

Hazardous Waste...The Basics

Melissa J. Hagen

- Contra Costa Health Services - Hazardous Materials Programs

February 28, 2011

1

Special thanks to:

Charles Corcoran

Waste Identification and Recycling Section
Hazardous Waste Management Program
Department of Toxic Substances
Control (DTSC)

February 28, 2011

2

Purpose of Course

- To provide the knowledge to enable you to make a “hazardous waste determination”
- To familiarize you with laws and regulations pertaining to hazardous waste identification

February 28, 2011

3

Objectives

- Understand the terms “waste”, “exclusion”, “exemption”, “listing”, and “characteristic”
- To know where to find the above
- To be able to work with sample data to make a hazardous waste determination

February 28, 2011

4

Agenda

- ◆ Introductions
- ◆ HW Identification & HW Determination Procedures
- ◆ Break
- ◆ HW Management
 - Storage Time
 - Recordkeeping
 - Emergency Response/Training
- ◆ CUPA Inspections
- ◆ Q&A

Administrative Essentials

- Restrooms
- Breaks
- Food/Drinks in Classroom
- Cell Phones
- EOC Room/Diablo Room
- Evacuation

ASK QUESTIONS!!!

- This course is most useful when you explore the concepts with me.
- If something is unclear or doesn't make sense, ask for clarification.
- "Parking lot" for questions that need research

7



Laws & Regulations

Dual System

Federal and State laws and regulations

9

Federal

- Statute: Resource Conservation and Recovery Act or RCRA, Chapter 42, United States Code (1976)
- Regulations: Title 40, Code of Federal Regulations (40 CFR, Parts 260-279)

10

State

- Statute: Hazardous Waste Control Law, California Health and Safety Code, Division 20, Chapter 6.5, (1973)
 - (www.leginfo.ca.gov/calaw.html)
- Regulations: California Code of Regulations, Division 4.5, Title 22
 - (www.calregs.com)

11

- California is a federally “authorized” state

12

Title 22 CCR: Contents

- Chapter 10 - Scope and Definitions
- ***Chapter 11 - Identification and Listing of Hazardous Wastes***
- Chapter 12 - Generator Standards
 - See section 66262.11

13

Title 22 CCR: Contents

- Chapter 13 - Transporter Standards
- Chapter 14 - Requirements for Permitted Facilities
- Chapter 15 - Requirements for Interim Status Facilities
- Chapter 16 - Requirements for Recyclable Wastes

14

Chapter 11 Appendices

- Appendix X
 - List of Chemical Names and Common Names of Hazardous Wastes
- Appendix XII
 - California Hazardous Waste Codes

NOTE: CUPA Inspections report waste by state waste codes

15

Hazardous Waste Identification

Introduction

16

Case 1: Nonhazardous wastes (mis)classified

- as hazardous wastes
 - Generators
 - Legally no problem
 - Unnecessary expense

17

Case 2: Hazardous wastes misclassified as nonhazardous wastes

Generators

- Legally BIG problems
- Illegal management/ disposal of hazardous wastes
- Fines up to \$25,000 per day, per violation

18

Who determines whether the waste is a hazardous waste? 22 CCR §66260.200(c)

- Generator's responsibility to make determination

19

Hazardous Waste Determination 22 CCR §66262.11

- The information a waste generator may use to classify their waste falls into two categories:
 - Analytical testing data
 - Generator knowledge of materials and processes used

20

How does an inspector know if the generator did the waste determination wrong?

- That's why we are here

21

Hazardous Waste Determination
Process

Waste Identification

22

Overview of the hazardous waste determination procedure

1. *Is the material a waste?*
 - *Is the material excluded or exempted?*
2. Is the waste excluded or exempted?
3. Is the waste listed in Article 4 or 4.1?
4. Is the waste listed in Appendix X?
5. Does the waste exhibit a characteristic of hazardous waste?

23

First things first...

Do I have a "waste" ?

24

What is a Waste? Layperson's definition

- Some thing that someone has, but that they don't have a use for.
- Probably going to get rid of.

