Selecting Protective Action Distances that Make Good Sense

Striking a Balance Between the DOT ERG and Fixed Facility EPHAs

Introduction

Purpose

- Spotlight an issue
- Outline a thought process
- Solicit feedback

DOE O 151.1C FAQs

- Off-site commercial transportation event:
  - Operational Emergency no further classification
- On-site commercial transportation event:
  - Operational Emergency no further classification

DOE O 151.1C FAQs (continued)

- The DOT ERG serves as the EPHA for transportation-related accidents.
- Neither the Order nor the EMG provides explicit direction related to the classification of accidents involving DOT compliant onsite shipments.

DOE O 151.1C FAQs (continued)

- Hazardous materials transport accidents on a DOE site must be classified and protective actions implemented, as appropriate.
- Transportation hazard identification, analysis, and the application of the results must be consistent with fixed-facility EPHAs.

DOE O 151.1C FAQs (continued)

- The DOE screening guidance in DOE G 151.1-2 should be implemented literally. [Do not build in more conservativism.]
- DOE advises not to analyze spills smaller than the screening threshold quantities.
  - *"There is no compelling evidence that such quantities have caused or are causing significant harm to people other than those directly involved with use or handling of the material. Hazard-specific planning and preparedness does not appear to be needed to protect people outside the workplace from the effects of these releases."*

Advice (not in FAQs)

- Use of the ERG to categorize and classify transportation events strictly applies to the ERG green pages. It was not intended that the orange guides be used as basis for classifying events.
- Thou shalt not apply the ERG to fixed facilities.

Summary

- Transportation events = OE unclassified
- Use the ERG in lieu of EHA but cat/class where appropriate.

ERG vs. Fixed Facility – Two Scenarios

Scenario 1:

- Anhydrous ammonia is being delivered to a fixed facility storage tank.
  - Part A: The tanker is breached while transporting on-site, spilling 1,000 gal.
  - Part B: The fixed facility storage tank is breached spilling 1,000 gal (e.g. 50 cal weapon).

ERG vs. Fixed Facility – Two Scenarios

Scenario 2:

- Nitric acid (70 wt%) is being delivered to a fixed facility storage tank.
  - Part A: The tanker is breached while transporting on-site, spilling 1,000 gal.
  - Part B: The fixed facility storage tank is breached (puddle), spilling 1,000 gal.

Scenario 1: 1,000 gal anhydrous ammonia spill

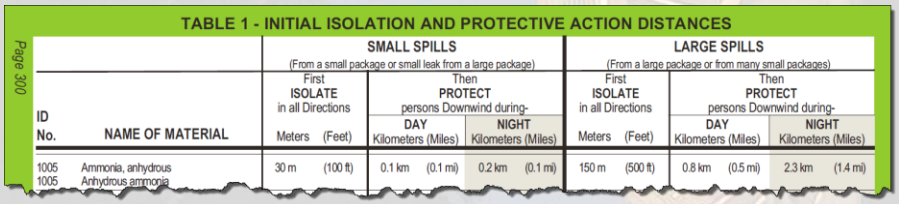

TABLE 1 - INITIAL ISOLATION AND PROTECTIVE ACTION DISTANCES

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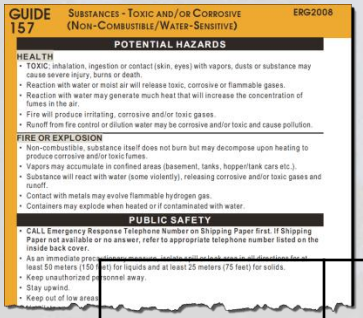
ID No.	NAME OF MATERIAL	SMALL SPILLS (From a small package or small leak from a large package) First ISOLATE in all Directions Meters	(Feet)	Then PROTECT persons Downwind during- DAY Kilometers (Miles)	NIGHT Kilometers (Miles)	LARGE SPILLS (From a large package or from many small packages) First ISOLATE in all Directions Meters	(Feet)	Then PROTECT persons Downwind during- DAY Kilometers (Miles)	NIGHT Kilometers (Miles)
1005	Ammonia, anhydrous	30 m	(100 ft)	0.1 km	(0.1 mi)	0.2 km	(0.1 mi)	150 m	(500 ft)	0.8 km	(0.5 mi)	2.3 km	(1.4 mi)
1005	Anhydrous ammonia												

