


# HOSPITAL LOGISTICS ISSUES UNDER RCRA

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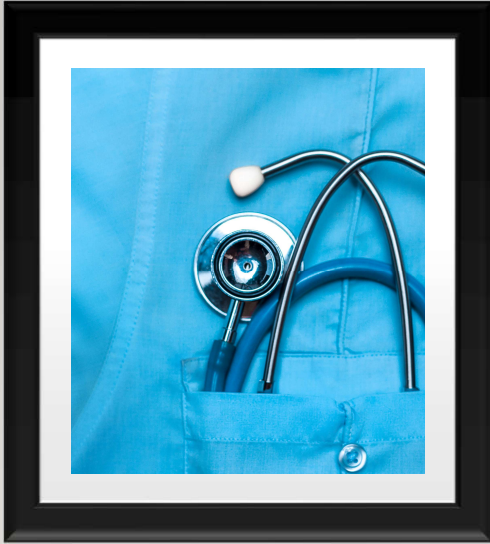
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## WHAT WILL BE COVERED

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-   
**General overview**
-   
**Comparison**
-   
**Explore logistics issues**
-   
**Examples**
-   
**Discussion**

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# HOSPITAL INSPECTIONS

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# AREAS TO INSPECT

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## PHARMACY

- Hazardous Waste Pharmaceuticals
  - Non-Creditable, Potentially Creditable
- Non-Hazardous Waste Pharmaceuticals
- Sequestration Devices
- Compounding
- Research Laboratory



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## IMAGING DEPARTMENT

- X-ray
- MRI
- CT
- Nuclear Medicine



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## ONCOLOGY DEPARTMENT

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- Medication Rooms
- Bulk Chemotherapy
- Trace Chemotherapy Waste
- Sequestration Devices



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## MED/SURGERY CENTER

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- Medication Rooms
- Hazardous Waste  
Pharmaceuticals
- Sequestration Devices



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## LABORATORIES

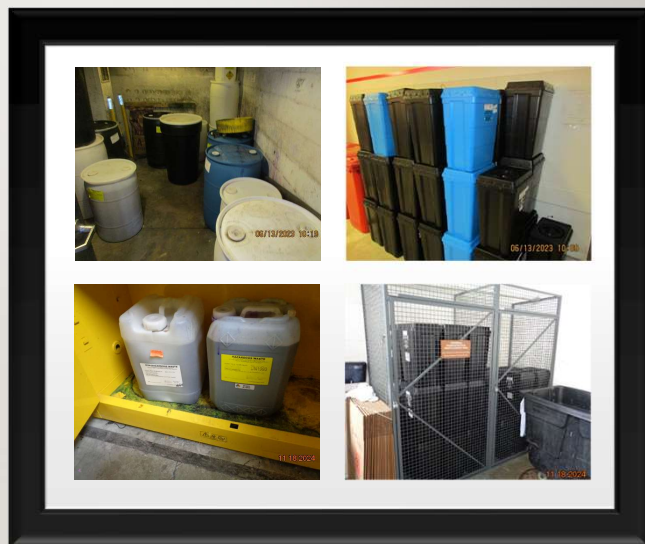
- Histology
- Cytopathology
- Hematology
- Microbiology
- Chemistry
- Other



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## WASTE STORAGE AREAS

- Central Accumulation Area
- Hazardous Waste Pharmaceutical Storage



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# FACILITIES MAINTENANCE

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# NOT SO OBVIOUS AREAS TO INSPECT

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# MORGUE

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- SPENT SOLVENTS



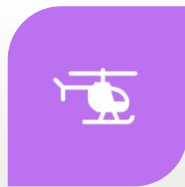
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# HELIPAD

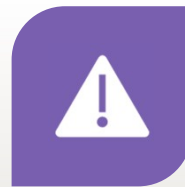
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WASTE FUEL



HELICOPTER  
MAINTENANCE



TESTING SAFETY  
EQUIPMENT

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## STERILIZATION & DECONTAMINATION

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- Expired/Damaged Chemicals
- Types of Cleaners Used
- Wastewater



