

# Chemical Sciences Division

Fiscal Year 2013

Environmental Health and Safety

Self-Assessment Report

## CSD Chemical Inventory Accuracy within Chemical Management System

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## **Executive Summary**

We have conducted an assessment of the Chemical Sciences Division (CSD) chemical inventory and compared this to the inventory listed in the Chemical Management System (CMS) utilizing the new barcode scanner and i-pod app. 87 % of the chemicals inventoried were accurately entered into CMS. A small portion of the chemical containers in CSD have mismatched locations, a small portion were erroneously disposed, a small portion were barcoded but not entered into CMS, and a small portion were not barcoded. All of these small errors were fixed. A significant number of chemicals were listed in CMS and not found on the shelves. Presumably these chemicals were used and the containers were disposed of without their data being removed from CMS. During the reconciliation, this can be rectified with the push of a button. Therefore, more frequent reconciliations will keep the CSD chemical inventory at a high level of accuracy.

## **Introduction**

An accurate chemical inventory helps CSD researchers, Environment, Health and Safety (EHS), and emergency responders to assess the chemical hazards that exist in the laboratory environment in order to implement appropriate controls for these hazards. The Chemical Management System (CMS) is a Lawrence Berkeley National Lab (LBNL) site-wide chemical inventory and database system designed to provide accurate and up-to-date list of chemicals and hazardous material stored at LBNL. As the CMS is used by Chemical Sciences personnel to conduct their research, Environment, Health and Safety Division for necessary regulatory reporting, and by emergency responders for fire and life safety, it is essential that the data contained within CMS is accurate. A full wall-to-wall chemical inventory had not been completed in CSD for several years, and it was assumed by CSD personnel that the accuracy of the data contained within CMS had diminished. We have conducted an assessment of the chemical inventory and compared this to the inventory listed in the Chemical Management System (CMS) utilizing the new i-pod app and barcode scanner being developed by EHS. It is our goal that this assessment will be used to coordinate resources necessary to complete the reconciliation of the physical inventory with the CMS database and to implement processes to better manage continued accuracy of the CMS.

## **Assessment Methodology**

The LBNL EHS Division is developing a mobile version of CMS. The CMS Mobile system utilizes an Apple i-pod with the appropriate application loaded onto it, paired via Bluetooth to an iOS Socket 7Xi handheld barcode scanner. (Please see Appendix for scanner i-pod and instructions for use). CSD has partnered with EHS to facilitate the development of this new technology, and therefore this technology was available to CSD to perform this assessment. Chemical inventories were conducted in representative spaces spanning various research activities conducted within the Chemical Sciences Division. Chemical inventories were conducted, within the Actinide Chemistry Group in building 70A room 2203, within the Bio-Actinide Chemistry Group in building 70A room 2223, within the ALS building 6 room 2263, containing the combined chemical storage of Kevin Wilson and Musa Ahmed, and lastly within the AMO group in building 2 rooms 102, 104, 106, 321A, and 333.

The procedure for the chemical inventory was as follows. The iPod and barcode scanner were used to scan all chemicals that contained barcodes within the labs. To any new chemical that did not contain a barcode, a barcode was added, and information for the chemical was added to the new chemical information sheet, an example of which is shown in the Appendix. Then the information for all of the new chemicals was entered into CMS. When all chemicals were scanned or recorded, the CMS mobile device was used to reconcile the lab. An example of the reconciliation report is given in the Appendix. Data returned by the reconciliation report includes: **Total Scanned** (total number of scanned barcodes), **Automatched** (indicating barcodes that were scanned and found in CMS database with all data correct), **Disposed** (indicates barcodes listed as disposed in CMS but were found on the shelf), **Unscanned** (indicates barcodes that are listed in CMS for this room, but the barcoded containers were not scanned in the room), and **New** (indicates items that contain barcodes, but the barcodes are not entered into CMS).

## Assessment Results

Table 1 displays the data from the chemical inventory reconciliation reports for each room that was inventoried and the accumulated totals from each category of the reconciliation report. A total of 775 chemical container barcodes were scanned in 8 CSD labs. Analysis of the data from the reconciliation report suggests that 51 % of the chemical containers scanned were all correct (Automatched), i.e. they were in the right location and with the right owner etc. However this analysis is misleading. A large number of chemicals (279) display a mismatched owner, and this is simply an artifact of limitations of the barcode scanning system. For example, lab 6-2263 contains chemicals for both Kevin Wilson and Musa Ahmed. The scanner can only be set to one owner at a time. The owner was set to Kevin Wilson and therefore when the lab was scanned all of Musa Ahmed's chemicals were incorrectly recorded as mismatched owner and not as automatched. Therefore, it is more accurate to include these mismatched owner entries into the total that are all correct. If we do this, the analysis of chemical containers that are considered to be all correct is 87 %.

