

CAMEO Chemicals Exercises

CAMEO Chemicals: <http://cameochemicals.noaa.gov>

1. You've gotten a report of an abandoned drum that has washed up at the local picnic beach. The only identification on the drum is the stenciled product name, "slimicide." What could be in the drum, and how hazardous might it be? Also, the officer in charge would like a printout of useful information: how can you provide that?

2. You're sent to the scene of a train derailment, and this is what you find on arrival:

- a) Would it make sense to dike this tank car as a response measure?
- b) Where there's smoke, there may be fire. If this tank car becomes involved in a fire, would it be safe to apply water to control the fire?



3. At the Port of Oakland, a container being handled at an unloading facility is accidentally dropped. It spills some of its contents. You are called to the scene. On arrival, you find 55-gallon drums of furfural, some of which are leaking, and cardboard drums holding thiourea powder, some of which have broken open. There's a strong possibility that these chemicals could mix. Would they react together, if they did mix? The officer in charge would like a printout of any relevant information.

4. Inside a warehouse, a red liquid with a rotten egg odor has spilled. What is it?

5. This exercise involves toxic Levels of Concern (LOCs, AKA toxic exposure guidelines or exposure levels). What are they?

Find all the chemicals for which all the following Levels of Concern are less than 2 ppm: AEGL3 (60 minutes), ERPG3, or TEEL3.

What does it mean to have a low LOC? Is a chemical with a low LOC *more* hazardous, or *less* hazardous than if its LOC was higher?

In CAMEO Chemicals, a toxic Level of Concern (LOC) tells you what level (threshold concentration) of exposure to a chemical could hurt you or other people if you breathe it in for a defined length of time (exposure duration). Toxic LOCs also may be referred to as exposure limits, exposure guidelines, or toxic endpoints. Generally, the lower the toxic LOC value for a substance, the more toxic the substance is by inhalation. For example, acrolein's LOC values are very low because it is a highly toxic chemical.

A CAMEO Chemicals data sheet may include any of the following **public exposure guidelines**, depending on which have been defined for the chemical:

- **AEGs** (Acute Exposure Guideline Levels)
- **ERPGs** (Emergency Response Planning Guidelines)
- **TEELs** (Temporary Emergency Exposure Limits)

These public exposure guidelines are designed to predict how the general public could be affected by a short-term release of a particular toxic chemical. Each has three tiers of exposure values (e.g., AEGL-1, AEGL-2, and AEGL-3) for each covered chemical. There are some key differences between the exposure guidelines, but at a very general level, the tiers are similar: the first tier (e.g., ERPG-1) is a detection threshold, the second tier (e.g., ERPG-2) is an escape impairment threshold, and the third tier (e.g., ERPG-3) is a life-threatening effects threshold.

AEGs are considered the best public exposure guidelines to date, because they undergo a rigorous review process, and are designed as guidelines for nearly all members of the general public—including sensitive individuals. Final AEGs have been defined for only a few dozen chemicals. **ERPGs** are based on experimental data, but unlike AEGs they are only available for a 1-hour exposure duration and they are not designed as guidelines for sensitive individuals. By definition, **TEELs** are temporary limits designed to be used as exposure limits for chemicals for which AEGs or ERPGs have not yet been defined.

CAMEO Chemicals data sheets also include **IDLH** (Immediately Dangerous to Life and Health limit), which is a **workplace exposure limit**. Workplace limits are usually defined for healthy adult workers, and typically incorporate safety factors to ensure that workers won't be overexposed to hazardous chemicals in the workplace. IDLH is designed primarily for making decisions regarding respirator use. In the 1980s, before public exposure guidelines were available for most common chemicals, the IDLH limit was used in public exposure situations.

6. During morning rush hour, a freight train crash derails many railcars in a densely populated area on the outskirts of Baton Rouge. Among the derailed cars are tank cars carrying the following products:

chlorohexane	maleic anhydride
methyl ethyl ketone	methionine
aniline	polyethylene
butadiene	sulfuric acid

The cars are scattered in the ditch along the tracks. Conditions are: 50°F air temperature, 100% humidity, 5 mph wind speed, complete cloud cover.

What are the hazards?

Which is/are the worst hazards?

There's some water in the ditch, and it might rain. Are any of these chemicals water-reactive?

The officer in charge would like printouts of the data sheets and the reactivity chart. How can you provide them?

