Ignitable Liquids and Gases Technician (2022)

Course Plan

Course Details

Description: This course provides the skills and knowledge needed to identify the regulations, construction, operations, and hazards associated with ignitable liquid and gas transportation, bulk storage, and pipelines.

Designed For: All emergency personnel with responsibility for responding to ignitable liquid and gas emergencies associated with transportation, bulk storage, and pipelines.

Prerequisites: Fire Control 4A: Ignitable Liquids and Gases Awareness/Operations (2022) **or** Fire Control 4: Controlling Ignitable Liquids and Gases (2015)

Standard: Attend and participate in all course sections

Successful completion of all skills identified on the Training Record

Hours (Total): 12 hours

(7 hours lecture / 5 hours application)

Maximum Class Size: 50

Instructor Level: SFT Registered Fire Control 4B: Ignitable Liquids and Gases Technician Instructor

Instructor/Student Ratio: 1:50 (lecture)

1:15 (Topic 5-2: Deploying Master Streams - a minimum of one Registered Fire Control 4B: Ignitable Liquids and Gases Technician Instructor and as many Fire Fighter Instructors as needed to meet the 1:15 student ratio)

Restrictions: See Equipment, Facilities, and Personnel requirements

SFT Designation: FSTEP

Table of Contents

Required Resources

Instructor Resources

To teach this course, instructors need:

- One of the following two texts:
  - *Fundamentals of Fire Fighter Skills* (including Instructor's Toolkit DVDs) (Jones & Bartlett Learning, 4th edition, ISBN: 978-1-284-15133-6)
  - *Essentials of Fire Fighting and Fire Department Operations* (Stowell, Frederick M., Murnane, Lynne, Brady Publishing, a division of Pearson Education, 7th edition, ISBN: 978-087939657-2)
- *Pipeline Emergencies* (Noll, Gregory G., Hildebrand, Michael S., Red Hat Publishing Company, Inc., 3rd edition)
  - *Pipeline Emergencies* (3rd edition, NASFM – DVD)
  - *Liquified Natural Gas* (2005, NASFM – DVD)
- *Emergency Response Guidebook* (NAERG)
  - Physical or digital access to current edition
- AHJ policies and procedures
- Structural personal protective equipment

Online Instructor Resources

The following instructor resources are available online at https://osfm.fire.ca.gov/divisions/state-fire-training/fstep-curriculum/

- Skills Exercise 1: Planning Initial Actions for Ignitable Liquid and Gas Fires
- Skills Exercise 2: Deploying Master Streams

Student Resources

To participate in this course, students need:

- *Emergency Response Guidebook* (NAERG)
  - Physical or digital access to current edition
- AHJ policies and procedures
- Structural personal protective equipment

Facilities, Equipment, and Personnel

Facilities

The following facilities are required to deliver this course:

- Standard learning environment or facility, which may include:
  - Dry erase board or paper easel chart
  - Markers, erasers
  - Amplification devices
  - Projector and screen
  - Laptop or tablet with presentation or other viewing software

    - Internet access with appropriate broadband capabilities
- A training site with the required facilities, structures, work areas, materials, props, tools, and equipment of adequate size, type, and quantity to fully and safely support the cognitive and psychomotor training required to deliver the Fire Control 4B: Ignitable Liquid and Gas Fire Technician curriculum

Equipment

Student safety is of paramount importance when conducting this course. The equipment listed below is the minimum for the delivery of this course. The student is responsible for providing all personal protective equipment and ensuring that it meets AHJ and site requirements.

