

Screening an Inventory for DHS Chemicals of Interest

**Presented on March 24, 2008
for NCC ACHMM**

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What We Will Cover

- Brief overview of the Department of Homeland Security (DHS) Standard
- How to Screen an Inventory for DHS chemicals
- Potential Scenarios Impacting an R&D Facility
- Measures to Minimize Impact of the Standard
- Some Best Practices

Note/Legal Stuff: This presentation is meant to be a brief overview of my interpretations of the regulations. Consult the current regulations for the latest and most accurate information.

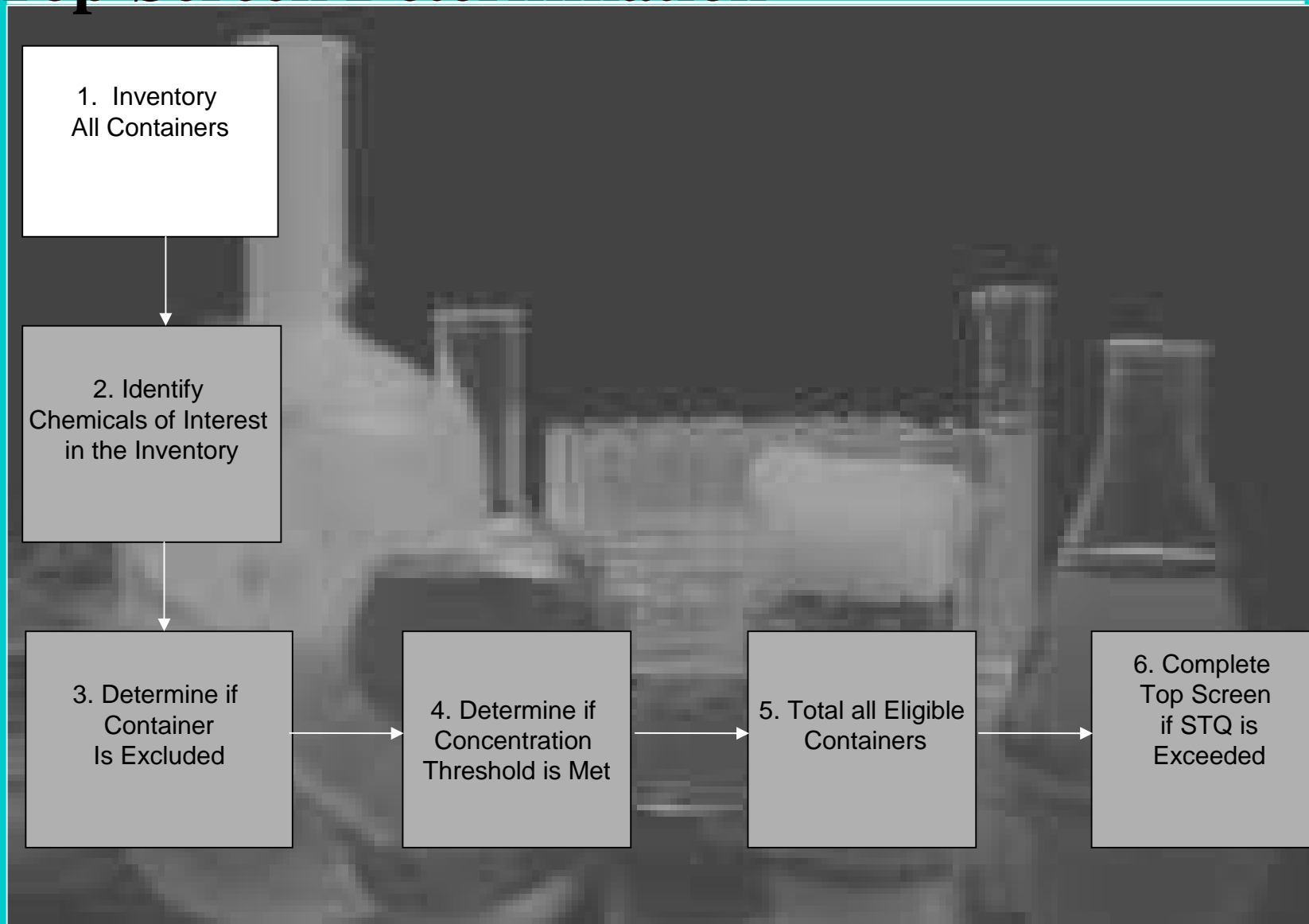


Legal Basis

- **DHS Appropriations Act of 2007**
 - provided DHS with the authority to regulate the security of high risk chemical facilities
- **Final rules published November 20, 2007**

