ChemTracker Consortium

INFORMATION PACKAGE

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ChemTracker Consortium Proposal

Vision: A Collaborative Chemical Inventory Management System User Group Service for the Higher Education Community

Mission: Provide a shared chemical inventory management service that includes a forum for the interchange of information and collaborative resolution of chemical inventory management issues as well as advancing the development of Environmental Health & Safety programs serving higher education.

Overview

Managing chemical inventories at colleges and universities has been identified as one of the major challenges for higher education institutions. The organizational structure and diversity of activities at colleges and universities has made resolving this issue most difficult. The creation of a "user group" of higher education organizations is intended to provide a forum for the interchange of information and creative resolution of these issues as well as provide for continued educational development of the Environmental Health & Safety programs serving colleges and universities.

ChemTracker provides technology, information and services to enable colleges, universities, and other not-for-profit organizations to efficiently manage the increasingly complex and expensive process of chemical-related compliance management. The ChemTracker Consortium includes the shared use of this service among higher education organizations via a user group forum that is intended to provide for technical information sharing and continued collaborative development of the system for the mutual benefit of the higher education organization user group.

User Group Model and Organization

The ChemTracker Consortium consists of higher education and other not-for-profit organizations that exchange information and knowledge from the collaborative use of the chemical inventory application service provided by ChemTracker.

An advisory board of no more than five representatives of the user group community will periodically convene to review suggestions and recommendations from all user group participants for program enhancements and provide recommendations regarding priority for additions and changes to the system and services offered. There shall be one representative from Stanford University and no more than one representative from each of four additional user institutions at any one time serving on the ChemTracker Consortium Advisory Board. The initial advisory board members will be invited to join the group for a term of no more than two years.

Access to the chemical inventory application is provided at a fee to recover costs for support and continued development of the service. Stanford University EH&S and the individual User Institution, based upon mutual agreement, will determine the fee. Each party that signs on as a user will ascribe to the provision of services as described in the User Service Agreement.

ChemTracker Advantages

ChemTracker provides researchers and EH&S managers with the tools they need to enhance their inventory control and regulatory reporting while simultaneously reducing the costs associated with chemical management. At the core of the service is a hosted software solution that provides chemical inventory management, using an easy-to-use web browser interface. Underlying the software is a sophisticated expert system that classifies chemicals and tracks hazardous materials inventory for regulatory reporting requirements.

The ChemTracker application is built of functional modules that address many phases of the chemical safety and compliance management process, meeting the following organizational needs:

Inventory Management
- Track materials by container, location, and owner
- Automatically link materials to an extensive safety and regulatory reference database
- Identify surplus materials to reduce waste disposal and purchasing costs

Safety Information
- View physical properties, structures, and hazard information
- Lookup Material Safety Data Sheets
- View Safety Information

Reporting

Print extensive inventory reports, including
- By Site or Facility
- By owner
- By storage location
- By hazard type
- Ad hoc query and reporting

Print regulatory reports, including
- Building and Fire code regulations (UBC/UFC)
- SARA 313 screening
- SARA 312 (Tier II) (HMBP/HMIS)
- SARA Extremely Hazardous Substances
- OSHA hazards
- Proposition 65
- Many other regulatory list-based reports

User Benefits

Reduced costs

Compliance Costs
- Reduced regulatory report production time
- Reduced use of regulatory reporting consultants
- Reduced risk of compliance fines
- Efficient use of surplus inventory to reduce purchasing and disposal costs

Facilities Costs
- Reduce construction costs through improved design analysis based on occupancy type requirements
- Obtain faster regulatory approval with standard reports and validated hazard classifications

IT Costs
- Hosted solution requires no hardware purchases
- Extremely fast enterprise-wide implementation
- System architecture facilitates easy integration with other applications

Enhanced Safety within Labs
- Eliminate duplication of chemicals ordered
- Provide for surplus chemical use on site
- Link directly with MSDS and Safety info
- Provide user friendly tools
- Readily available info for emergency response
- Improved safety information access

Enhanced EH&S information control
- Track all regulated materials by location, owner, and container
- Immediately search all inventory data on any number of criteria
- Hazard, toxicological, and physical reference data retrieval
- Immediate inventory reports from any web browser
- Bar-coding can be used to track container inventory from receiving to storage locations to disposal. (option to be developed)

Enhanced compliance
- Consistent hazard classification
- Continuous compliance feedback
- Improved regulatory reporting accuracy

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Presentation: Chemical Inventory Management via the Web

Abstract
Tracking chemical inventory is necessary for safety management as well as business compliance and is especially challenging for research and laboratory organizations. Safety and compliance, waste minimization, emergency preparedness, and facility planning all benefit from knowing what chemicals are on site, who is responsible for them, and where they are located. Stanford developed a web-based application for chemical inventory information management and compliance reporting throughout its research and service support operations. This application includes reference hazard data matched to the specific chemicals in the inventory. One-button output includes reports on regulated carcinogens and other select toxins, local hazardous materials submittals, and fire and building code classification for compliance and permitting, as well as ad hoc hazard reporting. To achieve this outcome Stanford conducted an extensive and thorough business process assessment of its chemical management and information program and operations. This paper reviews the study and evaluation techniques used, discusses the functionality of the developed system, lessons learned and other potentially valuable strategies being developed for the application.

Background
Stanford University is a large, dynamic educational and research organization. The physical campus consists of over 8100 adjacent acres located in six different governmental jurisdictions. There are 678 major buildings with over 12.5 million square feet of floor space. Stanford operates and is responsible for 46 miles of roadway, a 49-megawatt power plant with high voltage distribution lines, a heating and cooling plant, and two separate water systems with over 100 miles of water mains and three dams and lakes. There are about 1640 faculty (15 Nobel Laureates), 7,000 undergraduate students and 7600 graduate students. Full time staff number 6150, and with part time staff the number is close to 10,000. Stanford's operating budget is approximately $1.4 billion with $500 million annually spent on sponsored research on the main campus. There are approximately 2000 labs on campus with about 100 major buildings where chemicals are used and stored.

