Pennsylvania State Fire Academy

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Minimum Standards for Accreditation

February 2002

Course Title: Propane Emergencies Technician (PPET)

Length of Course: 24 hours **Lecture/Lab Breakdown:** 24/0

Prerequisites: IAFF or HISI or employer's certification at the OSHA/EPA Haz-Mat First Responder Operations level or greater. **NOTE: Local Level courses *Propane Emergencies Awareness (PPEA)* or *Propane Emergencies Operations (PPEO)* are NOT a prerequisite for this course; each course in this series is designed to be a stand-alone curriculum. As a result, much of the material repeats itself in each course.**

Referenced Text: NPGA ***Propane Emergencies*** (Hildebrand & Noll, 1999) and NPGA ***Propane Emergencies Facilitator's Guide*** (Callan, 1999); Local Level Course ***PPEP*** MSA and Instructor Guide.

Course Goal: A student completing this course will be able to recognize the hazards involved in a propane/liquefied petroleum gas emergency and take appropriate response actions in a wide range of propane related emergencies involving consumer products, portable storage, motor fuel use, and bulk storage and transport.

Description of Course: This program has been designed for experienced fire fighters, incident commanders, and related emergency response personnel (such as haz-mat team members) whose duties require a more detailed knowledge of propane and its properties. Students will learn about the basic properties and hazards of propane and liquefied petroleum gases, containment vessel characteristics, and control strategies for the both the common and more complex types of propane emergencies. Container damage assessment and incident management information is included.

Description of Methodology to be used: (Brief) Lecture and discussion; group activities

Student Equipment/Supply Needs: Pen/pencil and note-taking materials.

Equipment/Audiovisual/Supply Requirements: Classroom w/ usual amenities; TV/VCR with adequate monitors; computer projection capability for use of CD audiovisual package (or conversion of that package to 35 mm slides or overhead transparencies with appropriate projection equipment); NPGA Facilitator's Kit for this course.

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Course Topical Outline (General):

Time	Content	Instructor Notes
0:30	Unit 1: Welcome/Registration; Introduction & Overview	Per Academy policies
1:30	Unit 2: Standards, Codes, & Regulations	
2:00	Unit 3: Physical Properties & Characteristics of Propane	
2:00	Unit 4: Non-bulk Container Design & Construction Features	
3:00	Unit 5: Bulk Transportation Design and Function	
3:00	Unit 6: Bulk Plants & Bulk Storage Tanks	
3:00	Unit 7: General Emergency Response Procedures	
6:00	Unit 8: Tactical Response Guidelines for Propane Emergencies	
2:00	Unit 9: Product Removal, Transfer, and Recovery Operations	
1:00	Video	
:30	Summary and Evaluation	

Competency Evaluation Mechanism:

Direct questioning by instructor during course of class;
Instructor observation/feedback of student performances during group activities;
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Course Objectives (Learning Outcomes):

Upon completion of this course, the student will be able to correctly and, where appropriate, safely:

1.1 Describe the scope and target audience of this course.
1.2 Identify the key players who may become involved in a major propane emergency and explain their role in resolving the emergency.
2.2 Define the term *voluntary consensus standard* as it relates to safety and fire protection.
Describe the general scope of the following:
2.2.1 ANSI Z223.1 *The National Fuel Gas Code*
2.2.2 ASME *Unfired Boiler and Pressure Vessel Code (Division 1, Section VIII).*
2.2.3 NFPA 58 *National LP Gas Code*
2.3 Describe the role of the following in ensuring consistency and safety in the propane industry.
2.3.1 Independent testing laboratories.
2.3.2 Trade associations
2.4 List the two primary federal agencies that regulate LP Gases in the United States.
2.5 Describe the role of state and local governments in adopting consensus standards.
3.1 List the two major flammable gases extracted in the Liquefied Petroleum Gases (LPG) Industry.
3.2 Describe the two main reasons for odorizing propane.
3.3 Identify 5 basic characteristics of LP gases.
3.4 Describe the three ways propane behaves when stored in a closed container.
3.5 Describe the relationship between heat, temperature, and boiling point as it relates to the storage of propane in a closed container.
3.6 List the 5 basic symptoms of carbon monoxide poisoning.
3.7 List the basic products of incomplete combustion of propane.
3.8 Describe the hazards of aldehydes as they relate to incomplete combustion of propane.
3.9 Define the following physical and chemical properties of propane and explain their significance in an emergency.
3.9.1 Specific gravity
3.9.2 Vapor density
3.9.3 Boiling point
3.9.4 Expansion ratio
3.9.5 Flammable limits
3.9.5 Ignition temperature

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Course Objectives (Learning Outcomes)(continued):