25

Definition of Waste

§66261.2 22 CCR §25124 HSC

- A waste is any discarded material (in any physical form, such as solid, liquid, semi-solid, contained gas) that is not excluded by 66261.4(a), 66261.4(e), or 25143.2(b) or 25143.2(d)

26

What does "Discarded" mean? 22 CCR 66261.2(b)

- A material is discarded if it is:
 - *Relinquished*
 - *Recycled (sometimes)*
 - *Inherently waste-like*

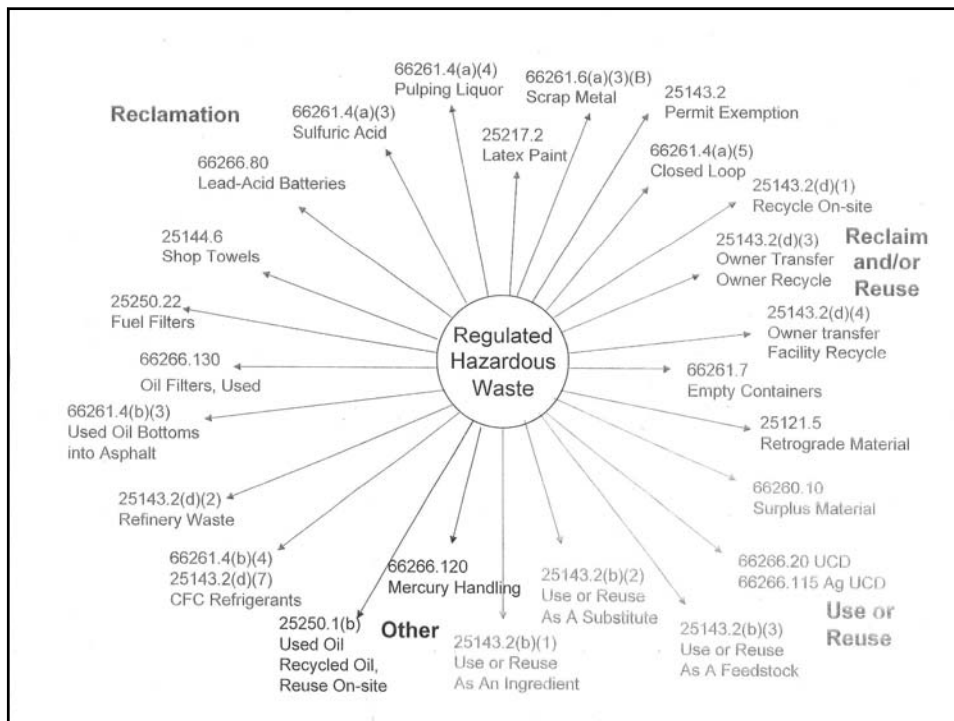
27

Improper Packaging/Labeling 22 CCR 66261.2(f)

- Materials are also wastes if they are:
 - mislabeled or inadequately labeled, unless labeled correctly within 10 days
 - in a deteriorated or damaged container, unless repackaged within 96 hours
- Must pose a threat to human health or the environment

28

- Exclusions
§25143.2 HSC
- Waste Exclusions
22 CCR §66261.4(a)
- Hazardous Waste Exemptions
22 CCR §66261.7



So you have a waste...

Is it a *hazardous* waste?

31

Definition of Hazardous Waste 22 CCR §66261.3

- A waste is a hazardous waste if it:
 - listed in or contains constituents listed in Appendix X, unless the waste is determined to be non-hazardous
 - is a mixture of a waste and a Article 4 (Federal) listed hazardous waste

32

Waste Determination Process

- Is the waste listed in Article 4 or 4.1?
- Is the waste "LISTED" ?

33

Ch. 11, Art. 4-1

Article 4. Lists of RCRA Hazardous Wastes

§66261.30. General.

(a) A waste is a RCRA hazardous waste if it is listed in this article, unless it has been excluded from this list pursuant to 40 CFR sections 260.20 and 260.22 or is categorized as a non-RCRA hazardous waste pursuant to section 66261.101. Wastes shall only be listed in this article if they are listed in 40 CFR Part 261 Subpart D.

(b) The Department will indicate the USEPA Administrator's basis for listing the classes or types of wastes listed in this article by employing one or more of the following Hazard Codes:

Ignitable Waste	(I)
Corrosive Waste	(C)
Reactive Waste	(R)
Acute Hazardous Waste	(H)
Toxic Waste	(T)

Appendix VII of this chapter identifies the constituent which caused the USEPA Administrator to list the waste as a Toxic Waste (T) as included in sections 66261.31 and 66261.32.

