
Tri-National Hazardous Materials Table Top Exercise



SITUATION MANUAL

May 21, 2014

0800 – 1600

Yuma County Library District, Main Library

2951 S. 21st Drive | Yuma, Arizona

Name	
Organization	
Email	

THIS PAGE LEFT BLANK INTENTIONALLY

TABLE OF CONTENTS

TABLE OF CONTENTS.....	2
EXERCISE OVERVIEW.....	4
ACKNOWLEDGEMENTS.....	5
EXERCISE AGENDA.....	6
GOALS.....	7
OBJECTIVES.....	7
CAPABILITIES TO BE TESTED.....	7
EXERCISE PLAY.....	9
PARTICIPANTS.....	9
EXERCISE STRUCTURE.....	9
EXERCISE GUIDELINES.....	9
ASSUMPTIONS AND ARTIFICIALITIES.....	9
BACKGROUND INFORMATION.....	10
COMMODITY INFORMATION AND INVOLVED.....	11
Composition of crude oil:.....	15
INITIAL SCENARIO.....	18
SCENARIO MAPS.....	19
MODULE 1: INITIAL OPERATIONS –1 Hour After the Release.....	22
SCENARIO.....	22
QUESTIONS FOR DISCUSSION.....	22
MODULE 2: SUSTAINED OPERATIONS - 4 Hours After the Release.....	23
SCENARIO.....	23
QUESTIONS FOR DISCUSSION.....	23
MODULE 3: PLAN REVIEW AND COORDINATION - 12 Hours After Release.....	24
SCENARIO.....	24
QUESTIONS FOR DISCUSSION.....	24
IMAAC MODELING RESULTS.....	26
MATERIAL SAFETY DATA SHEETS.....	41
ATTACHMENT A LIST OF ACRONYMS.....	53
ATTACHMENT B Excerpt from LCRGRP Notifications Section.....	56

THIS PAGE LEFT BLANK INTENTIONALLY

EXERCISE OVERVIEW

Exercise Name: 2014 Tri-National Hazardous Materials Tabletop Exercise

Type of Exercise: Tabletop Exercise

Date: Wednesday, May 21, 2014

Duration: 0800 – 1600

Location: Yuma County Library District, Main Library
2951 S. 21st Drive
Yuma, Arizona 85364

Sponsors:

- Arizona Division of Emergency Management (AZDEM)
- Border 2020/Frontera 2010
- California Governor’s Office of Emergency Services (CalOES)
- Regional Response Team (RRT) 9
- Yuma County
- Union Pacific Railroad
- United States Environmental Protection Agency (US EPA)

Scenario Type: Train Derailment/Hazardous Materials Release (Styrene Monomer and Crude Oil)

Core Capabilities Tested:

1. **Common:** Planning, Operational Coordination
2. **Response:** Operational Communications, Situational Assessment
3. **Recovery:** Natural and Cultural Resources

ACKNOWLEDGEMENTS

Exercise Design Team:

- Jim Acosta, CalOES
- John Allen, ADEM
- Trevor Anderson, CalOES
- Tony Badilla, Yuma County EM
- John Dirickson, ADEM
- Mike Erfert, Yuma FD
- Nichole Fortson, ADEM
- Mark Howard, AZSERC
- Chuck Kmet, ADEM
- Jan Lindner, ADEM
- Mike Malone, ADEQ
- Kenneth Nelson, Union Pacific RR
- Steve Nunez, CALOES Southern
- Courtney Perrier-Bear, ADOT
- Lance Richman, EPA, RRT 9
- Billy Ross, ADEM
- Dan Shane, EPA
- Jeff Smith, USBR
- Lida Tan, EPA
- Dan Varner, ADEM
- Ken Waters, NWS

Exercise Venue provided by: Yuma County Library District

EXERCISE AGENDA

Wednesday, May 21, 2014		
08:00	Welcome, Introductions and Opening Remarks	Mark Howard, AZSERC
08:15	Lower Colorado River Geographic Response Plan Brief-Out	Dan Shane, EPA FOSC
09:05	Break	
09:25	1. Hazardous Material Brief Styrene Monomer & Crude oil 2. Operational Coordination, Operational Communications, Situational Assessment and Relationship to this exercise	Mark Howard
10:15	Break	
10:30	Situation and Module 1	Dan Varner
12:00	Lunch	
12:45	Module 2	Dan Varner
14:00	Break	
14:15	Module 3	Dan Varner
15:45	Hot Wash	Dan Varner
16:00	Adjourn	



Yuma County Library District – Main Library

GOALS, OBJECTIVES, AND CAPABILITIES TO BE TESTED

GOALS

The goals of this exercise are to improve hazardous materials emergency response to a train derailment and subsequent hazardous materials release through:

1. Planning
2. Operational Coordination
3. Operational Communications
4. Situational Assessment
5. Natural and Cultural Resources

OBJECTIVES

The following objectives were identified by the Exercise Design Team to test in the communications drill and tabletop exercise:

1. Identify who must be included in the "Whole Community" and Discuss integration of all involved in the formulation of Tri-National Hazmat Incident Response Plans.
2. Discuss communications systems available for entities participating in the response to a Tri-National Hazmat Incident to identify those systems which are currently interoperable and those systems not currently interoperable.
3. Discuss current barriers to establishing and maintaining a Unified and Coordinated operational structure integrating all critical stakeholders in responding to a Tri-National Hazmat Incident.
4. Identify and discuss barriers to establishing and maintaining a Common Operational Picture for all entities participating in response to a Tri-National Hazmat Incident.
5. Identify key stakeholders required to participate in Tri-National Hazmat incidents to ensure Natural and Cultural Resources are protected to the maximum extent possible and damage is mitigated for those resources affected.

CAPABILITIES TO BE TESTED

This exercise utilizes the Core Capabilities outlined in the National Preparedness Goal to serve as a basis for evaluating exercise play. The key Core Capabilities that will be tested are listed below. The Core Capabilities were designed to replace the Target Capabilities previously identified by the federal government. Recognizing that many organizations are transitioning use between these two concepts, the related Target Capabilities for each Core Capability are also included. A crosswalk of Target Capabilities to Core Capabilities can be found at <http://www.fema.gov/pdf/prepared/crosswalk.pdf>.

Common

- **Planning.** Conduct a systematic process engaging the whole response community as appropriate in the development of executable strategic, operational, and/or community-based approaches to meet defined objectives.
 - **Related Target Capabilities:** Planning

- **Operational Coordination.** Establish and maintain a unified and coordinated operational structure and process that appropriately integrates all critical stakeholders and supports the execution of core capabilities.
 - **Related Target Capabilities:** Emergency Operations Center (EOC) Management, On Site Incident Management

Response

- **Operational Communications.** Ensure the capacity for timely communications in support of security, situational awareness, and operations by any and all means available, among and between affected communities in the impact area and all response forces.
 - **Related Target Capabilities:** Communications
- **Situational Assessment.** Provide all decision makers with decision-relevant information regarding the nature and extent of the hazard, any cascading effects, and the status of the response.
 - **Related Target Capabilities:** None

Recovery

- **Natural and Cultural Resources:** Protect natural and cultural resources and historic properties through appropriate planning, mitigation, response, and recovery actions to preserve, conserve, rehabilitate, and restore them consistent with post-disaster community priorities and best practices and in compliance with appropriate environmental and historical preservation laws and executive orders.
 - **Related Target Capabilities:** None

EXERCISE PLAY

PARTICIPANTS

- **Players.** Players respond to the situation presented, based on expert knowledge of response procedures, current plans and procedures, and insights derived from training.
- **Observers.** Observers support the group in developing responses to the situation during the discussion; they are not participants in the moderated discussion period, however.
- **Facilitators.** Facilitators provide situation updates and moderate discussions. They also provide additional information or resolve questions as required. Key Exercise Planning Team members also may assist with facilitation as subject matter experts (SMEs) during the tabletop exercise.

EXERCISE STRUCTURE

This tabletop exercise will be a facilitated, group exercise. Players will participate in the following three modules:

- Module 1: Initial Operations - 1 Hour After the Release
- Module 2: Sustained Response - 4 Hours After the Release
- Module 3: Plan Review and Coordination – 12 Hours After the Release

Each module begins with a scenario update that summarizes key events occurring within that time period. After the updates, participants review the situation and engage in functional group discussions of appropriate response and coordination issues.

EXERCISE GUIDELINES

- This TTX will be held in an open, low-stress, no-fault environment. Varying viewpoints, even disagreements, are expected.
- Respond on the basis of your knowledge of current plans and capabilities (i.e., you may use only existing assets) and insights derived from your training.
- Decisions are not precedent setting and may not reflect your organization's final position on a given issue. This exercise is an opportunity to discuss and present multiple options and possible solutions.
- Issue identification is not as valuable as suggestions and recommended actions that could improve response and preparedness efforts. Problem-solving efforts should be the focus.

ASSUMPTIONS AND ARTIFICIALITIES

In any exercise, assumptions and artificialities may be necessary to complete play in the time allotted. During this exercise, the following apply:

- The scenario is plausible, and events occur as they are presented.
- There is no hidden agenda, and there are no trick questions.
- All players receive information at the same time.

BACKGROUND INFORMATION

The Union Pacific Railroad Bridge is immediately to the east of the Ocean to Ocean Bridge that crosses the Colorado River on the north side of Yuma, Arizona. The Union Pacific (UP) Railroad Company owns the approximately 400 foot structure, which provides a river crossing for freight and passenger carrying trains. The bridge sets in a north and south aspect, and is adjacent to Quechan Road from the south.

Immediately to the southeast of the bridge is an Arizona State Park that consists of the Yuma Territorial Prison. The prison incarcerated inmates from July 1, 1876 to September 15, 1909, and is considered an historical building.

To the north of the bridge, and across the river, is the Fort Yuma Indian Reservations. The descendants of the Quechan Tribe of the Fort Yuma Indian Reservation date back to 1540 in this location. Fort Yuma is located directly north of the bridge, and are also considered historical buildings. This compound of buildings dates to 1858. Fort Yuma is located in Imperial County and the State of California.

Immediately to the west of the railroad bridge; the Ocean to Ocean Bridge is a narrow automobile bridge that consists of a single traffic lane. This bridge allows a single line of vehicles to cross, and is controlled by traffic lights on each end of the bridge. The bridge's roadway surface is higher than the tracks of the UP railroad bridge.

The 336 foot, Ocean to Ocean Bridge was a critical link in joining the Atlantic to Pacific Oceans with a highway. The bridge was built across the Colorado River between Yuma, Arizona and Fort Yuma, California in 1914 for \$76,000 and dedicated during a citywide celebration May 23, 1915. At the time of its opening, the bridge provided the first safe, economical crossing of the river at Yuma and it was the only vehicle bridge across the Colorado River for 1,200 miles. The bridge is also sometimes known as Colorado River Bridge; Yuma Bridge; Penitentiary Avenue Bridge. The bridge was added to the National Register of Historic Places in 1979

The Interstate 8 Bridge is approximately .1 miles to the west of the Ocean to Ocean Bridge. This bridge was built in 1978 and was constructed of formed concrete surrounding a stressed cable system to form a suspension of the platform. It consists of two traffic lanes in each direction, and is orientated in a southeast to northwest arc configuration.

To the southwest of these bridges is the Yuma Quartermaster Depot State Historical Park, also known as Yuma Crossing. The Arizona State Park consists of several historical building that date back to the 1870s.

Directly below the bridge is the Colorado River. The waterway is the border between the states of Arizona and California. The river flows in a southern direction, and carries water to the states of Sonora and Baja California in Mexico. A Salinity Canal parallels the river and provides desalted water to Mexico. The Colorado continues into Mexico and ends as a delta at the north end of the Gulf of California.

Downstream from the Ocean to Ocean Bridge is an inlet for the Main Canal. This canal provides water to several agricultural facilities in the Yuma Valley.

COMMODITY INFORMATION AND INVOLVED

Proper Shipping Name: **Styrene Monomer**, inhibited (RQ 1000 lbs/454Kg)

Hazard Class: Flammable Liquid, 3

Identification Number: UN2055

Packing Group: III

Total Quantity: 16,000 Gallons

CAS#: 100-42-5

Formula: C₈H₈

Chemical Name: Ethenylbenzene

Chemical Family: Aromatic Hydrocarbon

Common Name: Styrene Monomer

Physical State: Liquid

Color: Clear

Boiling Point: 293.4° F (145.2° C)

Molecular Weight: 104.152

Flash Point (TCC): 90° F (31.9° C)

Auto Ignition: 914° F (490° C)

Upper Explosive Limit: 6.1 vol%

Lower Explosive Limit: 1.1 vol%

Solubility @20°C: Water: 0.032 wt%

Alcohol: ∞

Ether: ∞

TLV: 20 ppm as an 8- hour Time Weighted Average (TWA8)

STEL: 40 ppm as a 15 minute Short term Exposure Limit

IDLH: 700 ppm

Specific Gravity: 0.91

Vapor Pressure: 5 mmHg

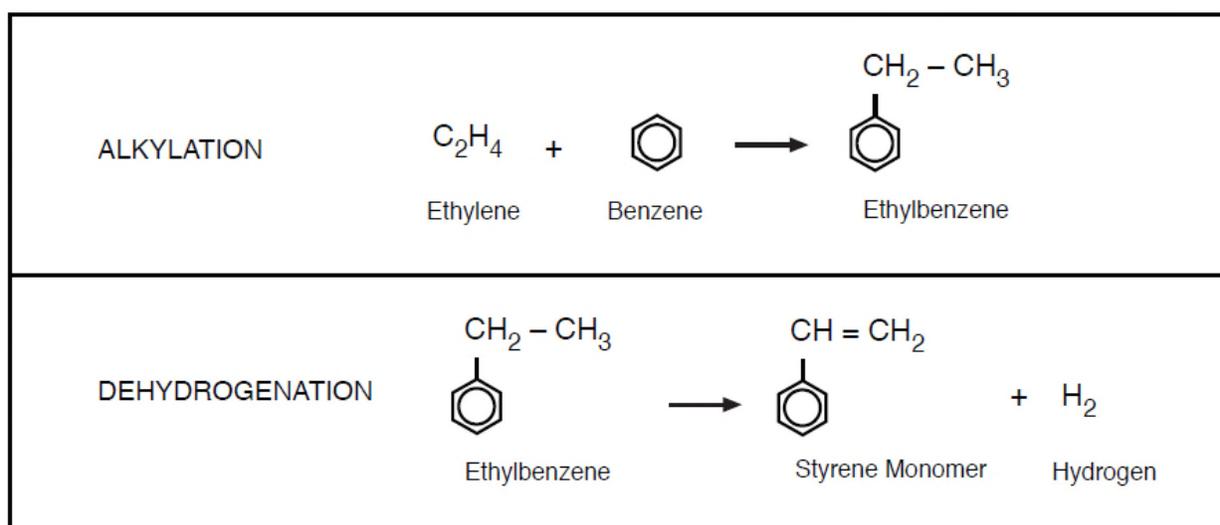
Odor Threshold: 0.14 ppm

4-tert-Butylcatechol (TBC) is added to styrene monomer, and acts as an inhibitor to prevent polymer formation. The standard addition rate is 10-15 ppm. If TBC levels fall below 10 ppm, inhibitor should be added to bring the level up to 10-15 ppm. The 4-tert-Butylcatechol concentrations should never fall

below 4 ppm. Depending on tank conditions, incipient polymerization may occur at this level. This is evidenced by a slight increase in styrene monomer viscosity and/or temperature. Polymer formation is shown by diluting one part of styrene monomer with 10 parts methanol and observing a cloudy solution. The exact polymer levels can be determined using ASTM Method D-2121, Method A.

The conventional method of producing styrene monomer involves the alkylation of benzene with ethylene to produce ethylbenzene, which is followed by dehydrogenation to produce styrene monomer. This process accounts for over 80 percent (CMAI, 2004) of the world's total styrene monomer production (see Figure 1.1).

