



Chemical Inventory System: the key to better lab management

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The Challenges

The operation of a chemical laboratory is more challenging today:

- ❑ Environmental awareness, Green Chemistry
- ❑ High cost of chemical inventory and disposal
- ❑ Requirements of government agencies, insurance
- ❑ Multiple-use chemicals: illicit drugs, terrorism, etc.
- ❑ Need to educate and train next generation of chemists and industry leaders in chemicals management

The Challenges

In 2004, the Philippines implemented various rules and regulations related to chemicals. Other requirements have been added since then.

- ✓ purchase
- ✓ labeling
- ✓ use
- ✓ storage
- ✓ waste management
- ✓ disposal



Philippine National Police



List of some relevant laws and regulations.

RA 8294: Regulation on explosives and materials used in the manufacture of explosives (1997): Restriction on purchase of nitrates, nitric acid, etc.

RA 6969: Toxic Substances and Hazardous and Nuclear Wastes Control Act (1990): Chemical waste management of toxic and hazardous wastes

RA 6425: Dangerous Drugs Act (1972) : Importation, sale, administration, delivery, distribution, transportation, possession or use of prohibited and regulated drugs and precursor chemicals

RA 9275: Clean Water Act (2004): Water quality management in all water bodies.

DAO 97-38 & 39: Chemical Control Order for Mercury & Cyanide and its Compounds: Importation, manufacture, use and distribution of mercury and mercury compounds and cyanide and cyanide compounds.

Joint DTI-DENR-DA-DOF-DOH-DOTC Administrative Order No. 01, series of 2009: The Adoption and Implementation of GHS of Classification and Labeling of Chemicals

Some desirable features in a Chemical Inventory System

- ❑ System should assist in compliance with government requirements
- ❑ Accurate inventory of chemicals and other laboratory equipment (e.g., glassware)
- ❑ Security of information
- ❑ Efficient management of requests
- ❑ Database of suppliers and purchases
- ❑ Tracking of chemical waste generation
- ❑ Training students in lab safety and chemical management

Chemical and Hazardous Waste Inventory System

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Can your old chemical inventory system cope with new demands?



Chemical inventory systems can make tracking of chemical stocks much *easier, more accurate and effective, and more economical.*

Stock Level Reports

Press CTRL and F to find specific chemical within page.

Common Name	Grade	Coec	Current Amount
1-ethyl-3-(3-dimethylamino-propyl) carbodiimide hydrochloride	Unknown	0%	5.0000 g
Agar granulated	Unknown	0%	500.0000 g
Alginate acid	Unknown	0%	100.0000 g
Borate buffered saline tablets	Unknown	0%	50.0000 l
Carrageenan	Unknown	0%	550.0000 g
Carrageenan MG Kappa	Unknown	0%	1000.0000 g
Chitosan 500	Unknown	0%	25.0000 g
CM dextran sodium salt	Unknown	0%	5.0000 g

Chemical and Hazardous Waste Inventory System

ChemTracker Consortium – The higher education collaboration for chemical inventory management and regulatory reporting

Tracking chemical inventory is necessary for safety management as well as regulatory compliance. It is specifically challenging for diverse and decentralized research and laboratory and compliance, waste management, emergency preparedness, and facility planning departments. ChemTracker Consortium is a multi-institutional effort to develop a web-based application for chemical inventory management and reporting that will be used by researchers, safety officers, and compliance officers. The consortium includes 15 universities and other institutions. The consortium is currently in the process of developing a web-based application for chemical inventory management and reporting that will be used by researchers, safety officers, and compliance officers.

By L.M. Gibbs

INTRODUCTION: THE CHEMICAL INVENTORY MANAGEMENT CHALLENGE

Managing chemical inventories is a complex task. It involves tracking the location, quantity, and safety of chemicals in a laboratory setting. This is a challenge because of the large number of chemicals and the need for accurate and up-to-date information.

