



USSOCOM

Chemical, Biological, Radiological & Nuclear Conference & Exhibition

Responding to the Terrorist CBRN Threat: "Preparation or Panic"

December 6-8, 2005

Chemical Homeland Security System

C-HoSS

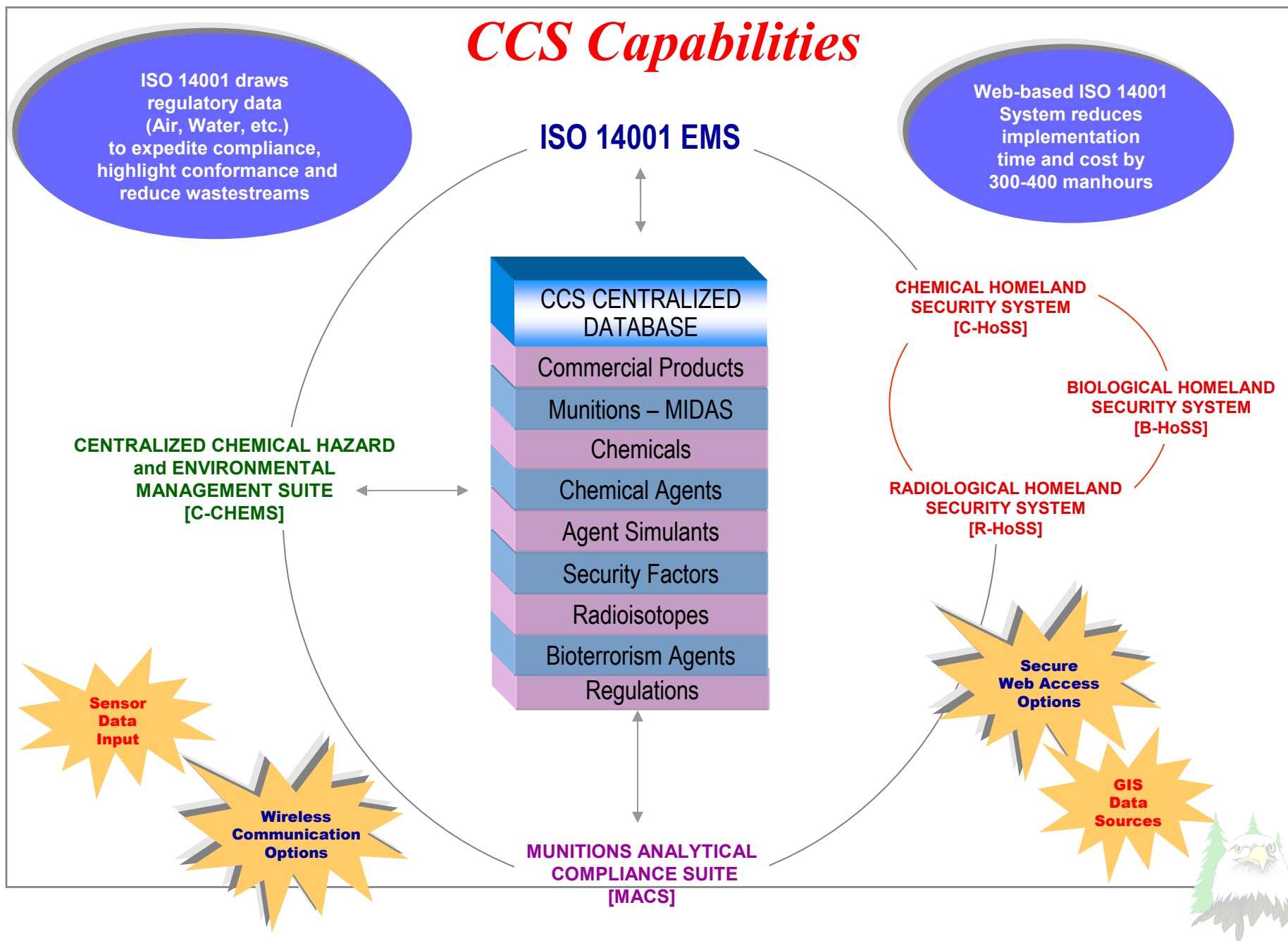
Chemical Compliance Systems, Inc.