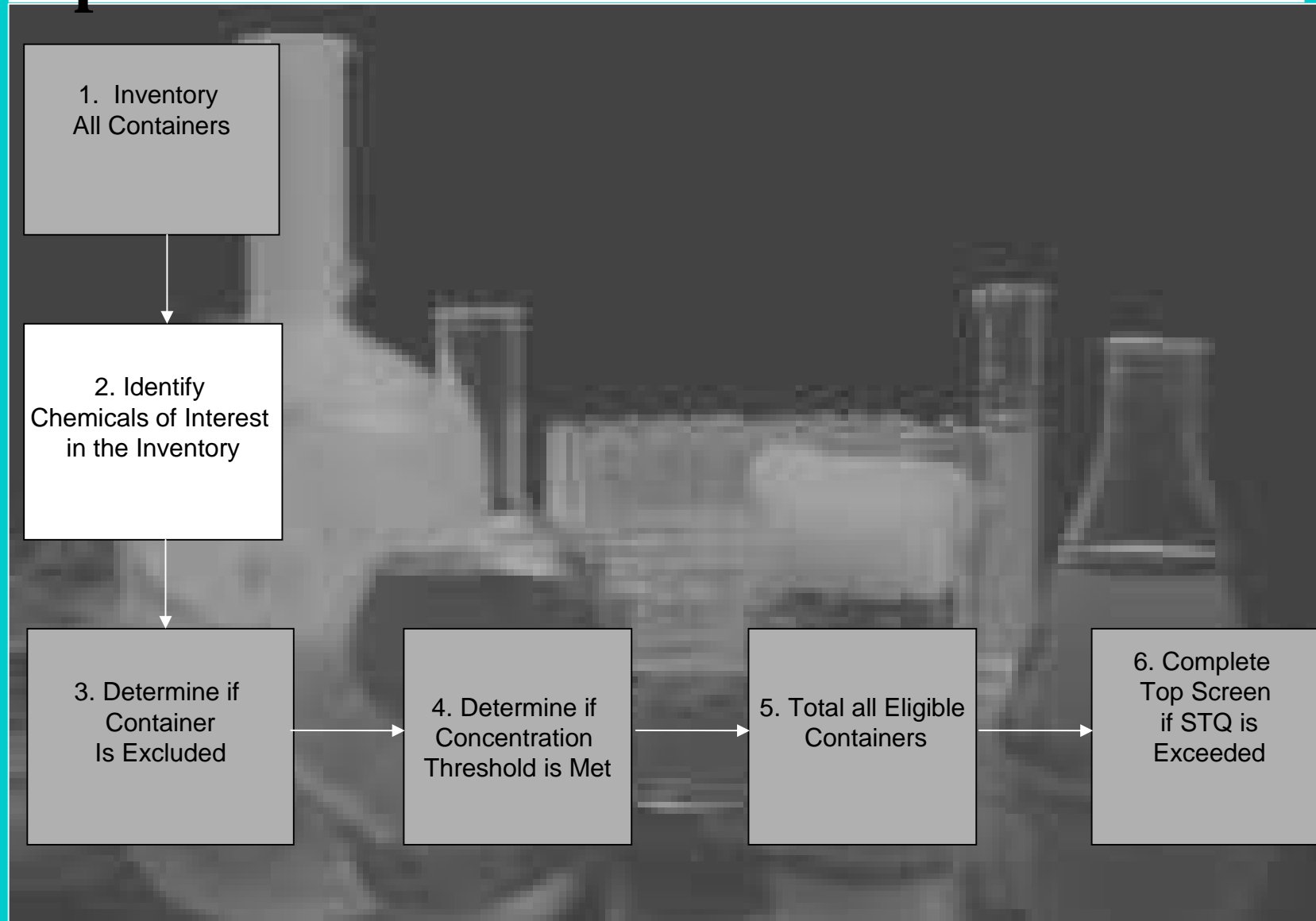


Top-Screen Determination





Top-Screen Determination





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SOLUTIONS

2. Identify Chemicals of Interest in Your Inventory

Current selection: 93 of 4558 inventory item(s).

Home Buildings Rooms Inventory Substances More...

View Location ? Sort 1.0349

Common tasks

[Add a \[n\]ew inventory item](#)

[Delete inventory item\(s\) \[Del\]](#)

[Show all inventory items \[J\]](#)

[Show highlighted inventory item\(s\) only \[R\]](#)

[\[H\]ide \(omit\) highlighted inventory item\(s\)](#)

[\[F\]ind inventory item\(s\)](#)

[\[P\]repare a report of listed inventory item\(s\)](#)

[\[G\]raph listed inventory item\(s\)](#)

[Mark inventory items for export](#)

[Un-mark inventory items for export](#)

[\[M\]SDS files](#)

[Linked substances](#)

Manage your chemical inventory...

Building name	Room name	Cabinet	Shelf	Row	Substance	CAS number	State	Qty	Size	Units
Main Laboratory	2289				2-Chloroethylchloro- methylsulfide	2625-76-5		1	50	g
Main Laboratory	2289				2-Chlorovinylchloroarsine	541-25-3	Liquid	1	75	g
Main Laboratory	2022		26/4	B	ACETYL CHLORIDE	75-36-5	Liquid	1	500	g
Main Laboratory	14		N		Acid Alcohol	64-17-5	Liquid	1	50	ml
Main Laboratory	14		N		Acid Alcohol	64-17-5	Liquid	1	50	ml
Main Laboratory	14		N		Acid Alcohol	64-17-5	Liquid	1	50	ml
Main Laboratory	14		N		Acid Alcohol	64-17-5	Liquid	1	50	ml
Main Laboratory	14		N		Acid Alcohol	64-17-5	Liquid	1	50	ml
Main Laboratory	2022		25/1	B	Aluminum (Fume, Dust, or Powder)	7429-90-5	Solid	1	500	g
Main Laboratory	2022		17/5	E	Aluminum (Fume, Dust, or Powder)	7429-90-5	Solid	1	100	g
Main Laboratory	2022		02/5	D	Aluminum (Fume, Dust, or Powder)	7429-90-5	Solid	1	25	g
Main Laboratory	2022		17/5	C	Aluminum (Fume, Dust, or Powder)	7429-90-5	Solid	1	100	lb
Main Laboratory	2022		17/5	C	Aluminum (Fume, Dust, or Powder)	7429-90-5	Solid	1	1	lb
Main Laboratory	2022		25/1	B	Aluminum (Fume, Dust, or Powder)	7429-90-5	Solid	1	50	lb
Main Laboratory	2022		10/1	A	Boron trichloride	10294-34-5	Gas	1	50	lb
Main Laboratory	2022		21/5	A	Bromine	7726-95-6	Liquid	1	450	g
Main Laboratory	2022		25/1	E	CALCIUM PHOSPHIDE	1305-99-3	Solid	1	1,000	g
Main Laboratory	2022		07/3	C	CHLOROFORM	67-66-3	Liquid	1	500	ml
Main Laboratory	2022		07/3	C	CHLOROFORM	67-66-3	Liquid	1	500	ml
Main Laboratory	2022		07/3	C	CHLOROFORM	67-66-3	Liquid	1	500	ml
Main Laboratory	2022		07/3	C	CHLOROFORM	67-66-3	Liquid	1	500	ml
Main Laboratory	2022		07/3	C	CHLOROFORM	67-66-3	Liquid	1	500	ml
Main Laboratory	2022		07/3	C	CHLOROFORM	67-66-3	Liquid	1	500	ml
Main Laboratory	11A		020	C	CHLOROFORM	67-66-3	Liquid	1	500	ml
Main Laboratory	133		203/4	A	Chlorosulfonic acid	7790-94-5	Liquid	1	450	g
Main Laboratory	2022		21/5	A	CHROMIC OXYCHLORIDE	14977-61-8	Liquid	1	1	lb
Main Laboratory	2022		27/2	A	ETHYL ETHER	60-29-7	Liquid	1	500	ml
Main Laboratory	2022		27/2	A	ETHYL ETHER	60-29-7	Liquid	1	500	ml



Chemicals of Interest (COI)

The Four Security Issues:

- Release
- Theft and Diversion
- Sabotage and Contamination
- Critical to Government or National Economy





Issue 1: Release

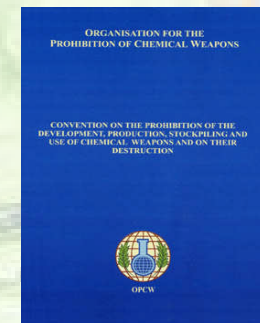
- **Toxics**
 - Create a toxic cloud that could affect populations
 - e.g., Chlorine, Arsine, Fluorine
- **Flammables**
 - Create a vapor cloud explosion that could affect populations
 - e.g., Butane, propane
- **Explosives**
 - Create a blast wave that could affect populations
 - e.g., TNT, picric acid