The following equipment is required to deliver this course:

Per 15 Person Module	Equipment
1	Apparatus with deck gun (or equivalent)
1	Ground monitor
As needed	Adequate hose lines
As needed	Adequate nozzles
As needed	Adequate water supply
15	PPE
As needed	Communication equipment

Personnel

The following personnel are required to deliver this course:

- Topic 5-2: Deploying Master Streams - a minimum of one Registered Fire Control 4B: Ignitable Liquids and Gases Technician Instructor and as many Fire Fighter Instructors as needed to meet the 1:15 student ratio

Time Table

Segment	Lecture	Application	Unit Total
Unit 1: Introduction			
Topic 1-1: Orientation and Administration	0.5	0.0	
Unit 1 Totals	**0.5**	**0.0**	**0.5**
Unit 2: Transportation Emergencies			
Topic 2-1: Identifying Transportation Regulations	0.5	0.0	
Topic 2-2: Identifying Transportation Operations and Hazards	0.5	0.0	
Topic 2-3: Identifying Hazards Associated with Transporting Ignitable Liquids	0.5	0.0	
Topic 2-4: Identifying Hazards Associated with Transporting Ignitable Gases	0.5	0.0	
Unit 2 Totals	**2.0**	**0.0**	**2.0**
Unit 3: Bulk Storage Emergencies			
Topic 3-1: Identifying Bulk Storage Regulations	0.5	0.0	
Topic 2-2: Identifying Bulk Storage Construction and Hazards	0.5	0.0	
Topic 2-3: Identifying Hazards Associated with Ignitable Liquid Bulk Storage	0.5	0.0	
Topic 2-4: Identifying Hazards Associated with Ignitable Gas Bulk Storage	0.5	0.0	
Unit 3 Totals	**2.0**	**0.0**	**2.0**
Unit 4: Pipeline Emergencies			
Topic 4-1: Identifying Pipeline Regulations	0.5	0.0	
Topic 4-2: Identifying Pipeline Operations and Hazards	1.0	0.0	
Topic 4-3: Identifying Hazards Associated with Ignitable Liquid Pipeline Products	0.5	0.0	
Topic 4-4: Identifying Hazards Associated with Ignitable Gas Pipeline Products	0.5	0.0	
Unit 4 Totals	**2.50**	**0.0**	**2.50**
Unit 5: Application			
Topic 5-1: Planning Initial Actions for Ignitable Liquid and Gas Fires	0.0	2.0	
Topic 5-2: Using Master Streams to Attack Ignitable Liquid and Gas Fires	0.0	3.0	
Unit 5 Totals	**0.0**	**5.0**	**5.0**
Formative Assessments			
Determined by AHJ or educational institution	0.0	0.0	0.0

Summative Assessment			
Determined by AHJ or educational institution	0.0	0.0	0.0
Course Totals	**7.0**	**5.0**	**12.0**

Time Table Key

1. The Time Table documents the amount of time required to deliver the content included in the course plan.

2. Time is documented using the quarter system: 15 min. = .25 / 30 min. = .50 / 45 min. = .75 / 60 min. = 1.0.

3. The Course Totals do not reflect time for lunch (1 hour) or breaks (10 minutes per each 50 minutes of instruction or assessment). It is the instructor's responsibility to add this time based on the course delivery schedule.

4. Application (activities, skills exercises, and formative testing) time will vary depending on the number of students enrolled. The Application time documented is based on the maximum class size identified in the Course Details section.

5. The following is a breakdown of what a program might look like if there were fewer students. These estimates may need to be adjusted based on student abilities.
   - 40 – 50 Students = 260 hours
   - 30 – 40 Students = 180 hours
   - 20 – 30 Students = 120 hours
   - 1 – 20 Students = 60 hours

6. Summative Assessments are determined and scheduled by the authority having jurisdiction. These are not the written or psychomotor State Fire Training certification exams. These are in-class assessments to evaluate student progress and calculate course grades.

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic a student will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, skills exercises, resources, evaluation methods, and participation requirements in the course syllabus.