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## OTHER POTENTIAL AREAS

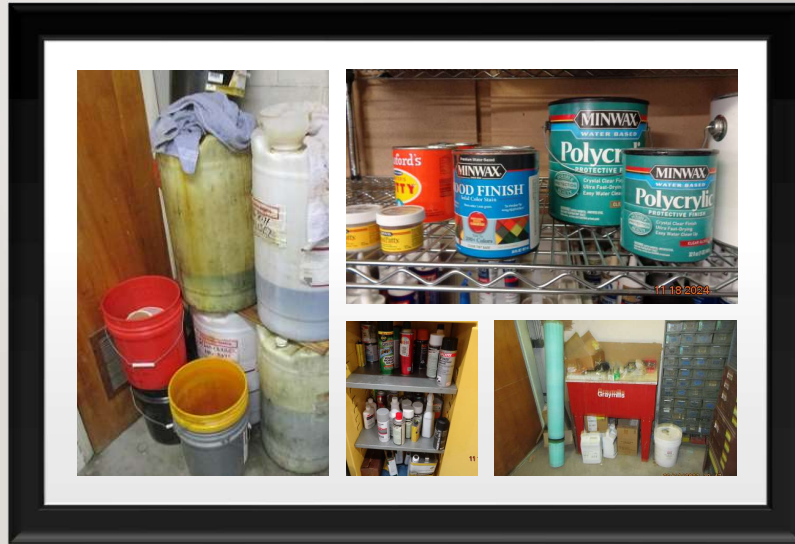
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## SPECIALIZED MAINTENANCE SHOPS

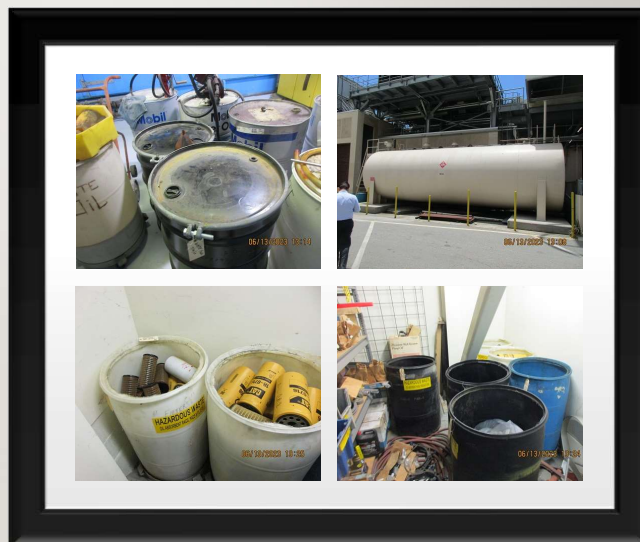
- HVAC
- Electric
- Mechanic
- Carpentry



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## POWER PLANT/BACKUP GENERATOR

- Waste Fuel
- Fuel Filters
- Used Oil
- Used Oil Filters
- Spent Bulbs
- Spent Batteries



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# WASTEWATER TREATMENT PLANT

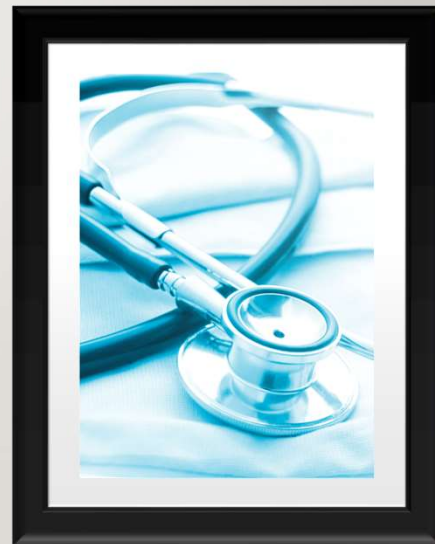
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# COMPARISON OF TWO HOSPITAL INSPECTIONS

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**INITIAL INFORMATION**

- These inspections occurred at separate hospitals belonging to the same hospital system
- Inspections occurred 17 months apart
- General information about each hospital
- Direct comparison (where applicable) to show areas of improved RCRA compliance
- Continued compliance issues