(c) Each RCRA hazardous waste listed in this article is assigned an EPA Hazardous Waste Number which precedes the name of the waste. This number shall be used in complying with the notification requirements of Health and Safety Code section 25153.6 and certain recordkeeping and reporting requirements under chapters 12 through 15, 18, and 20 of this division.

NOTE: Authority cited: Sections 208, 25141 and 25159, Health and Safety Code. Reference: Sections 25117, 25120.2, 25141, 25159 and 25159.5, Health and Safety Code and 40 CFR Section 261.30.

HISTORY

1. New section filed 6/24/91; effective 7-1-91 (Register 91, No. 22).

§66261.31. Hazardous Wastes from Non-Specific Sources.

(a) The following wastes are listed hazardous wastes from non-specific sources unless they are excluded pursuant to 40 CFR sections 260.20 and 260.22:

EPA Hazardous Waste No.	Hazardous Waste	Hazard Code
F001	the following spent halogenated solvents used in degreasing: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, before use, a total of ten percent or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and still bottoms from the recovery of these spent solvents and spent solvent	(T)

Article 4.1 Additional Lists of Hazardous Wastes**§66261.50. Mercury-Containing Products That Are Hazardous Wastes When Discarded.**

The following mercury-containing products are listed hazardous wastes when discarded:

*California
Hazardous
Waste
Number*

Hazardous Waste

M001	Mercury-containing motor vehicle light switches, as defined in section 66273.9, and any motor vehicle or portion of a motor vehicle that contains such switches, when any person decides to crush, bale, shred, or shear the vehicle. Motor vehicles and portions of motor vehicles from which all mercury-containing light switches have been removed are not included in this category. A light switch that cannot be removed from a vehicle due to accidental damage to the vehicle is not included.
M002	Non-automotive mercury switches and any product that contains such switches. Includes any mercury switch that does not meet the listing description for M001, including but not limited to, mercury switches from household appliances and household appliances from which mercury switches have not been removed; relays; silent wall switches; and float switches. Also includes mercury-containing flame sensors and household appliances from which all mercury flame sensors have not been removed. Appliances and other products from which all mercury switches and flame sensors have been removed are not included in this category.
M003	Lamps that contain intentionally-added mercury and products (or devices) with lamps that contain intentionally-added mercury. A lamp is defined as the bulb or tube portion of an electric lighting device. A lamp is specifically designed to produce radiant energy, most often in the ultraviolet, visible, and infrared regions of the electromagnetic spectrum. Products from which all mercury-containing lamps have been removed are not included in this category. This listing does not apply to vehicles that contain mercury-added lamps.
M004	Mercury-added novelties, as defined in section 66273.9 (other than novelties with mercury switches, which meet the listing description for M002, and novelties with mercury-containing lamps, which meet the listing description for M003). Includes, but is not limited to, novelties painted with mercury-containing paints.

NOTE: Authority cited: Sections 25140, 25214.10.1, and 58012, Health and Safety Code. Reference: Sections 25140 and 25212, Health and Safety Code.

HISTORY

1. New article 4.1 (section 66261.50) and section filed 2-13-2003; operative 3-15-2003 (Register 2003, No. 7).
2. Amendment of section and Note filed 2-4-2009; operative 2-4-2009 (Register 2009, No. 6).

Three categories of lists

1. Non-specific sources (F)
2. Specific sources (K)
3. Discarded commercial chemical products, off-specification species, and spill residues (P, U)

Non-specific Sources (F-List) 22 CCR §66261.31

- Spent solvent wastes (F001 - F005)
- Electroplating and metal finishing operations wastes (F006 - F012, F019)
- Dioxin-bearing wastes (F020 - F023; F026 - F028)

37

Example: F001

- "The following **spent** halogenated solvents used in **degreasing**: Tetrachloroethylene, trichloroethylene, methylene chloride, 1,1,1-trichloroethane, carbon tetrachloride, and chlorinated fluorocarbons; all spent solvent mixtures/blends used in degreasing containing, **before use, a total of ten percent** or more (by volume) of one or more of the above halogenated solvents or those solvents listed in F002, F004, and F005; and **still bottoms** from the recovery of these spent solvents and spent solvent fixtures."