Figure 1.1 Conventional Technologies



Styrene monomer is a basic building block of the plastic industry. It is used to make a host of downstream derivative products that go into millions of consumer goods. Primary derivatives of styrene monomer, in order of demand, include: polystyrene, expandable polystyrene (EPS) and acrylonitrile butadiene-styrene (ABS)/styrene-acrylonitrile (SAN) resins, styrene butadiene (SB) latex, SB Rubber (SBR), unsaturated polyester resins (UPR), specialty polymers, co-polymers and styrene thermoplastic elastomers (TPE) (see Figures 1.3 and 1.4).

Figure 1.3 Major Uses of Styrene Monomer

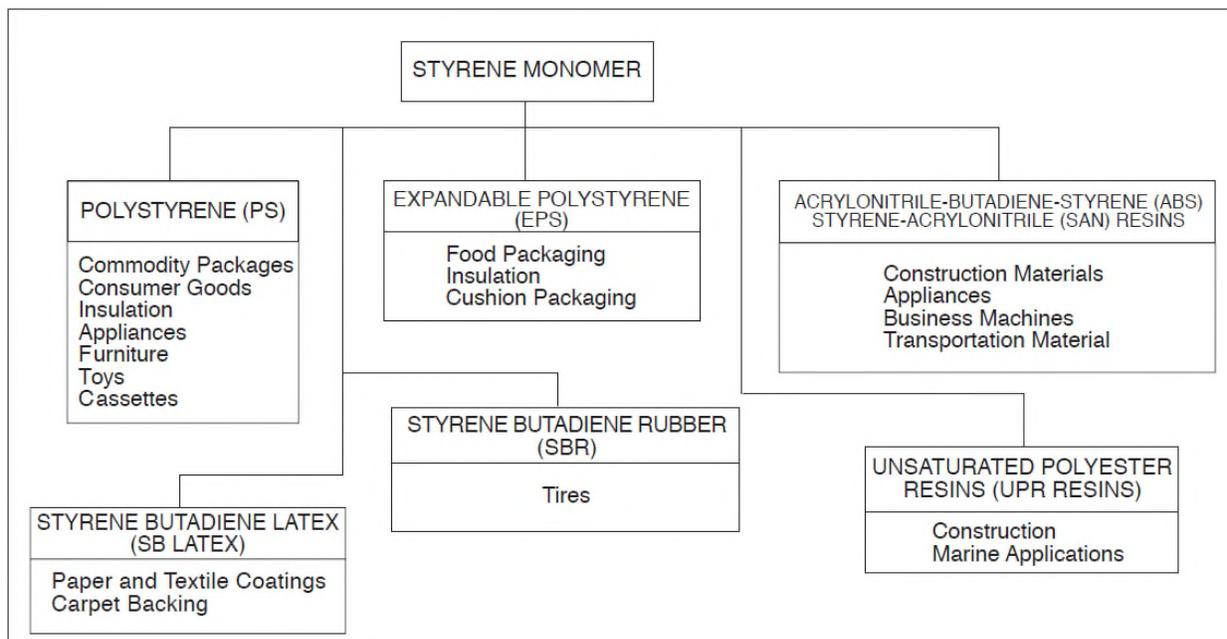
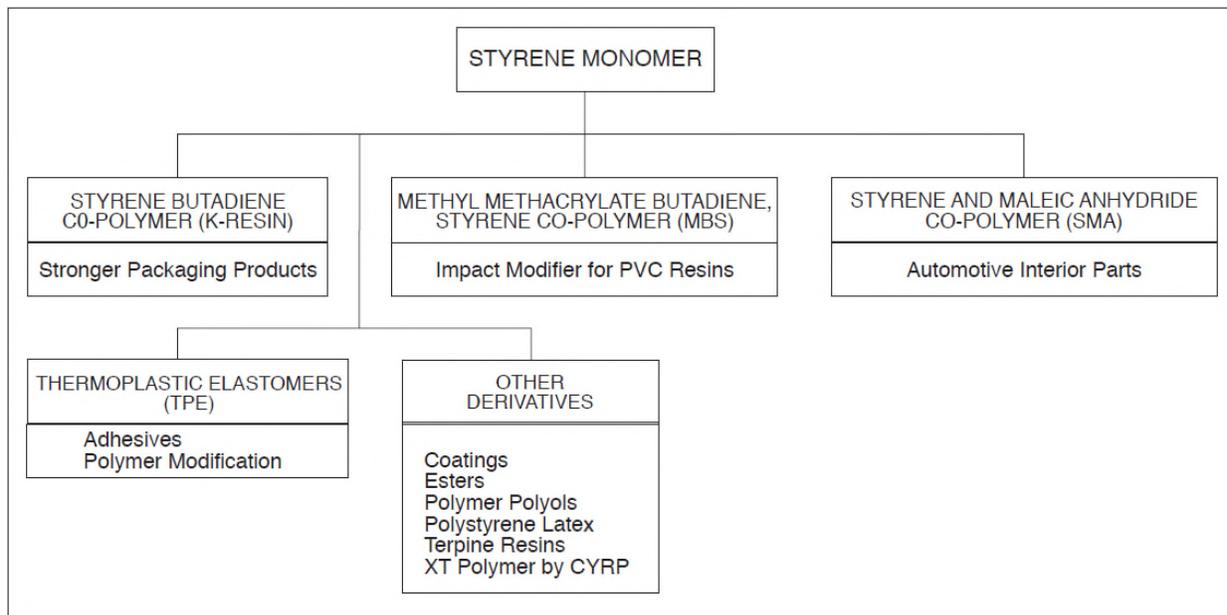


Figure 1.4 Additional Styrene Monomer Derivatives



Proper Shipping Name: **Petroleum Crude Oil**

Hazard Class: Flammable Liquid 3

Identification Number: UN 1267

Packing Group: II

Total Quantity: 30,000 Gallons

CAS#: Crude Oil 100%- 8009-05-9

Benzene 0.1%- 71-43-2

Formula: This material is a C1 to C50 hydrocarbon liquid which contains approximately 0.9 to 2.8 wt% sulfur compounds.

Chemical Name:

Chemical Family: Complex mixture of aliphatic and aromatic hydrocarbons

Common Name: Crude Oil Light, Sweet

Trade Name: West Texas Intermediate- Cushing

Physical State: Liquid

Color: Brown/black/green/yellow

Boiling Point: 38-570° C

Flash Point: (TCC) 140° F (60° C)

Auto Ignition Temp: > 260° C

Upper Explosive Limit: 8 vol%

Lower Explosive Limit: 0.8 vol%

Solubility in Water: Negligible

TLV: *Benzene- 0.5 ppm*

Specific Gravity: 0.7-0.95

Vapor Density: 2.5-5.0

Odor: Petroleum Hydrocarbon odor

Petroleum crude oil, or simply **crude oil**, is a naturally occurring, flammable and usually dark brown or greenish colored liquid found primarily in underground geological formations. Crude oil consists of a complex mixture of [hydrocarbons](#) of various [molecular](#) weights plus other chemical compounds.

Crude oil has been formed from compression and/or heating of ancient [biomass](#), derived from naturally decaying biota; this process typically occurs at considerable subsurface depth beneath layers of sedimentary soils deposited over geologic time.

As of 2011, the top three crude oil producers are Saudi Arabia, Russia and the USA, each of which contributes roughly 13 percent of the world total production. Uses of crude oil include production of most of the fuels that humans use, but also feed stocks for manufacture of a vast array of pharmaceuticals, plastics and other synthetic products.

Composition of crude oil:

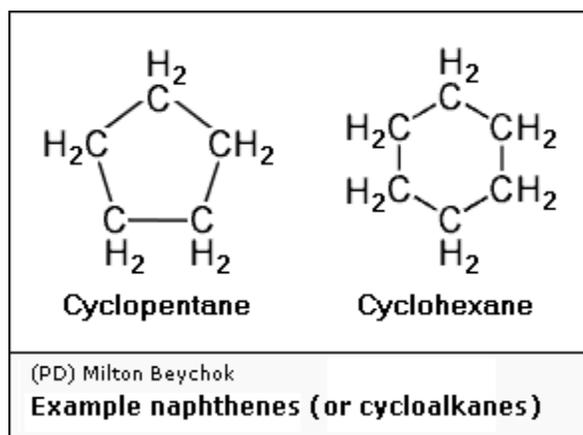
Element	Weight %	Hydrocarbon	Weight %
Carbon	83-87	Paraffins	30
Hydrogen	10-14	Naphthenes	49
Nitrogen	0.1-2	Aromatics	15
Oxygen	0.1-1.5	Asphaltics	6
Sulfur	0.5-6		
Metals	< 0.1		

The hydrocarbon weight % values are averages.

Both crude oil and [natural gas](#) are predominantly mixtures of hydrocarbons. At typical ambient conditions of pressure and temperature, the lower molecular weight hydrocarbons [methane](#), ethane, propane and butane occur as gases, while the higher [molecular](#) weight hydrocarbons (pentane and higher) are in the form of liquids or solids. However, in the underground oil reservoirs, the proportion which is gas or liquid varies depending on the subsurface pressure and temperature conditions and on the phase diagram of the petroleum mixture.

Crude oil consists mostly of hydrocarbons with small amounts of other chemical compounds that may contain [nitrogen](#), [oxygen](#) or [sulfur](#). It may also contain trace amounts of [heavy metals](#) such as [iron](#), [nickel](#), [copper](#) and [vanadium](#). The average elemental composition of petroleum crude oil and the average distribution of the different hydrocarbons in the various crude oils are shown in the adjacent tables. The exact elemental composition varies widely from formation to formation but the proportion of chemical elements varies over fairly narrow limits. The distribution of the different types of hydrocarbons in petroleum also varies considerably from one crude oil reservoir to another which means that the properties of the various crude oils are quite different.

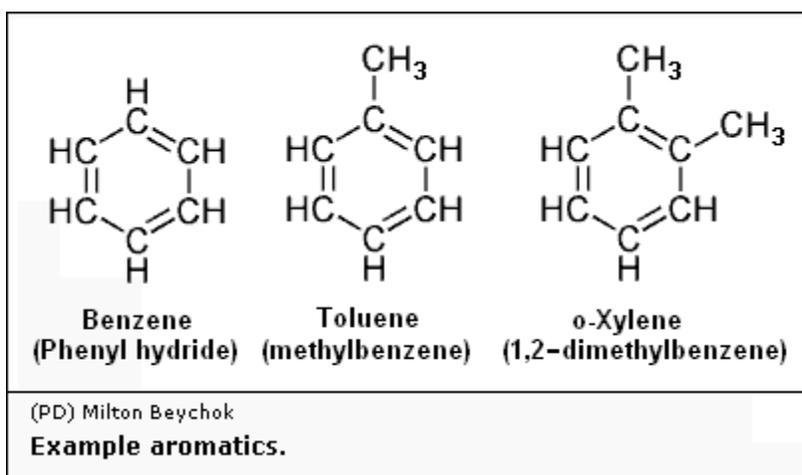
Hydrocarbons in crude oil:



Petroleum is a mixture of a very large number of different hydrocarbons. The most common hydrocarbons found in petroleum crude oil are linear or branched alkanes (also called *paraffins*), cycloalkanes (also called *naphthenes* or *cyclic paraffins*), or much more complicated chemicals like *asphaltics* which may have a molecular weight of 800 to 2500.

The alkanes present in crude oil are saturated hydrocarbons, with linear or branched chains, which contain only carbon and hydrogen atoms and have the general formula of C_nH_{2n+2} . They generally have from four to 40 carbon atoms per molecule, although some molecules may be present that have less than five or more than 40 carbon atoms.

The naphthenes (cycloalkanes) are also saturated hydrocarbons, but they have one or more rings of carbon atoms to which hydrogen atoms are attached. The general formula for naphthenes having a single ring of carbon atoms (with no side chains) is C_nH_{2n} . Naphthenes have similar properties to alkanes but have higher boiling points. The upper adjacent diagram depicts the chemical structure of cyclopentane and cyclohexane as some examples of naphthenes (cycloalkanes) having a single ring.

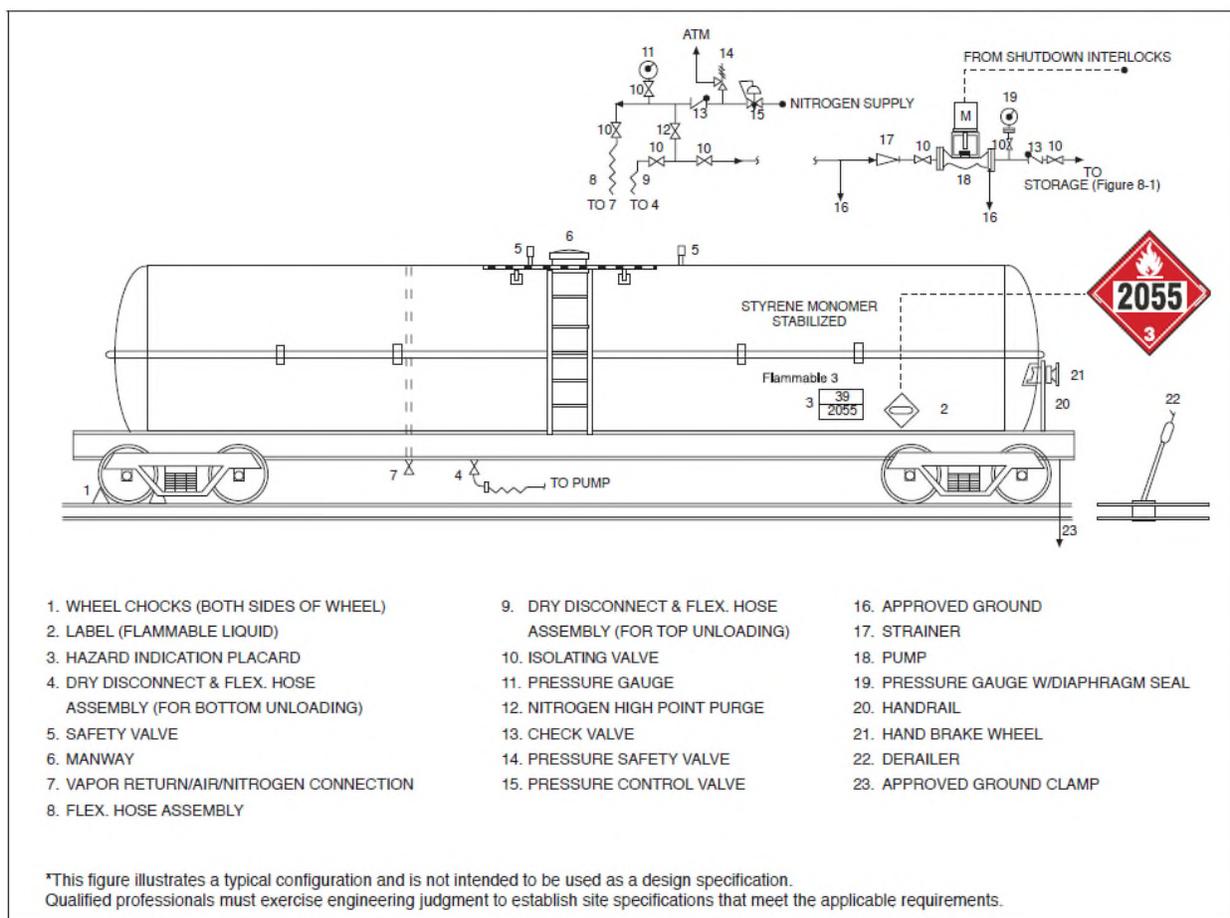


The aromatic hydrocarbons have one or more rings of six carbons, called *benzene rings*, to which hydrogen atoms are attached. The general formula of the aromatic hydrocarbons having a single ring (and having no side chains) is C_nH_n . The lower adjacent diagram depicts the chemical structures of benzene as an example of an aromatic hydrocarbon having a single ring with no side chains, as well as the structures of toluene and o-xylene as examples of aromatic hydrocarbons having a single benzene ring with one and with two side chains.