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**HOSPITAL I:  
JUNE 2023**

- LQG
- Inspection was requested by the Hospital
- Comprised of 6 Specialized Sections
- ~900 Beds
- 4000 Employees
- Areas inspected that were not present at Hospital 2
  - Morgue
  - Oncology Department
  - Cytopathology, Microbiology, and Pharmaceutical Research Laboratories
  - Mechanic, Electric, and HVAC Shops
  - Energy Complex

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## HOSPITAL 2: NOVEMBER 2024

VSQG Under Subpart P

Inspection to verify change in generator status

~400 Beds

1400 Employees

Areas inspected that were not present at Hospital 1

- Nuclear Medicine
- Chemistry Lab
- Carpentry

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## AREAS OF IMPROVEMENT

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# PHARMACY

JUNE 2023

NOVEMBER 2024



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# PHARMACY

JUNE 2023

NOVEMBER 2024



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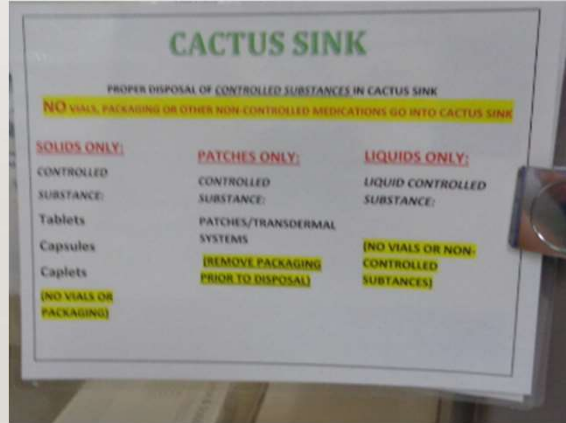


# PHARMACY

JUNE 2023



NOVEMBER 2024



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# HISTOLOGY LABORATORY

JUNE 2023



NOVEMBER 2024



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# HISTOLOGY LABORATORY

JUNE 2023

NOVEMBER 2024



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## CONTINUED ISSUES

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# HAZARDOUS WASTE PHARMACEUTICAL STORAGE

JUNE 2023

NOVEMBER 2024



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# SPENT FLUORESCENT LAMP STORAGE

JUNE 2023

NOVEMBER 2024



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## LOGISTICS ISSUES

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## CAUSE OF RCRA LOGISTICS ISSUES AT HOSPITALS?

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### Very Large Facilities

- Multiple buildings, departments, floors, laboratories, maintenance areas
- Numerous SAAs and/or HWAAAs
- Thousands of employees

