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
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
• 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
Hazardous Material Exercise

Exhaust System

Sprinkler Head

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