706 Route 15 South, Suite 207 • Lake Hopatcong, NJ 07849

973-663-2148 • (fax) 973-663-2378

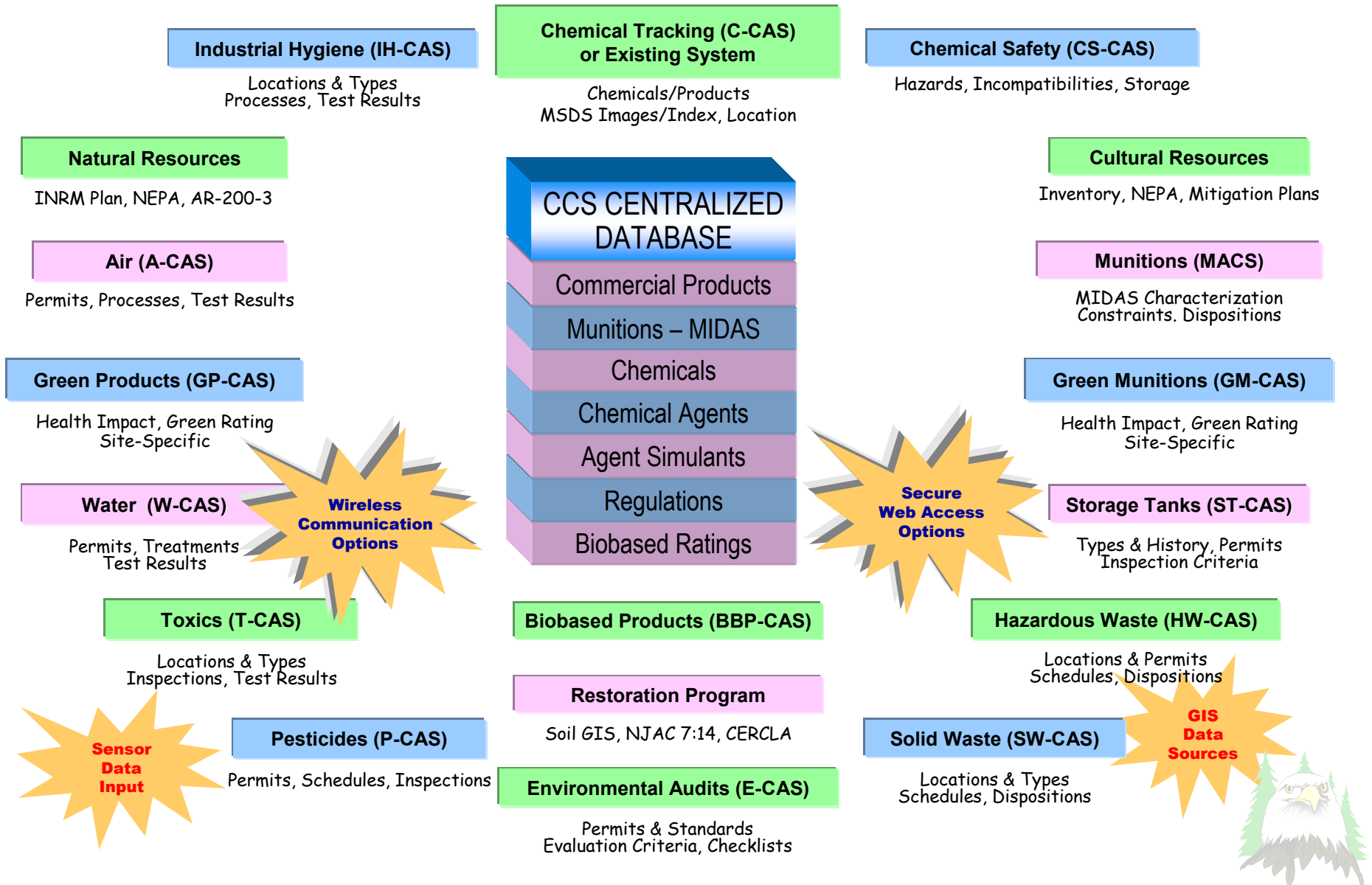
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CCS Capabilities