The inventory history at Stanford began in the mid-1980s with the collection of information on paper. In 1987, a desktop computer was used for transposing the data to an "xBase" database for ease of manipulation of large quantities of chemical inventory information. In the late 1980's and early 1990's, the Uniform Fire Code and Uniform Building Code, model consensus codes adopted by most jurisdictions west of the Mississippi river, incorporated quantity limits for hazardous materials that could be stored or used in building fire control areas. As a result, the need arose to ensure users of chemicals were in compliance with these new requirements. Based upon this pending regulatory driver, Stanford began an extensive review of the chemical inventory system needs, including all stakeholders in the process improvement study.

The Chemical Inventory Problem

A workable chemical inventory system is becoming an essential tool for businesses today. Multiple laws and regulations for chemicals have varied and, at times, have conflicting requirements for chemical data and information. There are over 20 regulatory reports that require the use of chemical inventory data. The most difficult to develop are reports for fire and life safety code compliance with hazardous materials limits. These reports require detailed information on the hazardous properties of each material (as defined by the fire code), the amounts of each material in defined fire separation areas within a building and aggregation of the amount of each hazardous substance by hazard category in a defined spatial area (the fire control area) of the building..

Methods for collecting inventory data range from use of paper and index cards to computerized systems. The real challenge, however, is to link the chemical container information to hazard reference data and to building spatial data to meet regulatory reporting requirements. Data management challenges also include the need to aggregate chemicals by their hazard category, rather than solely by chemical name. Existing commercial applications were unable to accomplish these tasks.

Study Project Findings

The chemical inventory process was defined as a core administrative information system need at Stanford. As such, a project to clearly identify system needs was undertaken. This involved extensive benchmarking with approximately 50 institutions ranging from other academic facilities to private companies. The key findings from the benchmarking were: 1) every institution has some "system" for identifying chemicals but the accuracy or ease of use of existing systems was questioned in all cases by the owners of the systems and all were looking for a better solution; 2) there was no good, single source of hazard reference data available; and, 3) most chemical purchasing transactions are for replacement chemicals rather than new unique materials.

From internal stakeholder meetings, it was determined that for any system to be effective it must generate compliance as a by-product of conducting the core business, allow flexible implementation and maintenance of data, and provide value to the core business user. It must also be adaptable to new regulatory requirements, be sustainable and scalable for the long-term use, and integrate with purchasing and space management systems. This study led to the development of an improved process for chemical inventory on campus. It also resulted in an extensive list of functional requirements necessary for any system to meet both the institutional need for a compliance management tool, as well as a system for maintaining chemical inventories by laboratories and other chemical use sites on campus. The goal was to identify an existing commercial system to meet Stanford's needs. However, after extensive review of all existing systems, and several RFP processes, no available solution currently existed that would meet the functional and program needs identified in the project.

It was at this point that Stanford EH&S decided to develop a web-based chemical inventory and reporting system. Utilizing contracted programming support working very closely with subject matter experts a web-based system was developed over a 10-month period and subsequently introduced to the campus. This system, previously known as the Stanford Chemical Inventory Management System (SCIMS), has evolved into the system known today as ChemTracker.

ChemTracker System

ChemTracker implements a system of users, chemical owners and groups. All chemicals and materials are linked to a "chemical owner." This distinction allows users of different categories to access the information necessary to perform their responsibilities. Environmental Health & Safety personnel may have access to all inventory, all reporting
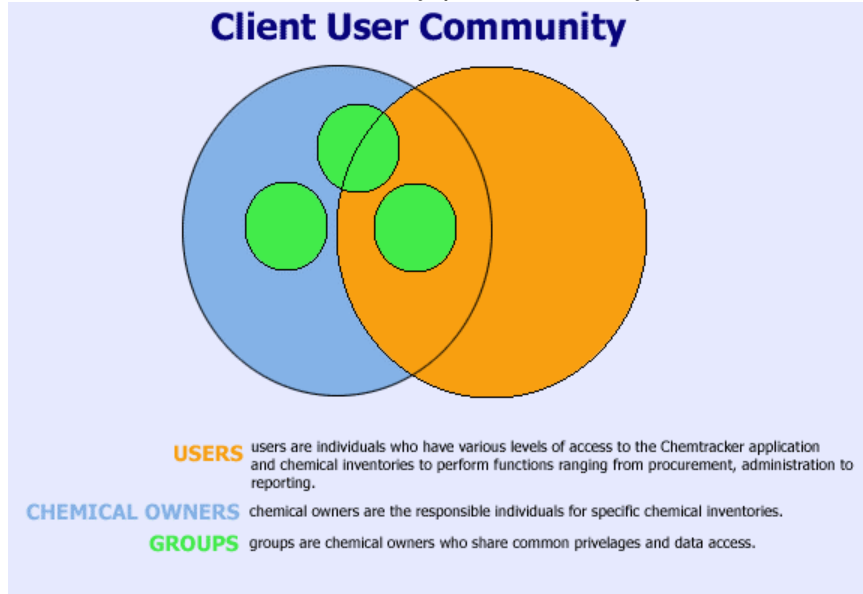

capabilities, and user administration. A data administrator may only require read only access to a specific chemical owners inventory. A business user may only need the ability to see inventory flagged for purchasing. Different categories of users can be grouped to provide common privileges and authorizations.