PACKAGING:

Styrene Monomer and Petroleum Crude Oil are authorized to be package in a DOT 111A tank car per 49 CFR 173.242. For the table top exercise, this tank configuration will be used;

The U.S. DOT-111A tank car is a type of non-pressure tank car in common use in North America. Tanks built to this specification must be circular in cross section, with elliptical, formed heads set convex outward. They have a minimum plate thickness of $\frac{7}{16}$ inch (11.1 mm), and a maximum capacity of 34,500 US gallons. Tanks may be constructed from carbon steel, aluminum alloy, high alloy steel or nickel plate steel by fusion welding.



INITIAL SCENARIO

On May 21, 2014 at approximately 0800 hours, a Union Pacific Rail Road, west-bound freight train, derailed on the railroad bridge, east of the Ocean to Ocean Bridge, located at 100 N Quechan Road in Yuma, Arizona. The slow speed (15mph) derailment was caused by a hot box (seized wheel bearing), on the forward truck of a DOT 111A 100W1 tank car, bearing TILX 260259, and transporting Styrene Monomer. There are additional DOT 111A tank cars in front of the subject car, transporting the same commodity. Directly behind TILX 260259 are several tank cars containing Petroleum Crude Oil, being shipped from Cushing, Oklahoma.

As the wheel on the forward truck malfunctioned, the wheels of the truck derailed, and the truck dislodged for the car. As the tank car continued forward, the truck cut into the bottom of the tank, causing a 4 inch by .75 inch tear. The 4 inch bottom outlet valve is immediately aft of the tear.

The breach of the tank is allowing Styrene Monomer to release into the Colorado River, and the beach area immediately below the bridge.

The first tank car directly behind the Styrene Monomer car is a DOT 111A 100W1 tank car, bearing GATX 205560, and a red placard with the ID Number 1267. During the incident, this tank car also sustained damage to the under carriage and is leaking product from a cracked weld, near the barrel and the head of the tank. The crack is approximately 12 inches in length, and allowing crude oil to leak from the tank.

The entire train measures approximately 6,000 feet, and weighs approximately 9,000 tons. At the time of the incident, the locomotives were in the state of California.

WEATHER CONDITIONS

The weather forecast for Yuma, Arizona on May 21, 2014.

Temperature: High: 100° F

Low: 79° F

Humidity: 5%

Wind Direction: West, 270 °

Wind Speed: 10 miles per hour

Diminished winds later this evening

Barometric Pressure: 28.89in. Steady

Visibility: 10 miles

Colorado River Temperature: 86° F

SCENARIO MAPS



Location: Outside Yuma, AZ

Latitude: 32° 43' 43" N

Longitude: 114° 36' 55" W

Time: 1500Z (0800 local)

Date: 21MAY2014

Hazard/Release:

16,000 gal (121,162 lbs) Styrene

30,000 gal of Crude Oil

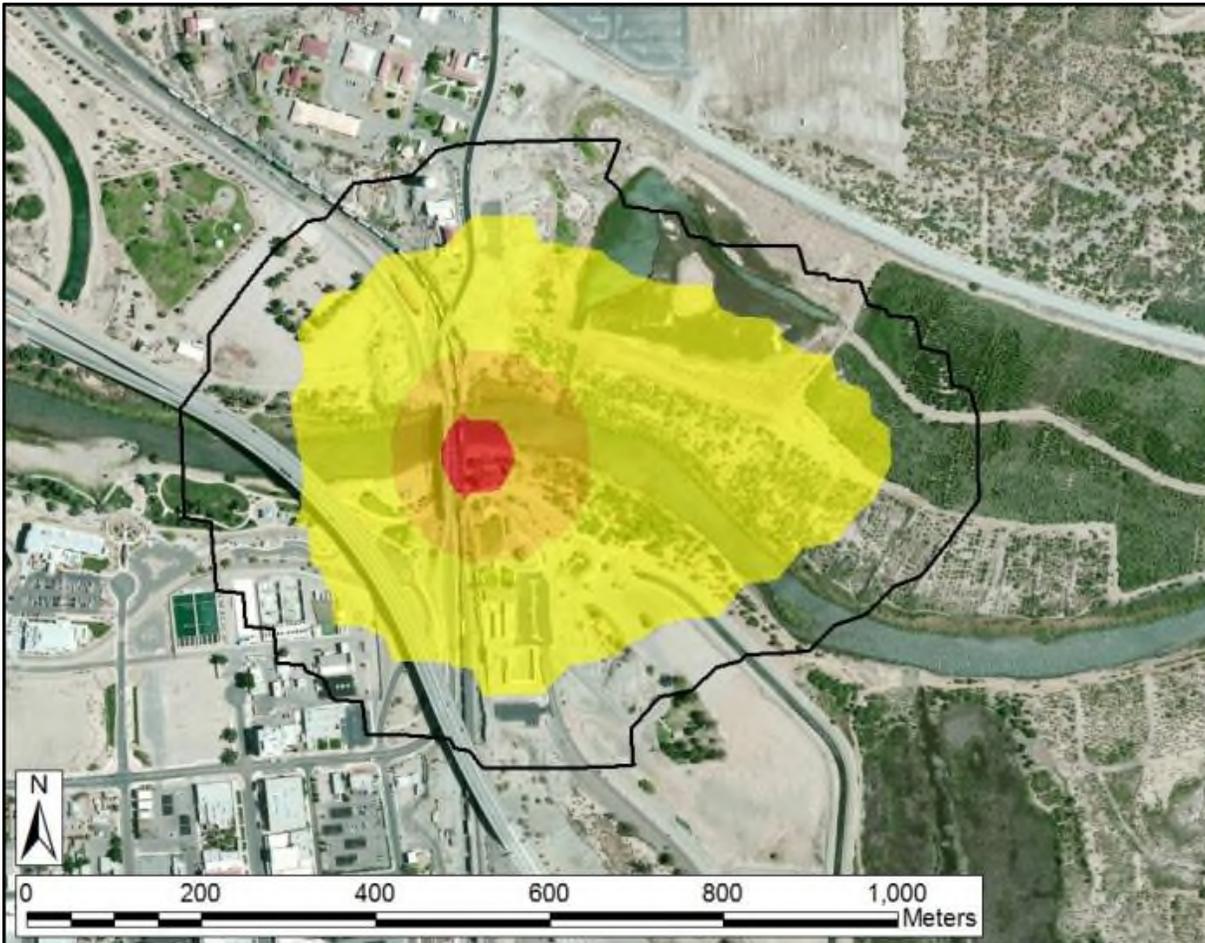
Weather: Varies throughout the course of the exercise:

Wind Direction: From 270°

Wind Speed: 5-10 mph

Temperature: 79-100° F

Humidity: 5-10%



AEGL Duration Table
 Styrene(Percent of Population)
 21-May-14 23:00:00Z (8.000 hr)

	Best Estimate		
	AEGL-1	AEGL-2	AEGL-3
< 10 min	68.75	0.00	0.00
10 min - 30 min	25.00	0.00	0.00
30 min - 1 hr	6.25	0.00	0.00
1 hr - 4 hr	0.00	0.00	0.00
4 hr - 8 hr	0.00	0.00	0.00
> 8 hr	0.00	0.00	0.00

Extended Styrene : Acute Exposure Guideline Levels (INTERIM)
 21-May-14 23:00:00Z (8.000 hr)

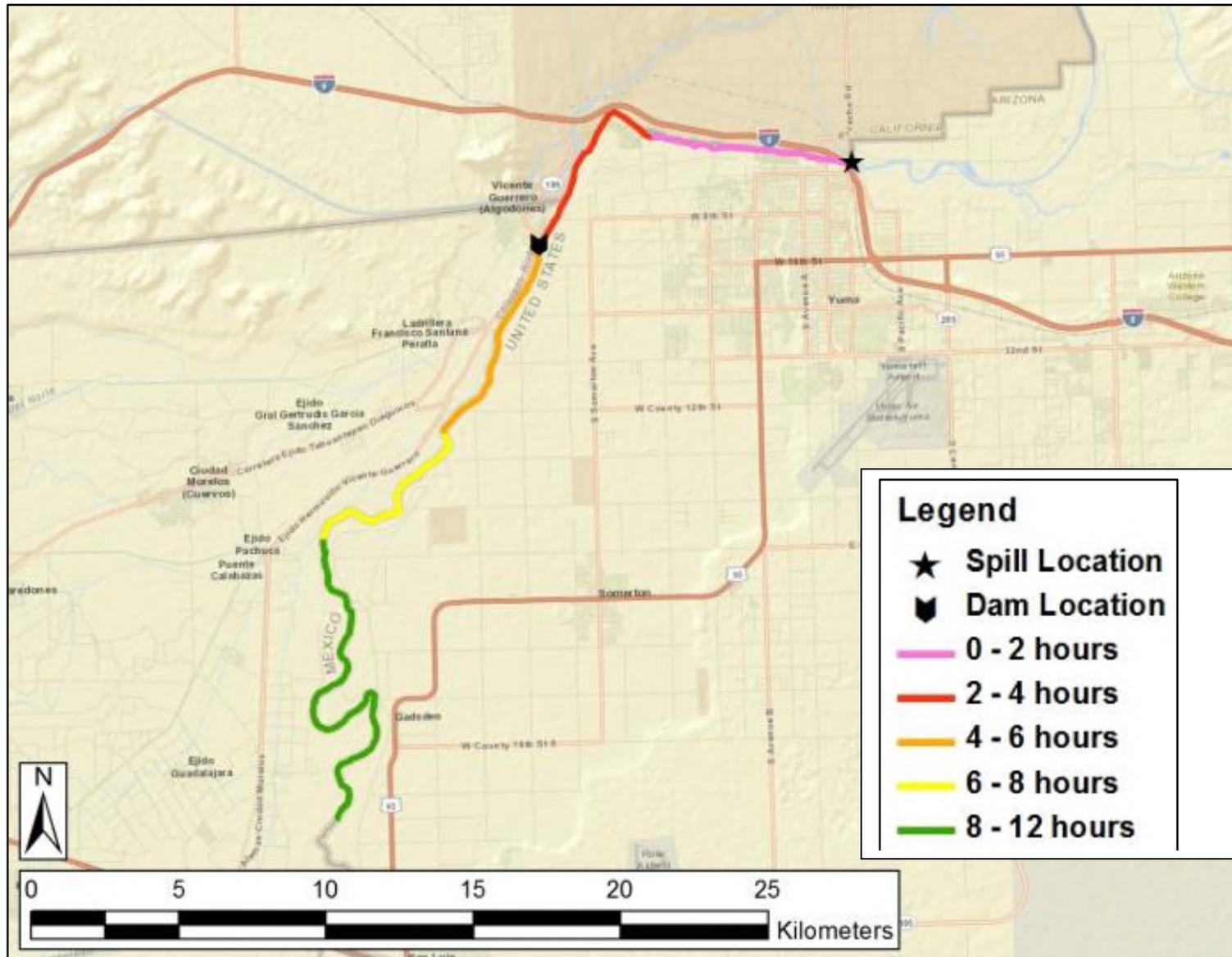
Mean Area		
	Value	In contour population
AEGL-3 Death Possible	3.0	0
AEGL-2 Injury Possible	2.0	1
AEGL-1 Threshold	1.0	12

Area of Concern		
	Value	In contour population
AEGL-1 Threshold	1.0	32

Death Possible (AEGL-3): The concentration in air of a substance at or above which it is predicted that the general population could experience life-threatening health effects or death.

Injury Possible (AEGL-2): The concentration in air of a substance at or above which it is predicted that the general population could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

Threshold (AEGL-1): The concentration in air of a substance at or above which it is predicted that the general population could experience notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are reversible upon cessation of exposure.



MODULE 1: INITIAL OPERATIONS –1 Hour After the Release

SCENARIO

Immediately after the incident, UP would make the initial notifications to the NRC and their dispatch. During the first hour after the train derailment:

1. The initial command structure is being set up. Who is the IC?

QUESTIONS FOR DISCUSSION

- Upon notification of the incident, what initial notifications will dispatch make?
- What actions will the initial responders conduct at the incident?
- Once initial response is underway, what subsequent notifications may need to be made?
- Who should be on-scene to support on-scene response activities?
- What resources do local responders have available to support this type of incident?
- **Who must be included in the “Whole Community” and discussion of the Tri-National Incident Response Plans?**
- What response plans exist for this type of incident?
- When were the plans updated last?
- **Who will be involved in the discussion of the communications systems available for entities participating in the response to a Tri-National Hazmat Incident and can identify those systems which are currently interoperable and those systems not currently interoperable?**
- What kind of command will be set up? (Unified, Incident, a series of incidents based on location(s)?)
- **Who should be involved in discussing current barriers to establishing and maintaining a Unified and/or a coordinated operational structure integrating all critical stakeholders in responding to a Tri-National Hazmat Incident?**
- Will an EOC be set up and if so where?
- How and who will establish the response priorities and objectives?
- **Who would be responsible for identifying and discussing barriers to establishing and maintaining a Common Operational Picture for all entities participating in response to a Tri-National Hazmat Incident?**
- What additional resources might be needed?
- Where are the additional resources and how long will it take them to get there?
- **Who are the stakeholders?**
- How will the public be notified and by whom?
- What critical infrastructure is at risk?
- Who owns the bridge?
- What are your natural and cultural resource concerns?
- Who is responsible for managing the natural and cultural resource concerns?
- How will the Railroad communicate with the response agencies?

MODULE 2: SUSTAINED OPERATIONS - 4 Hours After the Release

SCENARIO

It is now four hours since responders arrived on scene. Initial containment operations are underway in the immediate vicinity of the release. Air monitoring has been established by the local responders (?). Downstream receptors are preparing to be impacted.

QUESTIONS FOR DISCUSSION

- **Review the Notifications Section of the LCRGRP. Are these accurate? Were all the contacts listed notified? Are there contacts that should have been notified who are not on this notification list?**
- How will command and communications be established?
- What agencies are beginning to arrive and what resources do they bring to the response?
- What would trigger the need to establish a Unified Command or other coordinated command structure?
- Who may need to be included in a Unified Command structure, if established?
- How would technical support from the Regional Response Team (RRT 9) be requested and what is the expected response time?
- What would be the expected actions of the Tribes, Mexico, local, state and federal agencies responsible for the following functions?
 - Emergency Management
 - Fire Services
 - Law Enforcement
 - Environmental Protection
 - Natural Resources
 - Other Stakeholders
- What other stakeholders should be engaged in the response?
- **How will operations be coordinated with the State of California, the State of Arizona and other jurisdictions in the Yuma area?**
- What actions have been taken to limit the spread of the contamination?
- What actions can be taken to limit the spread of the contamination?
- Where is the release? How fast is it moving?
- Are there sensitive or protected species at risk?
- Where are these sensitive areas and what actions can be performed to protect these species?
- How much farther will the contamination spread?
- How are alerts (and updated alerts) being sent to Mexico?

MODULE 3: PLAN REVIEW AND COORDINATION - 12 Hours After Release

SCENARIO

Twelve hours after the initial release local clean-up is well underway and notifications for downstream have been made utilizing information described in the LCRGRP. Locally Key stakeholders have gathered for an after action review of the response with a focus on what went well and what could be improved upon. The response continues downstream as the material reaches the Mexican border.

QUESTIONS FOR DISCUSSION

- Are players familiar with local, state, and federal response plans and what are they?
- Do plans adequately and accurately reflect how response agencies conducted response operations?
- Do plans identify how local, state, and federal agencies would coordinate?
- What elements of plans need to be updated?
- What elements of plans need to be coordinated?
- What stakeholders, if any, need to be included in the process who are not involved in this exercise?

THIS PAGE LEFT BLANK INTENTIONALLY

Unclassified//For Official Use Only
EXERCISE EXERCISE EXERCISE



IMAAC

**Interagency Modeling and
Atmospheric Assessment Center**

Tri-National Hazardous Materials TTX Styrene Release from a Train Derailment outside Yuma, AZ

17APR2014 0200Z

RFI – 14 – 0173U

17APR2014

Requestor: Daniel Shane

Distribution authorized to U.S. Government agencies and their contractors for administrative/operational use.