Developing a chemical and hazardous waste inventory system

We describe the development of a chemical management information system (CMIS) that addresses the multiple requirements of university-based chemistry department. The CMIS is a web-based inventory-keeping software developed using PHP and MySQL that provides chemical information such as safety data sheets, tracks individual chemical bottles using a barcode system to monitor stock-levels, consumption, movement and expiration; complies with government regulations on controlled chemicals and hazardous chemical wastes; facilitates sharing of chemicals among different departments; and stores supplier information. It has four user levels with increasing functionality: students; faculty members and researchers; department heads and staff; and technicians and system administrator. Currently, the system manages over 11,000 chemical bottles of three departments in the university.

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Chemical and Hazardous Waste Inventory System

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Some commercially available chemical inventory systems



CISPro uses a container-based tracking model for management and tracking of laboratory chemical bottles

chemoventory

Chemoventory is a PHP- based online chemical inventory software which enables users to manage their chemicals through MSDS management techniques.

Price: \$ 500

<http://www.chemoventory.com/index.php>

CISPro System	Price
CISPro database	\$ 2999
MSDS & Document Storage Module	\$ 1499
Barcode scanner	\$ 1999
Barcode Printer	\$ 1199

<http://www.chemistry-software.com/inventory/12220.htm>

Introduction to Chemical Management Inventory System (CMIS)

cmis.ateneo.edu

Chemical and Hazardous Waste Inventory System

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What can CMIS do?

- Keep information on chemical stock
- Monitor chemical consumption
- Keep track of other transactions (e.g., suppliers, purchase, delivery, movement, stock, inquiries and requests)
- Database of (M)SDS and other chemical information
- Generate reports regarding chemical stocks for specific purposes

Chemical and Hazardous Waste Inventory System

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Monitoring of Chemicals

- System of tracking is container-based
- Each bottle is provided with a barcode sticker
- Labels are printed using a direct thermal printer

Ateneo de Manila
Chemistry Department
Acetic Acid RG
123456789

- Labels are made of tear- and chemical-resistant resin
- Ink is chemical-resistant

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Updating of Chemical Data

Each bottle is assigned a bottle ID

Updating of chemical data can be done **directly** or by using a **barcode scanner**.

Ateneo de Manila
Chemistry Department
Acetic Acid RG
123456789

Chemical Bottle ID:

Chemical Bottle Details

Stock ID: 25
 Chemical Name: Acetic Acid, Ethyl Ester
 Art Number:
 Brand Name: J.T. Baker
 Grade: Technical
 Concentration: 0
 Amount: 1.0000 l
 Price: PHP 0.00
 Storage Location: Second Floor Stock Room, C208
 Funding Institution:
 Date Added: 2007-01-08
 Expiration Date: 2017-01-08

[Click Here to Modify Bottle](#)

OR

[Click Here to View Other Stock of Same Chemical](#)

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Scanner-Server Synchronization

Chemical data in the barcode scanner are conveniently synchronized with data in the server

Synchronization Page

These procedures will allow you to synchronize your mobile device with the data on your server and vice-versa.

Step 1. Connect the BarCode Scanner to BarCode Scanner Dock.

Step 2. Update the BarCode Scanner System Files using Microsoft ActiveSync. This will upload the Server Snapshot to your BarCode Scanner.

Step 3. Update the SERVER first using the BARCODER.
[Click Here to Update Server Data based from BarCode Data Snapshot.](#)

Step 4. Create Server Snapshot.
[Click Here to Create Server Snapshot](#)

Step 5. Open the Chemical Inventory System Program at the Bar Code Scanner.

Step 6. Press Update Database.