Enabling Learning Objectives

1. Identify facility requirements
    - Restroom locations
    - Food locations
    - Smoking locations
    - Emergency procedures
2. Identify classroom requirements
    - Start and end times
    - Breaks
    - Electronic device policies
    - Special needs and accommodations
    - Other requirements as applicable
3. Review course syllabus
    - Course objectives
    - Calendar of events
    - Course requirements
    - Student evaluation process
    - Assignments
    - Activities
    - Required student resources
    - Class participation requirements

Discussion Questions

1. Determined by instructor

Application

1. Have students complete all required registration forms.

Unit 2: Transportation Emergencies

Topic 2-1: Identifying Transportation Regulations

Terminal Learning Objective

At the end of this topic a student, given regulatory documents, will be able to identify regulations pertaining to transporting ignitable liquids and gases in accordance with state and federal requirements.

Enabling Learning Objectives

1. Describe modes of ignitable liquid and gas transportation
   - Rail cars
   - Road trailers
   - Cargo transport
2. Describe the primary federal agencies that regulate ignitable liquid and gas transportation
   - Federal Motor Carrier Safety Administration
   - Department of Transportation, Federal Railroad Administration
3. Describe the primary state agencies that regulate ignitable liquid and gas transportation
   - California Department of Motor Vehicles
4. Identify rules and regulations that govern the design, construction, operation, safety, and maintenance of ignitable liquid and gas transportation
   - Road
     - NFPA 385: Standard for Tank Vehicles for Flammable and Combustible Liquids (2022)
     - 49 Code of Federal Regulations (CFR) Part 390 (federal)
     - California Vehicle Code Section 31303 (state)
   - Rail
     - 49 Code of Federal Regulations (CFR) Part 174 (federal)
     - California Code of Regulations, Title 13, § 1160.2 - U.S. Department of Transportation Regulations (state)
5. Identify the primary causes of ignitable liquid and gas transportation incidents
6. Identify key players who may become involved in a major ignitable liquid and gas transportation emergency and describe their role in resolving the emergency
   - California Highway Patrol
   - Railroad representatives
   - California Fish and Wildlife
   - County Environmental Health

Discussion Questions

1. Who regulates ignitable liquid and gas transportation operations at the federal level?
2. Who regulates ignitable liquid and gas transportation operations in California?
3. What are the major causes of ignitable liquid and gas transportation incidents?

Application

1. Determined by instructor

Instructor Notes

1. None

Topic 2-2: Identifying Transportation Operations and Hazards

Terminal Learning Objective

At the end of this topic a student, given sample markers, labels and placards, and basic design and construction features, will be able to describe rail cars, road trailers, and cargo transport units by identifying markers, labels, and placards, and basic design and construction features.

Enabling Learning Objectives

1. Identify hazard classifications
2. Identify markings, labels, and placards
3. Describe rail tank car construction, fittings, and purpose
    - Pressure tank car
    - Non-pressure / low pressure tank car
    - Non-pressure / low pressure tank car (TC117, DOT117)
    - Other cars that may contain ignitable liquids and gases
    - Box car
4. Identify common markings on rail cars
    - Reporting marks and car number
    - Load limit (pounds or kilograms)
    - Empty weight of car
    - Placard
    - Tank qualification and pressure relief device information
    - Car specification
    - Commodity name
5. Describe general shapes and purposes of road trailers and cargo transport units
    - MC331, TC331, SCT331
    - MC338, TC338, SCT338, TC341, CGA341
    - DOT406, TC406, SCT306, MC306, TC306
    - DOT407, TC407, SCT307, MC307, TC307
    - Compressed gas/tube trailer
    - Intermodal tank
    - Other vehicles that may contain ignitable liquids and gases
    - Vacuum tanker
    - Mixed cargo
6. Identify where rail cars, road trailers, and cargo transport units are loaded and unloaded in the AHJ

Discussion Questions

1. Where are rail cars, road trailers, and cargo transport units loaded and off-loaded in your AHJ?
2. How do you determine whether a transportation vessel is pressurized or non-pressurized?

Application

1. Given photos, have students determine whether transportation vessels are pressurized or non-pressurized.
2. Given pictures of placards and an *Emergency Response Guidebook*, have students identify what they represent.

