

# Nevada Department of Transportation Hazardous Commodity Flow Study

Nevada SERC Meeting - November 8, 2018



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*presented to*  
Nevada Department of Transportation

*presented by*  
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- Chemical Selection Process
- Petroleum Supply Chain Preliminary Results
- Hazmat Roadside Data Collection Update
- Questions

# Chemical Selection Process

*Details*

## Purpose

- Facilities reported over 18,000 toxic and flammable chemicals stored at more than 2,300 locations in Nevada. With so many chemicals in transport, the CS Team focused on priority chemicals that pose the greatest health and safety hazards to the public.
- Identifying priority chemicals also helps to determine which facilities to contact for additional hazmat routing, frequency and volume data.

# Data Collection *Details*

## Chemical Data Sources

- Extremely Hazardous Substances (EHS) are the priority, however, others may also be selected
- CAPP Data - Risk Management Plans (RMP) required by EPA
- Toxics Release Inventory (TRI) Data
- Nevada Statewide Hazmat Database (Tier II Chemical Reporting)
- CAMEO Chemical Database





# Methodology

- The CS Team isolation distance, threshold planning quantity, lower flammability limit and flash point as criteria to determine hazmat priority.

Criterion	Description	Source
Isolation Distance	Recommended distance within which first responders should position emergency assets	Emergency Response Guidebook
Threshold Planning Quantity	Minimum amount of chemical that if present at a facility poses a hazard	EPA/CAMEO
Lower Flammable Limit (LFL)	Lower limit of a concentration range of a gas or vapor that will burn if exposed to an ignition source.	Engineering Toolbox
Flash Point	Temperature at which vapor from gas ignites	NFPA

# Isolation Distance

- For both toxic and flammable chemicals, **Isolation Distance** was calculated for large spills from truck and rail. This is defined as the recommended distance from a spill source within which first responders should position emergency assets. The larger the Isolation Distance, the greater the hazard.

Isolation Distance (in feet) Toxic Chemicals	Score
0-500	1
501-1000	2
1001-2000	3
2001-3000	4

# Threshold Planning Quantity

- TPQ is defined as the minimum amount of chemical that if present at a facility, the EPA requires the development of a Risk Management Plan (RMP). The lower the level of TPQ, the higher the hazard from the chemical.

Threshold Planning Quantity (in lbs.)	Score
0-100	3
101-500	2
501-1000	1

# Flammability Range

- The Flammable Range (Explosive Range) is the concentration range of a gas or vapor that will burn (or explode) if an ignition source is introduced. Below the explosive or flammable range the mixture is too lean to burn and above the upper explosive or flammable limit the mixture is too rich to burn. The lower the flammability level, the higher the hazard.

Lower Flammable Limit (LFL)	Score
0-2	2
2-4	1.5
4-6	1
6-8	0.5



# Flash Point

- The Flash Point is the temperature at which vapor from flammable liquids ignite. This can be a positive or negative number. The lower the flash point, the higher the score.

Flash Point	Score
-100+° F	1.5
0 to -100° F	1
0-100° F	0.5

# Scoring Table (Excerpt)

	Chemical Name	Isolation distance ft.	TPQ lbs.	LFL	Flash Point ° F	Iso. Dist. Score	TPQ Score	LFL Score	Flash Point Score	Final Score	On-Site lbs.	Sites	EHS
1	Chlorine	3,000	100	0		4	3	0	0	7	5,461,350	6	Yes
2	Sulfur Dioxide	3,000	500	0		4	2	0	0	6	288,521	1	Yes
3	Nitrogen Dioxide	1,250	100	0		3	3	0	0	6	69	2	Yes
4	Isobutane	2,640	0	1.8	-117	2	0	2	1.5	5.5	2,128,779	4	No
5	Hydrocyanic Acid	1,000	100	0		2	3	0	0	5	19,194	1	Yes
6	Butane	2,640	0	1.86	-76	2	0	2	1	5	2,450,876	6	No
7	Propane	2,640	0	2.1	-155	2	0	1.5	1.5	5	4,545,685	7	No