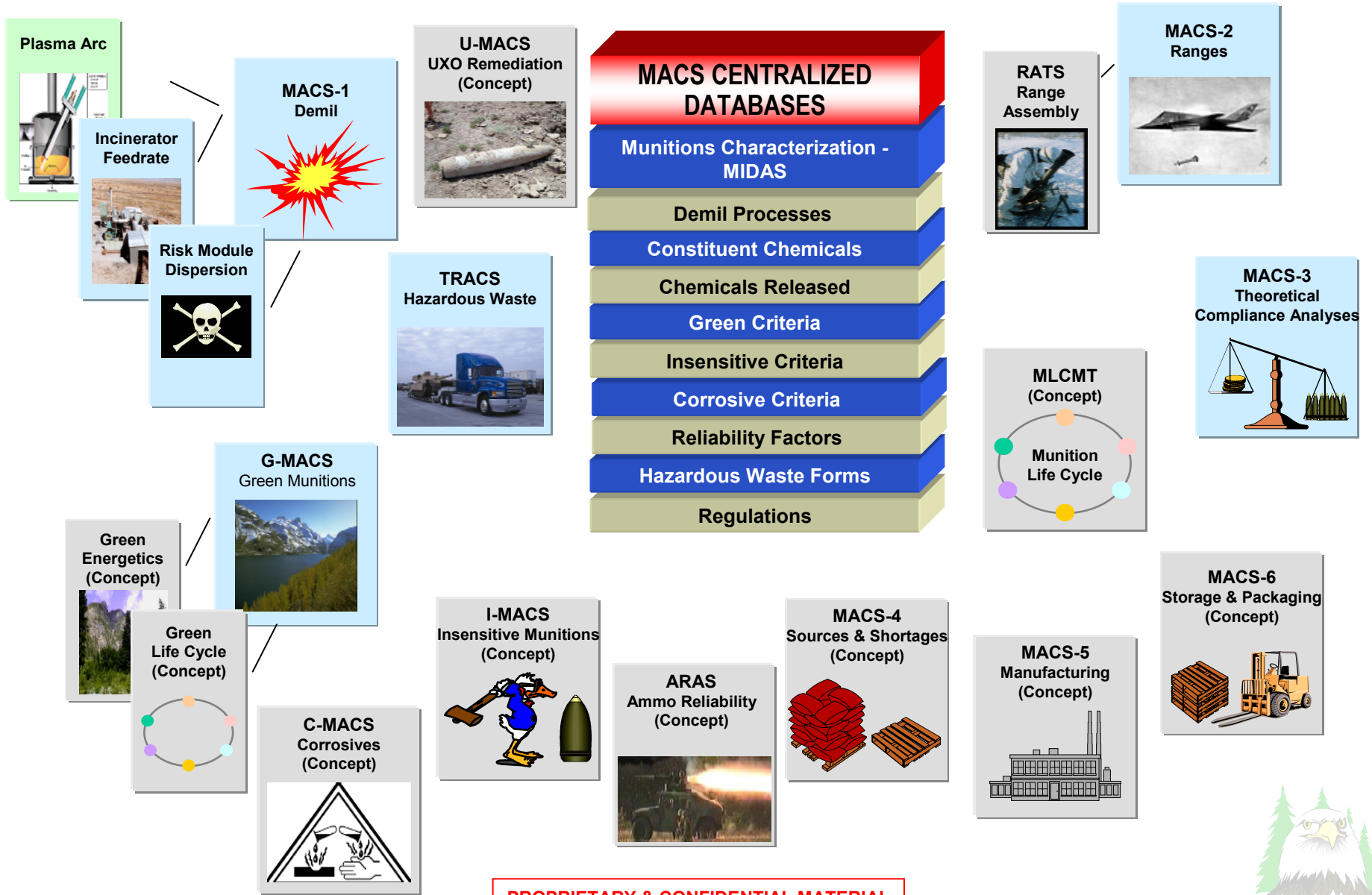


Centralized Chemical Hazard and Environmental Management Suite (C-CHEMS)

Centralized and Relational Databases



Munitions Analytical Compliance Suite (MACS)



PROPRIETARY & CONFIDENTIAL MATERIAL



USSOCOM
Responding to the Terrorist CBRN Threat: “Preparation or Panic”

Scenario #4

Sleeper Cell Agents Employed As

Chemical research laboratory technician—Columbia University, NYC
Large high school custodian—downtown LA
Supply clerk—Aberdeen Proving Ground, north of Baltimore
Warehouse manager—large chemical manufacturer, near Chicago

Their Objectives

Identify internal supply of readily accessible, incompatible chemicals
Create a massive explosion
Release substantial quantities of toxic air pollutants (CBR)

Simultaneous Explosions

Same day—in/near 4 major U.S. cities
Major local panic ➔ national fear
Substantial loss of life—each site
Serious long-term health & environmental effects
Tremendous loss of confidence in homeland security

