

Hazardous Material Exercise



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Chlorine Gas

Managing the MAQ for
water treatment plant

Your assignment

- Water treatment remodel project
- Directed to assist public works director
- Bring plant into compliance with code
- Goal not be Group H-4

Current Storage of Arrangement



Information to assist

- Safety Data Sheet (SDS) provided for chlorine gas from Airgas
- OSHA – HCS Pictogram & Hazards
- 150 pound chlorine gas contains approximately 800 cu ft of gas
- Facility needs a minimum of 6 - 150 pound cylinders to operate
 - 3 online – use closed system
 - 3 in storage

The Exercise

- What are the options to avoid classifying the water treatment plant building as a Group H-4 occupancy?
- This is a one story facility

The Exercise

- Classify Chlorine Gas
 - **Hazardous material classification**
- Determine Maximum Allowable Quantity or MAQ
- Identify applicable fire code chapters and sections
- Options to increase future capacity

Break into Groups of 5

15 Minutes for the Exercise
This may challenge you

SFM Interpretation

Chlorine Gas
2015 MSFC Requirements

Main Uses

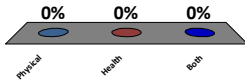
- Clean and Sanitize Water
 - Water Treatment Plants
 - Swimming Pools

Water Treatment

- Considerations
 - How often to take delivery of new cylinders
 - How often employees will be required to change out cylinders
 - Construction Costs
 - Maintenance Costs

What type of hazard?

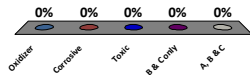
A. Physical
B. Health
C. Both



Hazard Type	Percentage
Physical	0%
Health	0%
Both	0%

What is the hazard classification?

- A. Oxidizer
- B. Corrosive
- C. Toxic
- D. B & C only
- E. A, B & C



Hazard Identification

SDS Section 2

- Oxidizing Gas
 - Physical Hazard
- Corrosive Gas
 - Health Hazard
- Toxic Gas
 - Health Hazard

Toxic or not Toxic

- Definitions in MSFC Chapter 2
- LD₅₀ – Lethal Dose
 - Orally or Absorbed
- LC₅₀ – Lethal Concentration
 - Inhalation
- Go to SDS Section 11
 - LC₅₀ – Rat – 293 ppm – 1 hour
 - Toxic material by definition

MSFC

- Chlorine Gas addressed in five chapters
 - Chapter 50, Hazardous Materials
 - Chapter 53, Compressed Gases
 - Chapter 54, Corrosives
 - Chapter 60, Toxic Materials
 - Chapter 63, Oxidizers

Chapter 50 Hazardous Materials

- 5001 General
 - Scoping Section 5001.1
 - Classifying materials 5001.2
 - Physical vs Health Hazards
 - Permits and HMMP and HMIS Section 5001.5
 - Closing facilities Section 5001.6

Chapter 50 Hazardous Materials

- 5003 General Requirements
- If MAQ not exceeded per control area, comply with 5001 and 5003
 - General safety requirements
 - SDS available at site
 - NFPA 704 placards
 - Control of smoking and open flames

Chapter 50 Hazardous Materials

5003 General Requirements

- **Building and control area construction requirements**
- **Gas room when required**
- **Gas cabinet when increasing MAQ**
- **Exhausted enclosure when increasing MAQ**
- **Handling and transportation**

Chapter 53 Compressed Gases

- **MAQ is not a consideration**
- **Compliance with chapter is required**
 - **Review the scope in Section 5301.1**
 - **Exceptions & references other chapters**
 - **General requirements**
 - **Storage requirements**
 - **Use and handling**

Chapter 54 Corrosives

- **Review the scope 5401.1**
- **Not exceeding MAQ**
 - **Comply with 5001, 5003, 5401**
 - **5401 states compliance with Chapter 53 and permits in 105.6**
 - **105.6 for compressed gases allows operational permit for 200 cu ft or more**

Chapter 60 Toxic Materials

- Not exceeding MAQ, Section 6004.2.1.1
 - Comply with 5001, 5003, 6001, 6004.1
 - 6001 states compliance with this chapter, Chapter 53 and permits in 105.6
 - 6004.1 has limits on storage in certain occupancy types
 - Also has requirements for gas cabinets and exhausted enclosures if required

Chapter 63 Oxidizers

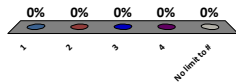
- Not exceeding MAQ
 - Comply with 6301, 6303, 5001, 5003
 - 6303 requires emergency shutoff and controlling of ignition sources
 - 6301 states compliance with Chapter 50 & 53 and permits in 105.6
 - 105.6 for compressed gases allows operational permit for 504 cu ft or more

MAQ Table 5003.1.1(1) and (2)

- Oxidizing Gas 1,500 cu ft
- Corrosive 810 cu ft
- Toxic 810 cu ft
- 100% increase for fire sprinklers
- 100% increase for gas cabinets, exhausted enclosures
- Typical 150# cylinder about 800 cu ft

How many control areas allowed?

- A. 1
- B. 2
- C. 3
- D. 4
- E. No limit to #



Control Areas

- Section 5003.8.3
- Table 5003.8.3.2
 - Up to 4 on first floor
 - One can be the entire room
- MSBC requires 1 hour fire barrier
 - 60 minute door

Hazmat Isn't Easy

- With the right info you can do this
- Classify the product
- Applicable Chapters and Sections
 - Read the scoping section
- Exceed or not exceed MAQ

The Exercise Results

- Need is 6 - 150# cylinders
 - **Don't exceed MAQ**
- 1 cylinder in a control room
 - **2 cylinders with footnote "e" or "f"**
 - **4 cylinders with footnote "e" and "f"**
- Add another control room
 - **Now up to 8 with both footnotes**

Exercise Results

- Sprinklers and Footnote "f"
 - **Additional costs and maintenance**
- What if
 - **3 control rooms and sprinklers**
 - **6 cylinders and mission accomplished**

Exercise Results

- Future expansion
- How many control rooms?
 - **4**
- Sprinklers and Footnote "f"
 - **16 cylinders**
- Still not classified as Group H-4

Exterior Labeled Entrance



Main Control Room



3 Control Rooms







- Group H-4 Costs**
- Corrosives
 - Toxic and Highly Toxic Materials
 - Exceeding the MAQ
 - MSBC construction requirements
 - Occupancy separations
 - Gas room requirements
 - Liquid tight and noncombustible floors

Group H-4 Costs

- Treatment systems
- Gas detection systems
- Additional requirements in other chapters

Remember

If outside your scope of knowledge and expertise
Section 104.7.2

Questions / Comments