1005	Ammonia, anhydrous (1,000-gal tank)	Isolate (AEGL-3) (m)	Then protect persons downwind during-	
			Day (km)	Night (km)
	ERG-2008	150	0.8	2.3 km
Fixed Facility	ALOHA (Day)	370	1.1	
	ALOHA (Night)	952		2.2

Scenario 1 - Overview

- Results – There seems to be reasonable correlation between the EPHA and ERG.
- Risks – The ERG significantly underestimates the TEL.
- Practical Impacts – Immediate shelter is the only practical option. So, the TEL distance is not the overriding concern.
- Conclusions – It looks like the EPHA and ERG can work together.

Scenario 2: 1,000-gal nitric acid spill



GUIDE 157 SUBSTANCES - TOXIC AND/OR CORROSIVE (NON-COMBUSTIBLE/WATER-SENSITIVE) ERG2008

POTENTIAL HAZARDS

HEALTH

- TOXIC; inhalation, ingestion or contact (skin, eyes) with vapors, dusts or substance may cause severe injury, burns or death.
- Reaction with water or moist air will release toxic, corrosive or flammable gases.
- Reaction with water may generate much heat that will increase the concentration of fumes in the air.
- Fire will produce irritating, corrosive and/or toxic gases.
- Runoff from fire control or dilution water may be corrosive and/or toxic and cause pollution.

FIRE OR EXPLOSION

- Non-combustible, substance itself does not burn but may decompose upon heating to produce corrosive and/or toxic fumes.
- Vapors may accumulate in confined areas (basement, tanks, hopper/tank cars etc.).
- Substance will react with water (some violently), releasing corrosive and/or toxic gases and runoff.
- Contact with metals may evolve flammable hydrogen gas.
- Containers may explode when heated or if contaminated with water.

PUBLIC SAFETY

- CALL Emergency Response Telephone Number on Shipping Paper first. If Shipping Paper not available or no answer, refer to appropriate telephone number listed on the inside back cover.
- As an immediate precautionary measure, isolate spill or leak area in all directions for at least 50 meters (150 feet) for liquids and at least 25 meters (75 feet) for solids.
- Keep unauthorized personnel away.
- Stay upwind.
- Keep out of low areas.

2031	Nitric acid (70%) (1,000-gal tank)	Isolate (AEGL-3) (m)	Then protect persons downwind during-	
			Day (m)	Night (m)
	ERG-2008	50	N/A	N/A
Fixed Facility	ALOHA (Day)	26	88	
	ALOHA (Night)	88		213

Scenario 2 - Overview

- Results:
  - ERG – Operational Emergency no further classification
  - Fixed facility – Site Area Emergency
- Risks:
  - Health risks appear to be minimal in either case.

Scenario 2 - Overview

- Practical Impacts: The situation appears to conflict with
  - *"Successful integration suggests that a site response for transportation accidents analyzed in the ERG should be consistent (i.e., classification and initial protective actions) with its response to emergency events that are specifically analyzed in EPHAs."*

Scenario 2 - Overview

- Conclusions – On the surface, it does not appear that the EPHA and ERG can work together for Orange Guide-only hazardous materials.

Discussion

- From DOE G 151.1-4, “Response Elements”
  - *“Any facility evacuation in response to an actual occurrence that requires time-urgent response by specialist personnel, such as hazardous material responders or mutual aid groups not normally assigned to the affected facility.*
- Does this cover the event?

Discussion

- If a transportation-related spill warrants categorization as an operational emergency not requiring further classification, what value is added by classifying the same event at a fixed facility?
- In general, does classifying Orange Guide-only hazardous materials add value?

Conclusion

- Going back to the less-than-screening-quantity threshold slide:
  - *"There is no compelling evidence that such quantities have caused or are causing significant harm to people other than those directly involved with use or handling of the material. Hazard-specific planning and preparedness does not appear to be needed to protect people outside the workplace from the effects of these releases."*

Final Point

- Is there “compelling evidence” that classifying events involving Orange Guide-only hazardous materials provides significant protection to personnel beyond that offered by the ERG protective actions?