38

Example: K001

- "Bottom sediment sludge from the treatment of wastewaters from wood preserving processes that use creosote and/or pentachlorophenol."

39

Example: U220 - Toluene

- Must be unused
- Must be the sole active ingredient
- A waste that contains toluene is not listed as U220 only because toluene is present
- Examples:
 - Laboratory chemicals, expired or shelf-life materials, raw material spills

40

Regulations Unique to Federal RCRA Listed Wastes

- Mixture Rule
- Derived-From Rule
- Contained-In Policy

41

Mixture Rule – RCRA Listed Wastes 22 CCR §66261.3 (a)(2)(E) & (F)

- Mixtures of wastes and RCRA listed hazardous wastes are hazardous wastes
- Concentrations are irrelevant

42

Mixture Rule – RCRA Listed Wastes 22 CCR §66261.3(a)(2) (E) & (F)

- Exemptions:
 - waste has been delisted by US EPA
 - wastes listed solely due to a characteristic other than (t) or (h), and mixture does not exhibit the characteristic (example, F003 - ignitability)
- (t=toxic, h=acutely hazardous)

43

Derived-From Rule- RCRA Listed Wastes 22 CCR §66261.3(c)

- Wastes generated from the treatment, storage or disposal of listed wastes are hazardous wastes
- Example: incineration of K001 sludge, resulting ash is derived from a RCRA listed waste

44

RCRA Contained-in Policy

- Applies to contaminated media and debris
- Environmental media (water or soil) that contain listed wastes are hazardous wastes
 - unless DTSC determines that the listed waste is present in insignificant concentrations (risk-based evaluation)

45

What if my waste isn't listed (is not a **listed** HW)?

- If a waste is not on any of the lists, the next step is to determine if the waste exhibits one of the **characteristics** of a hazardous waste

46

Hazardous Waste Determination Procedure

Hazardous Waste Identification - Characteristics

47

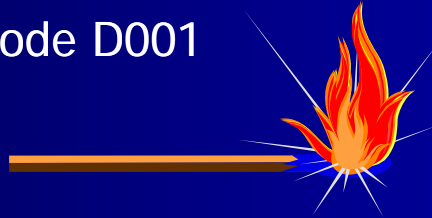
Characteristics of Hazardous Wastes 22 CCR Article 3

- Ignitability
- Corrosivity
- Reactivity
- Toxicity

48

Ignitable Wastes

- Wastes that can readily catch fire and sustain combustion
- Liquid with a flashpoint $\leq 140^{\circ}\text{F}$ (60°C)
- Waste code D001



49

Corrosive Wastes

- Measured by pH
- Measured by rate of steel corrosion
- Waste code D002
- California included solids (22 CCR §66261.22 (a) (3) & (a) (4))



50

Characteristic of Corrosivity

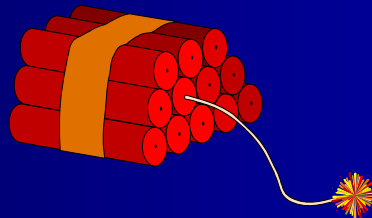
22 CCR §66261.22

- pH
 - Aqueous solution with a $\text{pH} \leq 2$ or ≥ 12.5
 - Not aqueous and, when mixed with an equal weight of water, has $\text{pH} \leq 2$ or ≥ 12.5

51

Reactive Wastes

- wastes that readily explode, or
- undergo violent reactions



52

Toxic Wastes

- wastes that can deleteriously effect human health or the environmental



53

Characteristic of Toxicity 22 CCR §66261.24

- Eight elements (or parts) to this characteristic
- Waste can be toxic by any of these elements (by any one criterion)
- TCLP is limited to federal hazardous wastes

54

Characteristic of Toxicity 22 CCR §66261.24

- Persistent and Bioaccumulative Toxic Substances (PBTs)
 - PBTs were considered public health threat and/or environmental hazard in the 1970's
 - Elements (a)(1) and (a)(2) of toxic characteristic
 - Toxicity is where California really differs

55

Characteristic of Toxicity (TCLP) 22CCR66261.24(a)(1)

- The federal toxicity characteristic is based upon a leach test called the TCLP or the "Toxicity Characteristic Leaching Procedure"
- Simulates landfill disposal of a hazardous waste

56

Characteristic of Toxicity (TCLP) 22 CCR66261.24(a)(1)

- If the result, in milligrams of hazardous constituent per liter of extract, equals or exceeds the RL, the waste exhibits the characteristic of toxicity.