### High Volume of Waste Generation

- Aisle space requirements
- Labeling requirements

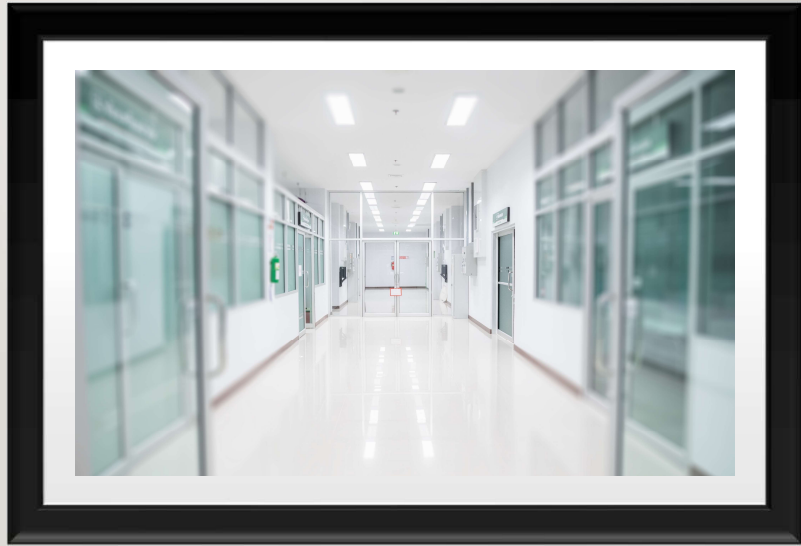
### Transporter Issues

- Minimum requirements for pick-up
- Pre-filled manifests
- Cost

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# LARGE FACILITIES

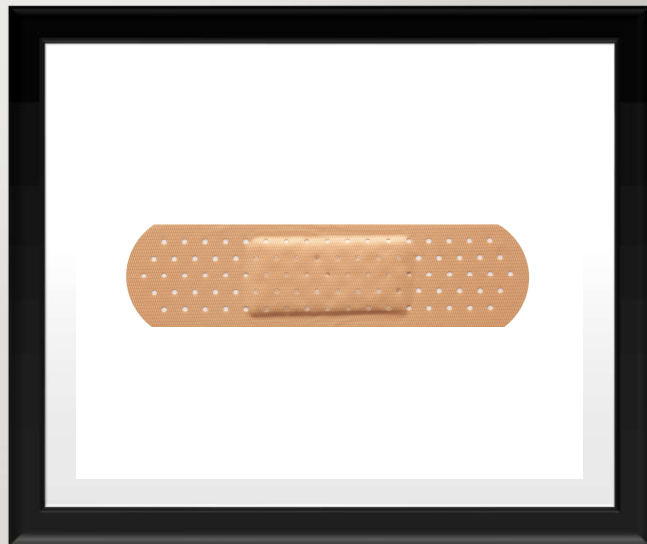
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# EMPLOYEE TRAINING VERSUS EMPLOYEE PRACTICES

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## EMPLOYEE TRAINING VS. EMPLOYEE PRACTICES

### TRAINING

- Cactus Sinks



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## EMPLOYEE TRAINING VS. EMPLOYEE PRACTICES

### TRAINING

- Cactus Sinks
  - Controlled Substances & Propofol ONLY
- Black Bins – HWP
  - All dropped, damaged, or unadministered medications except for controlled substances and propofol
- Blue Bins – Non-HWP
  - Pharmacy Only
  - Full Cactus Sink Cartridges

### PRACTICE

- Cactus Sinks
  - “All controlled substances”
  - “All liquid medications and pills”
  - “All liquid medications, pills, and partial doses [unadministered medications]”
- Black Bins
  - “Unadministered medications”
  - “Anything too big to fit in the Cactus sink”
  - “IV tubing and medicated patches”

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## EMPLOYEE TRAINING VS. EMPLOYEE PRACTICES

### During Inspection

- Inspectors verified employees are receiving annual training
- EHS Manager corrected staff on proper management of pharmaceutical waste per their training

### After Inspection

- EHS Manager initiated additional training
- Full Cactus Sink cartridges are now added to Black Bins
- Laminated reference guides posted



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NUMEROUS  
AREAS  
ACCUMULATING  
HAZARDOUS  
WASTE



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## SAAS AND/OR HWAAS (SQG/LQG) - DEFINED

### SATELLITE ACCUMULATION AREAS

- At or near the point of generation and under the control of the operator
- Up to 55 gallons of non-acute AND/OR
  - 1 quart of liquid acute  
OR
  - 1 kg of solid acute
- If limits exceeded, have three days to:
  - Comply with all CAA requirements OR
  - Date and move the container
    - CAA, Off-Site, OR On-Site TSDF

### HAZARDOUS WASTE ACCUMULATION AREAS

- Any location where hazardous waste is generated or accumulated that is not an SAA or CAA

#### Both

- Containers must be in good condition, closed, compatible with the waste, and labeled "Hazardous Waste" with an indication of the hazards present
- **Area must meet preparedness and prevention measures and emergency procedures applicable to status\***

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## SAAs and/or HWAAs (SQG/LQG) – Logistics?

### WHAT AREAS IN A HOSPITAL "GENERATE OR ACCUMULATE HAZARDOUS WASTE"?

- Laboratories
- Medication rooms
- Pharmacies
- Surgery centers
- Some imaging departments
- Some maintenance areas

#### How many such areas are there?

- At least 25 identified at each hospital during inspections
- Hospital 2 is now a VSQG and not subject to these requirements

#### What are the requirements for each of these areas?

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## SAAS AND/OR HWAAS (SQG/LQG) - REQUIREMENTS