Instructor Notes

1. None

Topic 2-3: Identifying Hazards Associated with Transporting Ignitable Liquids

Terminal Learning Objective

At the end of this topic a student, given a list of liquid products and Safety Data Sheets (SDS), will be able to identify hazards associated with liquids transported by rail cars, road trailers, and cargo transport units in accordance with the SDS for each product.

Enabling Learning Objectives

1. Identify indicators of a leaking liquid
    - Visual
    - Olfactory
    - Auditory
2. Describe behavioral traits of various ignitable liquids
    - Flash point
    - Specific gravity
    - Vapor pressure
    - Flammable limits
    - BTUs
    - Flame spread
3. Describe AHJ emergency response plans for hazards associated with ignitable liquids
4. Describe incident priorities
    - Life safety
    - Incident stabilization
    - Property conservation
    - Environmental protection
5. Describe strategic considerations
    - Size up
    - Offensive mode
    - Defensive mode
    - Combination mode
6. Describe tactical considerations
    - Protective actions
        - Evacuation
        - Shelter in place
        - Air monitoring
    - Suppression
        - Hand line vs. master stream
        - Water vs. foam
    - Containment
        - Diking
        - Damming
        - Diverting
7. Describe how to terminate an incident
    - Decontamination

- Documentation

Discussion Questions

1. What is Bakken oil? What hazards are associated with it?
2. What hazards are associated with ignitable liquids transported by rail cars, road trailers, and cargo transport units?
3. Do your AHJ emergency response plans have any limitations? How could you address or mitigate them?
4. What factors determine whether you use an offensive or defensive strategy?
5. What factors determine whether you use a hand line or master stream?

Application

1. See Topic 5-1: Planning Initial Actions for Ignitable Liquid and Gas Fires.

Instructor Notes

1. ELO3: Use plans from the AHJ to teach this objective. If the AHJ doesn't have them, bring multiple samples.

Topic 2-4: Identifying Hazards Associated with Transporting Ignitable Gases

Terminal Learning Objective

At the end of this topic a student, given a list of gas products and Safety Data Sheets (SDS), will be able to identify hazards associated with gases transported by rail cars, road trailers, and cargo transport units in accordance with the SDS for each product.

Enabling Learning Objectives

1. Identify indicators of a leaking gas
    - Visual
    - Olfactory
    - Auditory
2. Describe behavioral traits of various flammable and combustible gases
    - Flash point
    - Vapor density
    - Vapor pressure
    - Flammable limits
    - BTUs
    - Flame spread
3. Describe AHJ emergency response plans for hazards associated with flammable and combustible gases
4. Describe incident priorities
    - Life safety
    - Incident stabilization
    - Property conservation
    - Environmental protection
5. Describe strategic considerations
    - Size up
    - Offensive mode
    - Defensive mode
    - Combination mode
6. Describe tactical considerations
    - Protective actions
        - Evacuation
        - Shelter in place
        - Air monitoring
    - Suppression
        - Hand line vs. master stream
        - Water vs. foam
    - Ventilation
        - Configuration of space
        - Forced supply
        - Forced exhaust
        - Combination (supply/exhaust)

- Wind direction
- Passive mitigation

7. Describe how to terminate an incident
    - Decontamination
    - Documentation

Discussion Questions

1. Why is a flammable gas incident potentially more dangerous than a flammable liquid incident?
2. What types of flammable and combustible gases are transported through your AHJ?
3. What are some common ignition sources that you can control or isolate?
4. What factors determine whether you use an offensive or defensive strategy?
5. What hazards are associated with ventilation?

Application

1. See Topic 5-1: Planning Initial Actions for Ignitable Liquid and Gas Fires.

Instructor Notes

1. None

Unit 3: Bulk Storage Emergencies

Topic 3-1: Identifying Bulk Storage Regulations

Terminal Learning Objective

At the end of this topic a student, given regulatory documents, will be able to identify ignitable liquid and gas bulk storage regulations in accordance with state and federal requirements.