4.1 Define the following terminology as it relates to propane containers.
- 4.1.1 Container
- 4.1.2 Non – bulk packaging
- 4.1.3 bulk packaging
- 4.1.4 Fixed containers

4.2 Describe the following categories of propane containers.
- 4.2.1 DOT portable cylinders
- 4.2.2 DOT portable tanks
- 4.2.3 ASME mobile motor fuel tanks
- 4.2.4 ASME stationary tanks

4.3 Describe the following basic features of a propane tank.
- 4.3.1 Basic storage container
- 4.3.2 Pressure regulators
- 4.3.3 Pressure relief devices

4.4 Describe the following basic categories of DOT cylinders.
- 4.4.1 Portable service cylinder
- 4.4.2 Exchange service cylinder
- 4.4.3 Motor fuel cylinder
- 4.4.4 Stationary service cylinder

4.5 Describe the difference between a DOT motor fuel tank and an ASME motor fuel tank.

4.6 List the basic cylinder markings found on DOT cylinders.

4.7 Describe the following basic features of a DOT portable tank.
- 4.7.1 Tank openings and valves
- 4.7.2 Mounting hardware
- 4.7.3 Data plate information

4.8 Describe the following applications of ASME motor fuel cylinders.
- 4.8.1 Recreational vehicles
- 4.8.2 Lift trucks
- 4.8.3 Motor fuel tanks for road vehicles

4.9 Describe the basic features of ASME motor fuel tanks.

5.1 Describe the general features of a bobtail and a cargo tank truck.

5.2 Describe the following safety features on propane cargo tank trucks.
- 5.2.1 Internal safety valves
- 5.2.2 Excess flow valves
- 5.2.3 Remote shut-off devices
- 5.2.4 Fusible links, nuts, and plugs
- 5.2.5 Pressure relief valves
- 5.2.6 Overturn accident prevention

5.2.7 Describe the basic features of a propane railroad tank car.

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Course Objectives (Learning Outcomes)(continued):

5.3 Describe the following safety features on propane railroad tank cars.
- 5.3.1 Head shields and shelf couplers
- 5.3.2 Safety relief valves
- 5.3.3 Thermal protection

5.4.1 Describe the basic features of the DOT Spec. 51/IMO Type Intermodal propane container.

6.1 List and define the operational objectives of a bulk plant.

6.2 Identify the three primary operational areas of a bulk plant.

6.3 Describe:
- 6.3.1 the three basic features of a bulk storage tank.
- 6.3.2 the two types of bulk transport unloading stations found at a bulk plant.
- 6.3.3 the primary propane delivery system at a bulk plant.
- 6.3.4 the role of a cylinder filling station.

6.4 List two additional hazardous materials that may be found in a bulk plant.

7.1 Describe:
- 7.1.1 the importance of the Incident Management System as a tool for safely handling propane emergencies.
- 7.1.2 the three operational modes of strategy and tactics for managing a propane emergency.
- 7.1.3 Define the terms *strategy* and *tactics.*
- 7.1.4 The 8-step tactical procedure for managing propane emergencies.
- 7.1.5 Describe the concept of hazard assessment and risk evaluation as it applies to propane emergencies.

7.2 Given a scenario involving propane, identify and describe the critical safety considerations to be evaluated, including:
- 7.2.1 Potential for multiple hazards.
- 7.2.2 Risk of container failure.
- 7.2.3 Vulnerability to external heating.
- 7.2.4 Requirements for adequate water supply.
- 7.2.5 Risks from secondary exposures.
- 7.2.6 Risks from pressure-fed fires.
- 7.2.7 Risks from exposure to liquid propane.
- 7.2.8 Risks from confined spaces.
- 7.2.9 Protective clothing and equipment requirements.

8.1 Describe the basic tactics for managing the following types of propane emergency scenarios.
- 8.1.1 Propane cylinder overfill and release inside a building.
- 8.1.2 Removing exposed tank from a building on fire.
- 8.1.3 Controlling a propane cylinder fire outside of a building.

9.1 Describe the three most common product and container recovery issues.

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Course Objectives (Learning Outcomes)(continued):

9.2 Explain the following basic damage assessment terms:
- 9.2.1 crack
- 9.2.2 score
- 9.2.3 gouge
- 9.2.4 wheel burn
- 9.2.5 dent
- 9.2.6 rail burn
- 9.2.7 street burn

9.3 Explain the basic procedure of surveying a damaged container.

9.4 Define the terms *bonding* and *grounding.*

9.5 Describe the bonding and grounding sequence.

9.6 Describe the basic elements of safely uprighting and conducting recovery operations.

9.7 Describe the process of autorefrigeration

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