treat symptomatically and supportively.

None reported

**** SECTION 5 - FIRE FIGHTING MEASURES ****

General Information:

Material will not burn.
Wear appropriate protective clothing to prevent contact with skin
and eyes. Wear a self-contained breathing apparatus (SCBA) to
prevent contact with thermal decomposition products.

Extinguishing Media:
Substance is noncombustible; use agent most appropriate to
extinguish surrounding fire.

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Autoignition Temperature: Not available.
Flash Point: Not available.
Explosion Limits: Lower: Not available.
Upper: Not available.

**** SECTION 6 - ACCIDENTAL RELEASE MEASURES ****

General Information: Use proper personal protective equipment as indicated
in Section 8.

Spills/Leaks: Vacuum or sweep up material and place into a suitable disposal
container.

**** SECTION 7 - HANDLING AND STORAGE ****

Handling:

Wash thoroughly after handling.
Remove contaminated clothing and wash before reuse.
Do not get in eyes, on skin, or on clothing.
Keep container tightly closed.
Avoid ingestion and inhalation.

Storage:

Store in a tightly closed container.
Store in a cool, dry, well-ventilated area away from incompatible
substances.

**** SECTION 8 - EXPOSURE CONTROLS, PERSONAL PROTECTION ****

Engineering Controls:

Good general ventilation should be sufficient to control airborne
levels.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Sodium carbonate mo- nohydrate	none listed	none listed	none listed

OSHA Vacated PELs:

Sodium carbonate monohydrate:
No OSHA Vacated PELs are listed for this chemical.

Personal Protective Equipment

Eyes:

Wear chemical goggles and face shield.

Skin:

Wear appropriate protective gloves and clothing to
prevent skin exposure.

Clothing: Wear appropriate protective clothing to minimize
contact with skin.

Respirators: Follow the OSHA respirator regulations found in 29CFR
1010.134. Always use a NIOSH-approved respirator when
necessary.

**** SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES ****

Physical State:

Appearance: Solid

Colorless to white crystalline powder or granules.

Odor: Odorless

pH: 11.6 (1% solution)

Vapor Pressure: Not available.

Density: Not available.

Evaporation Rate: Not available.

Viscosity: Not available.

Boiling Point: Not available.

Freezing/Melting Point: 212 °F

Decomposition Temperature: Not available.

Solubility: 33% in water

Specific Gravity/Density: 2.25

Molecular Formula: Na2CO3.H2O

Molecular Weight: 123.9912

**** SECTION 10 - STABILITY AND REACTIVITY ****

Chemical Stability:

Stable.

Conditions to Avoid:

Incompatible materials:

Incompatibilities with Other Materials:
Reacts explosively with red-hot aluminum metal. Incompatible with
acids, strong oxidizing agents, nitric acid, 2,4-dinitrotoluene,
sulfuric acid, sodium sulfide, water, lithium, phosphorus pentoxide,
and fluorine.
Hazardous Decomposition Products:

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SECTION I - PRODUCT IDENTIFICATION

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PRODUCT NAME: METHANOL
COMMON SYNONYMS: METHYL ALCOHOL; WOOD ALCOHOL; CARBINOL; METHYLOL; WOOD SPIRIT
CHEMICAL FAMILY: ALCOHOLS
FORMULA: CH₃OH
FORMULA WT.: 32.04
CAS NO.: 67-56-1
NIOSH/RTECS NO.: PC1400000
PRODUCT USE: LABORATORY REAGENT
PRODUCT CODES: 9075,5807,9093,9063,9072,5370,5217,5842,9098,5811,9091,9068
9070,9049,9077,5536,6808,9073,9090,9071,9090,9127,9069,9076
9074,P704,9263