ChemTracker's Reference Database is the product of significant investment and years of research at Stanford University. ChemTracker protects the quality and integrity of its reference data with a strictly enforced data policy and domain experts with chemical, regulatory and database administration expertise. With ongoing research and customer-generated requests, ChemTracker continues to build its compendium of reference data. Research is collected from approved and ranked data sources and noted in a material's bibliography. Regulatory analysis is conducted and classifications are made by approved authorities and or presented to the regulatory body for approval. Materials are then reviewed and validated by our domain experts and graded by quality of the classification and data. Approved data is promoted to our production database.
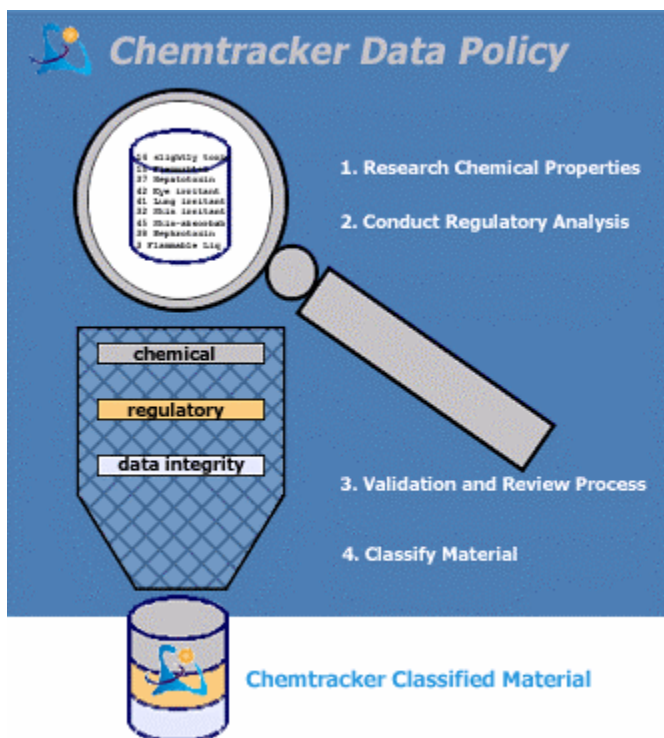
Your baseline inventory and facility information is uploaded or input into the ChemTracker application and linked to the ChemTracker Reference Database. The ChemTracker Reference Database contains extensive chemical and regulatory information on over 16,000 unique chemicals with over 65,000 synonyms. Inventory, Hazard Communication and Compliance reports can all be generated at the click of a mouse.
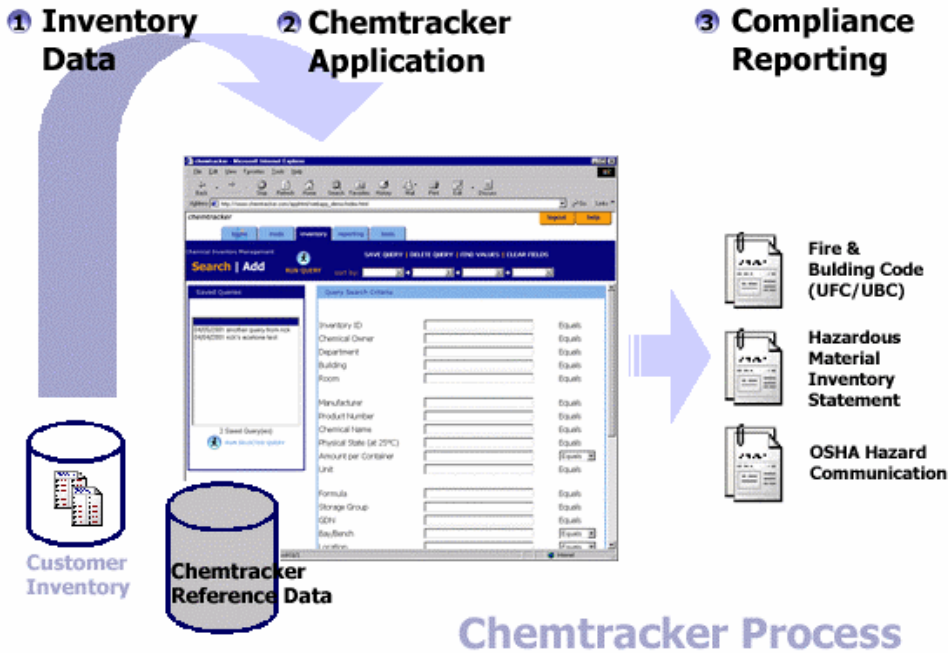

The ChemTracker system has many features that can only be truly experienced by viewing and working with the system. The system starts with adding records, editing and deleting records, searching inventory and, most importantly, regulatory reporting. To maintain the data in a state of readiness for reporting, the system only allows the entry of data that is validated. Every record in the database has a system validated owner and location, as well as valid units of measure. Units are converted to standard reporting units of measure by the system during the reporting step.

Application Security

ChemTracker's servers are located in a secured data center within Stanford University. Each user is issued a password to gain access to the system. The database containing reference data and client inventory records are behind multiple layers of security and mirrored for disaster recovery.
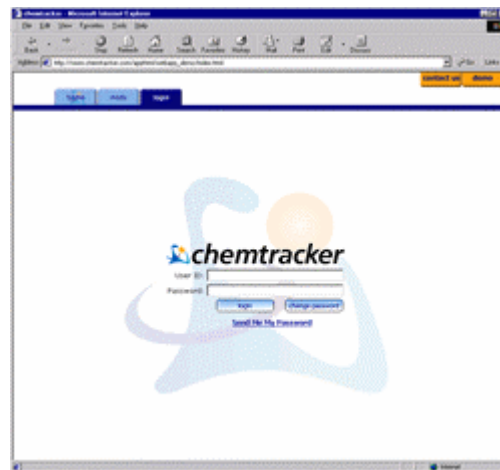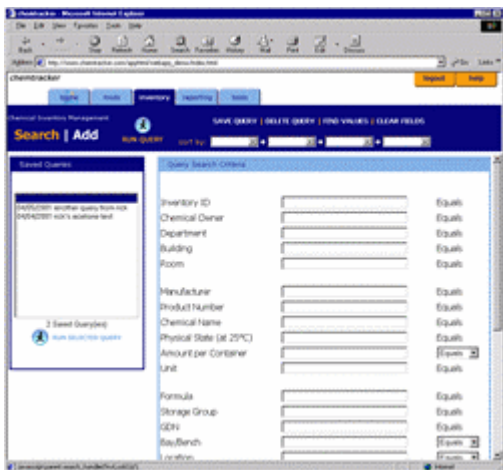
Inventory: Search screen

The search screen within the chemical inventory management application allows users to add, view, edit or delete items in their inventory on a centralized database. Depending on user privileges, this can be made available in a full version or a read-only version. Inventory items can be queried on one or any combination of the following field values: Inventory ID, Chemical owner, Department, Building, Room, Manufacturer, Product Number, Chemical Name, Physical State, Amount, Unit, Formula, Storage Group, GDN, Bay/Bench, Location, Shelf, Modify Date, Modify By, Inventory By, Expiration Date, Privacy, Surplus, and any of the User Defined Fields.