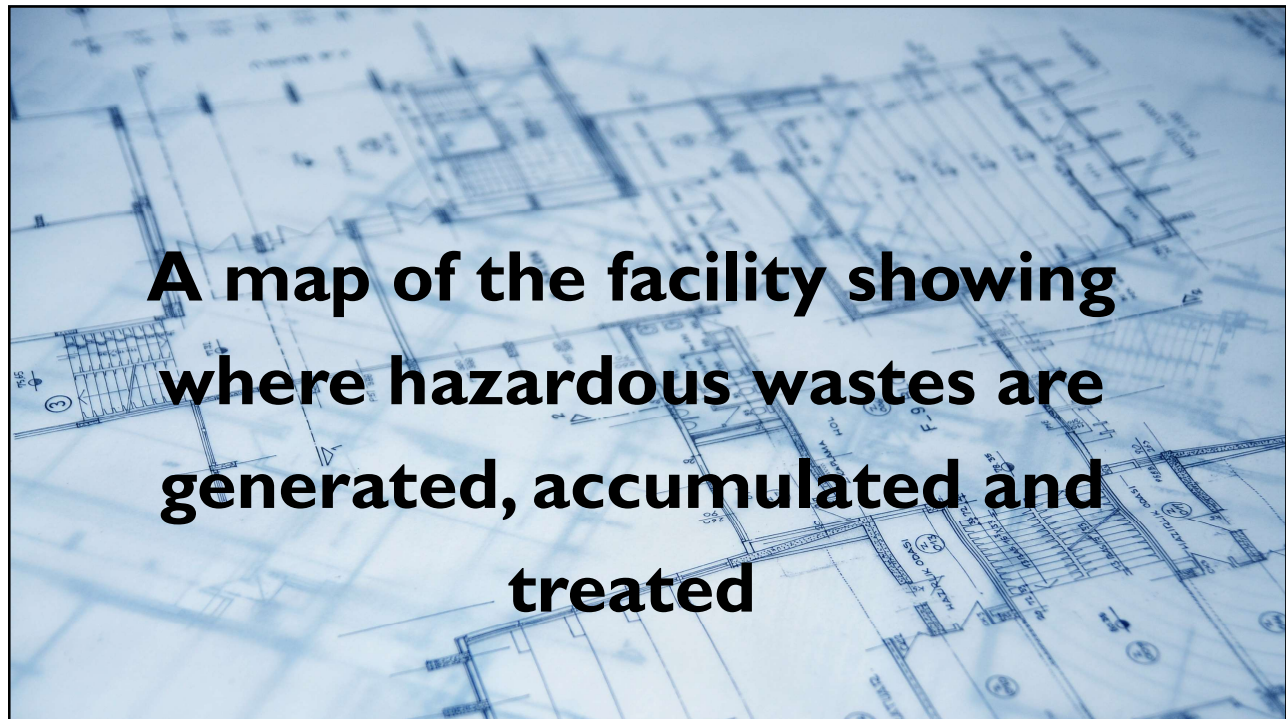
### SQG

- Required equipment present & maintained
- Aisle space (at least 3 feet)
- Arrangements with local authorities
- Designated emergency coordinator
- Employees thoroughly familiar with waste handling & emergency procedures
- **The location of required equipment posted**

### LQG

- SQG requirements AND a contingency plan
- Now must have a quick reference guide with:
  - List of all hazardous waste and hazards
  - Estimated maximum amount of those wastes present at any given time
  - Any special/unique treatment required if exposed
  - Map of facility in relation to surrounding area
  - Locations of water supply
  - List of on-site notification systems (i.e. fire alarms)
  - List of emergency coordinator(s) & numbers
  - **AND...**

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## FACILITY MAP (SQG/LQG) - REQUIREMENTS

### SQG

- Locations of the following items must be **posted**
  - Fire extinguishers
  - Spill kits
  - Eye wash stations
  - Decontamination showers
  - Fire alarms

### LQG

- SQG requirements AND
- Locations of the following items must be present on a **map of the facility**
  - SAAs
  - HWAAAs
  - CAA

How would you create a map marking these locations at a facility consisting of at least five, interconnected buildings with 4 to 18 floors each?

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## FACILITY MAP (SQG/LQG) – SOLUTIONS?

- Maps showing these areas on each individual floor?
- Maps showing the closest such areas/equipment in each direction from the SAA/HWAA/CAA where posted?
- Maps showing the location of such equipment within each SAA/HWAA/CAA?
- Maps of each department, laboratory, etc.?