=====

PRECAUTIONARY LABELING

=====

BAKER SAF-T-DATA* SYSTEM

HEALTH	-	3	SEVERE (POISON)
FLAMMABILITY	-	4	EXTREME (FLAMMABLE)
REACTIVITY	-	1	SLIGHT
CONTACT	-	1	SLIGHT

LABORATORY PROTECTIVE EQUIPMENT

GOGGLES & SHIELD; LAB COAT & APRON; VENT HOOD; PROPER GLOVES; CLASS B EXTINGUISHER

U.S. PRECAUTIONARY LABELING

POISON DANGER
FLAMMABLE. HARMFUL IF INHALED. CANNOT BE MADE NON-POISONOUS. MAY BE FATAL OR CAUSE BLINDNESS IF SWALLOWED.
KEEP AWAY FROM HEAT, SPARKS, FLAME. DO NOT GET IN EYES, ON SKIN, ON CLOTHING. AVOID BREATHING VAPOR. KEEP IN TIGHTLY CLOSED CONTAINER. USE WITH ADEQUATE VENTILATION. WASH THOROUGHLY AFTER HANDLING. IN CASE OF FIRE, USE ALCOHOL FOAM, DRY CHEMICAL, CARBON DIOXIDE - WATER MAY BE INEFFECTIVE. FLUSH SPILL AREA WITH WATER SPRAY.

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PRECAUTIONARY LABELING (CONTINUED)

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INTERNATIONAL LABELING

HIGHLY FLAMMABLE. TOXIC BY INHALATION AND IF SWALLOWED.
KEEP OUT OF REACH OF CHILDREN. KEEP CONTAINER TIGHTLY CLOSED. KEEP AWAY FROM
SOURCES OF IGNITION - NO SMOKING. AVOID CONTACT WITH SKIN.

SAF-T-DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

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SECTION II - COMPONENTS

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COMPONENT	CAS NO.	WEIGHT %	OSHA/PEL	ACGIH/TLV
METHANOL	67-56-1	90-100	200 PPM	200 PPM

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SECTION III - PHYSICAL DATA

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BOILING POINT: 65 C (149 F)
(AT 760 MM HG)

VAPOR PRESSURE (MM-HG): 96
(20 C)

MELTING POINT: -98 C (-144 F)
(AT 760 MM HG)

VAPOR DENSITY (AIR=1): 1.11

SPECIFIC GRAVITY: 0.79
(H2O=1)

EVAPORATION RATE: 4.6
(BUTYL ACETATE = 1)

SOLUBILITY(H2O): COMPLETE (100%)

% VOLATILES BY VOLUME: 100
(21 C)

PH: N/A

ODOR THRESHOLD (P.P.M.): N/A

PHYSICAL STATE: LIQUID

COEFFICIENT WATER/OIL DISTRIBUTION: N/A

APPEARANCE & ODOR: CLEAR, COLORLESS LIQUID. PUNGENT ODOR.

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SECTION IV - FIRE AND EXPLOSION HAZARD DATA

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FLASH POINT (CLOSED CUP): 12 C (54 F)

NFPA 704M RATING: 1-3-0

AUTOIGNITION TEMPERATURE: 463 C (867 F)

FLAMMABLE LIMITS: UPPER - 36.0 % LOWER - 6.0 %

FIRE EXTINGUISHING MEDIA

USE ALCOHOL FOAM, DRY CHEMICAL OR CARBON DIOXIDE. (WATER MAY BE INEFFECTIVE.)

SPECIAL FIRE-FIGHTING PROCEDURES

FIREFIGHTERS SHOULD WEAR PROPER PROTECTIVE EQUIPMENT AND SELF-CONTAINED BREATHING APPARATUS WITH FULL FACEPIECE OPERATED IN POSITIVE PRESSURE MODE. MOVE CONTAINERS FROM FIRE AREA IF IT CAN BE DONE WITHOUT RISK. USE WATER TO KEEP FIRE-EXPOSED CONTAINERS COOL.