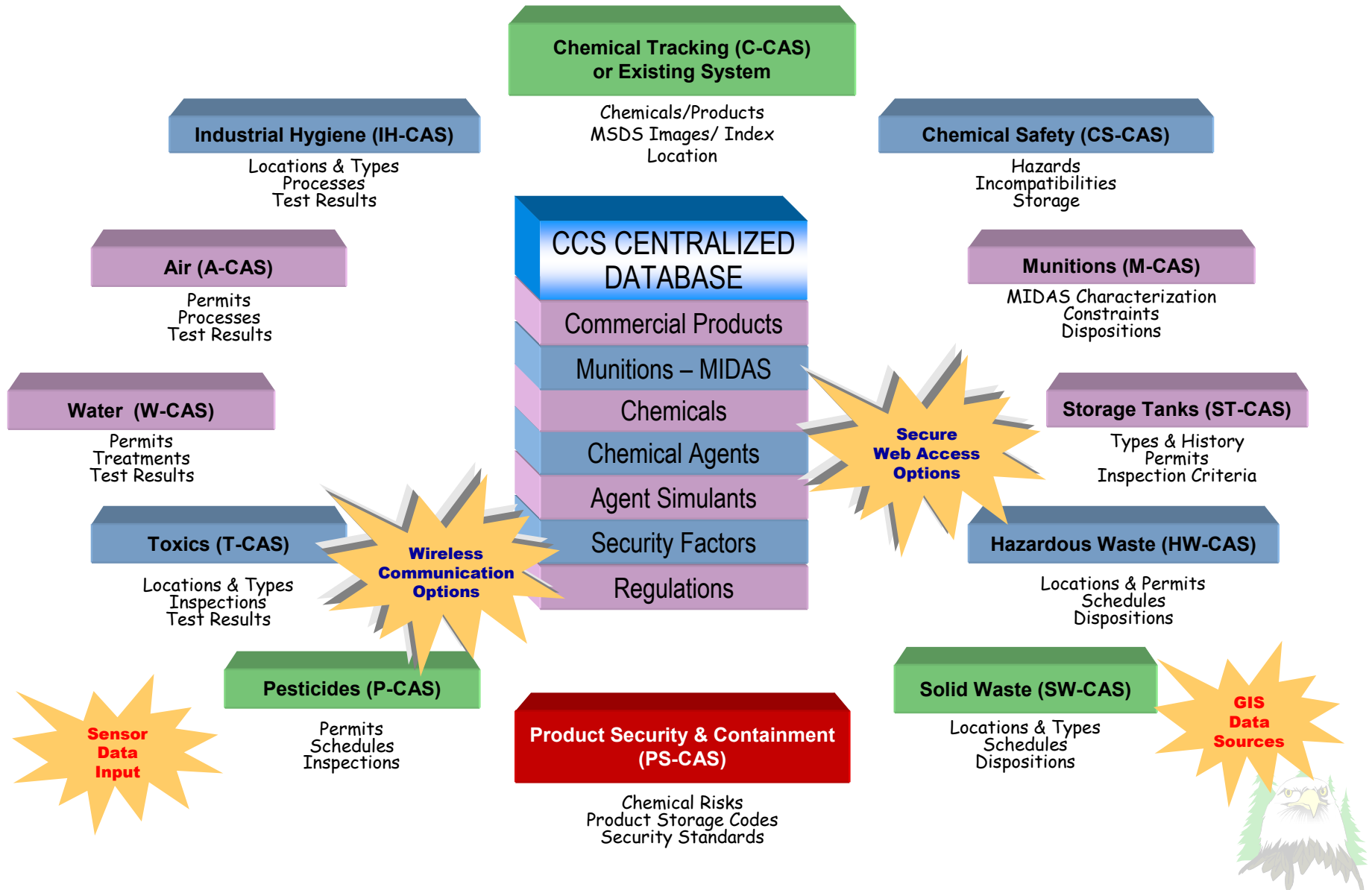
Perpetrators Continue Their Employment

1–3 years, then resign
Seek new employment
Next targeted institution & city

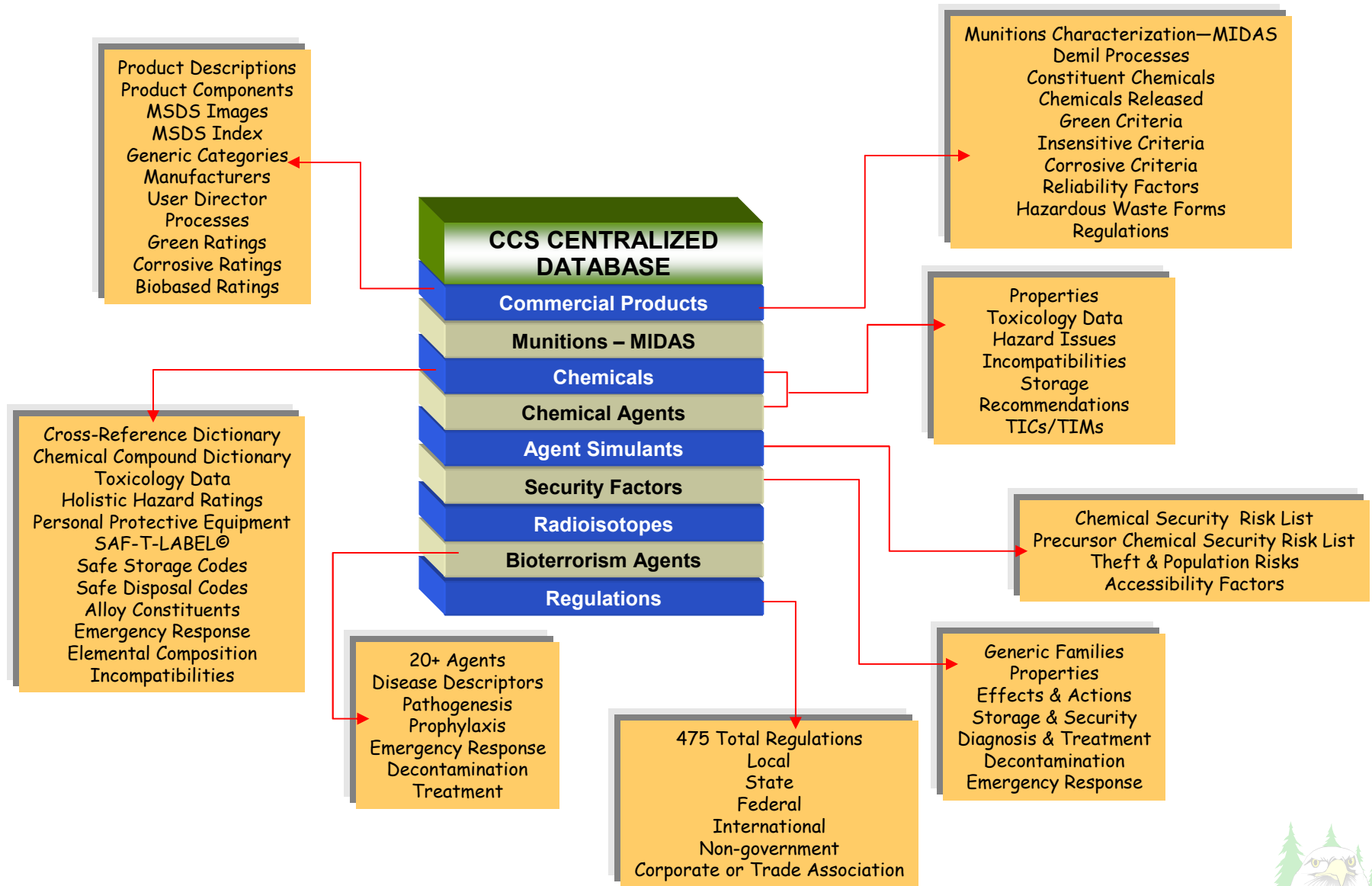


Chemical Homeland Security System (C-HoSS)