Issue 2: Theft and Diversion

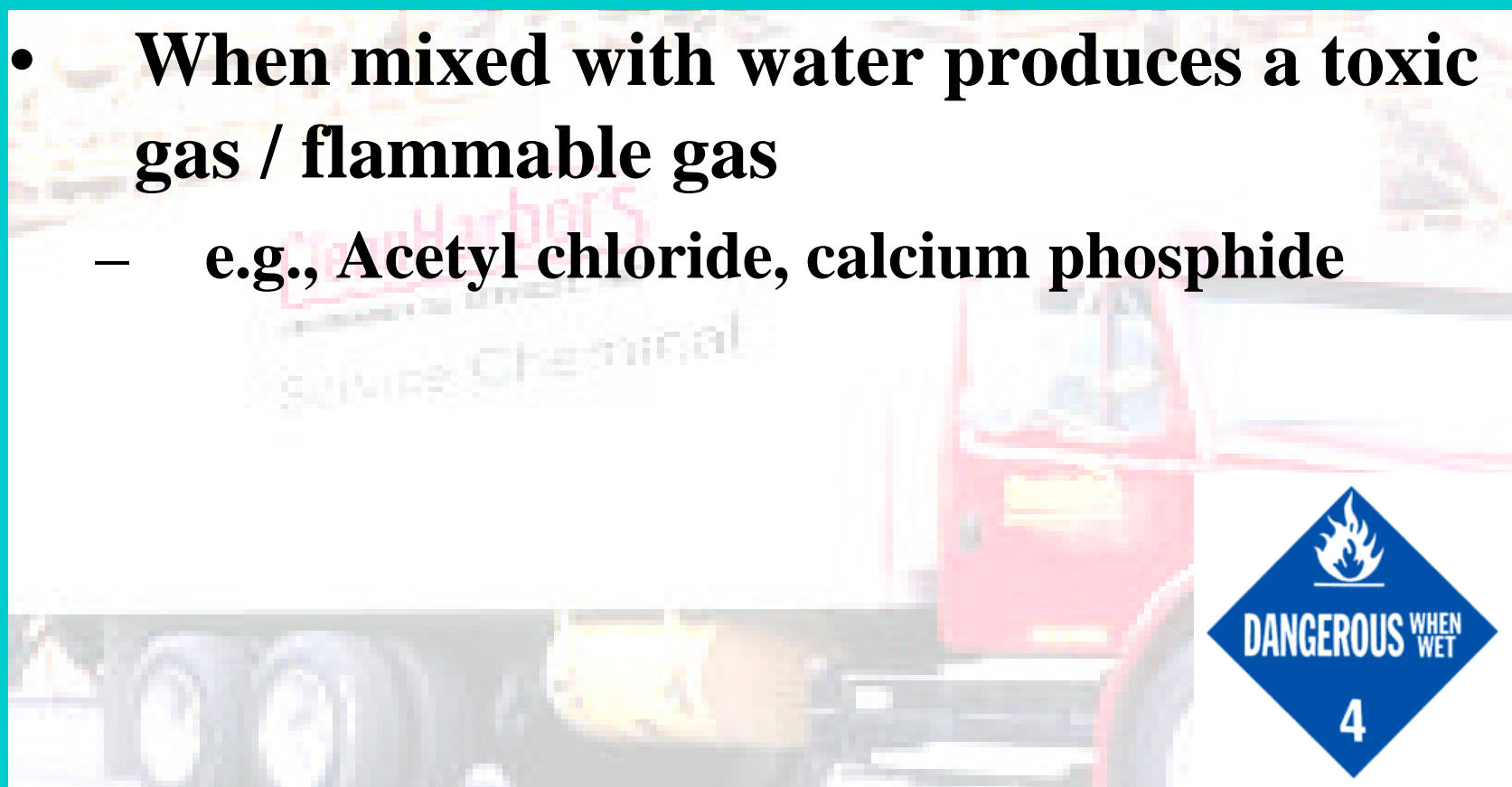
- **Weapon of Mass Effect**
 - DOT 2.3 toxic gases
 - e.g., Chlorine, phosgene
- **Chemical Weapons and Precursors**
 - e.g. mustard gas
- **Explosives and Improvised Explosive Devices**
 - e.g., TNT, picric acid, nitric acid (68%)





Issue 3: Sabotage and Contamination

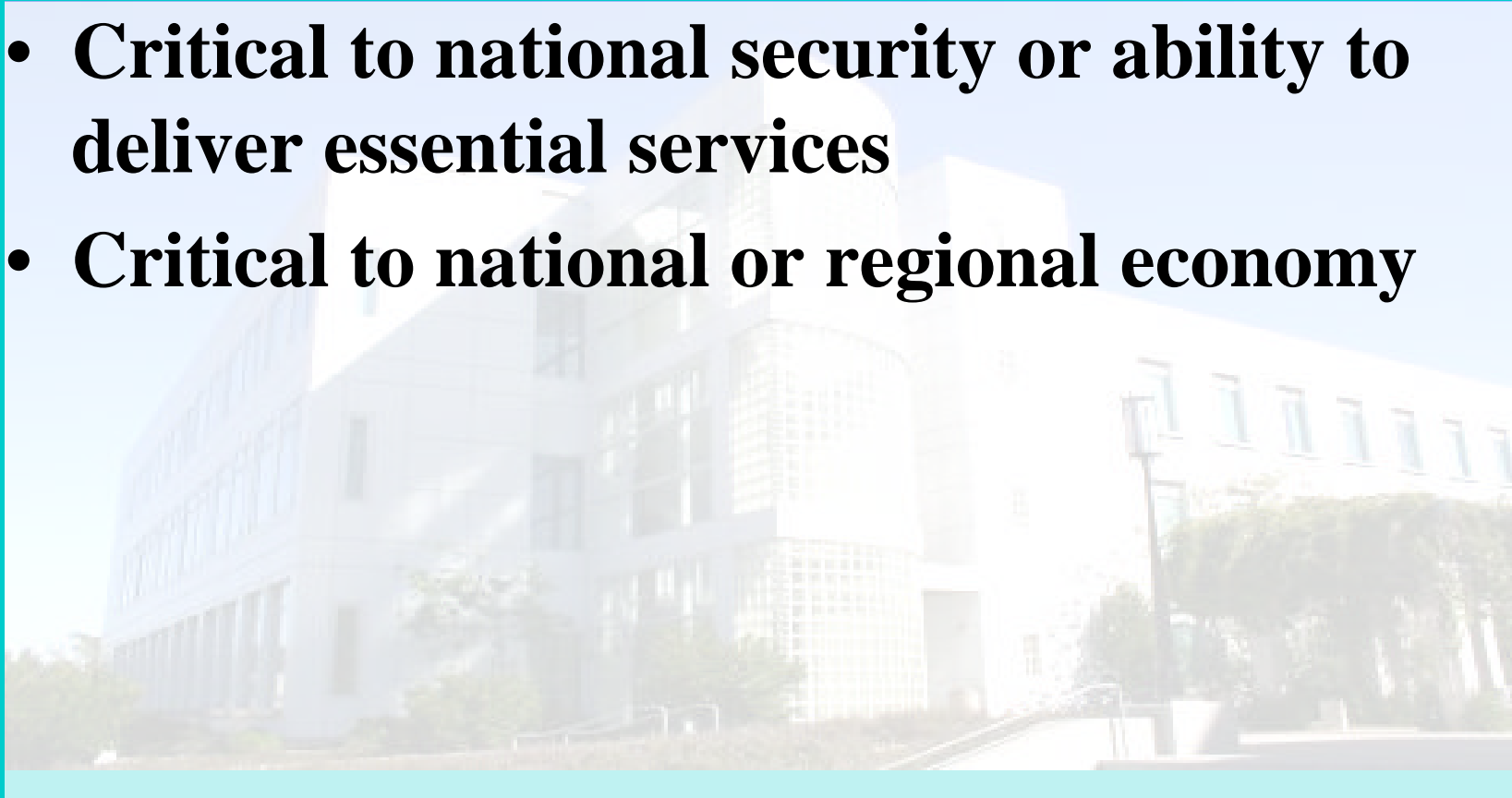
- **When mixed with water produces a toxic gas / flammable gas**
 - e.g., Acetyl chloride, calcium phosphide





Issue 4: Critical to Government/Economy

- **Critical to national security or ability to deliver essential services**
- **Critical to national or regional economy**

