



Questar Gas – Questar Pipeline

Workbook / Module:
Leak Detection (47)

DOT OPERATOR QUALIFICATION – QUALITY ASSURANCE REVIEW

- PURPOSE:** Review completed module to verify:
- Conformity to DOT requirements
 - Adequate content on covered task
 - Addresses abnormal operating conditions
 - Identifies training resources available
 - Defines evaluation and acceptance criteria
 - Identifies requalification requirements
 - Appropriate record keeping

Note: The training outline might be developed at a later date on a "as needed" basis

PREPARED BY

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QUALITY ASSURANCE REVIEW

SIGNATURE	DATE	SIGNATURE	DATE
Pipeline Compliance: * <i>[Signature]</i>	<i>1/14/04</i>	Other:	
Training * <i>[Signature]</i>	<i>12/2/04</i>	Other:	
Consultant: * 		Other:	

* Required, at a minimum.

Leak Detection (Module 47)

I. Purpose

- A. This module will qualify the individual on the following:
 - 1. Proper maintenance and operation of the combustible gas indicator and the flame ionization device.
 - 2. Identifying leak class and proper safety and reporting procedures.
- B. This module will be used to evaluate the individual's qualification to perform the following tasks:
 - 1. CGI equipment operation and maintenance
 - 2. FID equipment operation and maintenance

II. Resources

- A. Questar Regulated Services Standard Practices Procedures Manual
 - 1. Standard Practice 3-10-03, "Pipeline Patrolling and Leakage Surveys"
 - 2. Standard Practice 4-14-01, "Combustible Gas Indicator Maintenance and Operation Procedures"
 - 3. Standard Practice 8-10-00, "Personal Protective Equipment"
- B. Questar Gas Company Standard Practices Procedures Manual
 - 1. Standard Practice 3-75-01, "Evaluating Gas Leak Reports"
 - 2. Standard Practice 4-65-02, "Conducting Leak Surveys with the Heath Detecto Pak II Heath Detecto Pak III, or Southern Cross Flame Pack Portable Flame Ionization Equipment"
 - 3. Standard Practice 4-65-03, "Flame Ionization Equipment (Mobile Mounted) Operating Procedures"
 - 4. Standard Practice 5-00-08, "Underground Gas Leak Procedure"
- C. Federal Pipeline Safety Regulations
 - 1. 49 CFR 192.706, Transmission Lines: Leakage Surveys
 - 2. 49 CFR 192.723, Distribution Systems; Leakage Surveys
- D. Midwest Gas Association (MGA) Operator Qualification Training
 - 1. Course #104, "Recognizing and Reporting Natural Gas Leaks"
 - 2. Course #221, "Leak Classification"
 - 3. Course #231, "Operating Combustible Gas Indicator"
 - 4. Course #232, "Operating Flame Ionization Unit"
 - 5. Course #261, "Bar Hole Testing and Purging"
 - 6. Course #271, "Leak Surveys and Patrols"

III. Abnormal Operating Conditions

- A. Natural gas leak detected
- B. Instrument failure

IV. Evaluation Criteria

- A. Qualification will be evaluated using the following methods:

Leak Detection and CGI/FID Operation Training Outline

Covered Tasks: Leak detection, CGI operations and maintenance, FID operations and maintenance
Standard Practice: 3-10-03, 4-14-04, 8-10-00, 3-75-01, 4-65-02, 4-65-03, 5-00-08
Federal Pipeline Safety Standards: 49 CFR 192.706, 192.723
Module 47

I. Requirements for Leak Detection

A. Classify Leak

1. Winter season is defined as a period between December 21 and March 21 (Frost conditions are in effect and winter distances must be observed)
2. A leak – immediate attention
 - a. Evacuation – Gas detected in a building or near a building (20 feet winter, 10 feet any other time)
 - b. Evacuation -- 2% gas or more detected in a duct system
 - c. Immediate attention – no evacuation necessary (Stable 100% reading on a CGI and does not meet above listed criteria)
 - d. Immediate attention – no evacuation necessary
3. B leak – Any leak on a riser with less than 2% CGI read at 20” below ground or shallower that can be vented (rush evaluate/ and or repair)
 - a. Determined by appropriate Operations Supervisor
4. C leak – Monitor and schedule for repair
5. If leak is class “B” or “C,” fill out a leak repair order and turn into Operations for evaluation and monitoring until repaired