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## FACILITY MAP (SQG/LQG) - EPA

MEMORANDUM: FAQs ABOUT  
LQG QUICK REFERENCE GUIDES  
04/19/2022

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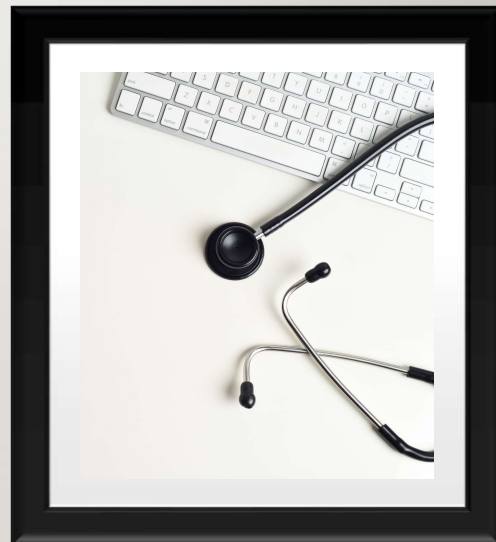
**Question:** What level of detail is appropriate for the facility map required by 40 CFR 262.262(b)(4)?

**Answer:** The appropriate radius of the maps will depend on the size and complexity of the generator site. The facility map should help first responders identify and access areas where hazardous waste is likely to be present, so the level of detail will depend on the facility's size and layout. For example, facility maps at very large, complex LQGs could focus on the location of buildings that house hazardous waste (e.g., a campus map), while maps at less complex LQGs could focus on more-specific locations of hazardous wastes within buildings (e.g., a blueprint or floorplan).

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## EXAMPLES FROM EACH HOSPITAL

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## HOSPITAL I (LQG) USED FUEL FILTERS

- Used Oil Filters and Used Fuel Filters stored in same drums
  - Separated by transporter
- All containers labeled “Hazardous Waste – Oil Absorbent Rags, Pads, & Filters”
- Records showed managed as a D001 Hazardous Waste
  - **No indication of the hazards present**
  - **Open containers**

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## HOSPITAL I (LQG) USED FUEL FILTERS

- Logistics?
- Separate Building
  - **No weekly inspections**
  - **Surpassed the 90-day time limit**
- Different Transporter
  - **Disposal manifests did not have EPA ID# present**
- Solutions?
  - SAA
  - Manage with Used Oil Filters

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## HOSPITAL 2 (VSQG) MISPLACED HAZARDOUS WASTE

- Chemistry Lab (1<sup>st</sup> Floor) waste found in facilities maintenance area (6<sup>th</sup> Floor)
  - Moved to CAA following inspection
- VSQG
  - No time limit
  - Container is closed, properly labeled, no storage issues
- **How long was it here?**



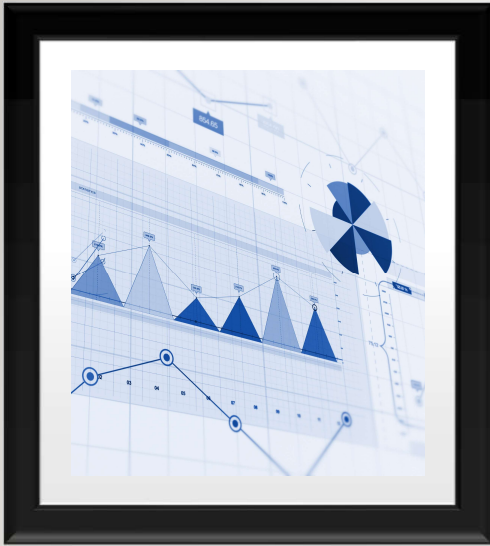
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## 15 MONTHS

- How Determined?
  - **Accumulation start date of 07/30/2023**
  - Facility has pick-ups at least 1/month; frequently 2/month
  - Container accumulating same waste during inspection was ½ full after 8 days
- Logistics?
  - Multiple departments and levels of employee training; miscommunication
  - **8700-12 Form notifying of drop from SQG to VSQG was submitted on 08/01/2023**
- Solutions?