Enabling Learning Objectives

1. Describe the primary federal agencies that regulate bulk storage operations
    - Environmental Protection Agency (EPA)
2. Describe the primary state agencies that regulate bulk storage operations
    - CalEPA
    - Unified program oversight
    - CAL FIRE Office of the State Fire Marshal
        - Interpretation
        - Statutory authority for enforcement
        - Certified Unified Program Agencies (CUPA)
        - Implementation
        - Management
3. Identify the rules and regulations that govern the design, construction, operation, safety, and maintenance of bulk storage facilities
    - 40 Code of Federal Regulations (CFR) Chapter 4, Subchapter A (federal)
    - California Code of Regulations, Title 8, Section 5451 (state)
    - California Code of Regulations, Title 22, Chapter 32 (state)
    - California Code of Regulations, Title 24 (state)
    - NFPA 30: Flammable and Combustible Liquids Code (2021)
4. Identify the primary causes of bulk storage incidents
5. Identify key players who may become involved in a major bulk storage emergency and describe their role in resolving the emergency
    - On-site response (industrial fire brigade, environmental health and safety, etc.)
    - Facility Engineer
    - Third-party contractors

Discussion Questions

1. Who regulates bulk storage operations at the federal level?
2. Who regulates bulk storage operations in California?
3. What are the major causes of bulk storage incidents?

Application

1. Determined by instructor

Instructor Notes

1. None

Topic 3-2: Identifying Bulk Storage Construction and Hazards

Terminal Learning Objective

At the end of this topic a student, given sample pipeline markers, a transportation chain overview, and basic design and construction features, will be able to describe bulk storage construction features and hazards by identifying markers, labels, and placards, and basic design and construction features.

Enabling Learning Objectives

1. Define "bulk storage"
   - Above ground: 1,320 gallons or more
   - Below ground: 55 gallons or more
2. Identify types of bulk storage facilities
   - Bulk fuel storage terminals
   - Refineries
   - Airports and aviation facilities
   - Military bases and training centers
   - Marketing (loading and unloading) terminals
   - Vehicle fuel (gas, diesel, hydrogen, LNG, biofuel) stations
   - Tank farms
3. Identify markings, labels, and placards
   - NFPA 704 (fixed facilities)
4. Describe tank construction and purposes
   - Cone roof tank
   - Open floating roof tank
   - Open floating roof tank with geodesic dome
   - Covered floating roof tank
   - Dome roof tank
   - Horizontal tank
   - Spherical tank
   - Underground tank
5. Identify AHJ bulk storage facility locations

Discussion Questions

1. Where are bulk storage facilities located within your AHJ?
2. What are the components of an NFPA 704 placard?

Application

1. Determined by instructor

Instructor Notes

1. None

Topic 3-3: Identifying Hazards Associated with Ignitable Liquid Bulk Storage

Terminal Learning Objective

At the end of this topic a student, given a list of liquid products and Safety Data Sheets (SDS), will be able to identify hazards associated with ignitable liquid bulk storage in accordance with the SDS for each product.

Enabling Learning Objectives

1. Describe AHJ emergency response plans for hazards associated with ignitable liquid bulk storage
2. Describe incident priorities
   - Life safety
   - Incident stabilization
   - Property conservation
   - Environmental protection
3. Describe strategic considerations
   - Offensive mode
   - Defensive mode
   - Combination mode
4. Describe tactical considerations
   - Protective actions
     - Evacuation
     - Shelter in place
     - Air monitoring
   - Suppression
     - Water supply
     - Hand line vs. master stream
     - Water vs. foam
     - Fixed systems
5. Describe how to terminate an incident
   - Environmental considerations for run off
   - Decontamination
   - Documentation

Discussion Questions

1. What hazards are associated flammable liquid fires in bulk storage facilities?
2. Why is water supply of greater concern at a bulk storage fire than at a transport fire?
3. What agencies or organizations might you interact with at a bulk facility liquid fire in your AHJ?

