DEPARTMENT OF THE AIR FORCE
Headquarters US Air Force
Washington, DC 20330-1030

QTP 4B051-9
24 March 2015

AIR FORCE SPECIALTY CODE 4B051
BIOENVIRONMENTAL ENGINEERING

Chemical Health Hazards

QUALIFICATION TRAINING PACKAGE

Accessibility: ***Publications and forms are available on the e-publishing website at http://www.e-publishing.af.mil for downloading or ordering.***

Realeasability: ***There are no releasability restrictions on this publication.***

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STS Line Item 4.6.3: Identify substance-specific standard compliance requirements

TRAINER GUIDANCE

Proficiency Code:	2b
PC Definition:	Can do most parts of the task. Needs help only on hardest parts. Can determine step-by-step procedures for doing the task.
Prerequisites:	None
Training References:	• OSHA 29 CFR 1910 Subpart Z • ACGIH Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents in the Work Environment • NIOSH Pocket Guide
Additional Supporting References:	NIOSH Pocket Guide Occupational and Environmental Health Readiness System (DOEHRS). Computer access
CDC Reference:	4B051
Training Support Material:	None
Specific Techniques:	Conduct hands-on training and evaluation.
Criterion Objective:	Given a chemical, identify the appropriate substance-specific standard compliance requirement successfully completing all checklist items with limited trainer assistance on only the hardest parts.
Notes:	

TASK STEPS

1. Determine if the workplace uses any chemicals regulated by OSHA's substance specific standards.
2. Research applicable standard**.**
3. Identify which portion of the substance specific standard applies to the workplace activity.
4. Determine if the workplace is in compliance with the substance specific standard.
5. Enter acquired information into OEHMIS/DOEHRS.

LOCAL REQUIREMENTS:

Trainee should have access to OSHA substance-specific standard for whichever chemical they will assess.

NOTES:

TRAINEE REVIEW QUESTIONS

STS Line Item 4.6.3: Identify substance-specific standard compliance requirements

1. List four OSHA substance-specific standards.
2. Name three specific requirements under OSHA's substance-specific standard.
3. In accordance with 29 CFR 1910.1001 Appendix B, what is the air sampling media required for Asbestos?

PERFORMANCE CHECKLIST

STS Line Item 4.6.3: Identify substance-specific standard compliance requirements

Proficiency Code:	2b
PC Definition:	Can do most parts of the task. Needs help only on hardest parts. Can determine step-by-step procedures for doing the task.

DID THE TRAINEE…		YES	NO
1. Determine if the workplace uses chemicals regulated by OSHA's substance specific standards?			
2. Research the applicable standard?			
3. Identify which portion of the substance specific standard applies to the workplace activity?			
4. Determine if the workplace is in compliance with the substance specific standard?			
5. Enter acquired information into OEHMIS/DOEHRS?			
Did the trainee successfully complete the task?			

TRAINEE NAME (PRINT)

TRAINER NAME (PRINT)

ANSWERS

1. List four OSHA substance-specific standards.

A:

- 1910.1001 Asbestos.
- 1910.1002 Coal tar pitch volatiles.
- 1910.1003 13 Carcinogens, including:
  - 4-Nitrobiphenyl; alpha-Naphthylamine; Methyl chloromethyl ether; 3,3'-Dichlorobenzidine and its salts; bis-Chloromethyl ether; beta-Naphthylamine; Benzidine; 4-Aminodiphenyl; Ethyleneimine; beta-Propiolactone; 2-Acetylaminofluorene; 4-Dimethylaminoazobenzene; N-Nitrosodimethylamine.
- 1910. 1004 alpha-Naphthylamine.
- 1910.1006 Methyl chloromethyl ether.
- 1910.1007 3-Dichlorobenzidine (and its salts).
- 1910.1008 bis-Chloromethyl ether.
- 1910.1009 beta-Naphthylamine.
- 1910.1010 Benzidine.
- 1910.1011 4-Aminodiphenyl.
- 1910.1012 Ethylenemine.
- 1910.1013 beta-Propiolactone.
- 1910.1014 2-Acetylaminofluorene.
- 1910.1015 4-Dimethylaminoazobenzene.
- 1910.1016 N-Nitrosodimethylamine.
- 1910.1017 Vinyl chloride.
- 1910.1018 Inorganic arsenic.
- 1910.1025 Lead.
- 1910.1026 Chromium VI.
- 1910.1027 Cadmium.
- 1910.1028 Benzene.
- 1910.1029 Coke oven emissions.
- 1910.1030 Bloodborne pathogens.
- 1910.1043 Cotton dust.
- 1910.1044 1,2-dibromo–3-chloropropane.
- 1910.1045 Acrylonitrile.
- 1910.1047 Ethylene oxide.
- 1910.1048 Formaldehyde.
- 1910.1050 Methylenedianiline.
- 1910.1051 1,3-Butadiene.
- 1910.1052 Methylene Chloride.

(Source: Career Development Course 4B051)

2. Name three specific requirements under OSHA's substance specific standard.

   A:
   - Applicable PELs.
   - Exposure monitoring.
   - Establish a regulated area.
   - Methods of compliance.
   - Control methods.
   - Post warning signs (verbiage and location).
   - Worker training.
   - Worker notification.
   - Recordkeeping and documentation.