# Proposed Top Ten Chemicals

	Chemical Name	Score	Chemical Uses	Facilities	EHS
1	Ammonia, Anhydrous	4	Refrigerant, fertilizer	18	Yes
2	Butane	4	Fuel and blending	6	No
3	Chlorine	7	Water treatment	6	Yes
4	Ethanol	1	Biofuel	5	No
5	Hydrofluoric acid	4	Manufacturing	8	Yes
6	Nitrogen Dioxide	6	Catalyst, oxidizing agent	2	Yes
7	Potassium Cyanide	4	Mining and electroplating	2	Yes
8	Propane	3.5	Fuel and heating	7	No
9	Sodium Cyanide	4	Mining operations	18	Yes
10	Titanium tetrachloride	4	Titanium, whitening	4	Yes

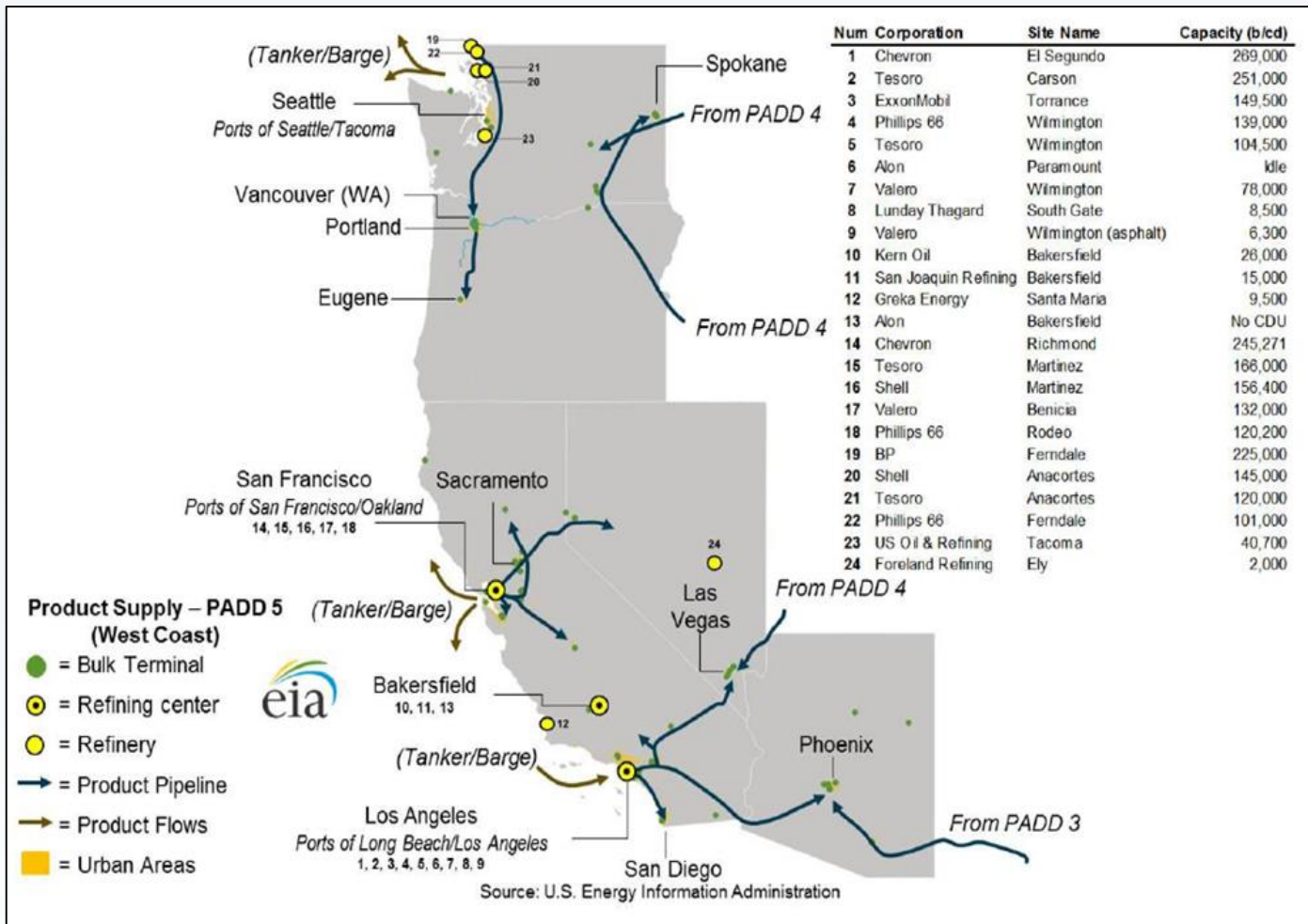
# Next Steps for Top Ten Chemicals

- Identify hazmat facilities storing top ten chemicals
- Identify distribution centers and manufacturers
- Conduct outreach to top ten hazmat facilities
- Obtain origin-destination information from multiple sources
- Develop top ten chemical maps