Inventory: Add screen

On the Add screen within the Inventory Management application, users can add chemicals directly into their stock directly by entering one of over 70,000 Manufacturer product numbers or by completing the following required information: Chemical Owner, Department, Building, Room, Chemical Name, Physical State, Amount per Container, Units of Measure. Default values can be saved for each of these fields. If the chemical name is selected from the pick list, the chemical is automatically linked to ChemTracker reference data. A multiple save feature can also be used to save multiple records of the same inventory container type.
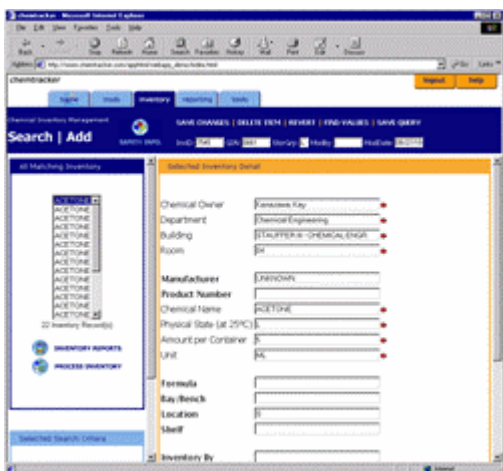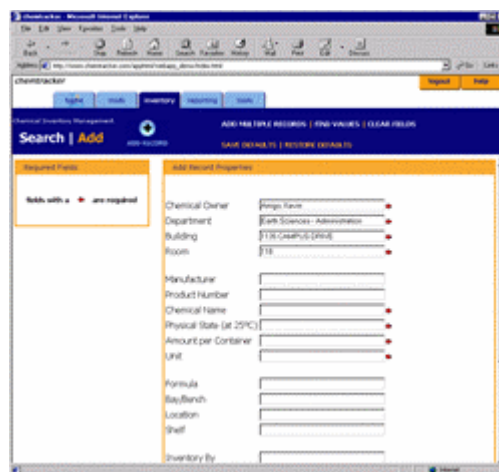
Inventory: Results screen

From the Results screen, a user can choose to generate any number of inventory reports including hazard communications, storage group update reports, chemical name update reports, card files or to a Microsoft Excel worksheet. Safety information can be obtained by clicking the safety information icon that will present building code and fire code classifications, NFPA classifications, hazard types, physical properties and other identifiers for the selected material. Additionally, the user can process inventory for the selected records that allows moving, copying or deleting the queried inventory.

Inventory Reporting

Mass Quantities by Chemical Name
For Building: 001-9 CHEMISTRY BUILDING

Items linked to reference data:

| CAS Num	Physical State	Chemical Name	Amount	Unit	Items
106-99-0	G	1,3-BUTADIENE	7.9939	CU FT	2
115-11-7	G	2-METHYLPROPENE	6.6273	CU FT	2
74-86-2	G	ACETYLENE	386.0000	CU FT	4
1070-74-2	G	ACETYLENE-D2	75.0000	CU FT	1
7664-41-7	G	AMMONIA GAS	1,511.2262	CU FT	12
13550-49-7	G	AMMONIA-D3	9.7771	CU FT	1
7440-37-1	G	ARGON, GAS	2,185.0000	CU FT	12
10294-34-5	G	BORON TRICHLORIDE	0.0035	CU FT	1
7637-07-2	G	BORON TRIFLUORIDE, GAS	3.1882	CU FT	2
74-83-9	G	BROMOMETHANE	3.6669	CU FT	4
106-97-8	G	BUTANE	7.8652	CU FT	4
	G	CARBON DIOXIDE 1PPM-5%/CARBON MONOXIDE 0-12.5%/AIR BALANCE GAS MIXTURE	210.0000	CU FT	1
124-38-9	G	CARBON DIOXIDE, GAS	1,004.5590	CU FT	5
630-08-0	G	CARBON MONOXIDE GAS	700.6374	CU FT	7
463-58-1	G	CARBONYL SULFIDE	3.2650	CU FT	1

Inventory Reports allow chemical owners and users to view their chemical and hazardous material inventories. These reports are typically used to assist in physical inventory counts, determine storage comparability, identify materials of specific hazard type, and to present an inventory snapshot.

Hazard Communication

Additional reporting within the inventory management application allows users to obtain hazard information on specific chemicals and materials or generate reports of your inventory by hazard type.

The system allows flexibility for organizations to determine how to manage and control the core data for the program while the application addresses the relationship of chemical materials to relative hazards for subsequent regulatory reporting. Administrators can assign user, chemical owner, and departmental designations as needed to suit the organizations needs. The system can be implemented centrally or it can be decentralized and used as a chemical receiving system, a stock room management system, or as a standing inventory system at the floor or laboratory level. Users can pick chemicals off a valid pick list or can enter a chemical not found on the list. Additional uses of the system include reviewing inventories, identifying out of date chemicals, and identifying and encouraging the redistribution of surplus chemicals.

The inventory page also links directly to MSDS and Safety information, allowing users to quickly look up such information. The interface is extremely intuitive and easy to learn.
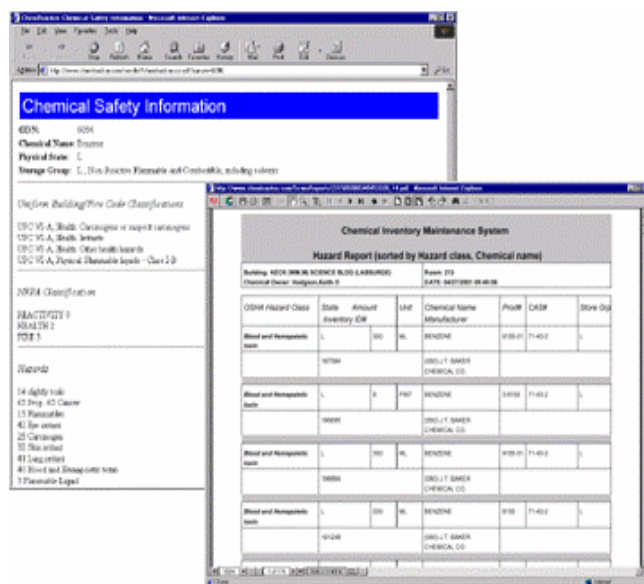
Compliance Reporting

The Regulatory Reporting application allows users to select specific types of compliance reports for facilities, control areas or facility groups. These reports can be generated on a mouse click at any time you desire or for formal submission to a regulatory agency.