UNUSUAL FIRE & EXPLOSION HAZARDS

VAPORS MAY FLOW ALONG SURFACES TO DISTANT IGNITION SOURCES AND FLASH BACK. CLOSED CONTAINERS EXPOSED TO HEAT MAY EXPLODE. CONTACT WITH STRONG OXIDIZERS MAY CAUSE FIRE. BURNS WITH A CLEAR, ALMOST INVISIBLE FLAME.

TOXIC GASES PRODUCED

CARBON MONOXIDE, CARBON DIOXIDE, FORMALDEHYDE

EXPLOSION DATA-SENSITIVITY TO MECHANICAL IMPACT
NONE IDENTIFIED.

EXPLOSION DATA-SENSITIVITY TO STATIC DISCHARGE
YES.

=====

SECTION V - HEALTH HAZARD DATA

=====

THRESHOLD LIMIT VALUE (TLV/TWA): 260 MG/M (200 PPM)

THE TLV LISTED DENOTES TLV (SKIN).

SHORT-TERM EXPOSURE LIMIT (STEL): 310 MG/M (250 PPM)

PERMISSIBLE EXPOSURE LIMIT (PEL): 260 MG/M (200 PPM)

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SECTION V - HEALTH HAZARD DATA (CONTINUED)

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TOXICITY OF COMPONENTS

ORAL RAT LD50 FOR METHANOL	5628 MG/KG
INTRAPERITONEAL RAT LD50 FOR METHANOL	9540 MG/KG
SUBCUTANEOUS MOUSE LD50 FOR METHANOL	9800 MG/KG
SKIN RABBIT LD50 FOR METHANOL	20 G/KG
CARCINOGENICITY: NTP: NO IARC: NO Z LIST: NO OSHA REG: NO	

CARCINOGENICITY
NONE IDENTIFIED.

REPRODUCTIVE EFFECTS
NONE IDENTIFIED.

EFFECTS OF OVEREXPOSURE

INHALATION: IS HARMFUL AND MAY BE FATAL. HEADACHE, NAUSEA, VOMITING, DIZZINESS, NARCOSIS, RESPIRATORY FAILURE, LOW BLOOD PRESSURE, CENTRAL NERVOUS SYSTEM DEPRESSION

SKIN CONTACT: IRRITATION, PROLONGED CONTACT MAY CAUSE DERMATITIS

EYE CONTACT: IRRITATION, MAY CAUSE TEMPORARY CORNEAL DAMAGE

SKIN ABSORPTION: NONE IDENTIFIED

INGESTION: IS HARMFUL AND MAY BE FATAL. BLINDNESS, HEADACHE, NAUSEA, VOMITING, DIZZINESS, GASTROINTESTINAL IRRITATION, CENTRAL NERVOUS SYSTEM DEPRESSION, HEARING LOSS

CHRONIC EFFECTS: KIDNEY DAMAGE, LIVER DAMAGE

TARGET ORGANS

EYES, SKIN, CENTRAL NERVOUS SYSTEM, GI TRACT, RESPIRATORY SYSTEM, LUNGS

MEDICAL CONDITIONS GENERALLY AGGRAVATED BY EXPOSURE

EYE DISORDERS, SKIN DISORDERS, LIVER OR KIDNEY DISORDERS

PRIMARY ROUTES OF ENTRY

INHALATION, INGESTION, EYE CONTACT, SKIN CONTACT, ABSORPTION

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SECTION V - HEALTH HAZARD DATA (CONTINUED)

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EMERGENCY AND FIRST AID PROCEDURES

INGESTION: CALL A PHYSICIAN. IF SWALLOWED, IF CONSCIOUS, GIVE LARGE AMOUNTS OF WATER. INDUCE VOMITING.

INHALATION: IF INHALED, REMOVE TO FRESH AIR. IF NOT BREATHING, GIVE ARTIFICIAL RESPIRATION. IF BREATHING IS DIFFICULT, GIVE OXYGEN. PROMPT ACTION IS ESSENTIAL.