Date: 04/17/2014

Other requests for this document shall be referred to:

Defense Threat Reduction Agency
8725 John J. Kingman Rd, MS 6201
Fort Belvoir, VA 22060-6201

**EXERCISE EXERCISE EXERCISE
Unclassified//For Official Use Only**



Request Summary

- **(FOUO) Request data**
 - Requestor: Daniel Shane, EPA (Region 9)
 - Contact: 415-972-3037, shane.dan@epa.gov
 - Request: Hypothetical exercise scenario for the Area Contingency Plan involving a train derailment and subsequent styrene and crude oil releases.
- **(FOUO) Solution**
 - Summary: AEGL plots are provided along with an estimate of water flow velocity.
 - Employment: Tri-National Hazardous Materials TTX
 - Reachback: J. Zielonka, B. Zinn

Location: Outside Yuma, AZ Latitude: 32° 43' 43" N Longitude: 114° 36' 55" W
Time: 1500Z (0800 local) Date: 21MAY2014
Hazard: 16,000 gal (121,162 lbs) Styrene
Weather: Varies throughout the course of the exercise: Wind Direction: From 270° Wind Speed: 5-10 mph Temperature: 79-100° F Humidity: 5-10%
Comments:



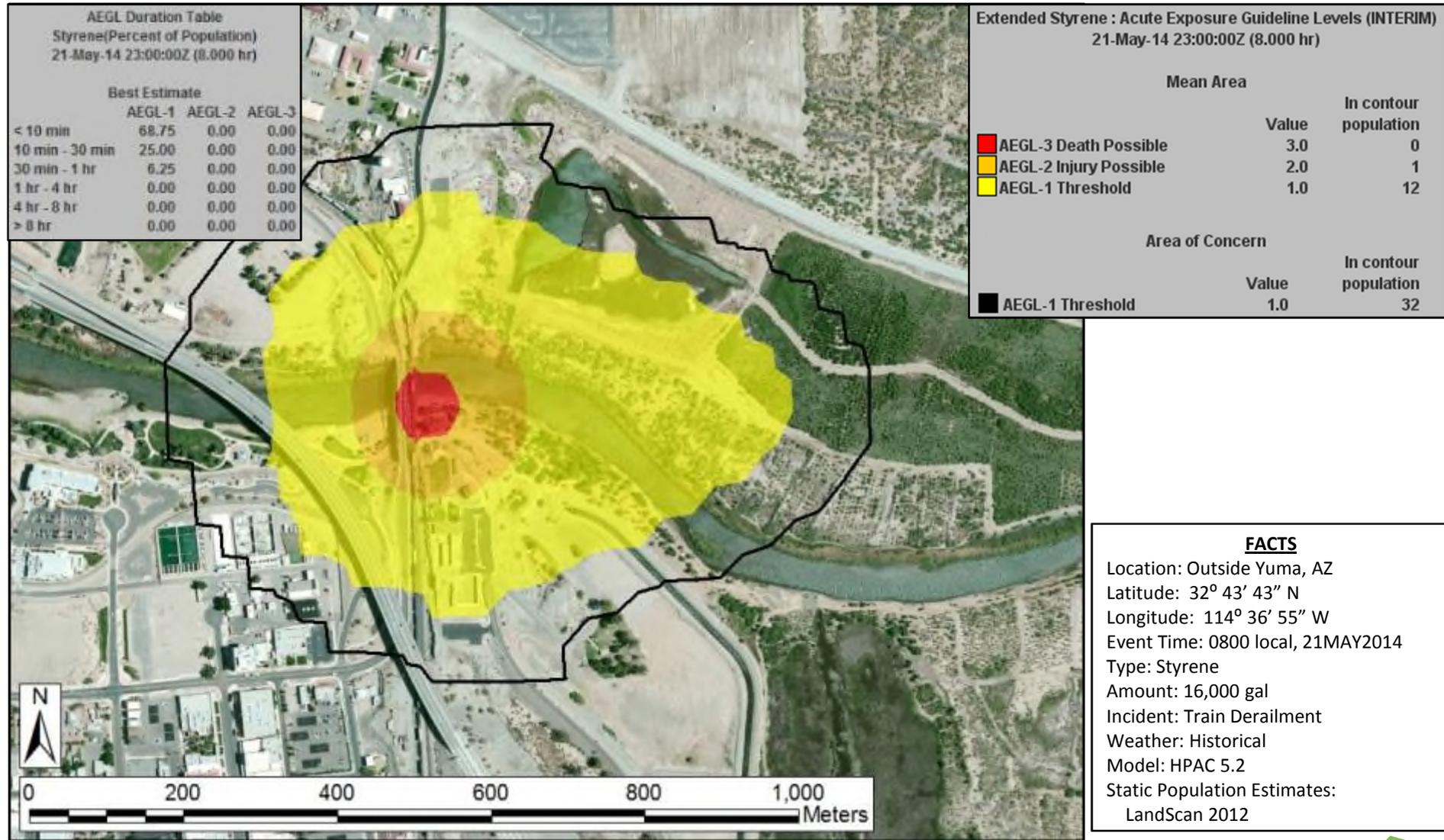
Airborne Hazard

- **(FOUO) Styrene Vapors**

- Styrene will evaporate and create potentially toxic fumes. In this scenario, styrene is spilling onto both water and ground. Styrene will have different evaporative characteristics from the two surfaces.
- Unfortunately, we are unable to model evaporation from both surfaces simultaneously. This model was run under the assumption that the surface was land only.
- The crude oil should not be a major airborne hazard except directly around the spill site unless a fire occurs.
- Population numbers are based on Landscan 2012 database, and should be taken as approximate only.
- AEGL duration table (next page) suggests that the vast majority of exposed individuals received only AEGL-1 levels of effects. These effects are generally minor but are included for consistency with the with exercise document. The majority of AEGL exposures occurred over an hour or less.
- A separate set of comments regarding the water transport follows the plume plot.



Styrene





Extended Acute Exposure Guideline Levels (AEGLs) – INTERIM

Death Possible (AEGL-3): The concentration in air of a substance at or above which it is predicted that the general population could experience life-threatening health effects or death.

Injury Possible (AEGL-2): The concentration in air of a substance at or above which it is predicted that the general population could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.

Threshold (AEGL-1): The concentration in air of a substance at or above which it is predicted that the general population could experience notable discomfort, irritation, or certain asymptomatic non-sensory effects. However, the effects are not disabling and are reversible upon cessation of exposure.

Extended Material Name : Acute Exposure Guideline Levels (INTERIM)		
Mean Area		
	Value	In contour population
■ AEGL-3 Death Possible	3.0	Values Vary
■ AEGL-2 Injury Possible	2.0	
■ AEGL-1 Threshold	1.0	
Area of Concern		
	Value	In contour population
■ AEGL-1 Threshold	1.0	Values Vary

90% confidence level that an AEGL-1 outcome is possible, based on atmospheric effects and weather uncertainty.

EPA: "Acute* Exposure Guideline Levels (AEGLs), are intended to describe the risk to humans resulting from once-in-a-lifetime, or rare, exposure to airborne chemicals. The National Advisory Committee for AEGLs is developing these guidelines to help both national and local authorities, as well as private companies, deal with emergencies involving spills, or other catastrophic exposures. *Definition: Acute exposures are single, non-repetitive exposures for not more than 8 hrs"

INTERIM AEGL Values: The interim AEGL status represents the best efforts of the NAC/AEGL Committee to establish exposure limits and the values are available for use as deemed appropriate on an interim basis by federal and state regulatory agencies and the private sector.

Notes: In accordance with EPA guidelines, the published AEGL times are at 10 min, 30 min, 1 hr, 4 hr and 8 hr only. Using these published guidelines from the EPA, DTRA developed HPAC 5.0 to plot human effects in a time weighted manner that better estimates the AEGL effects. For exposure times below 10 min AEGL values are extrapolated based on existing data fit. For most releases very short times tend to dominate AEGL exposure and therefore extrapolated data are dominant. Numerical figures are based upon a population database (LandScan). LandScan is based on the 2010 census for the U.S. (other nations vary), overhead imagery, geo-economic, and other observable data and was updated in 2012. Population is assumed static for calculations. The population numbers next to associated hazard levels are the people contained within the entire contour based **upon average day and night** time LandScan 2012 data. **Also available are the average day or night** time LandScan 2012 data. For planning purposes, estimates are assumed to be accurate within +10/-5%. Validation testing indicates agreement within 20% for select examined areas. The population data will not predict major shifts in personnel such as relocations (i.e.: religious pilgrimages, refuges, evacuations), events (i.e.: inaugurations, Olympics), or other population shifts. In such cases the population database needs to be updated to reflect actual conditions.



Acute Exposure Guideline Limits – Durations

The percentages displayed indicate what percentage of the total population affected at any AEGL level is affected by the AEGL level and time duration interval specified.

Acute Exposure Guideline Limits (AEGL) are defined for a particular chemical as airborne concentrations experienced* for durations of 10 minutes, 30 minutes, 1 hour, 4 hours and 8 hours. Beyond 8 hours, AEGL values are compared to the 8 hour definitions (if applicable).

Since AEGL values are a measure of both concentration and time, a release of a particular chemical will, over the indicated time, yield a spectrum of values of dosages that can be classified under one of the three AEGL levels for one of the time intervals displayed in table pictured to the right. In this example, 37.23% of the population is exposed to AEGL-1 levels for less than 10 minutes, 11.48% of the population is exposed to AEGL-1 levels for 10-30 minutes, etc.

AEGL Duration Table			
Nitric Acid (Percent of Population)			
21-Nov-12 20:45:00Z (7.000 hr)			
Best Estimate			
	AEGL-1	AEGL-2	AEGL-3
< 10 min	37.23	2.89	0.50
10 min - 30 min	11.48	2.41	0.60
30 min - 1 hr	12.62	3.49	0.99
1 hr - 4 hr	20.50	5.41	1.82
4 hr - 8 hr	0.02	0.02	0.02
> 8 hr	0.00	0.00	0.00

Areas in red boxes will vary from incident to incident – above is example for illustration purposes only



Waterborne Hazard

- **(FOUO) Styrene or Crude in Water**
 - Both styrene and crude oil should float on the water surface.
 - Styrene is partially soluble in water whereas oil is not (though styrene's solubility is still quite low).
 - Styrene should evaporate fairly readily, even from the water.
 - Because of the lack of solubility (and the evaporative component of the styrene), it is difficult to estimate dilution factors in the water.
 - However, velocity of the contaminants can be estimated.



Velocity Estimation (1)

- **(FOUO) Estimate of travel velocity in water**
 - ICWater and a nearby USGS streamgauge were used to estimate travel velocities.
 - Streamgauge information can be found at:
<http://waterdata.usgs.gov/ca/nwis/uv?09521100>
 - Streamgauge suggests that current flow conditions are low (~ 800 cfs), which corresponds to a velocity of ~ 2 feet per second. Historical flow rates appear to be able to go a bit lower.
 - At higher flow rates, ~ 2000 cfs, velocities are somewhat higher, closer to 2.5 fps.
 - Flow rates at the surface should be higher than the mean channel velocity.



Velocity Estimation (2)

- **(FOUO) Estimate of travel velocity in water (cont)**
 - Given the above, the slowest reasonable flow velocity on this reach for floating contaminants is probably about 2 fps (possibly a bit higher).
 - The highest plausible velocity is a slightly more difficult to estimate. At higher flow rates (~ 2,000 cfs), channel velocity would increase to about 2.5 fps. Flow velocities near the top of the channel would probably higher, though how much is difficult to estimate.
 - For purposes of this modeling, an upper bound of about 3.5 fps was assumed.
 - Velocities are scaled in each downstream reach proportionally by the ICWater code.
 - These two scenarios represent bounds of possible flow velocities – actual stream conditions would need to be known to get a more accurate estimate.



Downstream Transport Estimation

- **(FOUO) Estimate of downstream transport**
 - Downstream transport calculated using ICWater using NHD hydrography.
 - Release assumes that half of the pooled contaminant mass is transported downstream, while the other half remains on the land beneath the spill location.
 - Total distance traveled in 12 hrs is estimated to be ~ 24 - 44 km.

Transport Time (hr)	Fast Case – Distance Transported (km)	Slow Case – Distance Transported (km)
0 – 2	7.1	4.4
2 – 4	13.9	7.2
4 – 6	21.5	11.8
6 – 8	28.4	15.7
8 – 12	43.5	24.3



Additional Velocity Complication

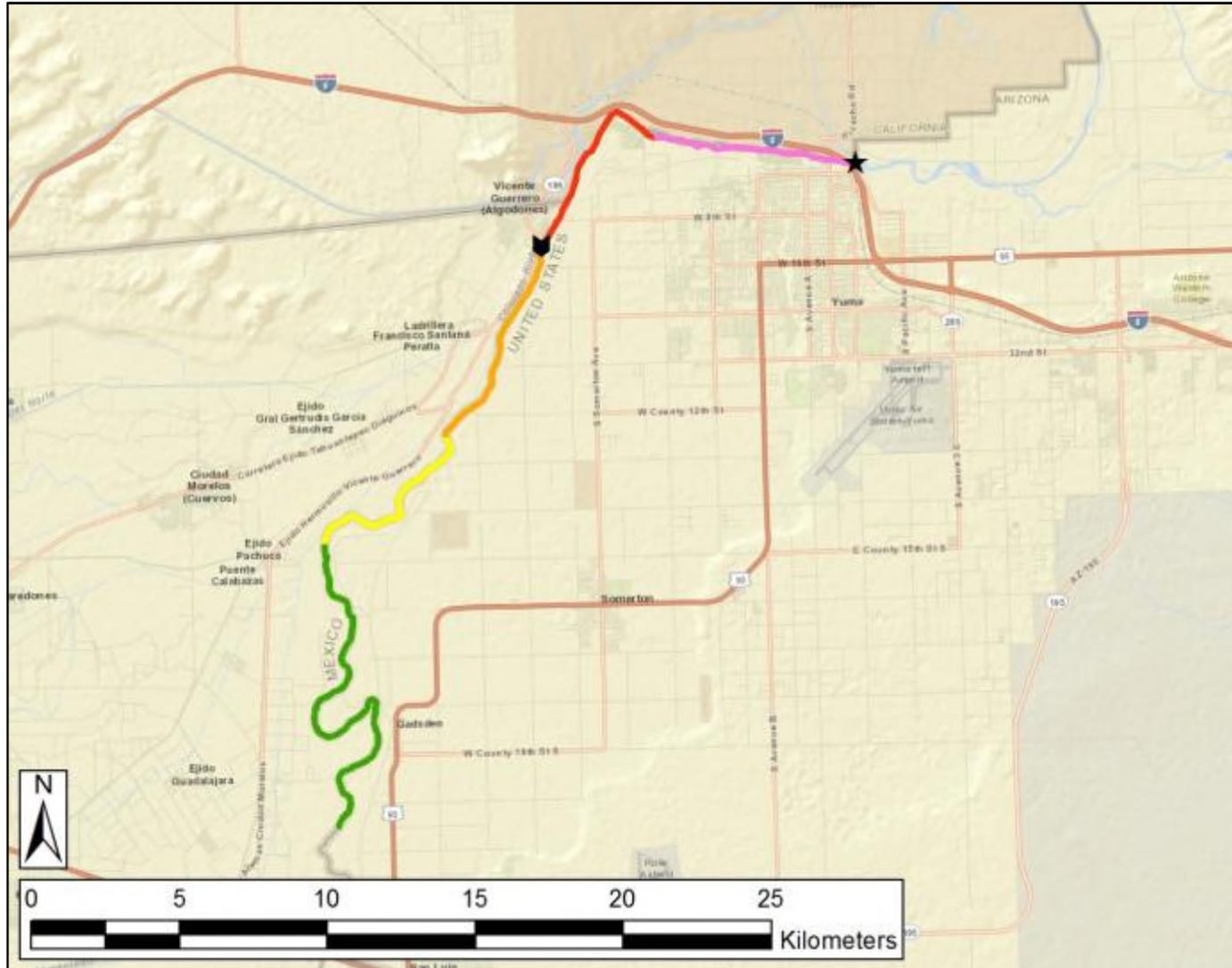
- **(FOUO) Downstream Dam**

- There is a dam several kilometers downstream of the release point (marked on the maps on the following slides).
- Behavior of flow around this location will be controlled by the dam itself, therefore there will be a human decision-based component that will affect the flow, particularly below this point.
- We cannot estimate what decision(s) will be made at this location, and therefore estimates of flow behavior past this point should be taken as highly uncertain.