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# HIGH VOLUME OF WASTE GENERATION

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# THE NUMBERS

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## WASTE GENERATION: HOSPITAL I (LQG)

01/01/2023 – 05/31/2023

### HAZARDOUS WASTE

#### Average

- 1,636 pounds/week
- 7,354 pounds/month

#### Maximum

- 6,175 pounds in a week
- 14,217 pounds in a month

### HAZARDOUS WASTE PHARMACEUTICALS

#### Average

- 554 pounds/week
- 2,159 pounds/month

### NON-HAZARDOUS WASTE

#### Average

- 1,329 pounds/week
- 5,951 pounds/month

#### Maximum

- 4,572 pounds in a week
- 7,843 pounds in a month

#### Maximum

- 3,600 pounds in a week
- 4,220 pounds in a month

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**Average Total Waste**  
**3,519 pounds/week**  
**15,464 pounds/month**

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## WASTE GENERATION: HOSPITAL 2 (VSQG)

DECEMBER 2023 – OCTOBER 2024

### HAZARDOUS WASTE

#### Average

- 133 pounds/month

#### Maximum

- 200 pounds in a month

### NON-HAZARDOUS WASTE

#### Average

- 448 pounds/month

#### Maximum

- 925 pounds in a month

### HAZARDOUS WASTE PHARMACEUTICALS

#### Average

- 1,231 pounds/month

#### Maximum

- 2,800 pounds/month

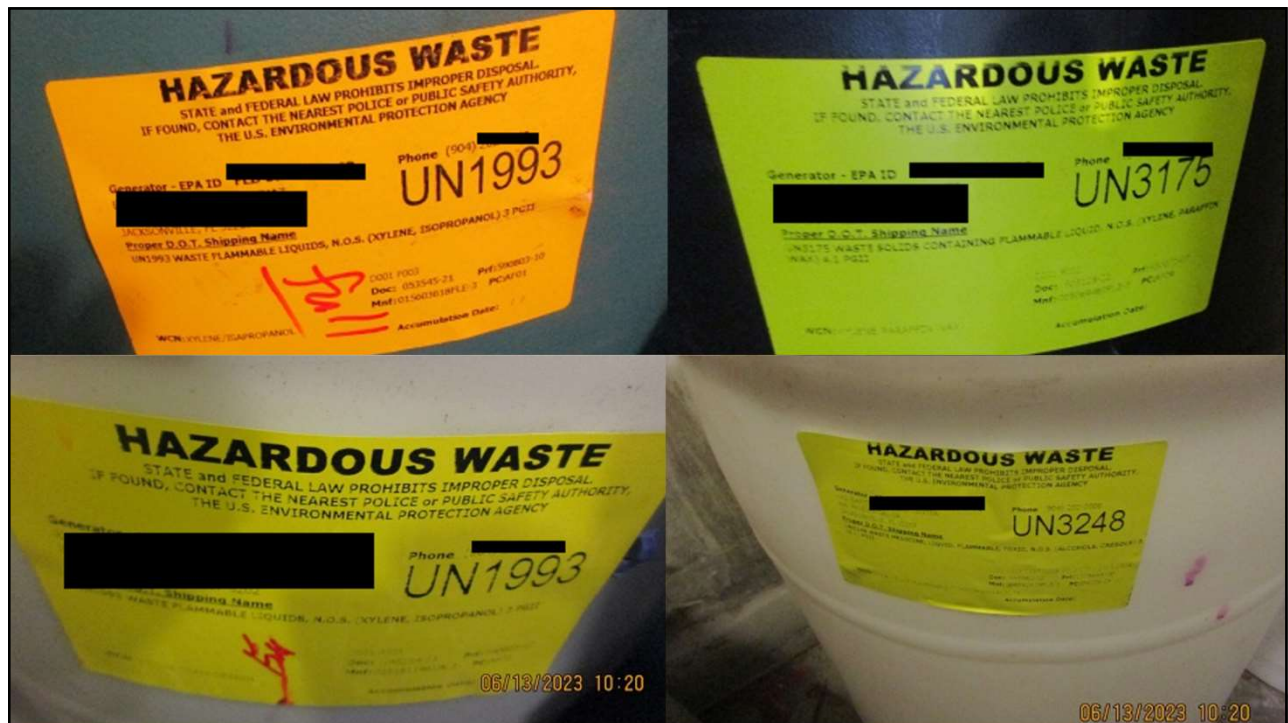
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**Average Total Waste  
1,812 pounds/month**