Report Formats

Reports are generated in the most widely accepted formats by regulatory sovereignty. Reports are presented on the screen in either HTML format or PDF file format. They can easily be printed or posted to a web site for review from these formats. Regulatory reporting routines are available for standard Hazardous Materials Inventory Statements reporting as well as analyzing and reporting of building occupancy classifications based on fire and building code requirements. The system simplifies determining the chemical makeup of a planned facility by moving or copying groups of data into new 'virtual buildings' allowing them to be analyzed for hazardous materials compliance and building design requirements by architects and engineers. Many jurisdictions now require the submittal of hazardous materials reports prior to issuance of a permit to build a new facility or renovate an existing building.

User Administration

The user administration application allows an administrator to set privileges for specific users, add users to groups, add users to departments, monitor user activity and link users to chemical owners.

MSDS Access

ChemTracker also offers direct links to MSDS systems as well as numerous third party MSDS solutions which can be made available to your entire organization, and allows MSDS searches for specific inventory items integrated into the ChemTracker solution.
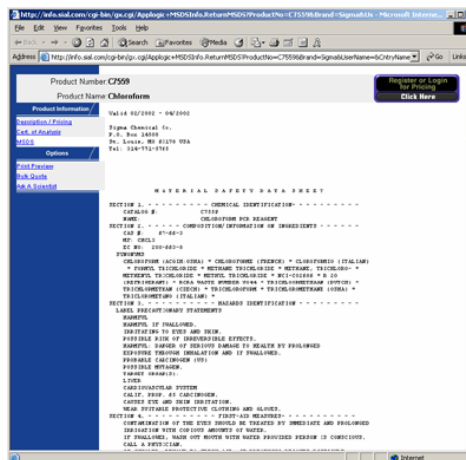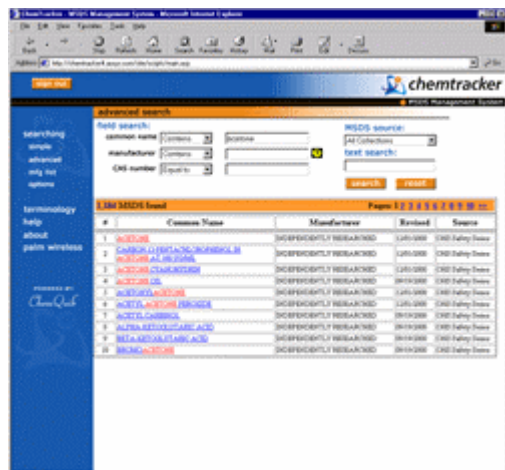
ChemTracker Advantages

The advantages of the system include centralized, safe and secure off-site data storage with easy, distributed access via web browser. The laboratory personnel or chemical owners are responsible for data entry eliminating transcription errors and work redundancy. The system also provides immediate feedback and is adaptable to individual in-lab chemical management processes and business rules.

Real-time monitoring of chemical hazard information by users, departments or EH&S enables more effective compliance and access to information. The system supports fire and building code compliance as well as other EH&S operational needs such as identifying locations of select agents, carcinogens, toxic gases, cylinder tracking, etc., and allows EH&S to add value to the business. In the words of a Professor of Organic Chemistry, "You guys finally did something right!"

After the successful implementation and use at Stanford and significant interest and approval by other organizations, Stanford's chemical management solution is accessible to other not-for-profit institutions through a consortium user group arrangement or for licensing to commercial organizations. The system is now in use in high tech and biotech companies, by hospital clinics and another university. This application service provides powerful tools for users to control their chemical inventory, access safety information, maintain inventories, review compliance and generate regulatory reports directly from their own web browser. With minimal administration, this system encourages rapid user acceptance facilitating single click compliance reporting and unparalleled lab safety.

Stanford Chemical Inventory Management System (ChemTracker).
Technical Overview

System Design:
ChemTracker is a suite of applications based on a "three tier" applications architecture which distributes user interface, applications software, and database engine across three different computing environments to optimize performance and reliability:

- **User Interface Tier:**
  User interface functionality is provided by dynamically generated HTML accessed via any Netscape Navigator or Microsoft Internet Explorer version 5.0 or greater web browser application on either PC or Macintosh platforms. Many interface components including input validation, dynamic local updating of displayed values, etc. are implemented using the JavaScript scripting language. This combination of HTML and JavaScript allows the application to take advantage of the computing power of the user's workstation thus reducing the load on the web/applications server.

- **Application Software Tier:**
  Dynamic generation of web pages, access to the database engine, and a large portion of the application business logic are provided by "server side" Java applications, known as "Servlets". Java servlets allow a high degree of flexibility, functionality, and integration in a web environment. ChemTracker servlets are run in a J2EE application server container which provides a robust Java runtime environment and an interface to the web server. All user connectivity to the applications is provided by Microsoft Internet Information Server, version 5.0. The web server and Java runtime environment are run concurrently in Microsoft Windows 2003 Advanced Server operating system.

- **Database Engine Tier:**
  All data is stored in and managed by an Oracle database engine, running in a Unix operating environment. Access to data by application servlets is implemented using Oracle's JDBC "Thin Client" which provides a set of high speed native Java classes for database access, eliminating the need for high overhead database access middleware. Within the Oracle database structure, extensive use is made of indices, triggers, sequences, constraints, and stored procedures to guarantee data integrity and reduce network traffic between the web/application server and the database server during data intensive operations.

Operational Flow:
A typical interaction between a user and the system takes place as follows:

- The user access the system via their web browser, by directly entering a URL in the browser's location field, or by using a link on some other web page. This URL or link is a servlet request to ChemTracker's web server, Microsoft's IIS.