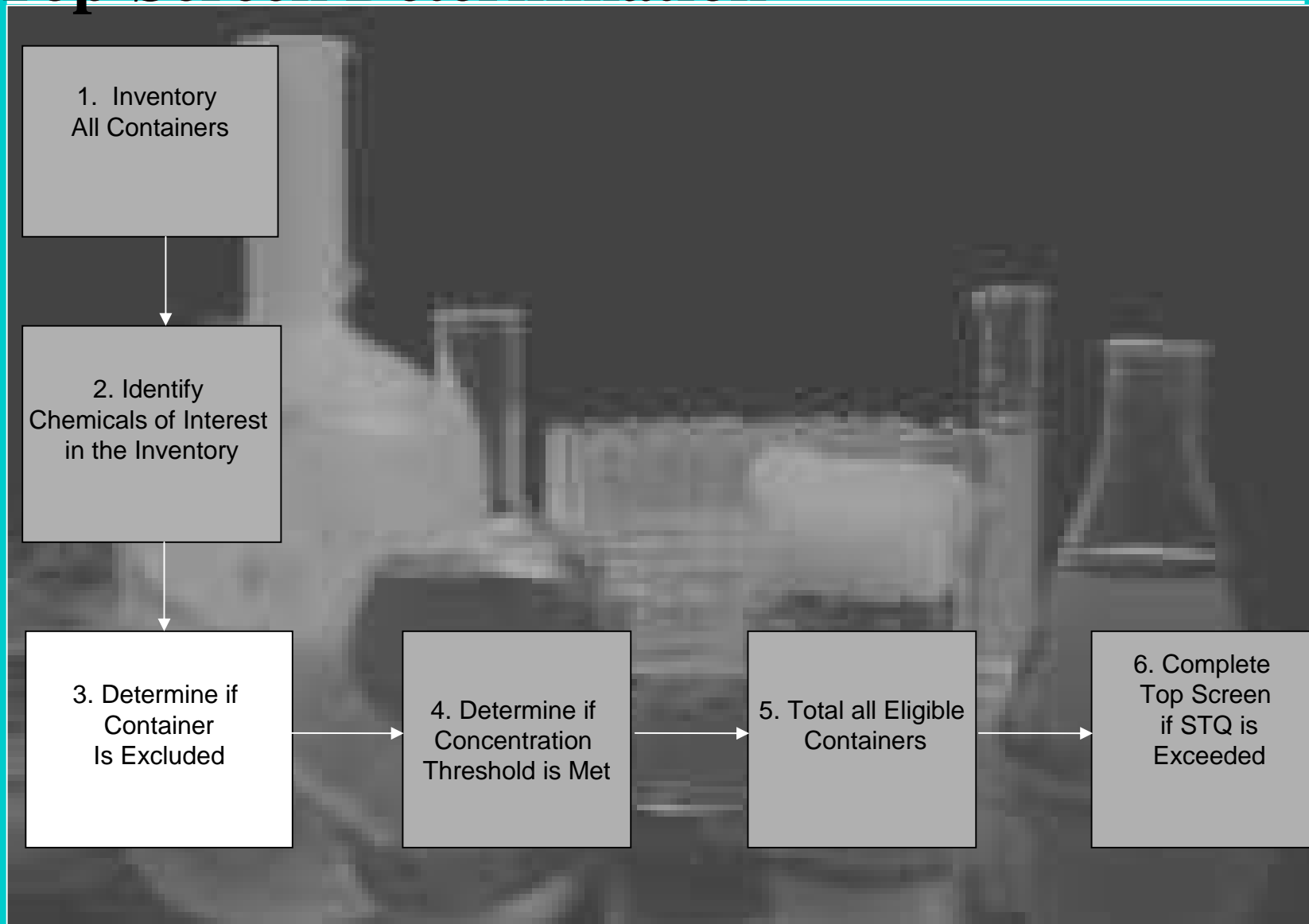


Appendix A to Part 27. -- DHS Chemicals of Interest ¹

Chemicals of Interest (COI)	Synonym	Chemical Abstract Service (CAS) #	Release		Theft		Sabotage		Security Issue							
			Minimum Concentration (%)	Screening Threshold Quantities (in pounds)	Minimum Concentration (%)	Screening Threshold Quantities (in pounds unless otherwise noted)	Minimum Concentration (%)	Screening Threshold Quantities	Release – Toxic	Release – Flammables	Release – Explosives	Theft – CW/CWP	Theft – WME	Theft – EXP/IEDP	Sabotage/Contamination	
Acetaldehyde		75-07-0	1.00	10,000						X						
Acetone cyanohydrin, stabilized		75-86-5					ACG	APA								X
Acetyl bromide		506-96-7					ACG	APA								X
Acetyl chloride		75-36-5					ACG	APA								X
Acetyl iodide		507-02-8					ACG	APA								X
Acetylene	[Ethyne]	74-86-2	1.00	10,000						X						
Acrolein	[2-Propenal] or Acrylaldehyde	107-02-8	1.00	5,000						X						
Acrylonitrile	[2-Propenenitrile]	107-13-1	1.00	10,000							X					
Acrylyl chloride	[2-Propenoyl chloride]	814-68-8	1.00	10,000							X					
Allyl alcohol	[2-Propen-1-ol]	107-18-6	1.00	15,000						X						
Allylamine	[2-Propen-1-amine]	107-11-9	1.00	10,000							X					
Allyltrichlorosilane, stabilized		107-37-9					ACG	APA								X
Aluminum (powder)		7429-90-5			ACG	100									X	
Aluminum bromide, anhydrous		7727-15-3					ACG	APA								X
Aluminum chloride, anhydrous		7446-70-0					ACG	APA								X
Aluminum phosphide		20859-73-8					ACG	APA								X
Ammonia (anhydrous)		7884-41-7	1.00	10,000						X						
Ammonia (conc. 20% or greater)		7884-41-7	20.00	20,000						X						
Ammonium nitrate, [with more than 0.2 percent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance]		6484-52-2	ACG	5,000	ACG	400						X			X	



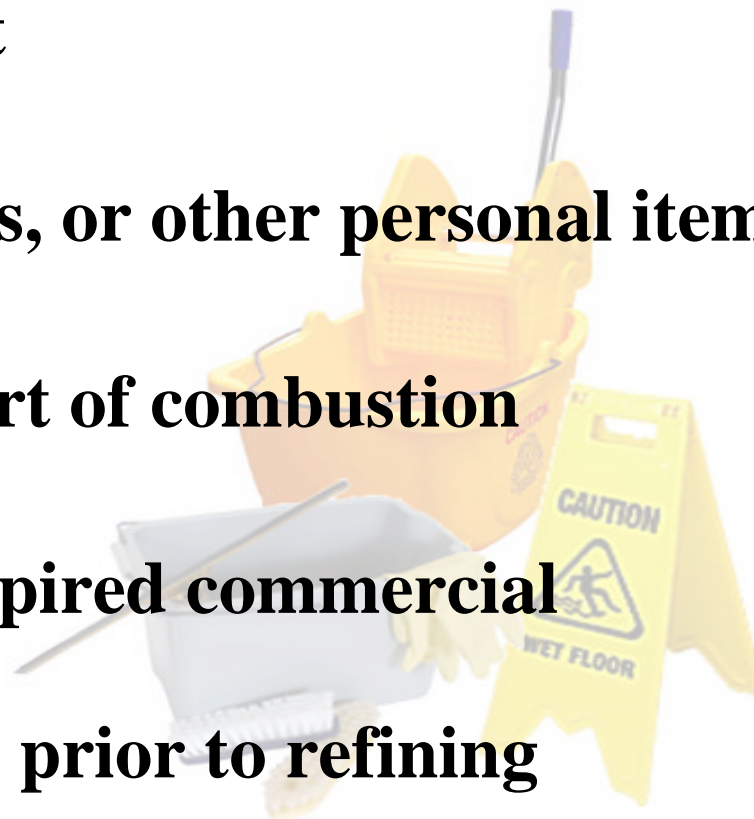
Top-Screen Determination





3. General Exclusions

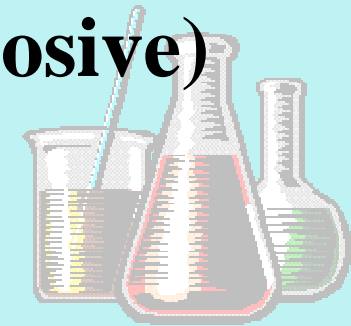
- **Structural component**
- **Janitorial supplies**
- **Food, drugs, cosmetics, or other personal items**
- **Process water**
- **Compressed air or part of combustion**
- **Articles**
- **Solid waste (except expired commercial products)**
- **Hydrocarbons, water, prior to refining**