Unclassified//For Official Use Only
EXERCISE EXERCISE EXERCISE

Downstream Contaminant Transport – Fast Case; Far View



Legend

- ★ Spill Location
- ♠ Dam Location
- 0 - 2 hours
- 2 - 4 hours
- 4 - 6 hours
- 6 - 8 hours
- 8 - 12 hours

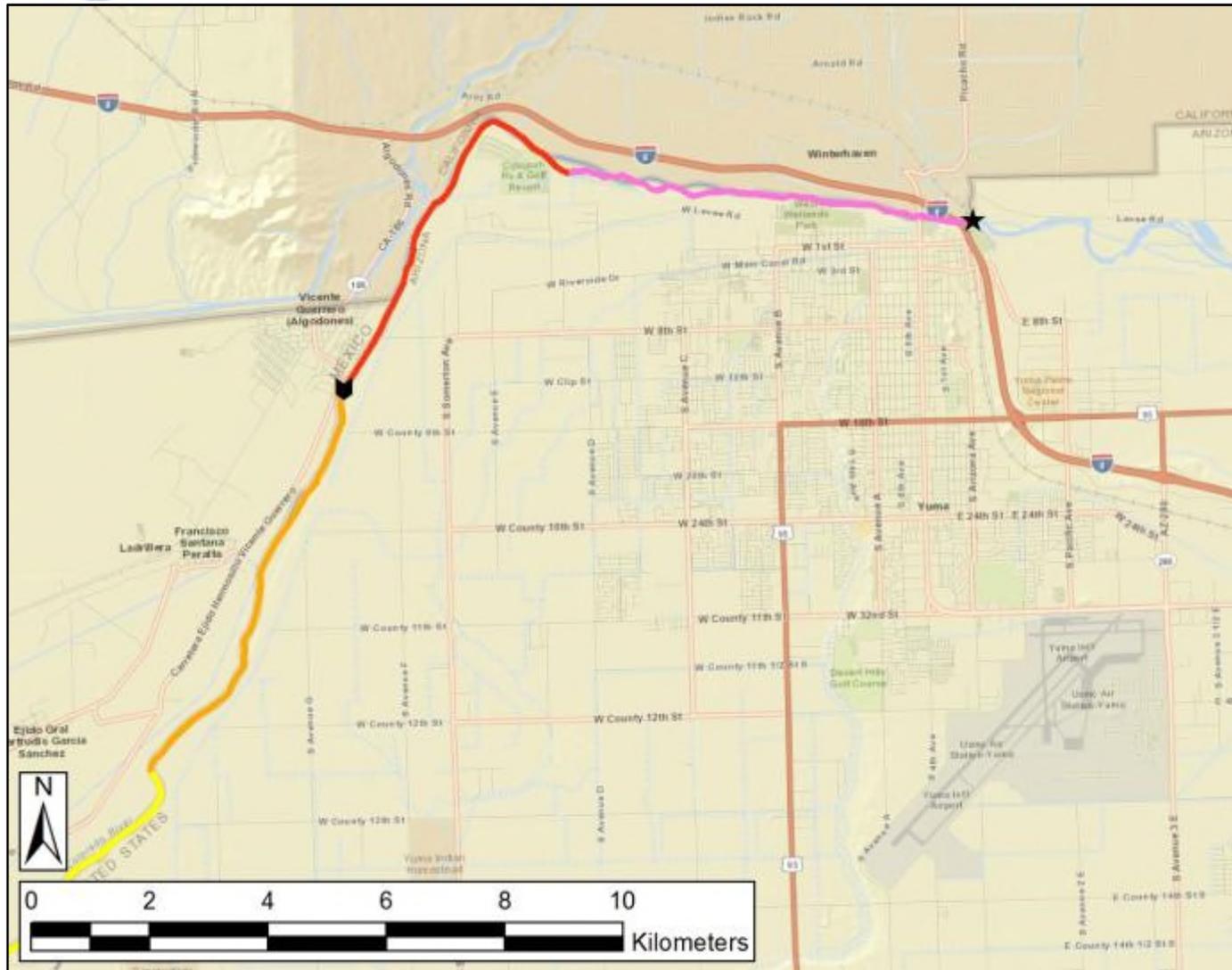
FACTS

Location: Outside Yuma, AZ
 Latitude: 32° 43' 43" N
 Longitude: 114° 36' 55" W
 Event Time: 0800 local, 21MAY2014
 Type: Styrene
 Amount: 16,000 gal
 Incident: Train Derailment
 Hydrology: NHD
 Model: ICWater v. 3.2



Unclassified//For Official Use Only
EXERCISE EXERCISE EXERCISE

Downstream Contaminant Transport – Fast Case; Near View



Legend

- ★ Spill Location
- ▾ Dam Location
- 0 - 2 hours
- 2 - 4 hours
- 4 - 6 hours
- 6 - 8 hours
- 8 - 12 hours

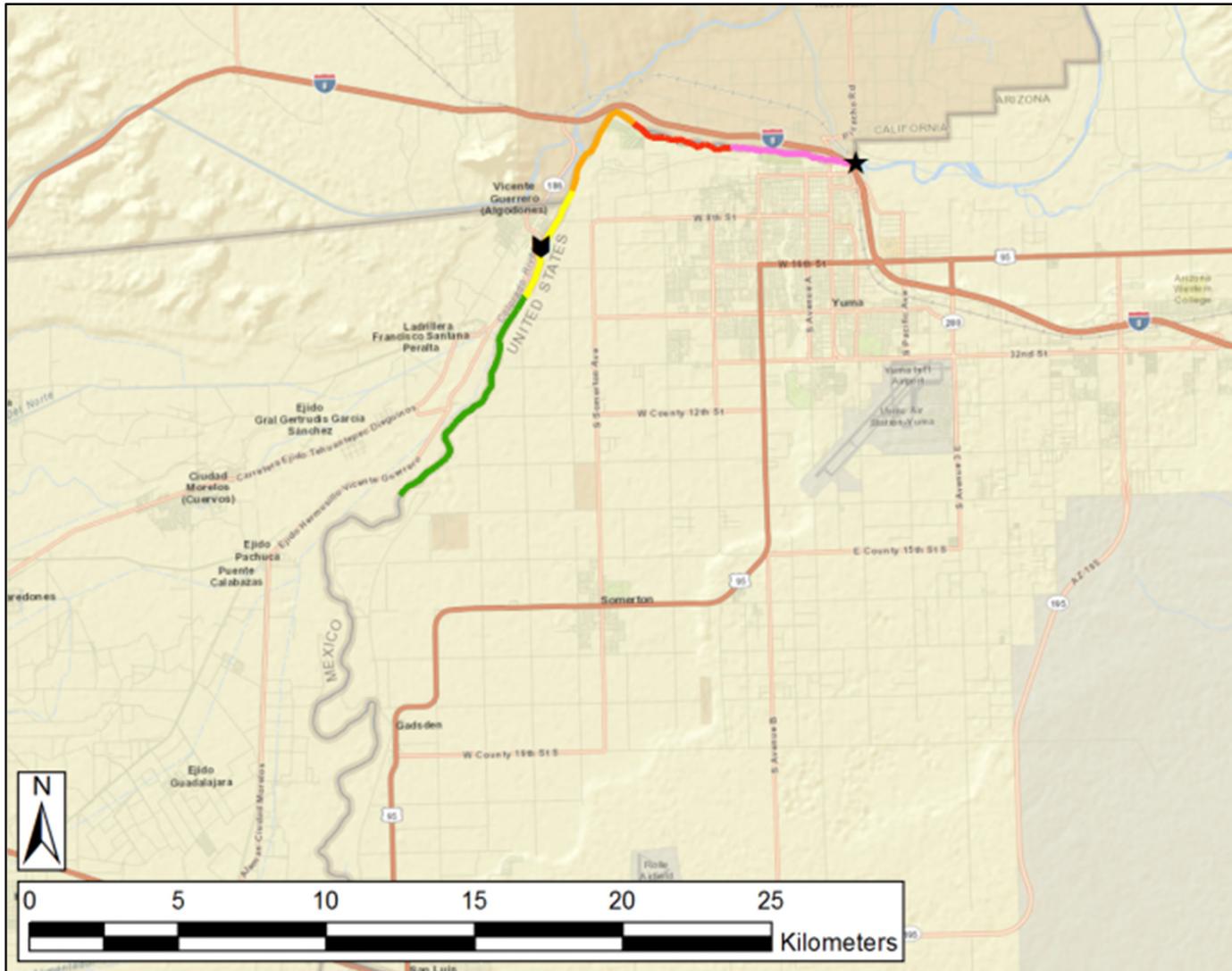
FACTS

Location: Outside Yuma, AZ
Latitude: 32° 43' 43" N
Longitude: 114° 36' 55" W
Event Time: 0800 local, 21MAY2014
Type: Styrene
Amount: 16,000 gal
Incident: Train Derailment
Hydrology: NHD
Model: ICWater v. 3.2



Unclassified//For Official Use Only
EXERCISE EXERCISE EXERCISE

Downstream Contaminant Transport – Slow Case; Far View



Legend

- ★ Spill Location
- ♠ Dam Location
- 0 - 2 hours
- 2 - 4 hours
- 4 - 6 hours
- 6 - 8 hours
- 8 - 12 hours

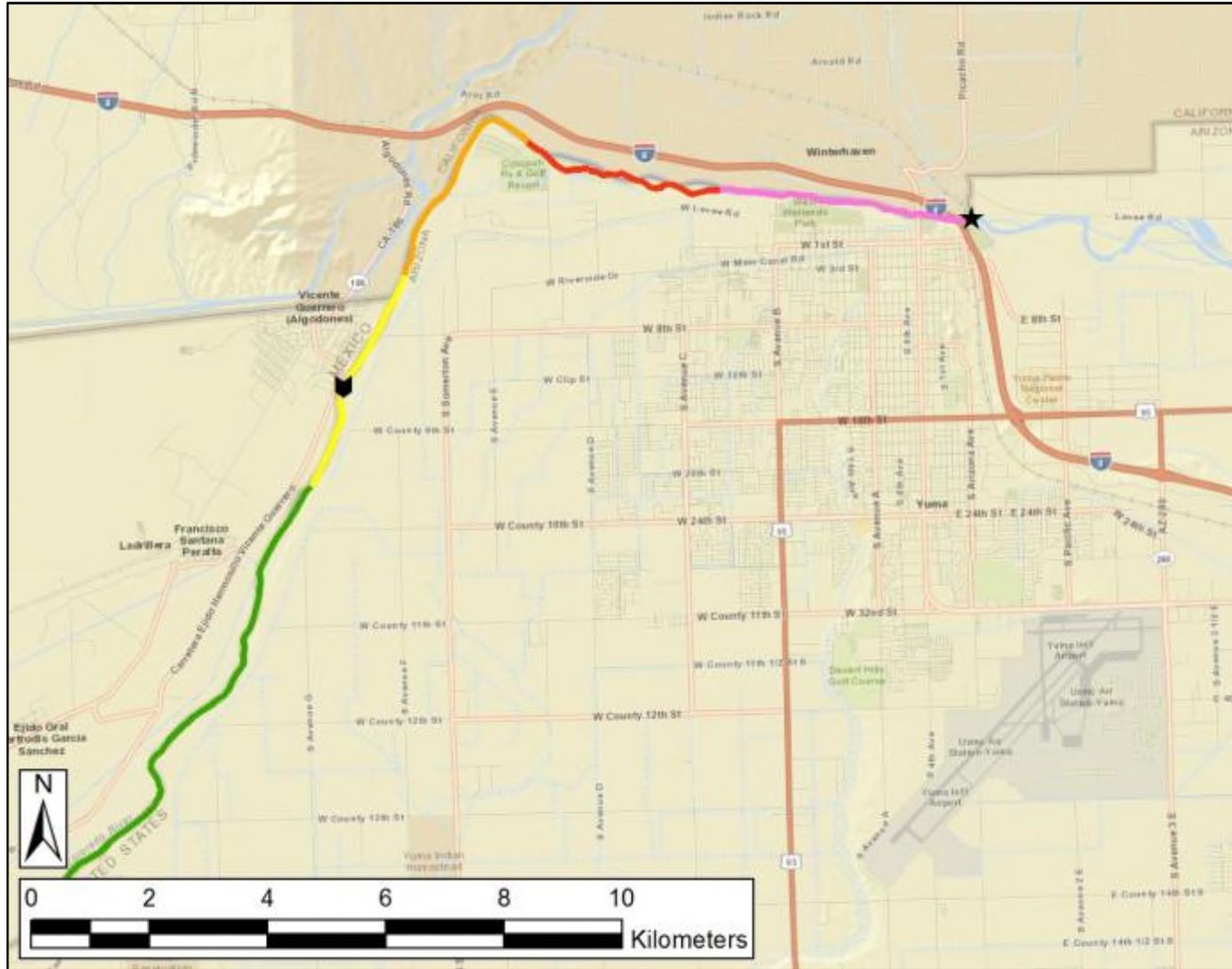
FACTS

Location: Outside Yuma, AZ
Latitude: 32° 43' 43" N
Longitude: 114° 36' 55" W
Event Time: 0800 local, 21MAY2014
Type: Styrene
Amount: 16,000 gal
Incident: Train Derailment
Hydrology: NHD
Model: ICWater v. 3.2



Unclassified//For Official Use Only
EXERCISE EXERCISE EXERCISE

Downstream Contaminant Transport – Slow Case; Near View



Legend

- ★ Spill Location
- ♣ Dam Location
- 0 - 2 hours
- 2 - 4 hours
- 4 - 6 hours
- 6 - 8 hours
- 8 - 12 hours

FACTS

Location: Outside Yuma, AZ
 Latitude: 32° 43' 43" N
 Longitude: 114° 36' 55" W
 Event Time: 0800 local, 21MAY2014
 Type: Styrene
 Amount: 16,000 gal
 Incident: Train Derailment
 Hydrology: NHD
 Model: ICWater v. 3.2

MATERIAL SAFETY DATA SHEETS

Material Safety Data Sheet Styrene Monomer, Inhibited

ACC# 22100

Section 1 - Chemical Product and Company Identification

MSDS Name: Styrene Monomer, Inhibited**Catalog Numbers:** O4507-1**Synonyms:** Ethenylbenzene; Cinnamene; Cinnamenol; Ethenylbenzene; Phenethylene; Styrol; Vinylbenzene; Vinylbenzol**Company Identification:**

Fisher Scientific
1 Reagent Lane
Fair Lawn, NJ 07410

For information, call: 201-796-7100**Emergency Number:** 201-796-7100**For CHEMTREC assistance, call:** 800-424-9300**For International CHEMTREC assistance, call:** 703-527-3887

Section 2 - Composition, Information on Ingredients

CAS#	Chemical Name	Percent	EINECS/ELINCS
100-42-5	Styrene	>99.0	202-851-5

Hazard Symbols: XN**Risk Phrases:** 10 36/38 20

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Appearance: clear, colorless. Flash Point: 88 deg F.

Warning! Flammable liquid and vapor. Aspiration hazard if swallowed. Can enter lungs and cause damage. May cause eye and skin irritation. May cause respiratory and digestive tract irritation. May cause central nervous system depression. May cause reproductive and fetal effects. May cause cancer based on animal studies. Uninhibited material may form explosive peroxides.