Table 1: Chemical Sciences Division Summary of Chemical Inventory

Lab	6-2263	70A-2203	70A-2223	2-102	2-104	2-106	2-321A	2-333	Total	% of total
Chemicals Inventoried Total	263	215	232	12	24	6	12	11	775	
Automatched Total	104	37	200	12	23	6	0	11	393	51
Mismatched location Total	43	23	12	0	1	0	12	0	91	12
Mismatched Owner Total	107	162	10	0	0	0	0	0	279	36
Disposed Total	14	2	1	0	0	0	0	0	17	2
Unscanned total	98	76	95	1	26	0	99	10	405	
New Total	19	14	9	0	0	0	0	0	42	5
New unbarcoded Total	78	36	7	0	0	0	0	0	121	

A small portion of the chemical containers in CSD have mismatched locations (12 %), a small portion were erroneously disposed (2 %), a small portion were barcoded but not entered into CMS (5 %), and a small portion were not barcoded (13 %). Given the length of time since the last wall-to-wall chemical inventory, I believe the division is doing quite well in managing the chemical inventory. It may be noted that the percentages do not add up to 100 %. There are two reasons for this. First, chemical data can be included under multiple

categories, i.e. have a mismatched location and also mismatched owner. Next, the 13 % unbarcoded containers are not added to the inventoried total. They were not scanned as part of the inventory because they did not contain a barcode. This percentage is arrived at by comparing the number of unbarcoded containers to the sum total of unbarcoded and barcoded containers.

Division researchers are failing to remove empty containers from the CMS database. 405 (unscanned) chemicals were listed in CMS and not found on the shelves. Presumably these chemicals were used and the containers were disposed of without their data being removed from the CMS. This is a large number of chemicals compared to the number of chemicals being used in these same lab spaces, but not surprising given the duration since the last chemical inventory reconciliation. During the reconciliation process, unscanned barcodes can be disposed of with the push of a button. Therefore, more frequent reconciliations to dispose of these unscanned barcodes will keep the chemical inventory at a high level of accuracy.

## **Conclusion**

Chemical inventories were conducted in representative spaces spanning various research activities conducted within the Chemical Sciences Division. During the course of the chemical inventory, any new chemical that did not contain a barcode was barcoded and entered into CMS. Mismatched locations were updated, mistakenly disposed chemicals were undisposed, and unscanned barcodes were disposed. Therefore, after a chemical inventory and reconciliation, the CMS database is 100 % accurate for the labs inventoried. However, as this analysis was conducted for representative labs within CSD, not all CSD labs have been reconciled. It is our intention to use this assessment to coordinate resources necessary and complete the reconciliation of all CSD labs. Moreover, it is also our intention to implement processes to better manage continued accuracy of the CMS. It had been three to five years since most of the CSD lab spaces had been inventoried. Based on the degree of accuracy demonstrated within this assessment, conducting a full wall-to-wall inventory and reconciliation every 1 to 2 years should be sufficient to maintain better than 90 % CMS accuracy.

## Appendix

Barcode scanner and i-pod with CMS Mobile installed.



## Using CMS Mobile

### Getting Started

Tap the CMS Mobile icon



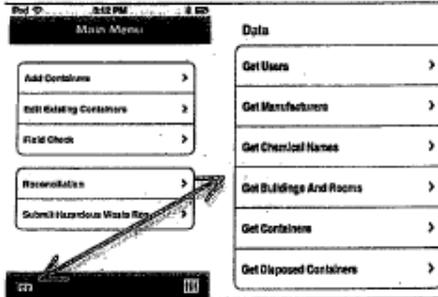
Log in using your LBL Employee ID and email password

Employee ID NUMBER

Password

Sign In LDAP Sign In

### Main Menu



### Updating Local Database

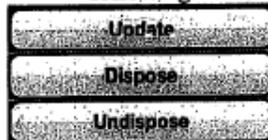
Be sure to update necessary data sets before you begin your scanning (i.e. containers, locations, etc.). This process can take 10min or longer depending on how long it has been since the local database was last updated

### Adding new containers to CMS

Add Containers >

Make changes to existing containers using one of the following

Edit Existing Containers >



Once a user selects an option, you can then scan a list of barcodes to perform the selected actions one.

Field Check >

Take a quick look at a container's Name, owner & Location

Note: edits are currently not allowed from the screen

Reconciliation >

Reconcile the entire inventory for a location.