3. Security Issue-Specific Exclusions

- **Release (Flammable, Toxic, Explosive)**
 - Laboratory use



- **Release (Flammable)**
 - Propane tanks $\leq 10,000$ lb





3. Security Issue-Specific Inclusions

- **Release**
 - Storage containers, tanks, pipes
 - Transport containers used as storage
 - Process intermediates, by-products
- **Theft**
 - Transportation packaging
- **Sabotage**
 - Placarded shipment





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SOLUTIONS

View/modify no. 26 of 85 inventory item(s) currently listed.

Home Buildings Rooms Inventory Substances More...

Identification | Quantity | DHS screening | User |

Inventory: Aluminum (Fume, Dust, or Powder) in 202

DHS listing rationale Theft (Exp/IEDP; Min: ACG; STO: 100 lb)

SCREENING EXEMPTIONS

Inventory item is exempt if it is:

- Used as a structural component.
- Used in routine janitorial maintenance.
- Used as a personal item by employees.
- Used in process or non-contact cooling water.

General Exclusions

- Used in compressed or combustion air.
- Contained in a manufactured article.
- Contained in a RCRA solid waste (not off-spec).
- In a natural hydrocarbon mixture prior to processing.

Inventory item is exempt from RELEASE screening if it is:

- Used in a laboratory under qualified supervision.

Issue-Specific Exclusions

Inventory item is exemption from TOXIC RELEASE screening if it is:

- Under 10 mm Hg partial press. anywhere in process/storage.

SCREENING ELIGIBILITY

If not exempt, item is subject to RELEASE screening if it is:

- In a vessel, UST, or magazine.
- In a transport container used for storage or loading/unloading.
- Natural gas/LNG in a peak shaving facility.
- In fuel (gas, diesel, kerosene, jet, or with NFPA fire 1-2-3-4).

Issue-Specific Inclusions

If not exempt, item is subject to THEFT screening if it is:

- In transportation packaging.

If not exempt, item is subject to SABOTAGE/CONTAMINATION screening if it is:

- Shipped under DOT placard.

Required for release - explosives, theft - EXP/IEDP, and sabotage/contamination:

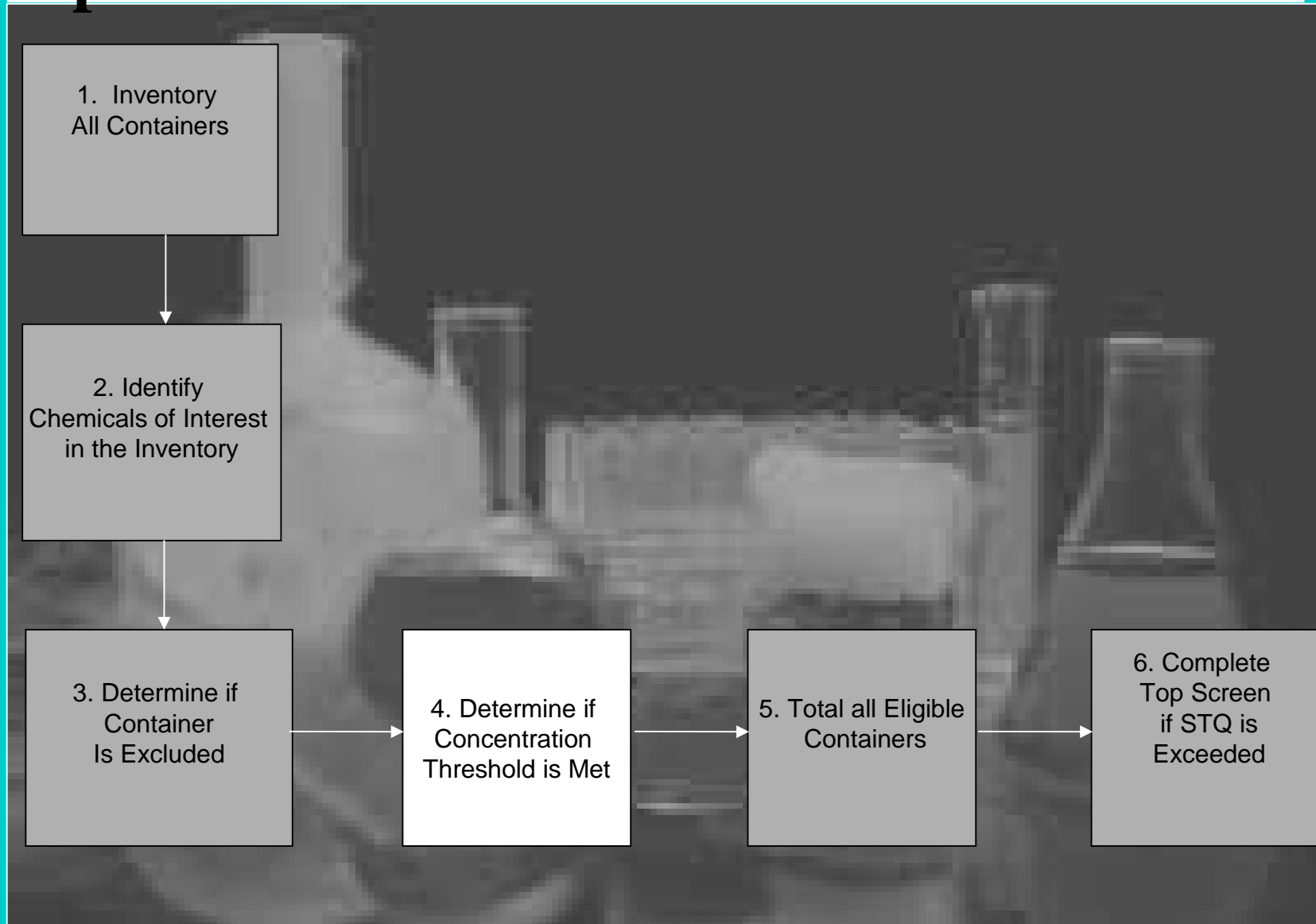
- Commercial grade

[4811] No. 26 of 85 listed inv item(s); Cr: [6/26/2006 10:28]-Administrator; Md: [2/25/2008 14:03]-Designer.