Target Organs: Central nervous system.**Potential Health Effects****Eye:** Causes eye irritation.**Skin:** May be absorbed through the skin in harmful amounts. Prolonged and/or repeated contact may cause defatting of the skin and dermatitis.**Ingestion:** May cause central nervous system depression, characterized by excitement, followed by headache, dizziness, drowsiness, and nausea. Advanced stages may cause collapse, unconsciousness, coma and possible death due to respiratory failure. Aspiration of material into the lungs may cause chemical pneumonitis, which may be fatal.**Inhalation:** Aspiration may cause respiratory swelling and pneumonitis. Causes narcotic effects including headache, dizziness, weakness, unconsciousness, and possible death.**Chronic:** No information found.

Section 4 - First Aid Measures

Eyes: Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical aid.

Skin: Flush skin with plenty of soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical aid if irritation develops or persists. Wash clothing before reuse.

Ingestion: Do NOT induce vomiting. If victim is conscious and alert, give 2-4 cupfuls of milk or water. Never give anything by mouth to an unconscious person. Get medical aid immediately. If conscious drink water, then induce vomiting. If unconscious, immediately take victim to a physician and do NOT attempt to induce vomiting.

Inhalation: Get medical aid immediately. Remove from exposure to fresh air immediately. If not breathing, give artificial respiration. If breathing is difficult, give oxygen.

Notes to Physician: Treat symptomatically

Antidote: None reported.

Section 5 - Fire Fighting Measures

General Information: As in any fire, wear a self-contained breathing apparatus in pressure-demand, MSHA/NIOSH (approved or equivalent), and full protective gear. Vapors may form an explosive mixture with air. Flammable Liquid. Can release vapors that form explosive mixtures at temperatures above the flashpoint. Containers may explode in the heat of a fire.

Extinguishing Media: This material is lighter than water and insoluble in water. The fire could easily be spread by the use of water in an area where the water cannot be contained. Use water fog, dry chemical, carbon dioxide, or regular foam.

Section 6 - Accidental Release Measures

General Information: Use proper personal protective equipment as indicated in Section 8.

Spills/Leaks: Absorb spill with inert material (e.g. vermiculite, sand or earth), then place in suitable container. Clean up spills immediately, observing precautions in the Protective Equipment section. Use a spark-proof tool. Provide ventilation.

Section 7 - Handling and Storage

Handling: Wash thoroughly after handling. Remove contaminated clothing and wash before reuse. Use only in a well-ventilated area. Ground and bond containers when transferring material. Use spark-proof tools and explosion proof equipment. Avoid contact with skin and eyes. Empty containers retain product residue, (liquid and/or vapor), and can be dangerous. Take precautionary measures against static discharges. Avoid ingestion and inhalation. Wash clothing before reuse. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose empty containers to heat, sparks or open flames.

Storage: Keep away from sources of ignition. Store in a cool place in the original container and protect from sunlight. Keep refrigerated. (Store below 4°C/39°F.) Keep containers tightly closed.

Section 8 - Exposure Controls, Personal Protection

Engineering Controls: Use adequate general or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

Exposure Limits

Chemical Name	ACGIH	NIOSH	OSHA - Final PELs
Styrene	20 ppm TWA; 40 ppm STEL	50 ppm TWA; 215 mg/m ³	100 ppm TWA; C 200 ppm

TWA 700 ppm IDLH

OSHA Vacated PELs: Styrene: 50 ppm TWA; 215 mg/m³ TWA; 100 ppm STEL; 425 mg/m³ STEL**Personal Protective Equipment****Eyes:** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.**Skin:** Wear appropriate protective gloves to prevent skin exposure.**Clothing:** Wear appropriate protective clothing to minimize contact with skin.**Respirators:** Follow the OSHA respirator regulations found in 29CFR 1910.134 or European Standard EN 149.

Always use a NIOSH or European Standard EN 149 approved respirator when necessary.

Section 9 - Physical and Chemical Properties

Physical State: Liquid**Appearance:** clear, colorless**Odor:** pungent odor**pH:** Not available.**Vapor Pressure:** 568 mm Hg**Vapor Density:** 1.22 Kg/m³**Evaporation Rate:**0.5 (Butyl Acetate=1)**Viscosity:** 0.751 mPa**Boiling Point:** 293 deg F**Freezing/Melting Point:**-23 deg F**Autoignition Temperature:** 914 deg F (490.00 deg C)**Flash Point:** 88 deg F (31.11 deg C)**Decomposition Temperature:**Not available.**NFPA Rating:** (estimated) Health: 2; Flammability: 3; Reactivity: 2**Explosion Limits, Lower:**1.1% v/v**Upper:** 7.0% v/v**Solubility:** Practically insoluble in water**Specific Gravity/Density:**0.9060**Molecular Formula:**C₈ H₈**Molecular Weight:**104.1

Section 10 - Stability and Reactivity

Chemical Stability: Stable under normal temperatures and pressures. May form peroxides in the absence of inhibitors.**Conditions to Avoid:** Incompatible materials, ignition sources.**Incompatibilities with Other Materials:** Vapor is explosive when exposed to heat or flame and reacts with oxygen at temperatures above 104 F, uninhibited material may form explosive peroxides. Uninhibited material may polymerize which becomes self-sustaining at temperatures above 65 C. Exposure to butyllithium, dibenzoyl peroxide, azoisobutyronitrile or di-tert-butylperoxide may cause violent polymerization. Violent reaction with chlorosulfonic acid, oleum, sulfuric acid and oxidizers. Oxygen + heat is explosive.**Hazardous Decomposition Products:** Carbon monoxide, carbon dioxide.**Hazardous Polymerization:** May occur.

Section 11 - Toxicological Information

RTECS#:**CAS#** 100-42-5: WL3675000

LD50/LC50:

CAS# 100-42-5:

Draize test, rabbit, eye: 100 mg Severe;

Draize test, rabbit, eye: 100 mg/24H Moderate;

Draize test, rabbit, skin: 100% Moderate;

Inhalation, mouse: LC50 = 9500 mg/m³/4H;Inhalation, rat: LC50 = 12 gm/m³/4H;

Oral, mouse: LD50 = 316 mg/kg;

Oral, rat: LD50 = 2650 mg/kg;<br.

Carcinogenicity:

CAS# 100-42-5:

ACGIH: A4 - Not Classifiable as a Human Carcinogen**OSHA:** Possible Select carcinogen**IARC:** Group 2B carcinogen**Epidemiology:** TClO (Inhalation, rat) = 293 ppm/6H; Reproductive - Effects on Newborn - behavioral.**Teratogenicity:** TClO - Lowest published toxic concentration(Inhalation,rat)= 300 ppm/6H; Lungs, Thorax, or Respiration - structural or functional change in trachea or bronchi; Lungs, Thorax, or Respiration - other changes; Liver - other changes.**Reproductive Effects:** RTECs reports reproductive effects in animals such as effects on weaning/lactation index, maternal effects, fetotoxicity, stillbirth and post-implantation mortality. TClO (Inhalation, rat) = 293 ppm/6H; Reproductive - Effects on Newborn - behavioral.**Neurotoxicity:** No information available.**Mutagenicity:** An increased incidence of mutations such as chromosome aberrations and micronuclei in peripheral lymphocytes has been reported in workers exposed occupationally. Some studies have found a slight increase in the incidence of sister chromatid exchanges while no increase has been found in several other studies. Mutation in microorganisms(Salmonella typhimurium) =1 umol/plate(Yeast - Saccharomyces cerevisiae) =1 mmol/L.**Other Studies:** IARC has determined that there is inadequate evidence for carcinogenicity in humans. Three studies have suggested an association between leukaemia and lymphomas with exposure to styrene. Other studies have shown no excess in mortality from cancer in humans. IARC has determined there is sufficient evidence of carcinogenicity in animals. Standard Draize test(skin,rabbit) = 100%; Moderate. Standard Draize test(eye,rabbit) = 100 mg; Severe.</br.

Section 12 - Ecological Information

Ecotoxicity: No data available. Cas# 100-42-5:LC50(96Hr.)Fathead Minnow = 46.4` mg/L; Static Bioassay Softwater.LC50(96Hr.)Fathead Minnow = 59.30 mg/L; Static Bioassay, Hardwater.LC50(96Hr.)Bluegill = 25.05 mg/L; Static Bioassay, Softwater.LC50(96Hr.)Goldfish = 64.74 mg/L; Static Bioassay, water.LC50(48Hr.) Water flea = 23.0 mg/L, Unspecified Bioassay.EC50(48Hr.) Water flea = 23.0 mg/L; Unspecified Bioassay.**Environmental:** Styrene does not absorb solar radiation at wavelengths above the solar cutoff (approximately 300 nm); therefore, it will not be directly photolyzed in the lower atmosphere (troposphere) or surface water. However, styrene is expected to be involved in indirect photochemical reactions. Styrenes have been found to be very active generators of photochemical smog.**Physical:** Styrene released to soil is subject to biodegradation. Volatilization and biodegradation are important transport and degradation processes respectively for styrene in water.**Other:** No information available.

Section 13 - Disposal Considerations

Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. US EPA guidelines for the classification determination are listed in 40 CFR Parts 261.3. Additionally, waste generators must consult state and local hazardous waste regulations to ensure complete and accurate classification.

RCRA P-Series: None listed.

RCRA U-Series: None listed.

Section 14 - Transport Information

	US DOT	IATA	RID/ADR	IMO	Canada TDG
Shipping Name:	No information available.				STYRENE MONOMER
Hazard Class:					3(9.2)
UN Number:					UN2055
Packing Group:					III
Additional Info:					FLASHPOINT 31C

Section 15 - Regulatory Information

US FEDERAL

TSCA

CAS# 100-42-5 is listed on the TSCA inventory.

Health & Safety Reporting List

None of the chemicals are on the Health & Safety Reporting List.

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA

Section 302 (RQ)

CAS# 100-42-5: final RQ = 1000 pounds (454 kg)

Section 302 (TPQ)

None of the chemicals in this product have a TPQ.

SARA Codes

CAS # 100-42-5: acute, chronic, flammable, reactive.

Section 313

This material contains Styrene (CAS# 100-42-5, 99 0%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 373.

Clean Air Act:

CAS# 100-42-5 is listed as a hazardous air pollutant (HAP). This material does not contain any Class 1 Ozone depleters. This material does not contain any Class 2 Ozone depleters.

Clean Water Act:

CAS# 100-42-5 is listed as a Hazardous Substance under the CWA. None of the chemicals in this product are listed as Priority Pollutants under the CWA. None of the chemicals in this product are listed as Toxic Pollutants under the CWA.

OSHA:

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

CAS# 100-42-5 can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts. California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations**European Labeling in Accordance with EC Directives**

Hazard Symbols:XN

Risk Phrases:

R 10 Flammable.

R 36/38 Irritating to eyes and skin.

R 20 Harmful by inhalation.

Safety Phrases:

S 23 Do not inhale gas/fumes/vapour/spray.

WGK (Water Danger/Protection)

CAS# 100-42-5: 2

Canada

CAS# 100-42-5 is listed on Canada's DSL List. CAS# 100-42-5 is listed on Canada's DSL List.

This product has a WHMIS classification of B2, D2A, F.

CAS# 100-42-5 is listed on Canada's Ingredient Disclosure List.

Exposure Limits

CAS# 100-42-5: OEL-AUSTRALIA:TWA 50 ppm (215 mg/m³);STEL 100 ppm (425 mg/m³) OEL-BELGIUM: TWA 50 ppm (213 mg/m³);STEL 100 ppm (426 mg/m³);Skin OEL-CZECHOSLOVAKIA:TWA 200 mg/m³; STEL 1000 mg/m³ OEL-DENMARK:TWA 25 ppm (105 mg/m³) OEL-FINLAND:TWA 20 ppm (85mg/m³); STEL 100 ppm (420 mg/m³) OEL-FRANCE:TWA 50 ppm (215 mg/m³) OEL-GERMANY:TWA 20 ppm (85 mg/m³) OEL-HUNGARY:STEL 50 mg/m³;Carcinogen OEL-JAPAN:TWA 50 ppm(210 mg/m³) OEL-THE NETHERLANDS:TWA 100 ppm (420 mg/m³) OEL-THE PHILIPPINES:TWA 100 ppm (420 mg/m³) OEL-POLAND:TWA 100 mg/m³ OEL-SWEDEN:TWA 25 ppm (110 mg/m³);STEL 75 ppm (30 mg/m³);Skin OEL-SWITZERLAND:TWA 50 ppm (215 mg/m³);STEL 100 ppm (430 mg/m³) OEL-THAILAND:TWA 100 ppm; STEL 200 ppm OEL-TURKEY:TWA 100 ppm (420 mg/m³) OEL-UNITED KINGDOM:TWA 100 ppm (420 mg/m³);STEL 260 ppm OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

Section 16 - Additional Information

MSDS Creation Date: 4/28/1999

Revision #2 Date: 8/02/2000

The information above is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes. In no event shall Fisher be liable for any claims, losses, or damages of any third party or for lost profits or any special, indirect, incidental, consequential or exemplary damages, howsoever arising, even if Fisher has been advised of the possibility of such damages.

MATERIAL SAFETY DATA SHEET**CRUDE OIL**

IMPORTANT: Read this MSDS before handling and disposing of this product and pass this information on to employees, customers, and users of this product.

1.	<u>PRODUCT and COMPANY IDENTIFICATION</u>	
Material Identity	Crude Oil	
Trade Name(s)	Oriente, Cano Limon, Line 63, Shell-Ventura, SJV Light, Rainbow, West Texas Inter-Cushing, Peace River-Canadian, Federated Crude-Canadian, Pembina Crude-Canadian, Forcados, Cabinda, Basrah Light, Basrah, Arab Medium, Elang Crude, Girassol	
Other Name(s)	Earth Oil, Petroleum Oil, Rock Oil, Zafiro	
Chemical Description	This material is a C1 to C50 hydrocarbon liquid which contains approximately .9 to 2.8 wt% sulfur compounds	
Manufacturer's Address	BP West Coast Products LLC Carson Business Unit 1801 E. Sepulveda Boulevard Carson, California 90749-6210	BP West Coast Products LLC Cherry Point Business Unit 4519 Grandview Road Blaine, Washington 98230
Telephone Numbers	Emergency Health Information:	1 (800) 447-8735

2. COMPONENTS and EXPOSURE LIMITS

Component ¹	CAS No.	% Composition By Volume ²	ACGIH TLV	Exposure Limits			Type
				OSHA	PEL ³		
CRUDE OIL, PETROLEUM	8002-05-9	EQ 100	N/AP	N/AP			
Which contains:							
BUTANE	106-97-8	AP 0.8 to 1	800	800	ppm		TWA
HEXANE (N-HEXANE)	110-54-3	AP 0.3 to 1	50 skin	50	ppm		TWA
ISOPENTANE	78-78-4	AP 0.3 to 1.5	N/AP 600	750 600	ppm ppm		STEL TWA
PENTANE	109-66-0	AP 1.5 to 2.5	N/AP 600	750 600	ppm ppm		STEL TWA
Other applicable exposure guidelines:							
COAL TAR PITCH VOLATILES, AS BENZENE SOLUBLES ⁽⁴⁾	65996-93-2		0.2	0.2	mg/m3		TWA
OIL MIST, MINERAL	8012-95-1		10 5	N/AP 5	mg/m3 mg/m3		STEL TWA
STODDARD SOLVENT	8052-41-3		100	100	ppm		TWA

Stoddard Solvent exposure limits are listed as an exposure guideline for hydrocarbon vapors that may be similar to those derived from crude oil

Since specific exposure standards or control limits have not been established for this material, the exposure limits shown here are suggested as minimum control guidelines.