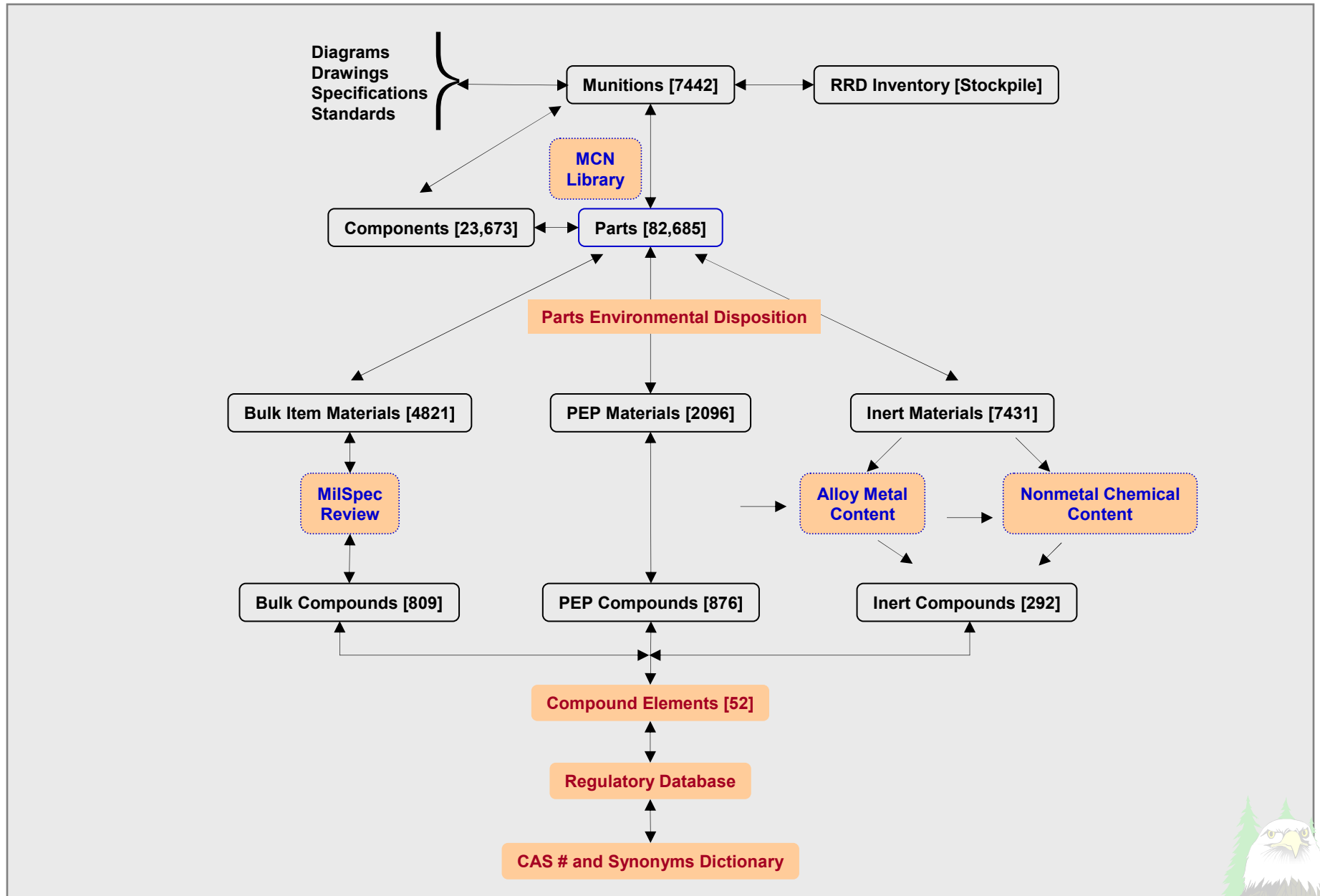
Centralized and Relational Databases



The CCS Relational Chemical and Product Database (R-CPD)