   (Source: Career Development Course 4B051)

3. In accordance with 29 CFR 1910.1001 Appendix B, what is the air sampling media required for Asbestos?

   A: Conductive filter holder consisting of a 25-mm diameter, 3-piece cassette having a 50-mm long electrically conductive extension cowl. Backup pad, 25-mm, cellulose. Membrane filter, mixed-cellulose ester (MCE), 25-mm, plain, white, 0.4 to 1.2-um pore size.

   (Source: 29 CFR 1910.1001 Appendix B, para 5.1.1)

STS Line Item 4.6.4: Identify / Analyze chemical hazards based on routes of entry (inhalation, injection, ingestion, absorption, contact)

TRAINER GUIDANCE

Proficiency Code:	3c
PC Definition:	Can do all parts of the task. Needs only a spot check of completed work. Can identify why and when the task must be done and why each step is needed.
Prerequisites:	None
Training References:	• American Industrial Hygiene Association (AIHA), The Occupational Environment: Its Evaluation, Control, and Management, 3rd ed, Falls Church, VA 2011
Additional Supporting References:	NIOSH Pocket Guide Occupational and Environmental Health Readiness System (DOEHRS). Computer access
CDC Reference:	4B051
Training Support Material:	• *Safety Data Sheet (SDS)* (i.e., if the SDS identifies it as a chemical or physical hazard). • OSHA 29 CFR 1910.1450 (Toxic and Hazardous Substances: Air Contaminants) Table Z-I through Z-3. • Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents in the Work Environment, American Conference of Governmental Industrial Hygienists (ACGIH). • The Registry of Toxic Effects of Chemical Substance.
Specific Techniques:	Conduct hands-on training and evaluation.
Criterion Objective:	Given a scenario and source documentation, identify, analyze and report chemical contact and absorption hazards successfully while completing all checklist items with NO trainer assistance.

TASK STEPS

3. Identify the process causing the exposure.
4. Identify the toxicological properties of chemical(s) and/or by-products formed/being produced.[1]
3. Determine potential route of entry.[2]
4. Identify/analyze qualitative/quantitative data (if available).
5. Determine duration/frequency of exposure.[3, 4, 5]
6. Utilize OEHMIS (DOEHRS).[6]

LOCAL REQUIREMENTS:

NOTES:

1. In occupational settings, identifying chemical threats begins with reviewing existing occupational health data in the Defense Environmental Health Readiness System (DOEHRS) or equivalent OEMIS, hazardous material reports and inventories produced by Environmental Management Information System (EMIS), and existing HRA reports. The basic approach to chemical hazard recognition is to:

    a. Determine raw materials.
    b. Determine produced product(s).
    c. Determine intermediate products formed in the process.
    d. Determine by-products potentially being released.
    e. Determine (and evaluate) cleaning or maintenance procedures conducted at the end of day, end of run, or changeover to another product.
    f. What hazardous waste is produced and how is it disposed?

1.1. Verify ingredients of potential hazard via SDS and/or additional documentation.

a. A chemical is considered hazardous if it is listed in any of the following:

i Material Safety Data Sheet (SDS) (i.e., if the SDS identifies it as a chemical or physical hazard).

ii OSHA 29 CFR 1910.1000 (Toxic and Hazardous Substances: Air Contaminants) Table Z-I through Z-3.

iii Threshold Limit Values (TLVs) for Chemical Substances and Physical Agents in the Work Environment, American Conference of Governmental Industrial Hygienists (ACGIH), current edition.

iv The Registry of Toxic Effects of Chemical Substance

1.2. Prepare list of potentially hazardous chemicals and constituents (HAZMATS).

2. Route of entry considerations include:
    a. Inhalation
        - Physical state (vapor, mist, dust, fume)
        - Vapor pressure and boiling point
        - Vapor density
        - Injection
        - Ingestion
    b. Absorption
        - Direct contact
        - Indirect contact
        - Vapor or aerosol

c. Contact
- Primary irritants
- Sensitizers

3. Chemical usage considerations include:
a) Spray vs. brush painting
b) Pouring
c) Sweeping
d) Heating
e) Amount used
f) Proximity to individual(s) applying
g) Duration of exposure
h) Cleaning maintenance procedures (end of day, end of run, or changeover to another product).

4. Acidic/caustic characteristics include:
a) Corrosive
b) Toxic
c) Flammable Liquid
d) Oxidizer/Reactive
e) Compressed Gas
f) Explosive
g) Radioactive
h) Carcinogen
i) Nerve Agent
j) Vesicant
k) Cyanogens
l) Pulmonary Agents

5. Inherent properties of chemicals include:
a) Form/property (solid, liquid or gas)
b) Vapor pressure
c) Vapor density
d) Solubility rate
e) Specific gravity (H20=1)
f) Particle size
g) Volatility

6. CDC 4B051, Volume 2, Unit 2 addresses format and data inclusion for preparing an assessment report. "The report should include the following: cover letter; summary of health risks and list of current processes which exceed action levels; summary of all risk assessment codes (RAC) assigned to the workplace; recommendations and required follow-up actions, including suspense dates and request to notify BE of completion in writing; and the following attachments: Identified health risk controls linked to specific process(es) and SEG(s); certified PPE list (mandatory)." This report should be compiled prior to entering information into the DOEHRS.