57

Persistent and Bioaccumulative Toxic Substances 22 CCR §66261.24(a)(2)

- Toxic and hazardous if:
 - The WET extract content \geq Soluble Threshold Limit Concentration (STLC) by the WET (mg/L), or
 - The digest content \geq Total Threshold Limit Concentration (TTLC) by analysis for total concentration in waste (mg/kg)

58

Characteristic of Toxicity

TCLP vs. WET

TCLP

- Simulated landfill leachate
- Acetic acid extractant
- 18 hour extraction
- 7 inorganic constituents
- 23 organic constituents
- less aggressive for inorganic constituents
- zero headspace extractor for volatile organic compounds

WET

- Simulated landfill leachate
- Citric acid extractant
- 48 hour extraction
- 19 inorganic constituents
- 18 organic constituents
- more aggressive for inorganic constituents
- More organic compounds

59

Characteristic of Toxicity

Comparing Total and WET or TCLP

- One can "guesstimate" what the concentrations will be in the extracts from the WET and TCLP methods using the concentrations in the total digest.

60

Characteristic of Toxicity Comparing Total and WET or TCLP

- WET uses a 10:1 ratio of solid sample (waste) to extractant fluid
- TCLP uses a 20:1 ratio of solid sample (waste) to extractant fluid

61

Characteristic of Toxicity Comparing Total and WET or TCLP

- If a substance in a waste were 100% soluble (in the extractant), then the maximum possible extract concentration would be:
 - WET: $1/10$ the total concentration
 - TCLP: $1/20$ the total concentration

62

Example 1



- Total digest = 530 mg/kg lead concentration, the maximum soluble results would be
 - WET: 53 mg/l
 - TCLP: 26.5 mg/l
- Both federal and state soluble thresholds for lead are 5 mg/l

63

Example 2

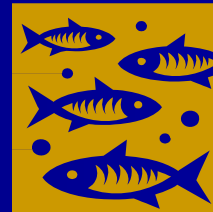


- Total digest = 53.0 mg/kg lead concentration, the maximum soluble results would be
 - WET: 5.3 mg/l
 - TCLP: 2.65 mg/l
- Both federal and state soluble thresholds for lead are 5 mg/l

64

Acute Toxicity

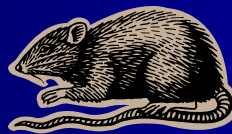
- Oral Toxicity
- Dermal Toxicity
- Inhalation Toxicity
- Acute Aquatic Toxicity



65

Acute Oral Toxicity 22 CCR §66261.24(a)(3)

- Waste is hazardous if oral $LD_{50} < 2500$ mg/kg (§ 25141.5 HSC)



66

Acute Dermal Toxicity 22 CCR §66261.24(a)(4)

- Waste is hazardous if dermal LD₅₀ < 4300 mg/kg

67

Acute Inhalation Toxicity 22 CCR §66261.24(a)(5)

- Waste is hazardous if inhalation LC₅₀ < 10,000 ppm

68

Acute Toxicity

- In many cases, toxicity data is available for pure chemical compounds found in wastes
- Although not common, in theory a generator could perform an animal bioassay on their waste

69

Aquatic Toxicity 22 CCR §66261.24(a)(6)

- Also known as the "fish test"
- LC50 Measured using:
 - fathead minnows
 - rainbow trout
 - golden shiners
- Hazardous if 96-hour LC50 < 500 mg/liter

70

Carcinogenicity

22 CCR §66261.24(a)(7)



- List of 16 carcinogenic substances
- Hazardous if present in a waste or material in single or combined concentration exceeding 0.001 percent (10 ppm)

71

Carcinogenic Substances

- | | |
|-------------------------------|---------------------------|
| ■ 2-acetylaminofluorene | ■ Dimethylaminoazobenzene |
| ■ acrylonitrile | ■ ethyleneimine |
| ■ 4-aminodiphenyl | ■ alpha-naphthylamine |
| ■ benzidine | ■ beta-naphthylamine |
| ■ bis(chloromethyl)ether | ■ 4-nitrobiphenyl |
| ■ Methyl chloromethyl ether | ■ N-nitrosodimethylamine |
| ■ 1,2-dibromo-3-chloropropane | ■ beta-propiolactone |
| ■ 3,3-dichlorobenzidine | ■ vinyl chloride |

72

Experience or Testing 22 CCR §66261.24(a)(8)

- Wastes shown through experience or testing to pose a hazard
- The criteria were not expected to capture all possible wastes that could be hazardous
- Use Best Professional Judgment
- Now really only DTSC applied.