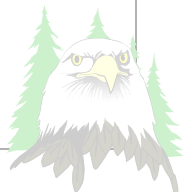
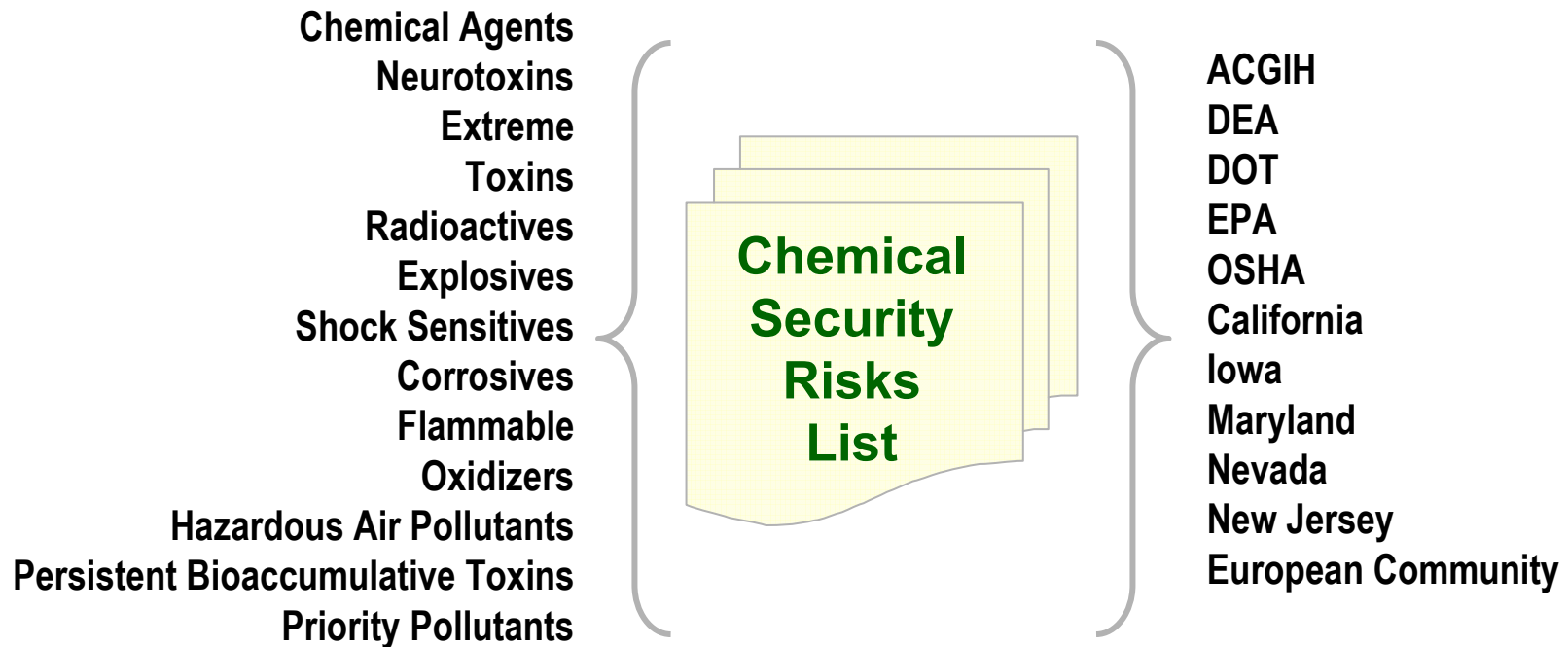


Enhanced MIDAS Database Library



Regulated Hazardous Chemicals

Acute Hazard Orientation



CPSC Specialty Regulated Substances

Canada Export Control Lists

DEA Essential Chemicals

DEA Precursor Chemicals

DOC Export Restrictions

EU Black/Gray Lists

IATA Air Transport Forbidden

IATA Passenger Transport Forbidden

IATA Regulated Substances

UK The Red List (Water)