Application

1. See Topic 5-1: Planning Initial Actions for Ignitable Liquid and Gas Fires.

Instructor Notes

1. None

Topic 3-4: Identifying Hazards Associated with Ignitable Gas Bulk Storage

Terminal Learning Objective

At the end of this topic a student, given a list of pipeline products and Safety Data Sheets (SDS), will be able to identify hazards associated with gases transported through a pipeline in accordance with the SDS for each product.

Enabling Learning Objectives

1. Describe AHJ emergency response plans for hazards associated with ignitable gas bulk storage
2. Describe incident priorities
   - Life safety
   - Incident stabilization
   - Property conservation
   - Environmental protection
3. Describe strategic considerations
   - Size up
   - Offensive mode
   - Defensive mode
   - Combination mode
4. Describe tactical considerations
   - Protective actions
     - Evacuation
     - Shelter in place
     - Air monitoring
   - Suppression
     - Water supply
     - Hand line vs. master stream
     - Fixed systems
5. Describe how to terminate an incident
   - Decontamination
   - Documentation

Application

1. See Topic 5-1: Planning Initial Actions for Ignitable Liquid and Gas Fires.

Instructor Notes

1. None

Unit 4: Pipeline Emergencies

Topic 4-1: Identifying Pipeline Regulations

Terminal Learning Objective

At the end of this topic a student, given regulatory documents will be able to identify pipeline regulations in accordance with state and federal requirements.

Enabling Learning Objectives

1. Describe basic types and categories of pipeline systems
   - Crude oil
   - Liquid
   - Natural gas
   - Propane
2. Describe the primary federal agencies that regulate pipeline operations
   - Department of Transportation, Pipeline and Hazardous Materials Safety Administration
   - Department of Labor – Occupational Safety and Health Administration
   - Environmental Protection Agency
3. Describe the primary state agencies that regulate pipeline operations
   - Office of the State Fire Marshal, Pipeline Safety Division
4. Identify rules and regulations that govern the design, construction, operation, safety, and maintenance of interstate pipelines
   - 49 Code of Federal Regulations (CFR) Parts 190-199 (federal)
   - California Government Code (CGC) Sections 51010-51019.1 (state)
5. Identify the primary causes of pipeline incidents
6. Identify key players who may become involved in a major pipeline emergency and describe their role in resolving the emergency
   - Pipeline owner
   - HazMat teams
   - Law enforcement
   - Industrial emergency response team
   - Oil spill response organizations (OSRO)
   - California Fish and Wildlife

Discussion Questions

1. Who regulates pipeline operations at the federal level?
2. Who regulates pipeline operations in California?
3. What are the major causes of pipeline incidents?

Application

1. Determined by instructor

Instructor Notes

1. None

Topic 4-2: Identifying Pipeline Operations and Hazards

Terminal Learning Objective

At the end of this topic a student, given sample pipeline markers, a transportation chain overview, and basic design and construction features, will be able to identify pipeline operations within a jurisdiction by identifying markers, transportation chains, and basic pipeline design and construction features.

Enabling Learning Objectives

1. Describe the pipeline transportation chain
2. Identify pipeline locations in California
3. Identify different types of pipeline markers found along a pipeline corridor
4. Identify the following information on a pipeline marker:
    - Product
    - Owner
    - Emergency telephone number
5. Describe the purpose of pipeline rights-of-way
6. Identify clues that, in the absence of markers, may indicate the presence of an underground pipeline
7. Identify basic design and construction features of a pipeline system
    - Piping
    - Pumps and compressors
    - Meters
    - Valves
        - Manual
        - Automatic
        - Emergency shutdown
        - Pressure relief
8. Identify operations of a gas pipeline
    - Gathering systems
    - Processing and treatment facilities
    - Compressor stations
    - Transmission pipelines
    - Service lines
    - Meters

Discussion Questions

1. Are there pipelines in your AHJ?
2. What information should a pipeline marker include?
3. What are some indictors of a pipeline right-of-way?