# Petroleum Supply Chain Methodology

- Nevada refined petroleum is produced in California and Utah
- Refined Petroleum is transported to Nevada via pipelines.
- Petroleum is primarily stored in Reno and Las Vegas
- Trucks transport refined petroleum to retail facilities

# Petroleum Sources





# Petroleum Storage

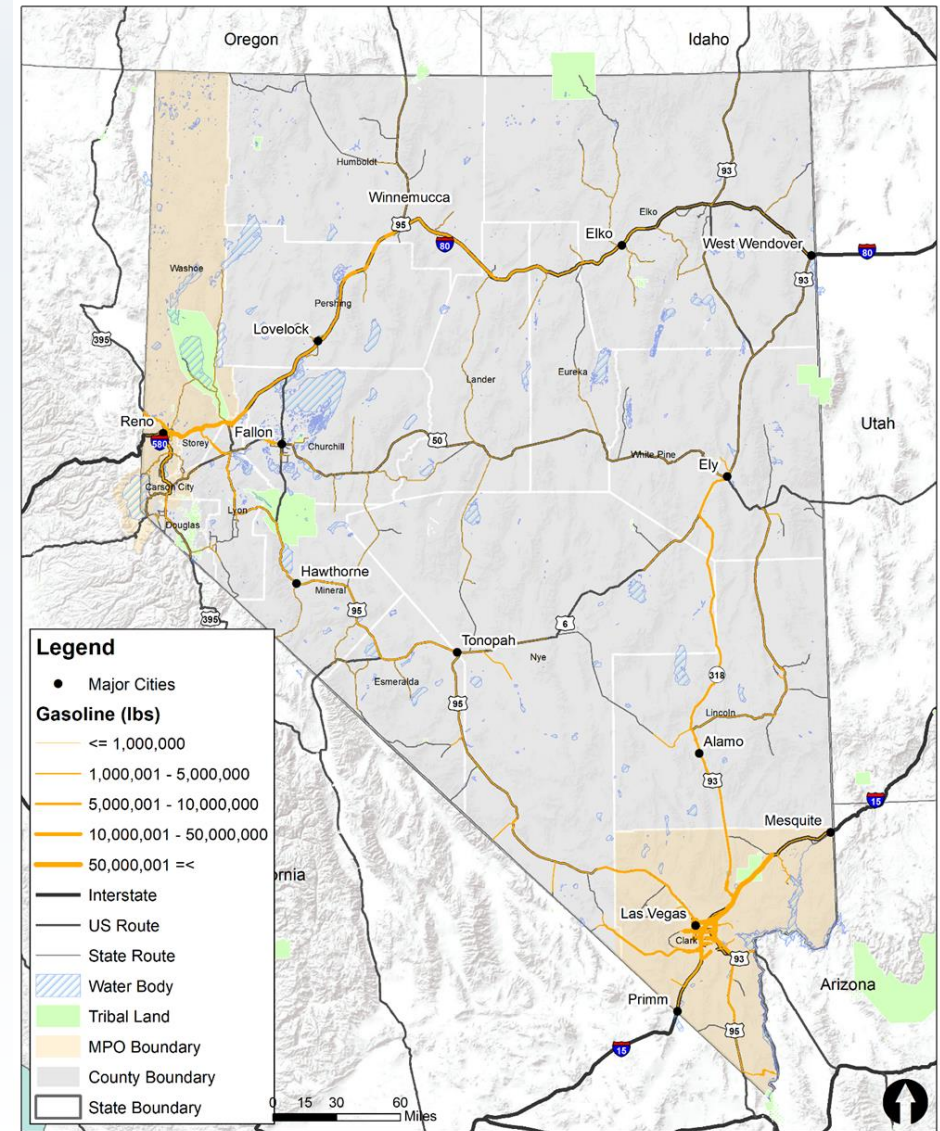
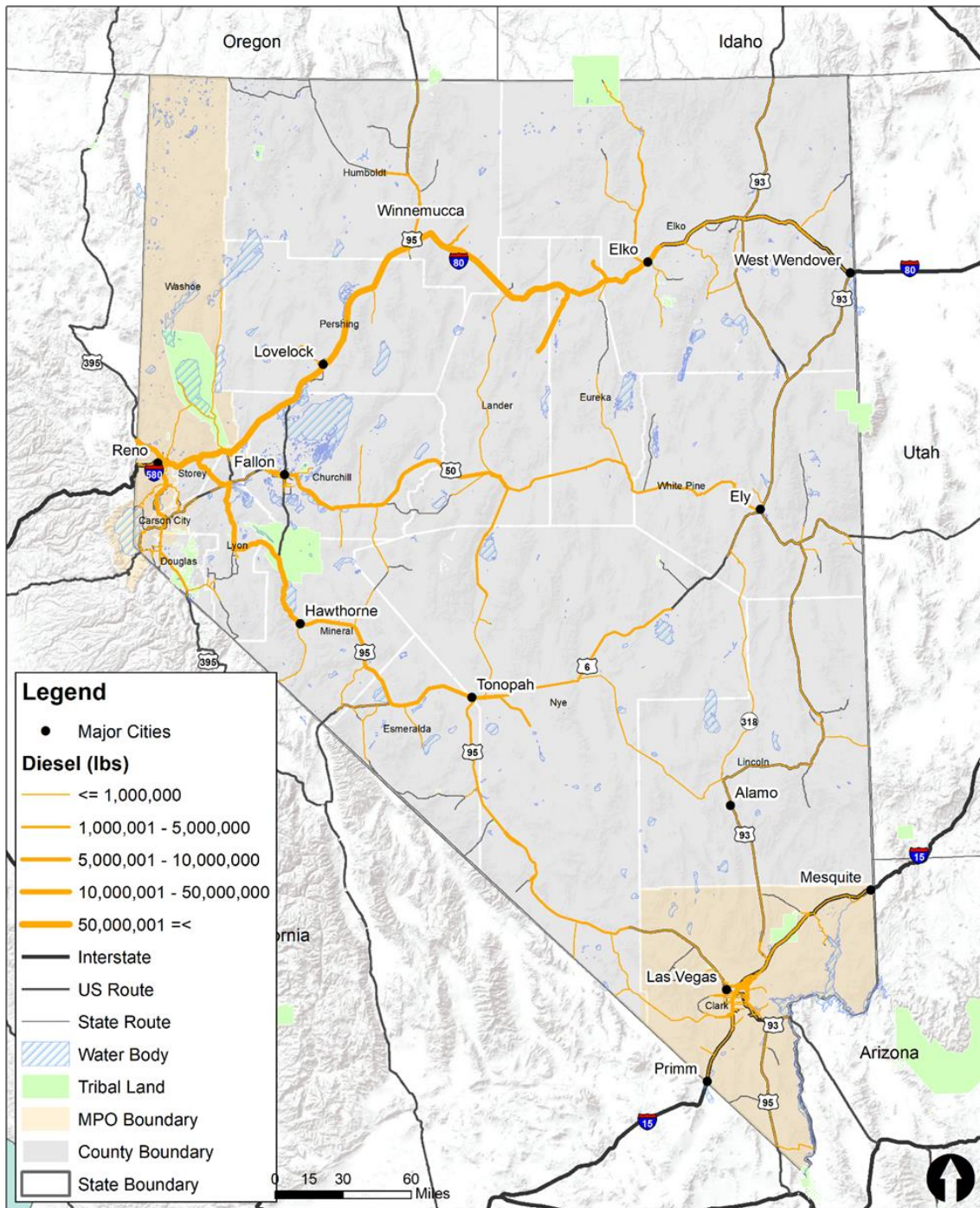