< > << >> Save Cancel



Top-Screen Determination





4. Determine Minimum Concentrations

- **Release (Toxics)**
 - ≥ 1 percent (unless vapor pressure < 10 mm)
- **Release (Flammables)**
 - ≥ 1 percent (if NFPA Flam = 4)
- **Release (Explosives)**
 - commercial grade or \geq min %
- **Theft (WME, CW, Explosives)**
 - commercial grade or \geq min %
- **Sabotage**
 - commercial grade

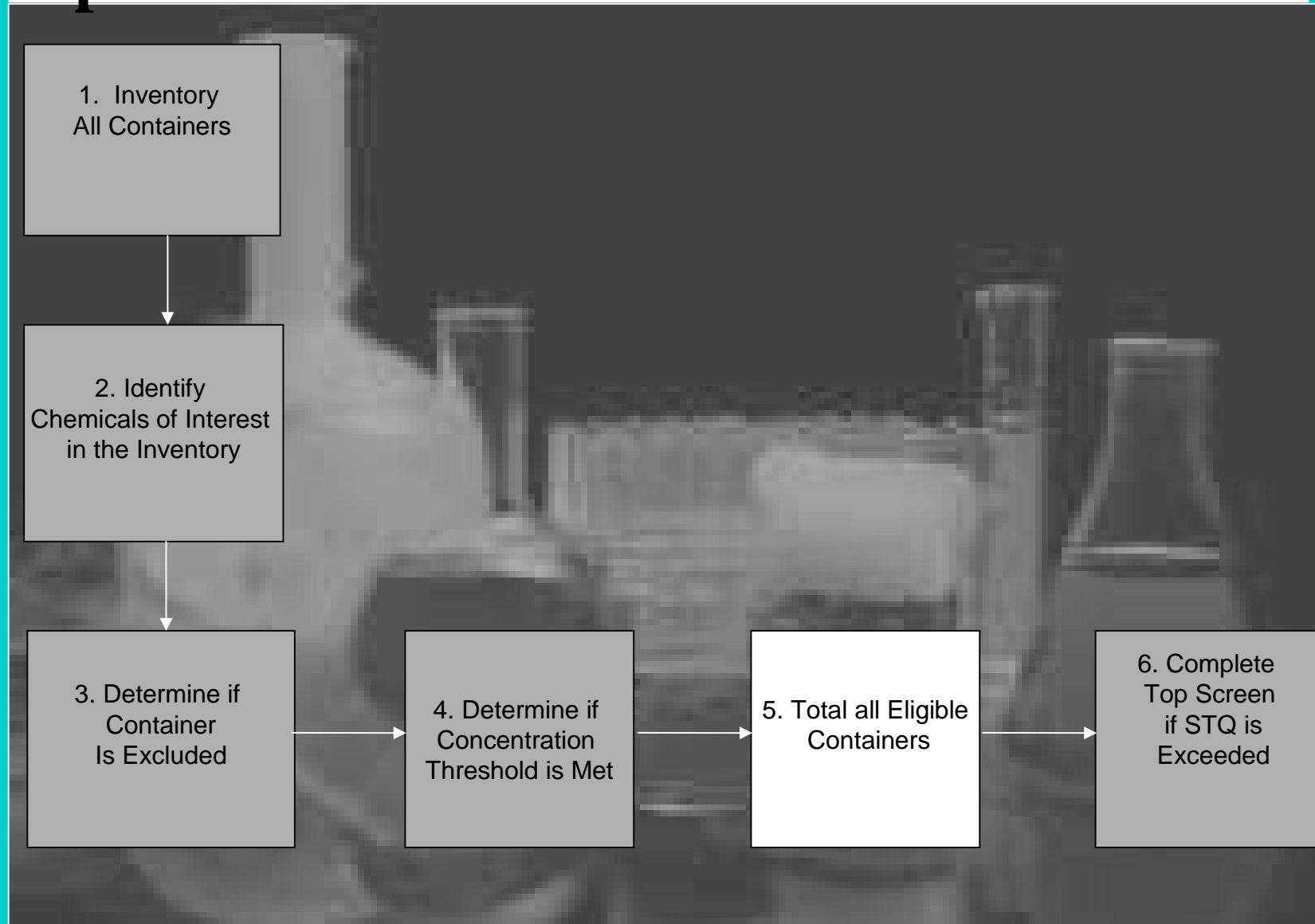


4. Determine Minimum Concentrations

Label name	Room name	Shelf	Row	Substance
<u>Potassium nitrate</u>	<u>2022</u>	<u>21/4</u>	<u>C</u>	<u>Potassium nitrate</u>
<u>Potassium perchlorate</u>	<u>2022</u>	<u>18/4</u>	<u>C</u>	<u>POTASSIUM PERCHLORATE</u>
<u>Potassium perchlorate</u>	<u>2022</u>	<u>18/4</u>	<u>C</u>	<u>POTASSIUM PERCHLORATE</u>
<u>Propane</u>	<u>2022</u>			<u>Propane, liquid</u>
<u>Propane</u>	<u>2022</u>			<u>Propane, liquid</u>
<u>Propane</u>	<u>2022</u>			<u>Propane, liquid</u>
<u>Propane</u>	<u>2022</u>			<u>Propane, liquid</u>
<u>Propane</u>	<u>2022</u>			<u>Propane, liquid</u>
<u>Ralph's Gas (0.5 % Chlorine)</u>				<<<<< Exclude (Release/Tox): BELOW min. concen: 1 %
<u>Ruby's Gas (10% Chlorine)</u>				<<<<< Include (Release/Tox): EXCEEDS min. concen: 1 %



Top-Screen Determination





5. Total All Eligible Containers

Example: Consider 3 Containers of Aluminum powder

- **Aluminum powder is Theft (Explosive), so include:**
 - **transport container**
 - **commercial grade**

Container 1: 50 lbs (transport container, commercial grade)

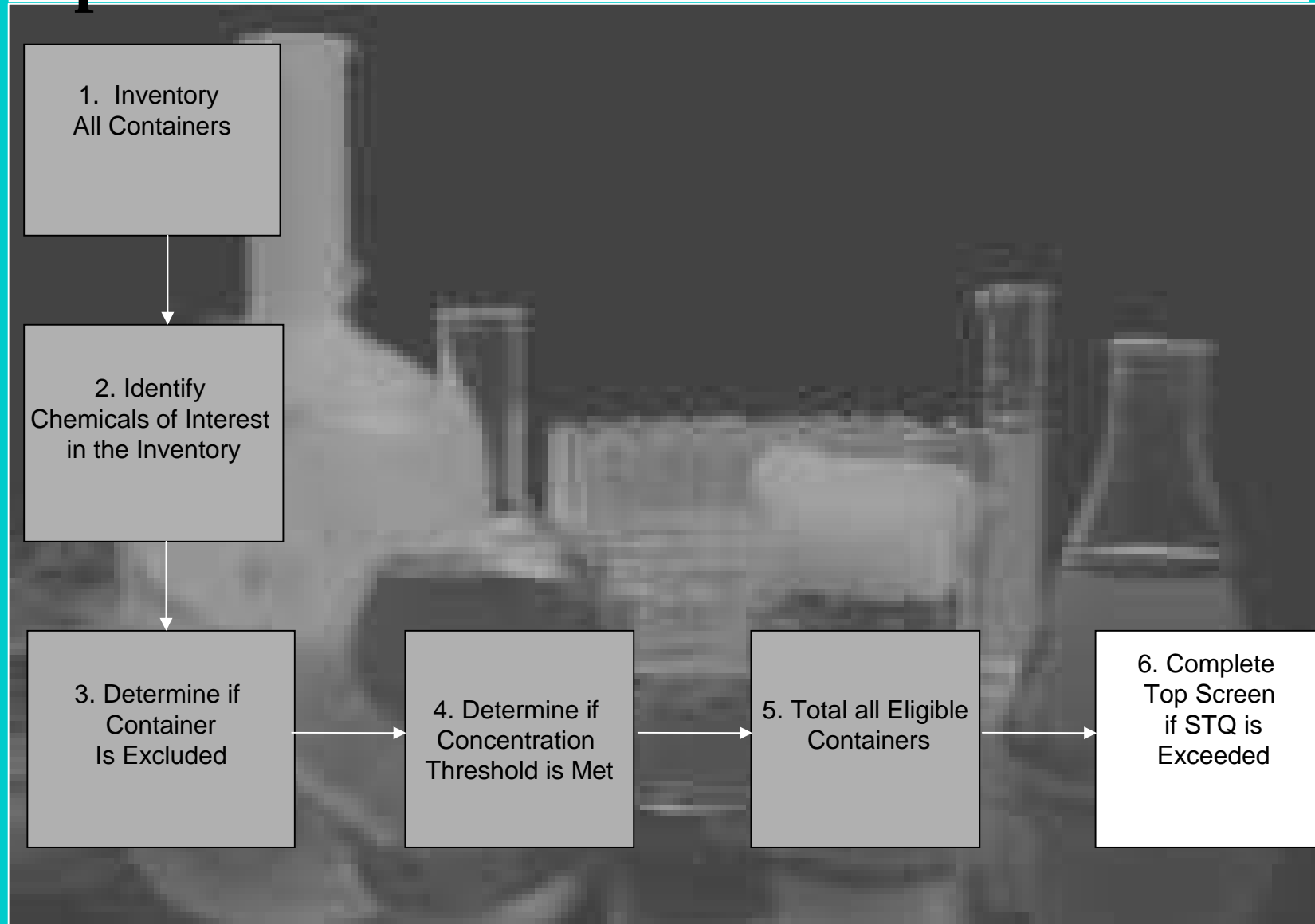
Container 2: 50 lbs (transport container, commercial grade)