C. Secure the area, if necessary

D. Begin evacuation, if necessary

E. Determine the extent of the leak area

F. Make repairs following procedures listed in Standard Practice 5-00-08,
Underground Gas Leak Procedure

II. Combustible Gas Indicator Operation (CGI)

A. Inspection of CGI

1. Check hoses, filters and aspirator bulbs for leaks
2. Check voltage adjustment to insure batteries are good
3. Check “0” adjustment to make sure the needle moves freely

B. Operation of CGI

1. In combustion-free air adjust voltage and zero control to the proper levels
2. The “0” adjustment should be done on the lower scale (5% or 4% depending on machine)

Leak Detection and CGI Operation Written Test (47)

Name _____

Employee Number _____

Date _____

1. Questar Gas leak classification includes the following leak classes:
 - A. "A" Leak, "B" Leak, "C" Leak and "D" Leak
 - B. "A" Leak and "C" Leak
 - C. "A" Leak, "B" Leak and "C" Leak
 - D. "A" Leak, "C" Leak and "D" Leak

2. When inspecting a Combustible Gas Indicator you must check all of the following **except**:
 - A. The voltage adjustment
 - B. The "0" adjustment
 - C. Aspirator Bulb
 - D. Operators manual is stored with the CGI

3. A leak is found on a riser, the CGI reads 6%. The leak is located 12" below ground. What is this leaks classification?
 - A. "A" Leak
 - B. "B" Leak
 - C. "C" Leak
 - D. "D" Leak

4. Which brand of CGI do you have to purge combustible gas from before switching from the lower scale to the higher scale?
 - A. Bacharach
 - B. Davis
 - C. Century
 - D. None of the above

5. You are responding to a gas leak. The leak is outside 34 feet from any building, the CGI reads 70%. What would this leak be classified as?
 - A. "A" Leak
 - B. "B" Leak
 - C. "C" Leak
 - D. "D" Leak

6. A CGI must be checked at the Center test station at least:
 - A. Once a day
 - B. Once a month
 - C. Every two weeks
 - D. Once a year

7. You are investigating a leak. You find a reading of 20% gas on the CGI, 8 feet away from a building on May 29. This leak will be classified as a(n):
- A. "A" Leak
 - B. "B" Leak
 - C. "C" Leak
 - D. "D" Leak
8. You find a gas leak registering 25%, 26 feet from a building on March 2. It would be classified as a(n):
- A. "A" Leak
 - B. "B" Leak
 - C. "C" Leak
 - D. "D" Leak
9. You find a leak on a riser and the reading is approximately 1.5%. The riser is dug up and the leak is 14" below ground. What would this leak be classified as?
- A. "A" Leak
 - B. "B" Leak
 - C. "C" Leak
 - D. "D" Leak
10. You find gas leaking in a sewer system, and a CGI reading of 12 % is indicated. What would this leak be classified as?
- A. "A" Leak
 - B. "B" Leak
 - C. "C" Leak
 - D. "D" Leak

Leak Detection and CGI Operation
Written Test Answers—Do Not Distribute (47)

1. Questar Gas leak classification includes the following leak classes:
 - A. "A" Leak, "B" Leak, "C" Leak and "D" Leak
 - B. "A" Leak and "C" Leak
 - C. "A" Leak, "B" Leak and "C" Leak
 - D. "A" Leak, "C" Leak and "D" Leak

2. When inspecting a Combustible Gas Indicator you must check all of the following except:
 - A. The voltage adjustment
 - B. The "0" adjustment
 - C. Aspirator Bulb
 - D. Operators manual is stored with the CGI