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## CAA – RCRA ISSUES (LQG)

- No accumulation start dates
- Only one indication of the hazards
- Incompatible wastes\*



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## CAA – RCRA ISSUES (LQG)

- No accumulation start dates
- Only one indication of the hazards
- Incompatible wastes
- No documentation of weekly inspections
- Aisle space
  - The 11 drums in this photo consist of approximately 2,051 pounds
  - Average waste accumulation in this room is 2,965 pounds
- No posted emergency information or facility map



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## CAA – LOGISTICS ISSUES (LQG)

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### Accumulation Start Dates & Indications of the Hazards

- Properly labeling all containers would be time and material intensive over time
- Weekly pick-ups with documentation to show it; proving they comply with the 90-day accumulation time limit

### Documenting Weekly Inspections

- Rarely have the same containers present for more than a week

### Aisle Space

- Facility has grown and has same infrastructure for waste storage as when they were an SQG

### Communication Device, Emergency Information, & Facility Map

- Everyone has a cell phone and knows to call EHS Manager

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## CAA – SOLUTIONS? (LQG)

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### Accumulation Start Dates & Indications of the Hazards

- Dry erase or otherwise reusable means of marking containers; date gun, stamps, etc.
- Prefill hazardous waste labels with month and year

### Documenting Weekly Inspections

- Electronic checklist/spreadsheet; timestamped photographs of containers
- Timing

### Aisle Space

- Reorganization – two additional rooms in CAA building storing compressed gasses and empty cylinders

### Communication Device, Emergency Information, & Facility Map

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# WASTE MANAGEMENT AREA - HWP

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# HWP STORAGE – RCRA ISSUES

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# HWP STORAGE – RCRA ISSUES

- Aisle Space
- Labeling?
  - Hazardous Waste Pharmaceuticals
  - Accumulation Start Date
  - Indication of the Hazard



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# HAZARDOUS WASTE PHARMACEUTICAL - LABELS



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## HWP STORAGE – RCRA ISSUES

- Aisle Space
- Labeling?
  - Hazardous Waste  
Pharmaceuticals
  - Accumulation Start Date
  - Indication of the Hazard
- Closed?
- Good condition?



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## HWP STORAGE – LOGISTICS

- How many bins in how many days?
  - 40 bins (at least)
    - 36 in photo, 4 more wheeled in as we walked out
  - 7 days
- Is this typical?
  - 627 pounds when shipped
    - Average: 554 pounds/week
    - Max: 3,600 pounds in a week



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## HWP STORAGE – SOLUTIONS?

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- Label all sides of the containers?
  - Added burden to the facility
  - Still wouldn't be able to see half the labels
- Stack differently? One deep? One high?
  - Not enough space
  - Still wouldn't be able to see if closed and/or labeled
- More frequent pick-ups?
  - Already paying for weekly pick-ups
  - Transporter charges double if less than 20 bins



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## TRANSPORTER ISSUES

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## TRANSPORTER ISSUES



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## TRANSPORTER SOLUTIONS?



### Carefully review each manifest

“I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name...”



### Talk to your transporter

If you are continuously making the same corrections to prefilled manifests, ask if they can update their prefilled form accordingly

10. Containers		11. Total	12. Unit	
No.	Type	Quantity	Wt./Vol.	
02	DF	02	G	D001
003	DF	938	44.7 G 2/21/23	D001
02	DF	02	G	D002
02	DF	02	G	D001
28. Containers		29. Total	30. Unit	
No.	Type	Quantity	Wt./Vol.	
01	DF	131	44.7 G 2/21/23	D001

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## SUMMARY

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- As regulators, there are a lot of aspects of the regulations that we may not think about
  - Did not realize how difficult it could be for larger facilities to comply with regulations
- Complexity and size of hospitals create additional issues with complying with SQG/LQG regulations
- This is a hospital system striving to do everything correctly and still struggling to meet all the RCRA requirements



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## DISCUSSION & QUESTIONS

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- Have you seen or had to advise on similar issues?
- Have you come across facilities that have found solutions to any of these issues?
- Any other relevant information or ideas to share?
- Any questions?



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