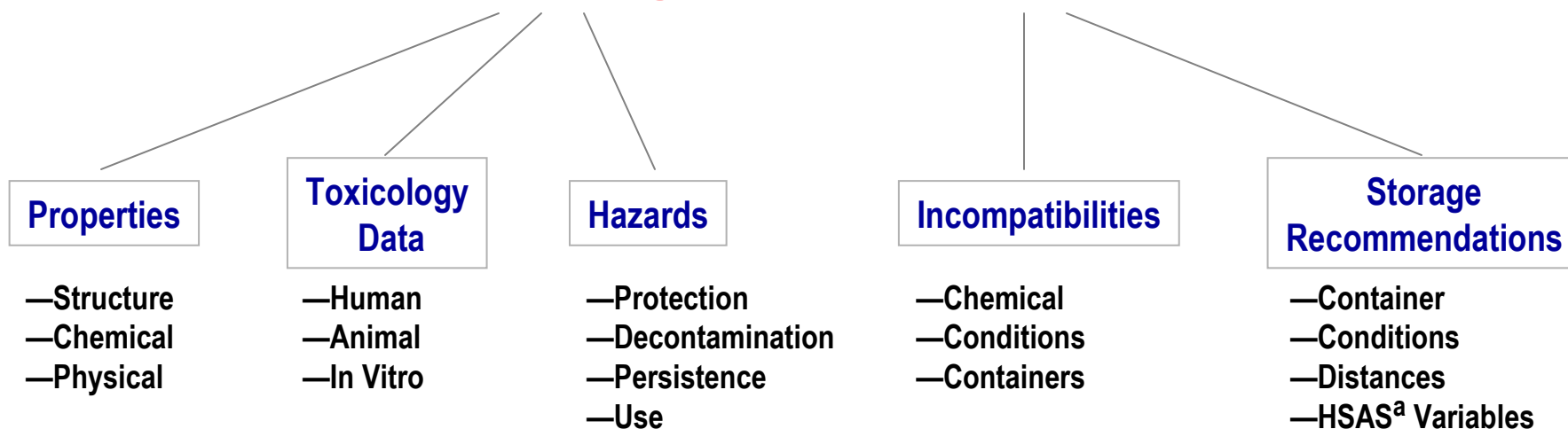
UN/FAO Prior Informed Consent



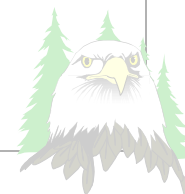
***Precursor
Chemical Security
Risks List***



Chemical Agents and Simulants



^a HSAS = Homeland Security Advisory System

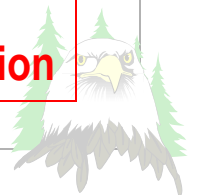


Toxic Industrial Chemicals/Toxic Industrial Materials (TICs/TIMs)

Selected Examples

Industrial Feedstocks:	Acrylamide, Chlorine, Hydrogen Chloride, Phosgene
Carbamate Insecticides:	Baygon, Mobam, Temik, Zectran
Organochlorine Insecticides:	Aldrin, Dieldrin, Endrin, Lindane, Heptachlor
Organophosphate Insecticides:	Disulfotan, Mevnphos, Parathion, Methylparathion
Insecticide Synergists:	Piperonyl Butoxide
Fungicides:	Pentachlorophenol, Hexachlorobenzene, Maneb, Naban, Zineb
Fumigants:	Calcium Cyanide, Methyl Bromide, Phosphine
Seed Disinfectants:	Methylmercury Acetate, Methylmercury Cyanide

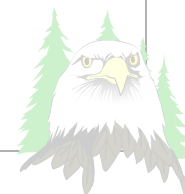
GOALS: [1] Identify all chemicals with severe to extreme acute toxicity
[2] Identify all chemicals in product classes with similar mechanisms of action



Incompatible Chemical Database

(Published Book)

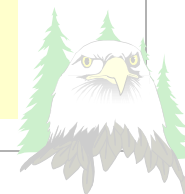
Chemical Class	Chemical	Incompatible Chemical	I.C. Class	Interaction Hazard
Corrosives	Acetic Acid Nitric Acid Chlorine	Hydrogen Peroxide Acetylene Aluminum Powder	Oxidizer Flammable Metal	Explosion Explosion Spontaneous Fire
Flammables	Acetone Benzene Carbon Disulfide	Chloroform Chlorine Potassium	Carcinogen Corrosive Flammable	Explosion Explosion Violent Explosion
Reactives	Nitrotoluene Nitroethane Acrylonitrile	Sulfuric Acid Hydrocarbons Bromine	Corrosive Combustible Corrosive	Explosion Explosion Explosion
Products	Toilet Bowl Cleaner Bleach Paint Solvent	Metal Powders Ammonia Chloroform	Metals Product Carcinogen	Explosion Poisonous Gas Explosion



Safe Chemical Storage Codes

(Published Book)

Code #	Chemical	Code #	Chemical
PK26	Acetaldehyde	RD26	n-Hexane
PR29	Acetylene	YL10	Hydrogen chloride
PR01	Ammonia	YL07	Iodine
LG22	Aniline	RD23	Isopropyl alcohol
LG06	Arsenic	GN04	Lead
RD26	Benzene	LG24	Malathion
PK26	Benzine	LG07	Mercuric chloride
YL07	Bromine	YL27	Methyl chloroform
LG04	Cadmium	RD26	Methyl methacrylate
RD27	Camphor	RD26	Naphthalene
RD09	Carbon disulfide	YL12	Nitric acid
LG27	Chordane	WH23	Phenol
YL11	Chromic acid	RD06	Phosphorous (yellow)
LG23	Coal tar creosote	LG03	Potassium arsenate
GN26	Cottonseed oil	GN02	Potassium permanganate
GN01	Cupric nitrate	GN08	Soda lime
RD26	Cyclohexane	LG02	Sodium dichromate
RD27	1,2-Dichlorobenzene	RD26	Styrene monomer
GN22	Dimethylformamide	YL11	Sulfuric acid
PK21	2,6-Dinitrotoluene	RD26	Toluene
RD23	Ethyl alcohol	RD26	Turpentine
WH20	Formic acid	RD26	Xylenes



Chemical Security Procedures

Security Procedure Phases

Phase I

Vulnerability Assessment

Identify chemical hazards, security risks, mortality risks

Phase II

Countermeasures Implementation

Reduce vulnerabilities

Phase III

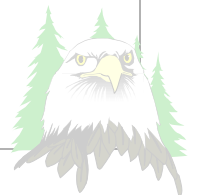
Verification Audit

Independently confirm counter measure adequacy

Phase IV

Management System Integration

Integrate chemical security procedures into line management functions



C-HoSS Security Criteria and Standards

- Chemical Hazard Class Rankings (*by Hazard Class*)
- Chemical Hazard Grades (1-4) (*within each ranking*)
- Product Concentration Grades (1-4)