- IIS reads this request and passes it to the J2EE application server, which transfers it to a servlet running in the server's execution environment. The application servlet responds by dynamically generating an HTML form which is transferred back through IIS to the user's browser.

- The user enters information into form fields. User input data is validated locally where possible via imbedded JavaScript.

- If it is not possible to validate locally, scripts format request strings to send back to the servlet which then formats these requests into Oracle SQL query strings which it passes to Oracle.

- Oracle executes the query and generates a result set, which it passes back to the servlet.

- The servlet formats the data returned from Oracle into HTML which is sent back to the user's browser. Result lists are presented to the user in "pick list" format, JavaScript is used to dynamically refresh the user's display as the user scrolls through the result list, reducing the need for interaction with server side components.

ChemTracker Application Modules:
The current system is composed of several modules:
- Inventory Management; A full featured inventory query and modify application, allowing ordered inventory searches all applicable data fields, Adobe PDF and Microsoft Excel format management reporting, validated data edit and input, "value added" functionality such as auto fill of chemical and physical state fields on input of a valid manufacturer name and product number, etc.

- Inventory Access Only; A "read only" version of the inventory management system for users not authorized to modify data.

- Surplus Access; A "read only" version of the inventory management system that only allows queries of inventory items marked as surplus.

- Hazard Query; Allows chemical inventory records to be search by hazard and regulatory categories.

- Regulatory Reporting; Creates Universal Building Code, Hazardous Materials Inventory Statement and other reports. In addition to the "for submission" versions of these reports, provides tools for discovering out of compliance locations and details of materials on by building, by room, and by owner basis.

- Chemical Safety; Provides chemical safety information either directly, or from within the inventory applications, based on chemical name or CAS number.

- User Management; Allows user definition, access authorization, and assignment to registered chemical owners.

- Owner Management; Allows chemical owner definition and assignment to registered departments.

- Site and Facility Management; Provides maintenance for sites, facility groups, facilities, control areas and rooms.

Security:
- ChemTracker data is stored in an Oracle 9i database, which is backed up to tape on an IBM ADSM/TSM Robot Tape Library using BMC DataTools for Oracle Backup, from 12:30 – 3:00am daily. This is a "cold backup" containing all data and database structures required to completely rebuild the database. A "data only" export is also taken at 12:00pm daily. The ChemTracker applications also keep a running audit trail of all user transactions performed. The servers hosting the Oracle data and backups are in seismically reinforced buildings which house almost 80% of other Stanford systems data.

- Each ChemTracker client organization's data is kept in a separate Oracle tablespace, with unique database usernames and passwords. Only Stanford ITSS personnel who maintain the system know database system administration accounts. ChemTracker application passwords are internally encrypted.

- Direct access to the database itself is limited to the ChemTracker applications and application developers. All user access is controlled by the applications.

- Web and database servers have been subjected to "best practices" security audits and remedies, and application and access logs are routinely checked for unauthorized access attempts.

Required Browser Settings for ChemTracker Web Application

(IBM PC type browsers)
For Internet Explorer (version 5.0 or later):
1. On the IE menu bar go to 'Tools', then click on 'Internet Options…'. A dialog box will be launched titled 'Internet Options', opening on the 'General' tab.
2. On the 'General' tab under Temporary Internet Files, click on the 'Settings' button: Make sure the option "Every visit to the page" is selected, and that the slider for "Amount of disk space to use" is all the way to the left. Click OK. This will return you to the 'Internet Options' dialog box.
3. Click the 'Security' tab, then the 'Custom Level…' button near the bottom of the dialog box. A checklist will be shown in a new dialog box entitled 'Security Settings'. Be sure the following items are checked under 'Cookies':
   a. Allow Cookies that are stored on your computer: Enable
   b. Allow per-session Cookies (not stored): Enable
4. Click OK at the bottom of the 'Security Settings' dialog box. This will return you to the 'Internet Options' dialog box.
5. Click the 'Advanced' tab in the 'Internet Options' dialog box. A checklist will be shown in the dialog box. Under the Microsoft VM section, be sure the 'Java JIT compiler enabled is checked. Click OK at the bottom of the dialog box.

For Netscape browsers (version 5.0 or later):
1. On the Netscape menu bar go to 'Edit', then click on 'Preferences'. A dialog box will be launched titled 'Preferences'.
2. Click on 'Appearance', then 'Colors' make sure the 'Always use my colors, overriding document' is **NOT** checked. Click on 'Advanced' at the bottom of the menu on the left side of the 'Preferences' dialog box. A checklist will appear. Be sure the following items are selected:
   a. 'Enable Java'
   b. 'Enable Javascript'
   c. 'Accept all Cookies'
3. Click on the '+' sign to the left of 'Advanced' at the bottom of the menu on the left side of the 'Preferences' dialog box. Click on 'Cache', make the following settings: 'Cache'- 0 kbytes; 'Disk Cache'- 0 kbytes; 'Document in cache compared to document on network:' select 'Every Time'. Click OK at the bottom of the dialog box.

(Apple Macintosh browsers)
For Internet Explorer (version 5.0 or later):
1. On the Menu bar go to 'Edit', then click on 'Preferences'. A dialog box will be launched titled 'Internet Explorer Preferences'.
2. Under Web Browser, click on 'Java' in the menu on the left side of the 'Internet Explorer Preferences' dialog box. A checklist will appear. Be sure the following item is selected: 'Enable Java'.
3. In the 'Internet Explorer Preferences' dialog box Under Web Browser, click on 'Advanced'. Make the following 'Cache' settings. Update pages: Always; 'Cache'- 0 MB. Click OK at the bottom of the dialog box.

For Netscape browsers (version 5.0 or later):
1. On the Netscape menu bar go to 'Edit', then click on 'Preferences'. A dialog box will be launched titled 'Preferences for…'.
2. Click on 'Appearance', then 'Colors' make sure the 'Always use my colors, overriding document' is **NOT** checked. Click on 'Advanced' at the bottom of the menu on the left side of the 'Preferences' dialog box. A series of checkboxes will appear. Be sure the following items are selected:
   a. 'Enable Java'
   b. 'Enable Javascript'
   c. 'Accept all Cookies'
3. Click on 'Cache' under 'Advanced' at the bottom of the menu on the left side of the 'Preferences' dialog box. Make the following settings: 'Disk Cache'- 0 Kbytes; 'Page in cache compared to page on network:' select 'Every Time'. Click OK at the bottom of the dialog box.