Chemical Response Tool Exercises

Chemical Response Tool: chemresponsetool.noaa.gov

Exercise 1: Navigation basics

1. In your browser, open **chemresponsetool.noaa.gov**. The Start Page is organized according to the three broad phases of a response to a hazardous chemical incident: (1) identifying the substance and getting information about it; (2) assessing its hazards; and (3) managing the response.
2. The lefthand Table of Contents includes links to individual topics, grouped into "books." Click any book to open it and see the pages it contains. Click the book again to close it.
3. Click the buttons just above the Table of Contents to view the index, search box, and glossary.
4. Click **Contents** to return to the Table of Contents.
5. Click **About this website**, then **Overview & contacts**. Review the page.
6. Click **Contacting your SSC**. Review the page.
7. Three books are resource collections designed for the three response phases:
 - **Identify chemicals & get reports**
 - **Assess a chemical's hazards**
 - **Manage the response**
8. Click the **CHEMICAL QUICK GUIDES** book, then click any chemical in the index for a quick-reference guide.
9. Five books are "field guides":
 - Field guide to placards and labels (**Field guide to placards** in Table of Contents)
 - Field guide to shipping papers and information sources (**Shipping papers & info sources**)
 - Field guide to containers and vehicles (**Containers & vehicles guide**)
 - Field guide to levels of concern (**Levels of concern guide**)
 - Field guide to WMD (**WMD guide**)

A Response Scenario

At U.S. Coast Guard Sector River City, you are the watchstander and you have just taken a call. A container vessel has collided with a towboat, and a USCG "white boat" has been ordered to the scene. You are in communication with the boat crew.

Exercise 2: Learning about a hazardous substance

As a response team begins to survey for damage on the container vessel, you monitor their findings. Near the impacted area on the deck of the container vessel, an intermodal tank labeled as ACRYLONITRILE is found to be damaged. The tank isn't yet leaking, but appears to be compromised. The team would like to know more about this substance and its hazards.

1. Click **CHEMICAL QUICK GUIDES**; find **Acrylonitrile** in the chemical index.
2. Review the NFPA ratings and special hazards.
3. Click **UN/NA number** (a glossary term)
4. Review the isolation and protective action distance estimates. An intermodal tank is within the volume range that the distance developers had in mind. For much larger quantities, releases into water, or catastrophic releases, contact your NOAA SSC!
5. Click **Specific Gravity** to see how to use this property in a response.
6. Click your browser's **Back** button to return to the Quick Guide.
7. Note (or click) the links at the bottom of the guide to the CAMEO Chemicals data sheet and NIOSH Pocket Guide entry for acrylonitrile.
8. Note (or click) the printer icon at the bottom of the guide. Only the Quick Guide information appears on the printout.

Exercise 3: Working with NFPA hazard codes

To understand the NFPA hazard codes for this chemical, you want to refresh your memory about how the NFPA hazard code system works.

1. At the top of Acrylonitrile's Quick Guide, note the NFPA ratings for this chemical.
2. Click **NFPA ratings** to review a guide to the NFPA diamond placard.
3. Click your browser's **Back** button to return to the Quick Guide.

You're asked to brief the boat crew on the isolation and protective action distances and on acrylonitrile's key hazards. What do you tell them?

Exercise 4: Working with the Placards Field Guide

A dented intermodal tank near the acrylonitrile tank is not marked by name or ID number, but it displays a DOT placard. The placard is red. At the top of the placard is a flame symbol, and at the bottom is the number 3 (as shown at right). What is the potential hazard of this substance?



1. Click **Field guide to placards**, then **DOT placards**.
2. Scroll down until you see a placard matching the one on the vessel.
3. Click the placard or the heading just above the placard.

What is the potential hazard of this material? What would be appropriate response measures for this substance?

Exercise 5: Working with a substance's intermodal panel

A nearby intermodal tank doesn't appear to be damaged. It displays an orange, rectangular intermodal panel with a hazard ID code 66, and UN/NA number 1649:



1. Click **Field Guide to Placards**, then **Intermodal panel**.
2. Look up the hazard ID code. The code indicates the substance's most significant hazard. There may be other hazards.
3. To learn more, scroll down, and click **Use the UN/NA number to search the Emergency Response Guidebook**. Find the Guide for UN/NA 1649.

4. Click **Use the UN/NA number to search CAMEO Chemicals**. Search for a chemical with UN/NA number **1649**. Four substances are found: anti-knock compounds as well as two components of anti-knock compounds.

You check the dangerous cargo manifest and find that the tank is listed as containing tetraethyl lead.

5. In the Search results in CAMEO Chemicals, click **View Data Sheet** under TETRAETHYL LEAD, LIQUID.
6. Check the Chemical Quick Guides for this substance.

What are the hazards of greatest concern? What should you be sure to tell the boat crew with regard to this tank?