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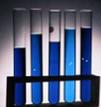


Management of Chemicals

Pop-up windows are used by the system to remind chemical managers of pending chemical requests or chemicals that need to be replenished

Chemical and Hazardous Waste Inventory System

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System Data

The following information are stored in the CMIS:

-  Supplier information
-  Chemical information
-  Storage locations
-  Hazard code information

List of Suppliers

Supplier Name	Alisons
Contact Person	Jerry
Work Phone Number 1	712-22-66
Modify Delete View Supplier Details View Chemicals Supplied	
Supplier Name	ATKINSON
Contact Person	Elbanor
Work Phone Number 1	361-77-51
Modify Delete View Supplier Details View Chemicals Supplied	
Supplier Name	Baler Industries
Contact Person	Edith Mera
Work Phone Number 1	371-12-70
Modify Delete View Supplier Details View Chemicals Supplied	
Supplier Name	Belman
Contact Person	Joel
Work Phone Number 1	711-43-15
Modify Delete View Supplier Details View Chemicals Supplied	
Supplier Name	R.I Chem Corp
Contact Person	JO Jerry Dy
Work Phone Number 1	672-98-42
Modify Delete View Supplier Details View Chemicals Supplied	
Supplier Name	THEODAM
Contact Person	Jane/Rose
Work Phone Number 1	821-64-63
Modify Delete View Supplier Details View Chemicals Supplied	
Supplier Name	YANA Chemodites
Contact Person	Hanna/Ruth
Work Phone Number 1	712-28-21
Modify Delete View Supplier Details View Chemicals Supplied	

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[Supplier Home](#)

Chemical Information

The following chemical information are available:

-  Chemical name
-  IUPAC name
-  CAS No.
-  (M)SDS link
-  Hazard code
-  Grade
-  Brand
-  Supplier
-  Price
-  Funding Institution

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Safety Data Sheets

CMIS displays chemical information with corresponding hazard code and (M)SDS link

Chemical Detail

Chemical Common Name 1 Acetone
 Chemical Common Name 2 dimethyl ketone
 IUPAC Name propanone
 CAS Number 67-58-1
 MSDS Link [click](#)
 Additional Information

Tracked by PNP? No
 Tracked by PDEA? Yes
 Tracked by EMB? No

[Chemical List Page](#)

Overview of CMIS Customized Features

1. Different user-levels
2. Safety Data Sheets (SDS) bank
3. Exportable reports
4. Tracking of controlled chemicals
5. Link to hazardous waste inventory system (HWIS)
6. Back-up and Recovery Mechanism

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User Levels

CMIS has different user-levels:

- Level 1 – Undergrad and grad students, guests
- Level 2 – Teaching/research assistants, junior faculty
- Level 3 - department staff
- Level 4 – administrator, technicians, lab manager, senior faculty

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Controlled Access to Information

CMIS Feature	User Level			
	1	2	3	4
Chemical Information	✓	✓	✓	✓
Storage Location		✓	✓	✓
Stock levels		✓	✓	✓
Setting up and Modification of Data				✓
Requesting Services	✓	✓	✓	✓
Request Management				✓
Password Management		✓	✓	✓
Waste tracking				✓
Reporting Services			✓	✓
Admin Functions				✓

Reporting Services

The system has the following reporting services:

-  Stock Level Reports
-  Consumption Reports
-  Threshold Reports
-  Expiration Reports
-  Movement Reports

Movement Reports

OR

Movement Reports For Selected Chemical :

Common Name	Old Location	New Location	Date
Arislow, 2 - amino-4-chloro	Second Floor Stock Room	PDEA CABINET	2007-03-12 04:21:15
Arislow, 2 - amino-4-chloro	PDEA CABINET	Second Floor Stock Room	2007-03-12 04:21:20
P - Bromoacetic Acid - Student Prep	Second Floor Stock Room	Student Prep	2007-03-13 07:02:19
P - Bromoacetic Acid - Student Prep	Student Prep	Second Floor Stock Room	2007-03-13 07:06:17
Date Added	Expiration Date	Number of Days From Expiration	
2007-05-06	2017-06-10	3672	
Hexanoic acid	Reagent	99%	0.5000 l

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Monitoring of Controlled Chemicals

System also allows monitoring of controlled chemicals under the EMB, PDEA and PNP

Reports are easily prepared using the system's Reporting Service

Reporting Service

EMB-tracked Chemicals

Reporting Service

PDEA-tracked Chemicals

Reporting Service

PNP-tracked Chemicals

- [List of Tracked Chemicals](#)
- [Stock Level Reports](#)
- [Stock Level Reports Based on Location](#)
- [Consumption Reports](#)
- [Threshold Reports](#)
- [Expiration Reports](#)
- [Movement Reports](#)
- [Price Reports](#)