Chemical Hazard Factor (CHF) = Ranking × Grade × Concentration

- Theft Risk Grades (1-4) (*per product*)

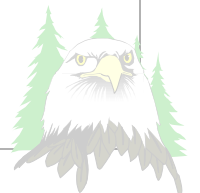
Chemical Security Risk Factor (CSRF) = Ranking × Grade × Concentration × Theft Risk

- Population at Risk Grades (1-4)

Chemical Mortality Risk Factor (CMRF) = Ranking × Grade × Concentration × Theft Risk × Population Risk

- Accessibility Factor Levels (*Storage Constraint Levels and Descriptors*) (0.5 - 4.5)

CMRF Ⓜ Accessibility Factor (AF) = Vulnerability Factor (VF)



Chemical Security Product Storage Codes

- Based Upon CSRF

- Codes = AF Levels ^a

CSRF = 600, or CHF = 38 ^b = AF Level 1

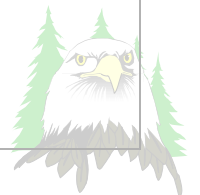
CSRF = 1200, or CHF = 75 = AF Level 2

CSRF = 1800, or CHF = 100 = AF Level 3

CSRF = 2400, or CHF = 150 = AF Level 4

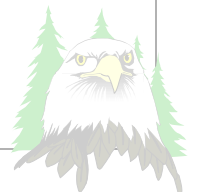
^a AF Levels will be calculated at 1/2 step intervals.

^b Whichever is lower for a hazardous material.



Chemical Security Criteria and Homeland Security Advisory System (HSAS) Correlation

HOMELAND SECURITY ADVISORY SYSTEM (HSAS)					
	SEVERE	HIGH	ELEVATED	GUARDED	LOW
	Red	Orange	Yellow	Blue	Green
<i>If</i> CSRF = or CHF =	> 400 or 50	> 800 or > 80	> 1600 or > 110	> 2400 or > 130	> 2800 or > 160
<i>Then</i> AF Increases	2 Levels	1.5 Levels	1.0 Levels	0.5 Levels	0 Levels



C-HoSS Security Risk Assessment Analytical Reports

PRODUCT & CHEMICAL ANALYSES

- Inventory by Product Type ^a
- Product by Location
- Product by Container Size
- Product by Weight
- Product Hazard Classifications
- Product Hazard Rankings
- Product Hazard Grades
- Product Hazard Factors
- Product Security Risk Factors
- Product Accessibility Factors
- Product Accessibility Levels/Storage Codes
- Chemicals by Product
- Pure Chemicals by Location
- Pure Chemicals by Weight

PRECURSOR CHEMICAL ANALYSES

- Precursor Chemicals by Location
- Precursor Chemicals by Container Size
- Precursor Chemicals by Weight
- Precursor Chemicals Hazard Classifications ^b
- Precursor Chemicals Hazard Rankings
- Precursor Chemicals Hazard Grades
- Precursor Chemicals Hazard Factors
- Precursor Chemicals Security Risk Factors
- Precursor Chemicals Accessibility Factors
- Precursor Chemicals Accessibility Levels/Storage Codes

SPECIALTY MODULE ANALYSES

- Air Releases
- Water Contaminants
- Toxics
- Pesticides
- Hazardous Waste
- Solid Waste
- Storage Tanks
- Munitions
- Chemical Safety
- Industrial Hygiene

INCOMPATIBILITY ANALYSES

- Prioritized Incompatibility Threats by Product
- Prioritized Incompatibility Threats by Room
- Prioritized Incompatibility Threats by Building
- Prioritized Incompatibility Threats by Facility

SECURITY ANALYSES

- Inventory by CHF
- Inventory by CSRF
- Inventory by AF
- Inventory by Storage Levels
- Inventory (shift) by HSAS

^a Chemical, Precursor Chemical, Munition, Chemical Agent, Simulant.

^b Assigned by their worst classification: (1) innate classification, or (2) reaction product classification.



C-HoSS Capabilities vs. Chemical Security Procedures

Security Procedure Phases

C-HoSS Capabilities

PHASE I

Vulnerability Assessment

Identify chemical hazards, security risks, mortality risks

Chemical Hazard Factor Report

Chemical Security Risk Factor Report

Chemical Mortality Risk Factor Report

Chemical Vulnerability Risk Factor Report

PHASE II

Counter Measures Implementation

Reduce vulnerabilities

Accessibility Factor (Storage Constraint) Report
(per chemical/material)

PHASE III

Verification Audit

Independently confirm counter measure adequacy

Chemical Vulnerability Factor "Report Card"
(to the local fire department)

PHASE IV

Management System Integration

Integrate chemical security procedures into line management functions

Integration of C-HoSS w/ chemical tracking system
Daily C-HoSS correlation w/ Homeland Security
Advisory System





For information, contact:

Dr. George Thompson

georgethompson@chemply.com

973-663-2148

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706 Route 15 South, Suite 207 • Lake Hopatcong, NJ 07849

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