Exercise 6: Identifying a chemical by matching physical clues to a cargo manifest

The survey party reports that in a damaged section close to the acrylonitrile tank, a pink liquid is slowly leaking onto the deck below a stack of shipping containers. It seems very likely that the leaking liquid is originating from one of those containers.

The cargo manifest indicates that four different hazardous materials are in the containers in this stack: sulfuric acid, sodium chlorate, phenol, and toluene. It's not known which one is leaking.

1. In the Chemical Response Tool, click **Identify chemicals & get reports**, then **Is hazmat present?**, then **Physical clues for detecting hazmat**.
2. Follow the method shown in **Example 2** to identify the pink liquid.

How might you further verify the substance's identity?

Exercise 7: Predicting potential reactivity

Since the phenol and acrylonitrile could mix if the acrylonitrile begins to leak, the officer in charge wants to know whether they could react together.

- Click **Manage the response**, then **Deal with hazmat on a vessel**, then **Check for incompatible chemicals in a container or adjacent containers**. Follow the instructions.

Would these two chemicals react?

The potential for the acrylonitrile tank to fail is a major concern in this response. The leaking product would pool on deck, and also could spill into the water. The officer in charge would like answers to the following questions about acrylonitrile's potential hazards

Before starting the following exercises, click **Assess a chemical's hazards**, then **Overview**.

Exercise 9

Q. If the acrylonitrile spills into the water, would it dissolve into the water?

Find the relevant question, review the page, then follow the directions to find the substance's water solubility in CAMEO Chemicals. Is acrylonitrile insoluble, slightly soluble, soluble, or miscible?

Exercise 8

Q. If the acrylonitrile spills into the water, would it float or sink?

You may already have answered this question in Exercise 2. If not, find the relevant question, review the page, then follow the directions to answer the officer's question. Would it float or sink?

Exercise 10

Q. Could the acrylonitrile react with the water? Would a dangerous reaction product be generated?

Find the relevant question, review the page, then follow the directions to use CAMEO Chemicals to answer the officer's question. Could it react? If it could, what would the reaction generate?

Exercise 11

Q. Would the acrylonitrile be hazardous to marine organisms? Where in the water column would organisms be at greatest risk?

Find the relevant question, review the page (notice the **two locations** link); also use your earlier findings about water solubility and density to answer the officer's question.

Exercise 12

Q. Could the evaporating pool of acrylonitrile create a hazardous vapor cloud?

Find the relevant question, then review the page. How toxic is acrylonitrile? How volatile is it, compared with common chemicals? Use your earlier findings about water solubility and density, along with your findings about acrylonitrile's toxicity and volatility, to answer the officer's question.

Exercise 13

Q. What is the reportable quantity (RQ)? Is it likely to be exceeded?

The officer asks for the reportable quantity (RQ) for acrylonitrile. She also would like to know whether acrylonitrile's RQ would be exceeded if the tank failed and released its full contents.

1. You first need to estimate the amount of acrylonitrile in the tank. Click **Containers & vehicles**, then **Intermodal tanks**.
2. The tank containing the acrylonitrile looks like the tank shown in the upper left. Click that picture. Review the text for tank capacity data.
3. Click **Manage the response**, then **Is the RQ exceeded?**
4. Click the link to open **RQ Calculator** in a new window.
5. Fill in information about the potential release of acrylonitrile. Assume that the tank is full, so that the amount of acrylonitrile it contains is equal to its capacity. Use a release duration that seems reasonable to you.

Exercise 14: Contacting your SSC

At this point, everyone recognizes that there are serious chemical hazards on the container vessel. The officer in charge decides that it's time to call the NOAA SSC.

- Click **Contacting your SSC**.

The Chemical Response Tool Quiz-o-Rama

1. A truck that may be carrying hazmat has slid off the road into a gully. How could you check whether there's hazmat on board?

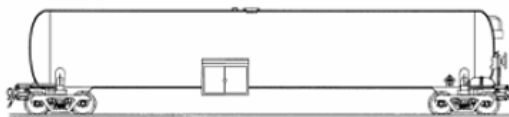
2. You get closer, and find that the truck is placarded with this placard:

What kind of product could it be carrying, and how far back should people stand?



3. Someone says that MSDSs often contain errors, and you want to learn more about that. What can you find out?

4. A train has derailed, and one of the derailed cars (shown at right) looks like it could be carrying hazmat. What sort of substances might it contain?



5. You get a tip that there could be a radiological agent on an incoming vessel. What technical experts could you contact for help?
6. What the heck is an LOC? What's an example of one, and how might you use it in a response?
7. You're at sea and you need to call CHEMTREC. What number do you dial?
8. You find a bug in the Chemical Response Tool. How can you let us know about it?