¹ Carcinogen displayed after Component Name. Listed by ⁽¹⁾ NTP, ⁽²⁾ IARC, ⁽³⁾ OSHA, ⁽⁴⁾ Other

² See Abbreviations on last page

³ The OSHA exposure limits were changed in 1993 due to a federal court ruling. ARCO has chosen to list the 1989 OSHA exposure limits in this document as they are generally more stringent and therefore more protective than the current exposure limits. (Refer to 29 CFR 1910.1000).

3. HAZARD IDENTIFICATION

IMMEDIATE HAZARDS

DANGER

HIGHLY FLAMMABLE! OSHA/NFPA Class 1B flammable liquid. KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME! CONTAINS PETROLEUM DISTILLATES! Avoid breathing vapors or mists. Use only with adequate ventilation. If swallowed, do not induce vomiting since aspiration into the lungs may cause chemical pneumonia. Obtain prompt medical attention.

May cause irritation or more serious skin disorders! May be harmful if inhaled! May cause irritation of the nose, throat, and lungs, headache, dizziness, drowsiness, loss of coordination, fatigue, nausea and labored breathing. May cause irregular heartbeats. Avoid prolonged or repeated liquid, mist, and vapor contact with eyes, skin, and respiratory tract.

Wash hands thoroughly after handling.

Sulfur compounds in this material may decompose to release hydrogen sulfide gas which may accumulate to potentially lethal concentrations in enclosed air spaces. Vapor concentrations of hydrogen sulfide above 50 ppm, or prolonged exposure at lower concentrations, may saturate human odor perceptions so that the smell of gas may not be apparent. **DO NOT DEPEND ON THE SENSE OF SMELL TO DETECT HYDROGEN SULFIDE!**

Long-term tests show that similar crude oils have produced skin tumors on laboratory animals.

Crude oils contain some polycyclic aromatic hydrocarbons which have been shown to be carcinogenic after prolonged or repeated skin contact in laboratory animals.

Routes of Exposure

Signs and Symptoms

Inhalation (Primary)

Vapors or mists from this material, at concentrations greater than the recommended exposure limits in Section 2, can cause irritation of the nose, throat, and lungs, headache, dizziness, drowsiness, loss of coordination, fatigue, nausea and labored breathing. Airborne concentrations above the recommended exposure limits are not anticipated during normal workplace activities due to the slow evaporation of this material at ambient temperatures. Exposure to moderate airborne concentrations of hydrogen sulfide (less than 50 ppm) can result in irritation of the eyes, nose and throat, headache, dizziness, shortness of breath, nausea and nervousness. Exposure to hydrogen sulfide vapor above 200 ppm may cause irritation of mucous membranes, inflammation of the lungs, accumulation of fluid in the lungs, irregular heartbeats, unconsciousness with convulsions or impaired breathing with suffocation. Exposure to higher concentrations of hydrogen sulfide vapor (above 500 ppm) may cause rapid death.

Eye Contact

May cause slight eye irritation.

Skin Contact

Moderate skin irritation may occur upon short-term exposure.

Exposure to sunlight may increase the degree of skin irritation.

Absorption through the skin may occur and produce toxic effects (see Summary of Chronic Hazards).

Ingestion

May cause irritation of the mouth, throat and gastrointestinal tract leading to nausea, vomiting, diarrhea, and restlessness. May cause headache, dizziness, drowsiness, loss of coordination, fatigue, nausea and labored breathing.

ASPIRATION HAZARD: Aspiration into the lungs may cause chemical pneumonia. This material can enter the lungs during swallowing or vomiting and may cause lung inflammation and damage which in severe cases may be fatal.

Summary of Chronic Hazards and Special Health Effects

Personnel with preexisting central nervous system (CNS) disease, skin disorders, or chronic respiratory diseases should be evaluated by an appropriate health professional before exposure to this material.

Prolonged/repeated skin exposure, inhalation or ingestion of this material may result in adverse dermal or systemic effects. Avoid prolonged or repeated exposure. May be harmful if absorbed through the skin. Prolonged or repeated contact may create cancer risk, organ damage, and adversely affect reproduction, fetal development and fetal survival. Avoid all skin contact.

Neurotoxic effects have been associated with n-hexane, a component of this material. Avoid prolonged or repeated exposure.

See Section 11 for Additional Toxicological Information.

4.**EMERGENCY and FIRST AID****Inhalation**

Immediately remove personnel to area of fresh air. For respiratory distress, give oxygen, rescue breathing, or administer CPR (cardiopulmonary resuscitation) if necessary. Obtain prompt medical attention.

Eye Contact

Flush eyes with clean, low-pressure water for at least 15 minutes, occasionally lifting the eyelids. If pain or redness persists after flushing, obtain medical attention.

Skin Contact

Immediately remove contaminated clothing. Wash affected skin thoroughly with soap and water. If irritation persists, obtain medical attention.

Ingestion

Do not induce vomiting since aspiration into the lungs may cause lipid pneumonia. Obtain prompt medical attention.

Emergency Medical Treatment Procedures

See above procedures. Personnel with pre-existing central nervous system disease, skin disorders, chronic respiratory diseases, or impaired liver or kidney function should avoid exposure to this product.

5.**FIRE and EXPLOSION**

Flash Point (Method)* Based on NFPA Petroleum, Crude AP 20°F to 90°F

Autoignition Temperature (Method)* N/DA

Flammable Limits (% Vol. in Air)* Lower AP 1 +

Upper AP 8 +

NFPA Hazard Rating:

Health: 2 = Moderate

Fire: 3 = High

Reactivity: 0 = Insignificant

+ Based on NFPA 325 **Special:**

* At Normal Atmospheric Temperature and Pressure

Fire and Explosion Hazards

HIGHLY FLAMMABLE! This material releases flammable vapors at or below ambient temperatures. When mixed with air in certain proportions and exposed to an ignition source, these vapors can burn in the open or explode in confined spaces.

Flammable vapors may travel long distances along the ground before reaching a point of ignition and flashing back.

Open top tanks involved in a fire have a potential for "boil-over" if water or water-in-oil emulsion is at the bottom of the tank. Boil-over may result in a large expulsion of burning oil from the tank, greatly increasing the fire area.

Extinguishing Media Special Firefighting Procedures

Foam, Dry chemical, Carbon dioxide (CO₂)

Water and water fog can cool the fire but may not extinguish the fire.

For fires involving this material, do not enter any enclosed or confined fire space without proper protective equipment. This may include self-contained breathing apparatus to protect against the hazardous effects of combustion products and oxygen deficiencies.

Cool tanks and containers exposed to fire with water. If firefighters cannot work upwind to the fire, respiratory protective equipment must be worn unless and until atmospheric monitoring indicates that such protection is not required. Improper use of water and extinguishing media containing water may cause frothing which can spread the fire over a larger area. Water fog or spray are of value for cooling tank shells and surfaces exposed to fire, but may not achieve extinguishment.

6. Precautions if Material is Spilled or Released	<p><u>ACCIDENTAL RELEASE MEASURES</u></p> <p>Contain spill, evacuate non-essential personnel, and safely stop flow. On hard surfaces, spilled material may create a slipping hazard. Equip cleanup crews with proper protective equipment (as specified in Section 8) and advise of hazards. Clean up by recovering as much spilled or contaminated materials as possible and placing into closed containers. Consult with an environmental professional for the federal, state and local cleanup and reporting requirements for spills and releases.</p>
7. Handling, Storage and Decontamination Procedures	<p><u>HANDLING and STORAGE</u></p> <p>Store and transport in accordance with all applicable laws. KEEP AWAY FROM HEAT, SPARKS, AND OPEN FLAME! KEEP CONTAINERS CLOSED, PLAINLY LABELED AND OUT OF CLOSED VEHICLES! Containers should be able to withstand pressures expected from warming or cooling in storage. Ground all drums and transfer vessels when handling. Store in cool (80°F or below), well-ventilated location. All electrical equipment in storage and/or handling areas should be installed in accordance with applicable requirements of the National Electrical Code (NEC). KEEP OUT OF REACH OF CHILDREN!</p> <p>Empty containers retain some liquid and vapor residues, and hazard precautions must be observed when handling empty containers. For determining National Electrical Code (NEC) Hazardous (Classified) location requirements for electrical installations, consider this material Class 1, Group D.</p>
8. Engineering Controls	<p><u>EXPOSURE CONTROLS/PERSONAL PROTECTION</u></p> <p>Where possible, use adequate ventilation to keep vapor and mist concentrations of this material below the Occupational Exposure Limits shown in Section 2. Electrical equipment should comply with National Electrical Code (NEC) standards (see Section 7).</p>
Respiratory	<p>Where there is potential for exposure to hydrogen sulfide gas in excess of the permissible exposure limit, a NIOSH/MSHA-approved supplied-air respirator operated in positive pressure mode should be worn.</p> <p>If hydrogen sulfide gas is not present in excess of permissible exposure limits, a NIOSH/MSHA-approved air-purifying respirator with an organic vapor cartridge may be permissible under certain circumstances where airborne concentrations of hydrocarbon vapor may exceed the exposure limits in Section 2. Where work conditions may generate airborne mists of the material, also use a high-efficiency particulate pre-filter. Consult a health and safety professional for guidance in respirator selection. Respirator use should comply with OSHA 29 CFR 910.134.</p> <p>CAUTION: The protection provided by air-purifying respirators is limited. Use a positive pressure air-supplied respirator if there is any potential for an uncontrolled release, if exposure levels are not known, or if concentrations exceed the protection limits of the air-purifying respirator.</p>
Eyes	<p>Eye protection should be worn. If there is potential for splashing or spraying, chemical protective goggles and/or a face shield should be worn. If contact lenses are worn, consult an eye specialist or a safety professional for additional precautions. Suitable eye wash water should be available in case of eye contact with this material.</p>
Skin	<p>Avoid all skin contact with this material. If conditions of use present any potential for skin contact, clean and impervious clothing such as gloves, apron, boots, and facial protection should be worn. Neoprene, Nitrile, Butyl Rubber or Viton glove material is recommended. When working around equipment or processes which may create the potential for skin contact, full body coverage should be worn, which consist of impervious boots and oil-resistant coated Tyvek suit or other impervious jacket and pants. Non-impervious clothing which accidentally becomes contaminated with this material should be removed promptly and not reworn until the clothing is washed thoroughly and the contamination is effectively removed. Discard soaked leather goods.</p>

Other Hygienic and Work Practices Use good personal hygiene practices. If skin contact should occur, material should be removed from the skin with a waterless hand cleaner, and the affected area should then be washed with a mild soap and water. Wash hands and other exposed areas thoroughly before eating, drinking, smoking or using toilet facilities.

9. PHYSICAL and CHEMICAL PROPERTIES

Boiling Point: AP -54°F to 1100°F
Viscosity Units, Temp. (Method): N/DA
Dry Point: N/AP
Freezing Point: N/DA
Vapor Pressure, Temp. (Method): AP 1 to 2 at 100°F (REID-PSIA)
Volatile Characteristics: Appreciable
Specific Gravity (H₂O = 1 @ 39.2°F): AP 0.88
Vapor Sp. Gr. (Air = 1.0 @ 60°F - 90°F): N/DA
Solubility in Water: Negligible
PH: N/AP
Appearance and Odor: Thick light yellow to dark black colored liquid. Petroleum hydrocarbon odor.
Other Physical and Chemical Properties: Total sulfur = approx. 1.1% - 2.8%
 Hydrogen sulfide content is less than 5 ppm dissolved in liquid
 Vanadium = approx. 210 ppm

10. STABILITY and REACTIVITY

Stability Stable
Hazardous Polymerization Not expected to occur.
Other Chemical Reactivity N/AP
Conditions to Avoid Heat, sparks, and open flame.
Materials to Avoid Strong acids, alkalis, and oxidizers such as liquid chlorine and oxygen.
Hazardous or Decomposition Products Burning or excessive heating may produce carbon monoxide and other harmful gases or vapors including oxides of sulfur and nitrogen.

11. TOXICOLOGICAL INFORMATION

Toxicological Information The information found in this section is written for medical, toxicology, occupational health and safety professionals. This section provides technical information on the toxicity testing of this or similar materials or its components. If clarification of the technical content is needed, consult a professional in the areas of expertise listed above.

Prolonged/ Repeated Exposures IARC has determined there is "limited evidence for the carcinogenicity in experimental animals of crude oil" and "inadequate evidence for the carcinogenicity in humans of crude oil." IARC concludes that "crude oil is not classifiable as to its carcinogenicity to humans (Group 3)."
 Crude oil administered orally to pregnant rats during gestation produced increased number of resorptions and decrease in fetal weight and length.

Exposure to N-hexane at concentrations considerably higher than the current permissible exposure limit has reportedly been associated with peripheral neuropathy.

12. ECOLOGICAL INFORMATION

Not Available

13. DISPOSAL CONSIDERATIONS

Waste Disposal Methods Maximize recovery for reuse or recycling. Consult environmental professional to determine if state or federal regulations would classify spilled or contaminated materials as a hazardous waste. Use only approved transporters, recyclers, treatment, storage or disposal facilities. Comply with all federal, state and local laws pertaining to waste management.

14. TRANSPORT INFORMATION

UN Proper Shipping Name Petroleum crude oil
UN Hazard Class 3
UN Number UN1267

UN Packing Group

PGI

15. REGULATORY INFORMATION**SUPERFUND AMENDMENTS AND REAUTHORIZATION ACT OF 1986 (SARA), TITLE III****Section 311/312 Hazard Categories:**

Immediate (acute) health hazard

Delayed (chronic) health hazard

Fire hazard

No chemicals in this product exceed the threshold reporting level established by SARA Title III, Section 313 and 40 CFR 372.

TOXIC SUBSTANCES CONTROL ACT (TSCA)

All components of this product are listed on the TSCA Inventory.

COMPREHENSIVE ENVIRONMENTAL RESPONSE, COMPENSATION AND LIABILITY ACT (CERCLA) This

material is covered by CERCLA's PETROLEUM EXEMPTION.

(Refer to 40 CFR 307.14)

CALIFORNIA SAFE DRINKING WATER AND TOXIC ENFORCEMENT ACT OF 1986 - PROPOSITION 65**PROP 65 WARNING LABEL:**

Chemicals known to the State to cause cancer, birth defects, or other reproductive harm are found in gasoline, crude oil, and many other petroleum products and their vapors, or result from their use. Read and follow label directions and use care when handling or using all petroleum products.

WARNING:

This product contains the following chemical(s) listed by the state of California as known to cause cancer or birth defects or other reproductive harm.

MINERAL OILS, UNTREATED ^(C)

Other Prop 65 chemicals will result under certain conditions from the use of this material. For example, burning fuels produces combustion products including carbon monoxide, a Prop 65 reproductive toxin.

(C) = Carcinogen**16. OTHER INFORMATION****General Comments** The information and conclusions herein reflect normal operating conditions and may be from sources other than direct test data on the mixture itself.

Abbreviations: EQ = Equal

AP = Approximately

N/P = No Applicable Information Found

LT = Less Than

UK = Unknown

N/AP = Not Applicable

GT = Greater Than

TR = Trace

N/DA = No Data Available

Disclaimer of LiabilityThe information in this MSDS was obtained from sources which we believe are reliable. **HOWEVER, THE INFORMATION IS PROVIDED WITHOUT ANY WARRANTY, EXPRESS OR IMPLIED, REGARDING ITS CORRECTNESS.**

The conditions or methods of handling, storage, use and disposal of the product are beyond our control and may be beyond our knowledge.

FOR THIS AND OTHER REASONS, WE DO NOT ASSUME RESPONSIBILITY AND EXPRESSLY DISCLAIM LIABILITY FOR LOSS DAMAGE OR EXPENSE ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE HANDLING, STORAGE, USE OR DISPOSAL OF THE PRODUCT.

This MSDS was prepared and is to be used only for this product. If the product is used as a component in another product, this MSDS information may not be applicable.