Container 3: 50 lbs (transport container, not commercial grade)

Total eligible: 100 lbs



Top-Screen Determination





6. Complete Top Screen if STQ is Exceeded

Container 1: 50 lbs (transport container, commercial grade)

Container 2: 50 lbs (transport container, commercial grade)

Container 3: 50 lbs (transport container, not commercial grade)

Total eligible: 100 lbs

STQ = 100 lbs

Complete Top-Screen

Appendix A to Part 27. -- DHS Chemicals of Interest ¹

Chemicals of Interest (COI)	Synonym	Chemical Abstract Service (CAS) #	Release		Theft		Sabotage		Security Issue							
			Minimum Concentration (%)	Screening Threshold Quantities (in pounds)	Minimum Concentration (%)	Screening Threshold Quantities (in pounds unless otherwise noted)	Minimum Concentration (%)	Screening Threshold Quantities	Release – Toxic	Release – Flammables	Release – Explosives	Theft – CW/CWP	Theft – WME	Theft – EXP/IEDP	Sabotage/Contamination	
Acetaldehyde		75-07-0	1.00	10,000						X						
Acetone cyanohydrin, stabilized		75-86-5					ACG	APA								X
Acetyl bromide		506-96-7					ACG	APA								X
Acetyl chloride		75-36-5					ACG	APA								X
Acetyl iodide		507-02-8					ACG	APA								X
Acetylene	[Ethyne]	74-86-2	1.00	10,000						X						
Acrolein	[2-Propenal] or Acrylaldehyde	107-02-8	1.00	5,000						X						
Acrylonitrile	[2-Propenenitrile]	107-13-1	1.00	10,000							X					
Acrylyl chloride	[2-Propenoyl chloride]	814-68-8	1.00	10,000							X					
Allyl alcohol	[2-Propen-1-ol]	107-18-6	1.00	15,000						X						
Allylamine	[2-Propen-1-amine]	107-11-9	1.00	10,000							X					
All, butylcellulose, stabilized		107-37-6					ACG	APA								X
Aluminum (powder)		7429-90-5					ACG	100								X
Aluminum bromide, anhydrous		7727-15-3							ACG	APA						X
Aluminum chloride, anhydrous		7446-70-0							ACG	APA						X
Aluminum phosphide		20859-73-8							ACG	APA						X
Ammonia (anhydrous)		7664-41-7	1.00	10,000						X						
Ammonia (conc. 20% or greater)		7664-41-7	20.00	20,000						X						
Ammonium nitrate, [with more than 0.2 percent combustible substances, including any organic substance calculated as carbon, to the exclusion of any other added substance]		6484-52-2	ACG	5,000	ACG	400					X				X	



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S O L U T I O N S

EH&S Manager - DHS Summary Report

Federal DHS-listed inventory (36 listed substances among 93 original inventory items)

Substance/Label (*mixtures)	Bldg.	Room	Cab.	Shelf	Row	Size	No.	Screening exemptions	Screening eligibility	On hand
<i>Subs: 2-Chloroethylchloro-methylsulfide -- Rationale: Theft (CW/CWP; Min: CUM 100g; STQ: CUM 100g)</i>										
2-chloroethylchloro methyl sulfie	Main Laboratory	2289				50 g	1		tms pkg; comm gr	50 g
<i>Subtotal for 1 item: 0.11 lb</i>										
<i>Subs: 2-Chlorovinylchloroarsine -- Rationale: Theft (CW/CWP; Min: CUM 100g; STQ: CUM 100g)</i>										
2-chlorovinyl di chloroarsine	Main Laboratory	2289				75 g	1		tms pkg; comm gr	75 g
<i>Subtotal for 1 item: 0.17 lb</i>										
<i>Subs: ACETYL CHLORIDE -- Rationale: Sabotage/contam (Min: ACG; STQ: APA)</i>										
Acetyl chloride	Main Laboratory	2022		28/4	B	500 g	1			437.5 g
<i>Subtotal for 1 item: 0.96 lb</i>										
<i>Subs: Aluminum (Fume, Dust, or Powder) -- Rationale: Theft (Exp/IEDP; Min: ACG; STQ: 100 lb)</i>										
Aluminum (powder)	Main Laboratory	2022		25/1	B	50 lb	1		tms pkg; comm gr	50 lb
Aluminum (granules, 8-20 mesh)	Main Laboratory	2022		17/5	C	1 lb	1		tms pkg; comm gr	0.875 lb
Aluminum (pellets)	Main Laboratory	2022		17/5	C	100 lb	1		tms pkg; comm gr	100 lb
Aluminum Blue GT	Main Laboratory	2022		02/5	D	25 g	1		tms pkg; comm gr	25 g
Aluminum powder	Main Laboratory	2022		17/5	E	100 g	1		tms pkg	25 g
Aluminum (powder)	Main Laboratory	2022		25/1	B	500 g	1		tms pkg	250 g
<i>Subtotal for 6 items: 151.54 lb, theft-EXP/IEDP: 150.93 lb (over)</i>										
<i>Subs: Boron trichloride -- Rationale: Release (Tox; Min: 1.00%; STQ: 5,000 lb), Theft (WME; Min: 84.70%; STQ: 45 lb)</i>										
Boron trichloride	Main Laboratory	2022		10/1	A	50 lb	1		tms pkg	50 lb
<i>Subtotal for 1 item: 50 lb, theft-WME: 50 lb (over)</i>										
<i>Subs: Bromine -- Rationale: Release (Tox; Min: 1.00%; STQ: 10,000 lb)</i>										
Bromine	Main Laboratory	2022		21/5	A	450 g	1			225 g
<i>Subtotal for 1 item: 0.5 lb</i>										
<i>Subs: CALCIUM PHOSPHIDE -- Rationale: Sabotage/contam (Min: ACG; STQ: APA)</i>										
Calcium phosphide	Main Laboratory	2022		25/1	E	1000 g	1		placard; comm gr	1000 g
<i>Subtotal for 1 item: 2.2 lb, sabotage-contam: 2.2 lb (over)</i>										
<i>Subs: Chlorine -- Rationale: Release (Tox; Min: 1.00%; STQ: 2,500 lb), Theft (WME; Min: 9.77%; STQ: 500 lb)</i>										
*[0.5%] - Ralph's Gas (0.5 % Chlorine)	Main Laboratory	11A				1000 lb	1		vessel; tms pkg	1000 lb
*[10%] - Ruby's Gas (10% Chlorine)	Main Laboratory	11A		009	G	10 lb	1		vessel; tms pkg	10 lb
<i>Subtotal for 2 items: 1,010 lb, release-toxic: 1 lb, theft-WME: 10 lb</i>										