SKIN CONTACT: IN CASE OF CONTACT, IMMEDIATELY FLUSH SKIN WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES WHILE REMOVING CONTAMINATED CLOTHING AND SHOES. WASH CLOTHING BEFORE RE-USE.

EYE CONTACT: IN CASE OF EYE CONTACT, IMMEDIATELY FLUSH WITH PLENTY OF WATER FOR AT LEAST 15 MINUTES.

SARA/TITLE III HAZARD CATEGORIES AND LISTS

ACUTE: YES CHRONIC: YES FLAMMABILITY: YES PRESSURE: NO REACTIVITY: NO

EXTREMELY HAZARDOUS SUBSTANCE: NO

CERCLA HAZARDOUS SUBSTANCE: YES CONTAINS METHANOL (RQ = 5000 LBS)

SARA 313 TOXIC CHEMICALS: YES CONTAINS METHANOL

GENERIC CLASS: GENERIC CLASS REMOVED FROM CFR: 7/1/91

TSCA INVENTORY: YES

=====

SECTION VI - REACTIVITY DATA

=====

STABILITY: STABLE HAZARDOUS POLYMERIZATION: WILL NOT OCCUR

CONDITIONS TO AVOID: HEAT, FLAME, OTHER SOURCES OF IGNITION

INCOMPATIBLES: STRONG OXIDIZING AGENTS, STRONG ACIDS, ZINC, ALUMINUM, MAGNESIUM

DECOMPOSITION PRODUCTS: CARBON MONOXIDE, CARBON DIOXIDE, FORMALDEHYDE

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SECTION VII - SPILL & DISPOSAL PROCEDURES

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STEPS TO BE TAKEN IN THE EVENT OF A SPILL OR DISCHARGE

WEAR SELF-CONTAINED BREATHING APPARATUS AND FULL PROTECTIVE CLOTHING. SHUT OFF IGNITION SOURCES; NO FLARES, SMOKING OR FLAMES IN AREA. STOP LEAK IF YOU CAN DO SO WITHOUT RISK. USE WATER SPRAY TO REDUCE VAPORS. TAKE UP WITH SAND OR OTHER NON-COMBUSTIBLE ABSORBENT MATERIAL AND PLACE INTO CONTAINER FOR LATER DISPOSAL. FLUSH AREA WITH WATER.

J. T. BAKER SOLUSORB(R) SOLVENT ADSORBENT IS RECOMMENDED FOR SPILLS OF THIS PRODUCT.

DISPOSAL PROCEDURE

DISPOSE IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL ENVIRONMENTAL REGULATIONS.

EPA HAZARDOUS WASTE NUMBER: U154 (TOXIC WASTE)

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SECTION VIII - INDUSTRIAL PROTECTIVE EQUIPMENT

=====

== VENTILATION:

USE GENERAL OR LOCAL EXHAUST VENTILATION TO MEET TLV REQUIREMENTS.

RESPIRATORY PROTECTION: RESPIRATORY PROTECTION REQUIRED IF AIRBORNE CONCENTRATION EXCEEDS TLV. THERE ARE NO CARTRIGES FOR METHANOL VAPORS. HANDLING OPERATIONS SHOULD BE CONDUCTED IN A CHEMICAL FUME HOOD. AT CONCENTRATIONS ABOVE 200 PPM, A SELF-CONTAINED BREATHING APPARATUS IS ADVISED.

EYE/SKIN PROTECTION: SAFETY GOGGLES AND FACE SHIELD, UNIFORM, PROTECTIVE SUIT, RUBBER GLOVES ARE RECOMMENDED.

=====

SECTION IX - STORAGE AND HANDLING PRECAUTIONS

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SAF-T-DATA* STORAGE COLOR CODE: RED (FLAMMABLE)

STORAGE REQUIREMENTS

KEEP CONTAINER TIGHTLY CLOSED. STORE IN A COOL, DRY, WELL-VENTILATED, FLAMMABLE LIQUID STORAGE AREA.

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