Chemical Inventory Administrator Tools
(These applications work on PC and Mac platforms with IE 5.0 or higher)

Utilities

- **User Manager**
  User Manager is an application where the administrator can add new users, identify existing users, and edit user profiles. When editing existing user profiles or adding new users, the administrator has the ability grant varying levels of inventory access (i.e., 'Modify Inventory' or 'Query Inventory-read only'). When editing chemical owner profiles, the administrator has the ability to assign customized field-types depending on any additional chemical information needs of the chemical owner.

- **Facility Management**
  Facility Management is an application where the administrator can find, edit or add buildings, control areas and room numbers. In editing room numbers, the administrator also has the ability to assign other descriptors (i.e. location code, room name).

- **Site Manager**
  Site Manager is an application where the administrator can find, edit or add a region and/ or site. For instance, "Stanford" would be a considered a region. Within a region, the administrator can group several buildings as a site so that one can process a regulatory report (i.e., Hazardous Materials Inventory Summary) specific to that site.

- **Restored Deleted Inventory**
  The administrator has the ability to restore accidentally deleted data simply by selecting the Owner Name and Date Range of the data to be restored. A summary will show all the deleted records during this time period. The administrator has the ability to restore entire batches of deleted records or selected deleted records.

Reports

- **Activity Reporting**
  The administrator has the ability to run an activity report for a department, group, or owner within a date range that will show the number of inventory records that have being added, deleted or modified. Activity reporting is an easy way to generally monitor how frequent specific user groups are updating their inventories.

- **Room-Inventory Reporting**
  The administrator has the ability to select a building and run a report showing room-specific information as follows: number of inventory records, room name (if any), name of occupying chemical owner, and occupancy type.

Other

- **AMONSing**
  AMONSing is an automatic process where each chemical newly entered into the inventory is assigned to its appropriate Group Differentiation Number (GDN) number. GDN numbers are chemical-specific and each have their own specific profile of hazard and regulatory classifications. The administrator has the ability to AMONS the inventory in a selected building or AMONS the inventory of all buildings at once.

- **SAMONSing**
  SAMONSing is a semi-automatic matching process that is used in cases where AMONSing has not been able to automatically assign GDN numbers to chemicals newly added to the inventory. Such chemicals are not assigned GDN numbers during the AMONSing process due to the variations in chemical spelling, nomenclature, wording, or other associated differences.

  Utilizing fuzzy-logic look up capability, the SAMONSing tool provides a selection of GDN numbers it "thinks" are possible matches to the unassigned chemical. The chemical/ EH&S expert then reviews the inventory item and assigns the appropriate GDN number.

General Instructions for Users

ChemTracker
Stanford Chemical Information Management System on the Web

Welcome to the ChemTracker application for maintaining your chemical inventory. The inventory data that was in the EH&S inventory database from the last chemical inventory update has been moved into a central Oracle database. The ChemTracker interface is your access point to your chemical inventory data via your web browser. You will be able to view, edit, add and delete records directly from your computer.

You will need either Netscape Communicator 4.5 or Netscape Navigator 4.08 or Microsoft Internet Explorer 5.0 or later versions installed on your computer. The application will work on either Mac or PC. To find out which version of Netscape you have installed on your computer, select 'About Navigator' from the Help menu of your browser. To find out which version of Internet Explorer you have installed on your computer, select 'About Internet Explorer' from the Help menu of your browser. You will also need Adobe Acrobat 3.0 or higher to run and print some of the reports that are available. If you need assistance with installing any of these, please contact your local network administrator.

Please change your password when you first login. Anyone gaining access to your User ID and password will be able to delete or edit records in your inventory. If you do not know your User ID, please contact the Chemical Inventory Administrator at 3-9667 or at 3-7487.

Login:
1. Launch Netscape or Internet Explorer.
2. Go to http://ehs.stanford.edu.
3. Click the 'ChemTracker Web' hyperlink.
4. At the login page, type the username that was sent to you in both the 'User ID' field and the 'Password field'.
5. Click the 'Change Password' button and enter a new password into the two boxes.
6. Click the 'Change Password' button.

The application should then open to the 'Search' screen. If it doesn't, click on the logout buttons and then log into the system again with your new password and you should arrive at the Search screen.

View Data
To view the data for the Chemical Owner(s) for which you are authorized:

1. Click into the 'Chemical Owner' field.
2. Click the 'Find Values' button in the header (this may take up to 30 seconds to return). If you are authorized for only one Chemical Owner, the name will appear in the 'Chemical Owner' field. If you are authorized to multiple Chemical Owners, select the Chemical Owner and click the 'Accept' button. (If you prefer to enter Chemical Owner's name, enter the **'Last Name'** only.)
3. You can sort the query using the 'Sort by:' pull down menus in the top frame. For instance, a sort by 'room', then by 'chemical' might be useful.
4. Click 'Run Query' in the blue menu bar in the header.

5. Click 'Save Query' in the blue menu bar in the header (you'll be prompted to name the query). This will allow you to select this query and run it much more quickly in the future.

Now you should see the chemical names of your inventory records in the right frame. If you use your down arrow key you will be able to browse all your records. Note that as you select each record in the 'Matching Inventory' box in the right frame, the details of the record show in the left frame. You can use the mouse to select an item as well. Be careful, you are now able to edit and delete records directly from this screen, but changes will only be committed to the database when you click on the 'Save Record' or 'Delete Record' buttons on the blue menu bar in the header.

Click the red Logout button in the upper right corner of the screen to logout and close the window when prompted. Try logging in again with your new password and select your saved query to see your chemicals again (this should be very fast). There is Help and Documentation available by clicking on any of the Help or Documentation buttons that you see as you proceed.