73

Mixture Rule - Characteristic Wastes

22 CCR §66261.3(b)(4)

- Wastes mixed with either a RCRA or a nonRCRA characteristic hazardous waste are hazardous waste only if the resulting mixture still exhibits a hazardous characteristic
- Intentional mixture to avoid regulation is treatment, and requires authorization

74

What is Appendix X?

- A tool for generators

75

Appendix X

- List of 791 chemicals
- List of 66 common names or types of hazardous wastes
- Characteristic of concern noted (X,C,I,R)

76

Acutely and Extremely Hazardous Wastes

- Acutely (Federal)
 - “P” listed
- Extremely (State)
 - Criteria-based
 - Appendix X (asterisks)

77

Categories of Hazardous Wastes 22 CCR Article 5

- RCRA Hazardous Wastes
- Non RCRA Hazardous Wastes
 - Acutely Hazardous Wastes
 - Extremely Hazardous Wastes
 - Special Wastes
- Universal Wastes

78

Who cares about which category my waste fits into?

79

Who determines whether a waste is a hazardous waste?

- Generator's responsibility to make determination
- 22 CCR §66260.200(c)

80

Hazardous Waste Determination 22 CCR §66262.11

- The information a waste generator may use to classify their waste falls into two categories:
 - Generator knowledge of materials and processes used
 - Analytical testing data

81

Can I classify my waste based entirely on knowledge?

Yes

82

To run a test, you'll first need to take a sample of the waste

SW846



Samples!

83

Other Wastes

- Empty Containers – 5 gallons
- Used Oil Filters/Fuel Filters
- Lead Acid Batteries
- Used Shop Towels

84

Treatment (Tiered Permitting)



February 28, 2011



85

OK! So I am a hazardous waste generator...

- What next?
 - EPA ID (eg CAL000123456)
 - Annual EPA ID Questionnaire
 - CUPA Permit

86

Hazardous Waste Management

- Storage Time
- Housekeeping
- Tanks and Containers
- Response Plans
- Employee Training
- Recordkeeping
- The CUPA Inspection

Hazardous Waste Management



How Long Can I Store my HW?

- It depends...

89

How Long Can I Store my HW?

- CESQG-Time starts at 100kg

Then...90 days

90

How Long Can I Store my HW?

- SQG – 100kg-1000kg/month

Then....180 days
(if over 200 miles – 270 days)

- Satellite Accumulation (One year total!)

91

How Long Can I Store my HW?

- CA LQG or RCRA (Federal) LQG

Then...90 days

- Satellite Accumulation (One year total!)

92

Housekeeping

- Aisle Space
- Closed containers
- Labels!!!
- Non faded labels

Waste Tanks

- Labeled with the words "Hazardous Waste"
- Accumulation start date
- Physical state
- Hazardous Properties

(May need DAILY inspections)



Waste Containers

- Labeled with the words "Hazardous Waste"
- Name & Address
- Accumulation start date
- Physical state
- Hazardous Properties
- Weekly Inspections



Response Plans

- Depends on generator status

– SQG

– LQG

(Can be combined with HMBP)

Employee Training

- Depends on generator status

- SQG

- LQG

(Can be combined with HMBP)

97

Recordkeeping

- Manifest
- Consolidated Manifest
- Bill of Lading

Maintain documents on site for 3 yrs!

98

The CUPA Inspection

- Normal business hours
- Written report
- Opening
- Closing
- Follow-up
 - (CL I, CL II, M)



Q & A Session

Contra Costa Health Services
Hazardous Materials Programs
925-335-3200

Melissa J. Hagen
Hazardous Materials Specialist II
mhagen@hsd.cccounty.us

100