THIS PAGE LEFT BLANK INTENTIONALLY

ATTACHMENT A LIST OF ACRONYMS

ADEQ	Arizona Department of Environmental Quality
ADOT	Arizona Department of Transportation
AZDEM	Arizona Department of Environmental Management
AZSERC	Arizona Emergency Response Commission
BLM	Bureau of Land Management
CalOES	California Office of Emergency Services
CDFWS	California Department of Fish and Wildlife Services
DPS	Department of Public Safety
EOC	Emergency Operations Center
FEMA	Federal Emergency Management Agency
FOSC	Federal On-Scene Coordinator
IBWC	International Boundary and Water Commission
IMAAC	Interagency Modeling and Atmospheric Assessment Center
MSDS	Material Safety Data Sheet
NOAA	National Oceanic and Atmosphere Administration
NRC	National Response Center
NWS	National Weather Service
OSPR	Office of Spill Prevention and Response
RRT	Regional Response Team
SMEs	Subject Matter Experts
TTX	Table Top Exercise
UP	Union Pacific Railroad
US EPA	United States Environmental Protection Agency
USCG	United States Coast Guard

THIS PAGE LEFT BLANK INTENTIONALLY

ATTACHMENT B Excerpt from LCRGRP Notifications Section

Notification Overview

The chart below shows the flow of notifications that must be made in a hazardous material, petroleum product, or other contaminant emergency.

First On-Scene

(Fire, Law, EMS, Public, etc.)

*will notify local **Dispatch** (via 911 or radio)*

Dispatch will make operational notifications. Operations will initiate incident command

A complete list of Dispatch Centers can be found on page R-4 of this plan



<i>Incident Command will make Mandatory Notifications</i>	
National Response Center	(800) 424-8802
Nevada DEM/ NDEP	(775) 688-2830/ (775) 687-9485 (NDEP out of state) (888) 331-6337 (NDEP in state)
Arizona DEM	(800) 411-2336
California Office of Emergency Services	(800) 852-7550 or (916) 845-8911
Incident Command may also consider notifying the following Affected or Adjacent Agencies	
U.S Bureau of Reclamation 24-hour Emergency Operations Center will be responsible for notifying downstream water users.	(702) 494-2231
Area 1	
Clark County, NV Office of Emergency Management	(702) 455-5710
Southern Nevada District Board of Health, Clark County, NV	(702) 759-0588
Areas 1 and 2	
Mohave County, AZ Environmental Health Division, Bullhead City Office	(928) 758-0704
Mohave County, AZ Division of Emergency Management	(928) 753-0753
Area 2	
San Bernardino County Office of Emergency Services	(909) 822-8071
San Bernardino County Environmental Health Services	(800) 472-2376
Area 3	
Riverside County Office of Emergency Services	(951) 940-6910
Riverside County Department of Environmental Health	(888) 722-4234
Imperial County Division of Emergency Management	(760) 482-2400
Imperial County Environmental Health	(760) 336-8530
La Paz County Department of Emergency Management	(928) 669-6141
La Paz County Environmental Health Division	(928) 669-1100
Yuma County Environmental Health Division	(928) 317-4584
Yuma County Office of Emergency Management	(928) 317-4680

Notify downstream counties only

Federal Mandatory Spill Notification Requirements

Chemical Spills

Originally published in 1985 under the authority of Section 102 of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), the Designation, Reportable Quantities, and Notification regulation:

- Designates specific substances as hazardous under CERCLA;
- Identifies the quantity of substances which, when released, requires notification; and
- Sets forth the notification requirements for releases of these substances.

The reportable quantities apply to the waste itself, not merely to the toxic contaminant. Unlisted hazardous wastes which exhibit toxicity are also covered under this regulation, and have been assigned a reportable quantity of 100 pounds.

The notification requirement applies to any person in charge of a vessel or an offshore or an onshore facility, who must notify the [National Response Center](#) if any release of a hazardous substance equal to or exceeding the reportable quantity occurs at their vessel or facility.

The list of hazardous substances and reportable quantities can be found at:

<http://www.epa.gov/swercepp/web/docs/er/302table01.pdf>

Oil Spills

Under the legal authority of the [Clean Water Act](#), the Discharge of Oil regulation, more commonly known as the "sheen rule", provides the framework for determining whether an oil spill to inland and coastal waters and/or their adjoining shorelines should be reported to the federal government. In particular, the regulation requires the person in charge of a facility or vessel responsible for discharging oil that may be "harmful to the public health or welfare" to report the spill to the federal government. The regulation establishes the criteria for determining whether an oil spill may be harmful to public health or welfare, thereby triggering the reporting requirements, as follows:

- Discharges that cause a sheen or discoloration on the surface of a body of water;
- Discharges that violate applicable water quality standards; and
- Discharges that cause a sludge or emulsion to be deposited beneath the surface of the water or on adjoining shorelines.

To ensure that all affected agencies/organizations are notified:

- 1) First On-Scene will notify Dispatch. (Page R-4 for List of Dispatch Centers)
- 2) *Dispatch* will make operational notifications. Operations will initiate formation of Incident Command.
- 3) Incident Command will make the ***Mandatory Notifications***.
- 4) Use the **Emergency Notification Guide** (Notification – Red Tab) to contact additional agencies/organizations.
- 5) Use the **Contact Number Lists** (Notification – Red Tab) to find emergency phone numbers.
 - a. Contact Number List Sorted by Agency Purpose - Agencies are sorted by the purposes listed below.
 - b. Contact Number List Sorted Alphabetically by Agency Name

List of Dispatch Centers

Dispatch Center	Phone Number	Area of Dispatch	Agencies Notified
Law Enforcement and Fire/Emergency Medical Services			
Bullhead City, AZ	928-763-1999	Bullhead City, Fort Mojave, Mohave Valley, Topock	Bullhead City (BHC) Police Department, BHC Fire District, Ft. Mojave Mesa Fire District, Mohave Valley Fire District, Golden Shores/Topock Fire District
Lake Havasu City, AZ	928-855-4111	Lake Havasu City	Lake Havasu City (LHC) Police Department and LHC Fire Department
Mohave County, AZ	928-753-0753 928-753-2141	Mohave County	Mohave County Sheriff's Office Dispatch/County DEMA
NPS (Lake Mead Dispatch)	702-293-8932	Lake Mead Lake Mohave	NPS and BLM fire and law enforcement EMS (Park Service)
Yuma County, AZ	928-783-4427	Yuma County	Yuma County SO, Yuma County fire and law enforcement
San Bernardino County Emergency Dispatch, CA	909-822-8071	San Bernardino County	San Bernardino County Fire and surrounding cities (Rialto, Colton, Lomo Linda, Redlands/Apple Valley)
Fire/EMS Only			
River Medical Dispatch	928-855-4111	Lake Havasu City, AZ	Desert Hills Fire District, River Medical Inc (EMS)
Clark County, NV	702-382-3000	Clark County, NV	Clark County Fire Department
Law Enforcement Only			
Arizona Game and Fish	623-236-7201	Arizona	Arizona Game and Fish officers or local law enforcement
Hoover Dam Police Department	702-494-2576		
Las Vegas Metropolitan PD	702-828-7110	Clark County, NV	Las Vegas PD
Nevada Department of Wildlife	775-688-1331 (6am to 11pm, 7 days)		
Phoenix Interagency Law Enforcement Dispatch	800-637-9152	NWR in Arizona	NWR Law Enforcement in Arizona
Ventura Fish & Wildlife Office	805-644-1766 (x339)	San Bernardino County	USFWS Field Response Coordinators

Emergency Notification Guide

Emergency Notifications are made in accordance with the area plan developed by the appropriate Regional and County Offices of Emergency Services.

Use the following checklist as a guide to contact additional agencies and organizations not listed in the Mandatory Notifications table above.

- Document the Time of Contact and Estimated Time of Arrival (ETA) on line provided.
- Notifying the agencies downstream of the release may be mandatory or may have priority.
- Consider notifying other agencies listed when appropriate.
- Checklist may be used to identify agencies that can provide additional resources.

The following notification procedures for spills that may impact Mexico are described in the Mexico – United States Joint Contingency Plan, March 2009.

When the NRC receives an incident report about a spill on the Lower Colorado River that may impact Mexico they will notify the following United States and Mexico Contacts:

United States Contacts

- US EPA On-Scene Coordinator for US EPA Region 9
(800) 300-2193
- U.S. Joint Response Team (JRT) Co-Chair, US EPA Office of Emergency Management, Emergency Operations Center
(202) 564-3850

(202) 564-8729 (*Fax*)
- Department of State - International Boundary and Water Commission
(928) 782-1598 (Yuma Office)

Mexico Contacts

- National Communications Center (CENACOM)
cenacom@segob.gob.mx (*email only*)
- Center for the Orientation of Emergencies (COATEA)
coatea@profepa.gob.mx (*email only*)
- Federal Attorney General for Environmental Protection (PROFEPA)
coatea@profepa.gob.mx (*email only*)

Contact Number List

Agency	Emergency/24 hour	Daytime/Office	Agency/Company Purpose	Level
Arizona Department of Environmental Quality	602-390-7894	602-771-4106	Environment/Health	State
Arizona Department of Public Safety	602-223-2212	928-782-1679	Environment/Health	State
Arizona Department of Transportation (ADOT)	800-377-3701/ 602-257-1563	928-726-5938	Roads	State
Arizona Emergency Response Commission	602-231-6346	602-231-6346	Emergency Management	State
Arizona Game and Fish	800-352-0700	928-692-7700	Environment/Health	State
Arizona State Parks	928-580-6527	602-542-4009	Environment/Health	State
Black Meadow Landing	760-663-4901	760-663-4901	Marina	Private Organization
BNSF Railway	800-832-5452	909-386-4082	Railroad	Private Organization
Bullhead City Fire District	928-763-1999	928-758-3971	Fire/EMS	Local
Bullhead City Police and Emergency Management	928-763-1999	928-763-9200	Law/EMS	Local
California Department of Fish and Wildlife (Sacramento)	800-852-7552 (Cal OES)	916-341-6957	Environment/Health	State
California Department of Fish and Wildlife (Blythe)	800-852-7552 (Cal OES)	760-604-6170	Environment/Health	State
California Office of Emergency Services (Cal OES)	916-324-8905	916-324-8905	Emergency Management	State
Clark County Fire Department	702-229-0401	702-455-7311	Fire/EMS	County

Agency	Emergency/24 hour	Daytime/Office	Agency/Company Purpose	Level
Desert Hills Fire District	928-754-3311	928-764-3333	Fire/EMS	Local
El Paso Natural Gas	800-334-8047	928-923-2202 928-768-7924	Utilities	Private Organization
Fort Mojave Mesa Fire Department	928-763-1999	928-768-9181	Fire/EMS	Local
Fort Mojave Tribal Police, FD, Public Health & Emergency Preparedness	928-346-1521	928-346-1521	Fire/EMS/Law	Local
Golden Shores/Topock Fire Department	928-763-1999	928-768-4546	Fire/EMS	Local
H2O Environmental, Inc.	702-396-4148	702-396-4148	Contract support	Private Organization
Kinder Morgan Energy Partners, L.P.	888-844-5658	760-455-6464	Pipeline	Private Organization
La Paz County Sheriff's Office	928-669-2281	978-669-6141	Law	County
Lake Havasu City Fire Department	928-855-4111	928-855-1141	Fire/EMS	Local
Lake Mohave Resort	928-754-3245	928-754-3245	Marina	Private Organization
Metropolitan Marine Solutions Vessel Assist Lake Mohave	818-398-6635	928-788-1815	Contract support	Private Organization
Mohave County DEMA	928-753-0753	928-757-0930	Environment/Health	County
Mohave County Sheriff's Office	928-753-0753 928-718-4601 (4602,4603)	978-753-2141	Law	County
Mohave Valley Fire District	928-763-1999	928-768-9113	Fire/EMS	Local
Nevada Department of Wildlife	775-688-1331	702-486-5127	Environment/Health	State
Nevada Division of	775-687-9485 (out of state)	775-687-9382	Environment/Health	State

Agency	Emergency/24 hour	Daytime/Office	Agency/Company Purpose	Level
Environmental Protection	888-331-6337 (in state)			
Nevada State Emergency Response Commission	775-684-7511	775-684-7511	Emergency Management	State
Nevada State Health Division, Radiation Control	877-438-7231		Environment/Health	State
Questar Pipeline (Southern Trails Pipeline)	800-261-0668	505-326-9602	Pipeline	Private Organization
San Bernardino County Fire	909-356-3805	909-855-5043	Fire/EMS	County
Southern Nevada Water Authority	702-249-0858	702-862-3748	Utilities	Private Organization
Southwest Gas Corporation (SGTC)	800-477-5422	928-763-5324	Utilities	Private Organization
TransCanada Pipeline (North Baja Pipeline, LLC)	800-447-8066	928-923-7891	Pipeline	Private Organization
TransWestern Pipeline Co.	866-999-8975	928-774-1547	Pipeline	Private Organization
Union Pacific Railroad	888-877-7267	909-685-2857	Railroad	Private Organization
U.S. Bureau of Land Management (Lake Havasu City, Yuma)	928-706-1957	928-343-8306 928-505-1264	Environment/Health	Federal
U.S. Bureau of Land Management (Clark County, NV)	702-494-7442	702.515.5053	Environment/Health	Federal
U.S. Bureau of Reclamation Lower Colorado River Regional Hazmat Office	702-467-5821	702-293-8060	Environment/Health/Safety	Federal
U.S Bureau of Reclamation 24 Hour Communication	702-494-2576		Environment/Health	Federal

Agency	Emergency/24 hour	Daytime/Office	Agency/Company Purpose	Level
Center				
U.S. Bureau of Reclamation - Lower Colorado Dam Office	702-467-5821 702-494-2576 928-343-8215 (Control Center)	702-293-8060 702-494-2231 928-343-8215 (Yuma)	Environment/Health	Federal
US DOT/PHMSA/Pipeline Safety	720-963-3175	720-963-3160 909-937-7228	Environment/Health	Federal
U.S. Environmental Protection Agency	800-424-8802	800-300-2193	Environment/Health	Federal
USFWS (Arizona)	623-910-2414	602-242-0210	Environment/Health	Federal
USFWS (Bill Williams River NWR)	928-667-4144	928-667-4144	Environment/Health	Federal
USFWS (Cibola NWR)	928-857-3253	928-857-3253	Environment/Health	Federal
USFWS (Havasu NWR)	760-326-3853	760-326-3853	Environment/Health	Federal
USFWS (Imperial NWR)	928-783-3371	928-783-3371	Environment/Health	Federal
USFWS (Las Vegas)	775-384-9137	775-861-6300	Environment/Health	Federal
USFWS (Southwest Arizona National Wildlife Refuge Complex – Kofa, Imperial, and Cibola NWRs)	928-783-7861	928-783-7861	Environment/Health	Federal
USFWS Willow Beach National Fish Hatchery	928-767-3456	928-767-3456	Environment/Health	Federal
Willow Beach Marina	702-294-1414	928-767-4747	Marina	Private Organization
Yuma County Emergency Management	928-783-4427	928-317-4680	Emergency Management	County
Yuma River Tours	928-920-4401	928-783-4400	Marina	Private Organization

Area	Tribe	Contact	Phone Number	Email
1	None identified			
2	Chemehuevi Indian Tribe	Glenn Lodge (Primary)	(760) 858-1140 (760) 718-8641 (cell)	Glodge08@gmail.com
		Tom Pradetto (Secondary)	(760) 858-1140	envirodirector@gmail.com
	Fort Mohave Indian Tribe	Wes Sullivan	(928) 346-1521	wsullivanfmpd@yahoo.com
3	Colorado River Indian Tribes (CRIT)	Roger Interlicchia	(928) 669-1253	roger.interlicchia@crit-nsn.gov
	Quechan Indian Tribe	Chase Choate	(760) 572-2969	c.choate@quechantribe.com
	Cocopah Indian Tribe	Mike Fila (Primary)	(928) 627-2025 (ext 12) (928) 750-6612 (cell)	mfila@cocopah.com
Robby Rodriquez (Secondary)		(928) 722-7381 (928) 446-2256 (cell)	robbyR@cityofsomerton.com	
			Dispatch (928)627-2012	