This option will allow you to scan an entire inventory and compare scanned information with the CMS database

Submit Hazardous Waste Req. >

Select Barcodes to Create a Hazardous Waste Requisition

Completion of this task requires you to go to the Waste Requisition system <https://ehswprod.lbl.gov/shoebox>

Scanning barcodes requires the app connect to the Socket Scanner  
While the app connects to the scanner

Wait for this notification, tap OK

Connecting to scanner....



The following items must be done via the Chemical Management System web application (CMS.lbl.gov)

- Adding New Chemical Names
- Adding New Manufacturer Names
- Adding Containers with an Owner name who is not currently identified as a CMS Owner.

### CMSMobile Set-Up

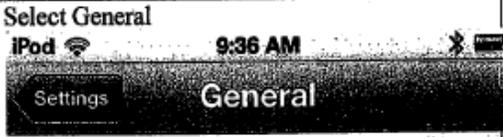
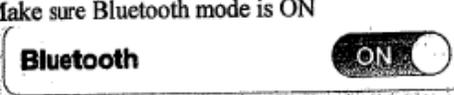
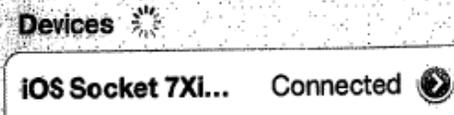
**Requirements**

You must already be a CMS user. If you are not already a CMS user, email [CMS@lbl.gov](mailto:CMS@lbl.gov) to be added to CMS. Remember to indicate whose inventory you will be managing.

CMSMobile must be connect to the LBL Network, which requires either	
A	Connecting to the lbl-employee WiFi network 
B	Connecting to any WiFi network using LBL VPN 

*CMSMobile will run without WiFi connection. However, the app will not submit information to the CMS database until WiFi connection is reestablished.*

#### Connecting the iPod and Socket Scanner

Step 1	Step 2	Step 3
 Tap the Settings Icon	Select General  Select Bluetooth 	Make sure Bluetooth mode is ON  Devices  iOS Socket 7Xi... Connected Ensure the Devices shows as iOS Socket and is connected.

Wait for Socket Scanner to Connect

If you are experiencing issues with the Socket Scanner, scan the command barcodes below to reset the device.

<b>1 - Factor Reset barcode</b> 	<b>2 - iOS Mode</b> 	<b>3 - Data "As-Is" barcode</b> 
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Kevin Wilson 6-2263

Chemical Name	Manufacturer	Size	Container	State	Barcode #
Pristane	ICC indofine <sup>chem</sup> <del>co.</del>	100mg	Plast	S	LBL CH303168
1-Iodooctadecane	Aldrich	25g	Glass	S	LBL CH303169
Glycolaldehyde dimer	Aldrich	1g	"	"	LBL CH303170
Tricarballic acid	Fluka	5g	"	"	LBL CH303171
isocitric acid lactone	Aldrich	1g	"	"	LBL CH303172
cis-Pinonic acid	Aldrich	5g	"	S	LBL CH303173
D-(-)-tartaric acid	Aldrich	25g	Plastic	S	LBL CH303174
Calcium Carbonate	Aldrich	5g	Glass	S	251632
Adipic acid	Acros	500g	Plastic	S	LBL CH303175
Citric acid	Sigma	100g	"	"	LBL CH303176
1,2,3,4-Butanetetracarboxylic Acid	Aldrich	100g	"	"	LBL CH303177
Meso-Erythritol	Sigma	25g	"	"	LBL CH303178
Citric acid	Sigma	100g	"	"	LBL CH303179
1-iodo adamantane	Aldrich	5g	Glass	"	LBL CH303180
Caffeine Solution 1mg/mL in Methanol	"	1mL	"	L	LBL CH303195
MRFA-Peptid	Thermo Sci	1mg	"	S	LBL CH303196
Ultamark 1621 Mass spec std	Aber GmbH	250mg	"	L	LBL CH303197
Fe(II) oxide	Aldrich	200g	Plastic	S	251394
Li Nitrogen	Various	240L	Metal	L	LBL CH303210

Reconciliation report example for building 6 room 2263.



Martin Neitzel <mlneitzel@lbl.gov>

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**Reconciliation Report for 006-2263 at: 2013-04-18 22:55:57 +0000**

1 message

CMS <lblmobilecms@gmail.com>

Thu, Apr 18, 2013 at 3:56 PM

To: "lmaeksich@lbl.gov" <lmaeksich@lbl.gov>, mlneitzel@lbl.gov

Details

Total Scanned: Total # of Barcodes Scanned: 263

Automatched: 104 of 104

Mismatched Location: 43 of 43

Mismatched Owner: 107 of 107

Disposed: 14 of 14

Unscanned: 98 of 98

New: 19 of 19

Sent from my iPod

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Reconciliation.csv  
10K