Print Report
To print a report of your inventory, run a query that suits your needs. When the search results appear in the right frame, click on the gray 'Inventory Reports' button near the bottom of the right frame. A window will appear giving you several choices. Click on 'Update Report' and then 'View Report' when the next window appears. This will launch Adobe Acrobat and present the report in a window on the screen or a button on your toolbar. The report can now be printed to your local printer. The update report includes an 'Inventory ID' number for each record that can be used to find that record. Enter the inventory ID number on the Search screen and run the query. This should return that specific record so you can edit it or delete it. The report provides a page break for each new location and storage group combination.

Add a record
Click on the 'Add Record' button on the blue menu bar in the top frame. This will take you to the Add Record screen. Valid information must be put in the highlighted fields in order to save a record. To add a record:

1. Click into the 'Chemical Owner' field and click on 'Find Values' button in the blue menu bar. Select and accept the Chemical Owner name. (If you prefer to enter the Chemical Owner's name, please enter **'Last Name'** only)
2. Click into the 'Department' field, and click on 'Find Values' button in the top frame. Highlight and accept the department name.
3. Click into the 'Building' field and type in part of your building name like Beck for Beckman or Stauf for Stauffer II or Bonair for Bonair Siding. Highlight and accept the building name for your building from the resulting list.
4. Type in your room number in the Room field and press tab. If it tells you there is no such room, delete the information from that field and click on the 'Find Values' button, then highlight and accept an appropriate room number from the resulting list.
5. Click on 'Save Defaults' on the blue menu bar in the top frame. This will keep all of these values filled in for future records and sessions. You can change the room number or building any time and save defaults again.
6. If you know the manufacturer and product number of the chemical, type those into the appropriate fields and if we have this information in our database already, the

chemical name and physical state will be filled in automatically. You are strongly encouraged, but not required, to include the manufacturer and product number.

7. If you only know the chemical name, type that carefully into the 'Chemical Name' field.
8. Type in S, L, or G in the 'Physical State' field for solid, liquid, gas.
9. Type in a number for the amount, like 5 or 250. Do not include units of measure in this field.
10. Type in a valid unit of measure, like gal or mg.
11. Click on the 'Save Record' button on the blue menu bar in the top frame, or if you have more than one container of exactly this item, click on the 'Save Multiple Records' button and enter the number of identical records you want to create in the resulting window.

Note there are other fields such as location you can fill in below. For explanations of what each of these are for, click into the field and then click on the 'Help' in the upper right corner of the screen.

Edit a Record
To edit the data for the Chemical Owner(s) for which you are authorized:

1. Construct a query according to your selected criteria such as Chemical owner(Last name only) and/or building and/or room number. The chemical names of your inventory records will show up in the right frame.
2. Use your down arrow key or mouse to select a record in the 'Matching Inventory' box in the right frame. The details of the record will be shown in the left frame. You can make changes on this record and click the 'save' button on the blue menu bar after modification of the record. The quantity, location information, or any of the user defined fields can be modified without affecting the identity of the chemical. If the physical state, manufacturer, product number, or name is changed, this may mean that it is a different chemical so the program will remove the link to safety and regulatory information. EH&S will be automatically notified to re-evaluate the record to link it to the correct regulatory and safety information.

Move and Copy Records
A group of chemicals can be moved, copied by using the 'Move/Copy' function. The user should first construct a query that returns all the records to be moved/copied. Next the user should click the 'Move/Copy' button on the Right hand frame below 'Matching Inventory' box. A new window will appear. There will be check boxes next to each record. The check boxes are checked by default but can be unchecked to exclude them from the bulk Move or Copy function. Fill in the destination for the chemicals (Who they are going to and where) in the top of the Frame. Click the appropriate button at the top of the screen to move or copy the records.

Delete Record
'Group Deletion' function is under development currently. However, individual records can be deleted. The user should run a query first, select the chemical from the 'Matching Inventory' list and click the 'Delete' button from the blue menu bar.

There is extensive on line help in the application. Click on the red Help button in the upper right corner of the screen. The help is somewhat context sensitive, but is just a large text file that can be scrolled and read as needed.

All new chemicals "owned" by a Chemical Owner must be recorded in the database within 30 days of arrival at Stanford. Significant changes in quantity or location should be updated within 30 days of occurrence. Recording and deleting every container that is purchased and used up is NOT expected or required. For example, if you normally have 6 one gallon containers of acetone in your laboratory or shop and use up four per month, the database should show 6 gallons of acetone in the room, ongoing. You don't need to delete a record every time you use up a gallon or create four one gallon records every time you buy a case. However, if you stop using acetone altogether, or decide that you only need two gallons on hand, you should reflect that by deleting the requisite number of items from your database. Similarly, if your standing inventory for a material increases significantly on an ongoing basis, that should be reflected by adding the requisite number of records to reflect the new amount on hand.

What to Inventory

DO INVENTORY	DO NOT INVENTORY
All chemicals and chemical products (except those noted at right) Paints Lubricants and Oils Biotoxins Gas Cylinders Specimen solutions Scintillation fluid Materials in lab freezers, refrigerators, and flammable liquid cabinets Recurring Hazardous Wastes*	Household products used in routine household-like activities (e.g. cleanser under the coffee room sink) Radioactive Materials Nucleotides Buffers Growth Media Controlled substances Enzyme preparations Biohazards Materials Materials for use within 1-2 days (e.g., working solutions)

*Hazardous waste in the lab at the time of the inventory that is a recurring type of waste must be inventoried. Use the name on the waste label as the chemical name, starting with the word waste. The quantity should reflect the amount accumulated at the time of inventory. If you are disposing of a reagent or stock chemical because the lab won't be using it again in the foreseeable future, do not inventory it.

Non-Profit Organization Fees for Access to and Use of ChemTracker

User Category	R&D Expenditure	Annual Membership Fee[i]
Category 1	>$100 M	$15,000
Category 2	$30 M - $100 M	$10,000
Category 3	$5 M - $30 M	$5,000
Category 4	< $5 M	$2,500

*Based on NSF Report of R&D total Expenditure at Universities and Colleges FY2003
http://www.nsf.gov/statistics/nsf05320/pdf/table29.pdf

[i] Fee for annual access to and use of the application; does not include possible one-time implementation cost.