TRAINEE REVIEW QUESTIONS

STS Line Item 4.6.4: Identify / Analyze chemical hazards based on routes of entry (inhalation, injection, ingestion, absorption, contact)

1. What is normally your primary source for chemical-specific information when determining whether a chemical is a health threat?
2. Some manufacturers will not release proprietary ingredients listed on the SDS to the general public. How would you obtain this info in order to determine potential chemical health threats?
3. Of the five routes of entry, what is the most common type of exposure to a chemical hazard?
4. List the three categories of skin absorption exposure.

PERFORMANCE CHECKLIST

STS Line Item 4.6.4: Identify / Analyze chemical hazards based on routes of entry (inhalation, injection, ingestion, absorption, contact)

Proficiency Code:	3c
PC Definition:	Can do all parts of the task. Needs only a spot check of completed work. Can identify why and when the task must be done and why each step is needed.

DID THE TRAINEE…		YES	NO
4. Identify the process causing the exposure?			
5. Identify the toxicological properties of chemical(s) and/or by-products formed/being produced?			
6. Determine potential route of entry?			
7. Identify/analyze qualitative/quantitative data (if available)?			
8. Determine duration/frequency of exposure?			
9. Enter acquired information into OEHMIS/DOEHRS?			
Did the trainee successfully complete the task?			

TRAINEE NAME (PRINT)

TRAINER NAME (PRINT)

ANSWERS

1. What is normally your primary source for chemical-specific information when determining whether a chemical is a health threat?

A: Safety Data Sheet (SDS)

(Source: Career Development Course 4B051)

2. Some manufacturers will not release proprietary ingredients listed on the SDS to the general public. How would you obtain this info in order to determine potential chemical health threats?

A: As a health professional, you are authorized access to this information and you may have to contact the manufacturer for the information.

(Source: Career Development Course 4B051)

3. Of the five routes of entry, what is the most common type of exposure to a chemical hazard?

A: The most common type of exposure occurs when you breathe a substance into the lungs or inhale the substance (inhalation).

(Source: Career Development Course 4B051)

4. List the three categories of skin absorption exposure.

A: Direct contact, indirect contact and vapor/aerosol.

(Source: Career Development Course 4B051)

STS Line Item 4.6.11: DOEHRS data entry

TRAINER GUIDANCE

Proficiency Code:	3c
PC Definition:	Can do all parts of the task. Needs only a spot check of completed work. Can identify why and when the task must be done and why each step is needed
Prerequisites:	None
Training References:	DOEHRS student guides https://doehrs-ih.csd.disa.mil/doehrs/displaystudentsuides.do
Additional Supporting References:	
CDC Reference:	4B051
Training Support Material:	None
Specific Techniques:	Have trainee enter information into DOEHRS IAW DOEHRS student guides
Criterion Objective:	Given a source of data (case file, sampling event, observations, etc.), input data into DOEHRS system IAW DOEHRS student guides and applicable local policy successfully completing all steps with NO trainer assistance.
Notes: Trainee must be given information from case files to enter into DOEHRS	

TASK STEPS

1. Determine type of data.[1]
2. Enter correct module of DOEHRS.
3. Input data.[2]
4. Verify accuracy of data.

LOCAL REQUIREMENTS:

NOTES:

1. Data may be any one of the following types:
   - Observations and notes or shop data
   - Environmental survey
   - Radiation survey
   - Incident response
   - SEG survey
2. Be sure to fill out all mandatory forms IAW applicable DOEHRS student guides and local policy.

TRAINEE REVIEW QUESTIONS

STS Line Item 4.6.11: DOEHRS data entry

1. What is the AF-approved OEH Management Information System called?
2. What are the four modules of DOEHRS?
3. What must be documented in DOEHRS?

PERFORMANCE CHECKLIST

STS Line Item 4.6.11: DOEHRS data entry

Proficiency Code:	3c
PC Definition:	Can do all parts of the task. Needs only a spot check of completed work. Can identify why and when the task must be done and why each step is needed

DID THE TRAINEE…		YES	NO
1. Determine type of data?			
2. Enter correct module of DOEHRS?			
3. Input data?			
4. Verify accuracy of data?			
Did the trainee successfully complete the task?			

TRAINEE NAME (PRINT)

TRAINER NAME (PRINT)

ANSWERS

1. What is the AF-approved OEH Management Information System called?

   A: Defense Occupational and Environmental Health Readiness System (DOEHRS).

(Source: Career Development Course 4B051)

2. What are the four modules of DOEHRS?

   A: Industrial Hygiene, Environmental Health, Radiation, Incident Reporting

(Source: Career Development Course 4B051)

3. What must be documented in DOEHRS?

   A: All information relating to OEH health risk assessment

(Source: Career Development Course 4B051)