Application

1. Determined by instructor

Instructor Notes

1. None

Topic 4-3: Identifying Hazards Associated with Ignitable Liquid Pipeline Products

Terminal Learning Objective

At the end of this topic a student, given a list of pipeline products and Safety Data Sheets (SDS), will be able to identify hazards associated with ignitable liquids transported through a pipeline in accordance with the SDS for each product.

Enabling Learning Objectives

1. Describe how different liquid pipeline products behave during an uncontrolled release
    - Crude oil / Bakken oil
    - Flammable and combustible liquids
    - Anhydrous ammonia
    - Carbon dioxide
    - Liquid petroleum gas (LPG)
    - Hydrogen
2. Identify indicators of a leaking liquid pipeline
    - Visual
    - Olfactory
    - Auditory
3. Define “highly volatile liquid” (HVL) and identify common HVLs transported by pipelines
4. Describe AHJ emergency response plans for hazards associated with flammable and combustible liquid pipeline leaks
5. Describe incident priorities
    - Life safety
    - Incident stabilization
    - Property conservation
    - Environmental protection
6. Describe strategic considerations
    - Size up
    - Offensive mode
    - Defensive mode
    - Combination mode
7. Describe tactical considerations
    - Protective actions
        - Evacuation
        - Shelter in place
        - Air monitoring
    - Suppression
        - Water supply
        - Hand line vs. master stream
        - Water vs. foam
        - Remote shut off
    - Containment
        - Diking

    - Damming
    - Diverting
8. Describe how to terminate an incident
    - Environmental considerations for run off
    - Decontamination
    - Documentation

Discussion Questions

1. What is Bakken oil? What hazards are associated with it? How is it transported in California?
2. What hazards are associated with non-flammable liquids transported through pipelines?
3. Which products used primarily in their gaseous state transport through pipelines as liquids?

Application

1. See Topic 5-1: Planning Initial Actions for Ignitable Liquid and Gas Fires.

Instructor Notes

1. None

Topic 4-4: Identifying Hazards Associated with Ignitable Gas Pipeline Products

Terminal Learning Objective

At the end of this topic a student, given a list of pipeline products and Safety Data Sheets (SDS), will be able to identify hazards associated with ignitable gases transported through a pipeline in accordance with the SDS for each product.

Enabling Learning Objectives

1. Describe how different gas pipeline products behave during an uncontrolled release
    - Natural gas
    - Ethane and ethylene
    - Methane gas
    - Chlorine
    - Propane
2. Identify indicators of a leaking gas pipeline
    - Visual
    - Olfactory
    - Auditory
3. Describe AHJ emergency response plans for hazards associated with ignitable gas pipeline leaks
4. Describe incident priorities
    - Life safety
    - Incident stabilization
    - Property conservation
    - Environmental protection
5. Describe strategic considerations
    - Size up
    - Offensive mode
    - Defensive mode
    - Combination mode
6. Describe tactical considerations
    - Protective actions
        - Evacuation
        - Shelter in place
        - Air monitoring
    - Suppression
        - Water supply
        - Hand line vs. master stream
        - Water vs. foam
        - Remote shut off
7. Describe how to terminate an incident
    - Environmental considerations for run off
    - Decontamination
    - Documentation

Discussion Questions

1. What factors determine whether to extinguish a pipeline gas fire or allow it to passively mitigate itself?
2. How will a natural gas leak differ from a propane leak? How will this impact your strategies and tactics?

Application

1. See Topic 5-1: Planning Initial Actions for Ignitable Liquid and Gas Fires.

Instructor Notes

1. None

Unit 5: Application

Topic 5-1: Planning Initial Actions for Ignitable Liquid and Gas Fires

Terminal Learning Objective

At the end of this topic a student, given an ignitable liquid or gas fire scenario, will be able to plan initial actions for an ignitable liquid or gas fire so that crew integrity is maintained; escape routes and safety zones are identified; contents are identified; correct protection, suppression, or containment actions are applied; and hazardous conditions are recognized.