Refined Product	Approximate Barrels per Month
Gasoline	1,000,000
Diesel Fuel	500,000
Jet Fuel	1,100,000
Other Terminals	1,000,000
Total	3,600,000

Other terminals include Pacific Tank Lines, Haycock Petroleum Company (Sinclair) and Pro Petroleum



# Petroleum Distribution





# Roadside Hazmat Surveys

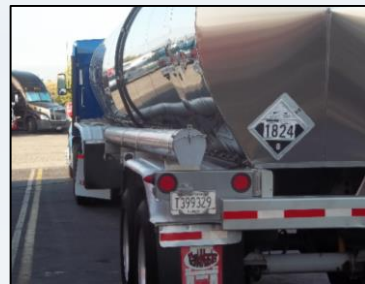
## Roadside Placard Surveys

- Two hour bi-directional counts of trucks displaying hazmat placards
  - » ID truck volumes, types and hazmat placards
  - » Conducted on weekdays and daylight hours
- Up to 20 count locations
  - » 8 in Las Vegas area
  - » 5 in the Reno area
  - » 7 in rural areas



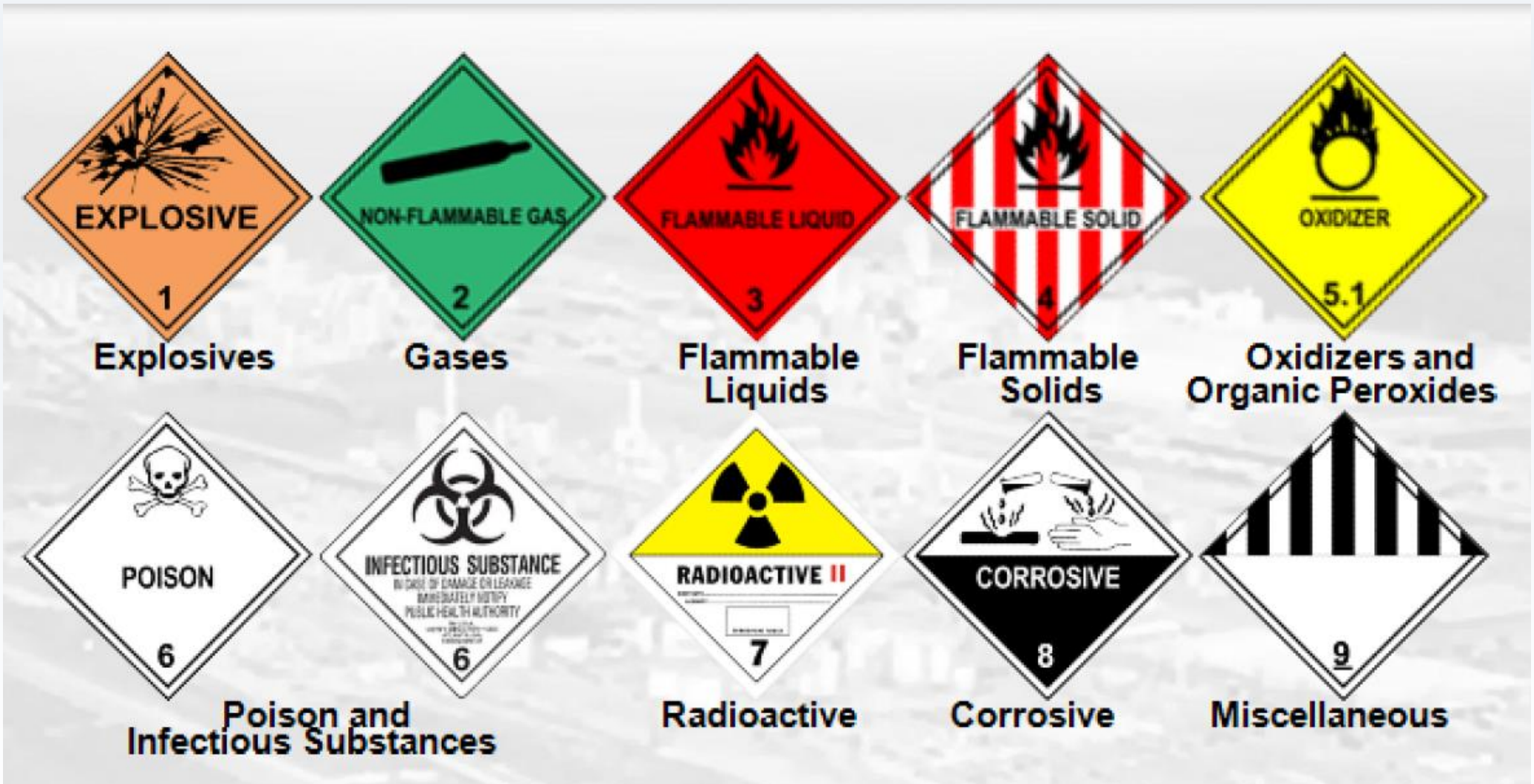


# Truck Placard Placement





# Hazmat Classifications



# Data Collection

## *Identifying Hazmat Placards*

### HazFlow Data Collection

- Use Worksheets to record Hazmat Counts



United Nations  
(UN) Number



Date/ Time				Highway	US 95 (SAMPLE)
				Cross Street	Skye Canyon Drive
	UN Number	Color	Direction	Notes	
1	1203	Red	N	Flying J	
2	1075	Red	S		
3	1005	Green	S		



THANK YOU!

Questions

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