*The "Subtotal" for inventory items that are mixtures is the weight of the pure substance only within the mixture. Other subtotal calculations vary with the screening calculation (6 CFR 27.203-27.204). "over" indicates that the total amount may exceed the specified STQ.



Potential Scenarios Impacting an R&D Facility

Common Lab Chemicals

- **Theft/Diversion**
 - **Nitric acid (68%): 400 lbs, approx. 34 gallons**
 - **Hydrogen peroxide (35%): 400 lbs, approx. 43 gallons**
 - **Nitrobenzene: 100 lbs**
 - **Triethanolamine: 220 lbs**
 - **Sodium azide: 400 lbs**
- **Release**
 - **Hydrochloric acid (37%): 15,000 lbs, approx. 1500 gallons**
 - **Chlorine 500 lb = 5 x 100 lb cylinders**



Potential Scenarios Impacting an R&D Facility

Shipping Expired Products

- **Sabotage if Vehicle is Placarded**
- **Placard at Any Amount:**
 - **Poison Inhalation Hazard (PIH) and Dangerous When Wet**
 - **Chloroacetyl chloride**
 - **Chlorosulfonic acid**



But No Vehicle Placard Required for ...

- **Small Quantity Exception**
 - 49 CFR 173.4
 - Certain Classes and Divisions are not eligible
 - Maximum container size: 30 ml (for most Classes)
- **Limited Quantity Exception**
 - 49 CFR 173.150 -173.155
 - PG I materials are not eligible
 - Division 6.1 are not eligible
 - Maximum container size: approx. 1 – 5 liters
- **DOT- Exemption Packaging**
 - May allow for shipping PIH and Dangerous When Wet w/o Label and Placard





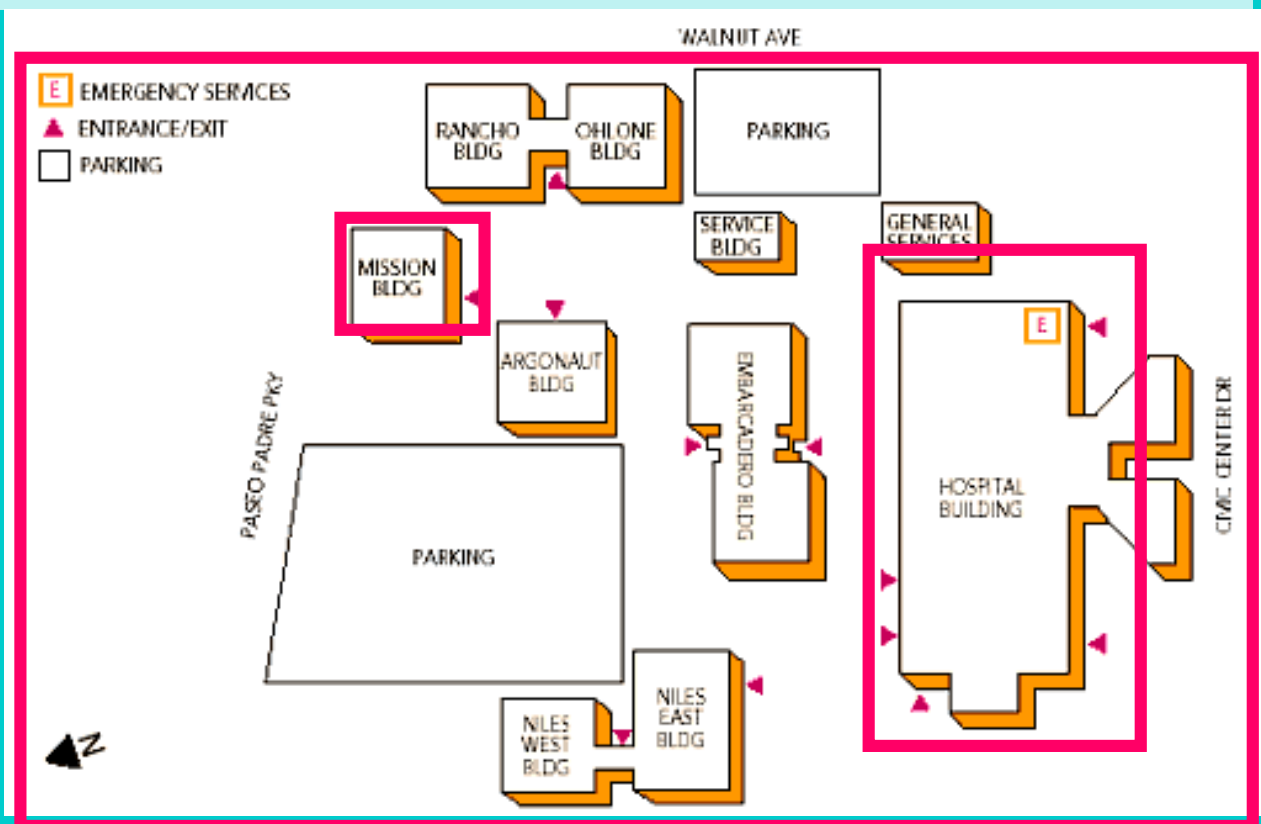
Ways to Minimize Impact

- **Facility definition**
- **Separate storage rooms**
- **Waste management**



Facility Boundaries

- All buildings – one Top Screen
- Each building – multiple Top Screens





EH&S Manager LE- Free Version

- Please email me if you want a copy art@hazardsolutions.com

Chemical Inventory

Go to: User: Administrator, Access: 3 Administrative, v. 2.00

Reminders

Reminder	Due date
TRI due	07/02/08
Quarterly Safety Inspections	08/24/08
Biennial Report due	08/04/08
HMBP update	07/04/08
Environmental fee	02/28/06

Inventory stats

Updated 03/26/2008, at 3:27 PM

--- Inventory ---

- Added this month: 308 item(s), 157 lbs. est.
- Added this year: 308 item(s), 157 lbs. est.
- Total item(s) in program (excluding removed): 308 in 1 room(s), 157 lbs. est.

Room: Chart: Plot

308 items [3/26/2008 3:27 PM]

Category	Count
Prop 65 reproductive	2
Prop 65 cancer	11
Acute toxin	9
Reproductive toxin	3
Carcinogen	18

Regulatory Links

URL	Name
www.hazardsolutions.com	Chemical Waste M...