Enabling Learning Objectives

1. Describe how to plan initial actions for an ignitable liquid or gas fire
2. Plan initial actions

Discussion Questions

1. Determined by instructor

Application

1. Activity 5-1: Planning Initial Actions for Ignitable Liquid and Gas Fires

Instructor Notes

1. There is no instructional time built into this topic. The content is covered in Topics 2-3, 2-4, 3-3, 3-4, 4-3, and 4-4.

Topic 5-2: Using Master Streams to Attack Ignitable Liquid and Gas Fires

Terminal Learning Objective

At the end of this topic a student, given a simulated ignitable liquid or gas fire scenario, PPE, an apparatus with a master stream, hose lines, and a water supply, will be able to deploy a master stream to attack a simulated ignitable liquid or gas fire in accordance with AHJ policies and procedures.

Enabling Learning Objectives

1. Describe how to deploy a master stream using an apparatus-mounted deck gun
2. Describe how to deploy a master stream using a ground monitor
3. Deploy a master stream using an apparatus-mounted deck gun
4. Deploy a master stream using a ground monitor

Discussion Questions

1. Determined by instructor

Application

1. Activity 5-2: Deploying Master Streams

Instructor Notes

1. There is no instructional time build into this topic. The content was already covered in Topics 2-3, 2-4, 3-3, 3-4, 4-3, and 4-4.
2. This is not a live fire class. Do not use live fire props for this scenario.

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- Mike Richwine, State Fire Marshal
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- (Vacant), Chief of State Fire Training
- John Binaski, Chair, Statewide Training and Education Advisory Committee (STEAC); Chief, Clovis Fire Department

Cadre – 2022 Curriculum Development

Leadership

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- Allison L. Shaw, Editor, Sacramento State

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How to Read a Course Plan

A course plan identifies the details, logistics, resources, and training and education content for an individual course. Whenever possible, course content is directly tied to a national or state standard. SFT uses the course plan as the training and education standard for an individual course. Individuals at fire agencies, academies, and community colleges use course plans to obtain their institution's consent to offer course and provide credit for their completion. Instructors use course plans to develop syllabi and lesson plans for course delivery.

Course Details
The Course Details segment identifies the logistical information required for planning, scheduling, and delivering a course.

Required Resources
The Required Resources segment identifies the resources, equipment, facilities, and personnel required to deliver the course.

Unit
Each Unit represents a collection of aligned topics. Unit 1 is the same for all SFT courses. An instructor is not required to repeat Unit 1 when teaching multiple courses within a single instructional period or academy.

Topics
Each Topic documents a single Terminal Learning Objective and the instructional activities that support it.

Terminal Learning Objective
A Terminal Learning Objective (TLO) states the instructor's expectations of student performance at the end of a specific lesson or unit. Each TLO includes a task (what the student must be able to do), a condition (the setting and supplies needed), and a standard (how well or to whose specifications the task must be performed). TLOs target the performance required when students are evaluated, not what they will do as part of the course.

Enabling Learning Objectives
The Enabling Learning Objectives (ELO) specify a detailed sequence of student activities that make up the instructional content of a lesson plan. ELOs cover the cognitive, affective, and psychomotor skills students must master to complete the TLO.

Discussion Questions
The Discussion Questions are designed to guide students into a topic or to enhance their understanding of a topic. Instructors may add to or adjust the questions to suit their students.

Application
The Application segment documents experiences that enable students to apply lecture content through cognitive and psychomotor activities, skills exercises, and formative testing. Application experiences included in the course plan are required. Instructors may add additional application experiences to suit their student population if time permits.

Instructor Notes
The Instructor Notes segment documents suggestions and resources to enhance an instructor's ability to teach a specific topic.

CTS Guide Reference
The CTS Guide Reference segment documents the standard(s) from the corresponding Certification Training Standard Guide upon which each topic within the course is based. This segment is eliminated if the course is not based on a standard.

Skill Sheet
The Skill Sheet segment documents the skill sheet that tests the content contained within the topic. This segment is eliminated if the course does not have skill sheets.