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Tracking of Chemical Waste

- A Hazardous Waste Inventory System (HWIS) linked to CMIS allows tracking of chemical wastes
- Information and hazard symbols in the system conform to EMB requirements

Hazardous Waste System

- Containers
- Container Search
- Manifest Form
- Transaction
- Update Waste Container Details
- Reporting Services
- Generated Waste
- Generated Waste by Location
- Generated Waste by Hazard Class
- Generated Waste by Waste Number
- Waste Weight Report
- Waste Movement Report
- Threshold Report
- Foundation Data
- Storage Location
- Transmitters and Treaters
- Waste Form
- Waste Source
- EMB Classification
- Hazard Class
- Waste Number
- Chemistry Inventory System

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Tracking of Chemical Waste

The hazardous waste system also has the following reporting services:

- Reports on generated wastes
- Classification of chemical wastes
- Threshold Reports
- Waste Disposal Reports
- Waste Movement Reports

Ateneo de Manila University
Chemical Inventory System

None

Log-out

Logged in as:
Judy Elizabeth R Santos
(Level 4 Access)

Hazardous Waste System

Reporting Services

- [Generated Waste](#)
- [Generated Waste by Location](#)
- [Generated Waste by Hazard Class](#)
- [Generated Waste by Waste Number](#)
- [Waste Weight Report](#)
- [Waste Movement Report](#)
- [Threshold Report](#)

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Tracking of Chemical Waste

A *manifest form* is a waste transport record of hazardous chemical wastes that are to be disposed.

System can also generate a manifest form for the chemical waste bottles that are to be disposed.

Create Manifest Form

Generator's Name:

Generator's Address:

DENR ID Number:

Telephone Number:

Fax Number:

Date of Transport:

Special Handling Instructions:

Owner or Authorized Representative:

Designation:

No Containers Filled Up Yet

[Manifest Home](#)



System Back-up and Recovery

CMIS also has features which provide means to back-up the database and restore all data should the system fail.

Backup

Backup succeeded

Please check the file at:

C:\wamp\www\chem\data\backupFolder\chemistry2008-02-09-17-02.txt

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System Restore Page

Recovery File to be used:

Backup files can be found at: C:\wamp\www\chem\data\backupFolder\

Restore might take a few minutes. Do not close the window or click on the button more than once.

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CMIS Feedback

What are the strengths of the CMIS?

It allows our thesis mentors to take note of the chemicals that their mentees are using, It allows the stockroom to take note of the chemicals that they dole out- **Kaira Leal**, student, Chem

Easy access to information regarding lab classes- **Quel Unson**, Faculty, ES

Material safety data sheets- **Michaela Boren**, student, ES

Very helpful- **Troy Alivio**, student, Chem

it helps the stockroom keep track of chemicals- **Red Bagonoc**, student, Chem

It connects available resources of all SOSE departments- **Raiza Elumba**, student, ES

Easy to navigate- **Jed Billena**, Faculty, Biology



Summary

- CMIS combines a web-based inventory system and barcode scanner to provide a means for efficient updating and query of chemical stock levels.
- The system provides a better venue for tracking and managing of chemicals, allowing better decisions in their distribution, procurement and storage.



Acknowledgements

Financial support:

- University Physical Plant, Ateneo
- Loyola Schools Research Grant

Inputs:

- Biology department: Dr. Emilyn Espiritu, Dr. Vivian Tolentino and Joanne Flores
- Chemistry department: Edward Chainani, Dr. Nina Rojas, Dr. Armand Guidote
- ES Department: Ms. Jewel Racquel Unson, Dr. Teresita Perez

System Set-up:

MIS Office: Rose Banson, Joel Grutas, Rodel Crisostomo
Campus Network Group: Felicissimo Dolor, Patrick Medina
Chemistry Department: Olivia Buenafe, Deniz Wong

THANK YOU!



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