3. A leak is found on a riser, the CGI reads 6%. The leak is located 12" below ground. What is this leak's classification?
 - A. "A" Leak
 - B. "B" Leak
 - C. "C" Leak
 - D. "D" Leak

4. Which brand of CGI do you have to purge combustible gas from before switching from the lower scale to the higher scale?
 - A. Bacharach
 - B. Davis
 - C. Century
 - D. None of the above

5. You are responding to a gas leak. The leak is outside, 34 feet from any building, the CGI reads 70%. What would this leak be classified as?
 - A. "A" Leak
 - B. "B" Leak
 - C. "C" Leak
 - D. "D" Leak

6. A CGI must be checked at the Center test station at least:
- A. Once a day
 - B. Once a month**
 - C. Every two weeks
 - D. Once a year
7. You are investigating a leak. You find a reading of 20% gas on the CGI, 8 feet away from a building on May 29. This leak will be classified as a(n):
- A. "A" Leak**
 - B. "B" Leak
 - C. "C" Leak
 - D. "D" Leak
8. You find a gas leak registering 25% 26 feet from a building on March 2. It would be classified as a(n):
- A. "A" Leak
 - B. "B" Leak
 - C. "C" Leak**
 - D. "D" Leak
9. You find a leak on a riser, the CGI reading is approximately 1.5%. The riser is dug up and the leak is 14" below ground. What would this leak be classified as?
- A. "A" Leak
 - B. "B" Leak**
 - C. "C" Leak
 - D. "D" Leak
10. You find gas leaking in a sewer system, a CGI reading of 12% is indicated. What would this leak be classified as?
- A. "A" Leak**
 - B. "B" Leak
 - C. "C" Leak
 - D. "D" Leak

Flame Ionization Detector
Written Test Answers – Do Not Distribute (47)

1. In a walking survey, how far off the ground should the tip or cone of the sample collection wand be held?
 - A. At least 6 inches
 - B. At least 12 inches, since natural gas rises
 - C. As close to the ground as possible, but not more than 2 inches

2. The FID unit can be used in an explosive environment.

TRUE FALSE

3. What gases make up the fuel gas used in the FID?
 - A. Methane and nitrogen
 - B. Methane and hydrogen
 - C. Hydrogen and nitrogen
 - D. Natural gas and air

4. How does the operator know when the FID is detecting gas?
 - A. The flame gets higher
 - B. The handle gets hot
 - C. The sensitivity control increases then decreases
 - D. An audible alarm will sound or the meter will read higher

5. It is determined that a house must be evacuated. Your actions are to: (AOC)
 - A. Knock on the door to inform the occupants of the evacuation. You can then enter the house with an FID unit
 - B. Knock on the door to inform the occupants of the evacuation. The occupants are not at home. Shut off the service and proceed to the next house
 - C. Knock on the door to inform the occupants of the evacuation. You ask the occupants to turn off all lights as they exit. You move on to the next house

Operator Qualification
Observation Form

Employee: _____ Employee Number: _____

Evaluation Method: Performance on the Job Simulation

Evaluator: _____

Covered Task(s):

CGI equipment operation and maintenance (258 / 259)
Leak Detection (256 / 257)

Module 47 – Leak Detection

STEPS	PASS	FAIL	Unsatisfactory Performance Comments
1. Inspect for physical damage	<input type="checkbox"/>	<input type="checkbox"/>	
2. Inspect all in-line filters, hoses, probes	<input type="checkbox"/>	<input type="checkbox"/>	
3. Squeeze bulb to aspirate CGI or turn Ranger to auto zero	<input type="checkbox"/>	<input type="checkbox"/>	
4. Seal intake inlet	<input type="checkbox"/>	<input type="checkbox"/>	
5. Check for leakage • AOC - CGI leaks	<input type="checkbox"/>	<input type="checkbox"/>	
6. Check batteries on CGI AOC - Low or dead batteries	<input type="checkbox"/>	<input type="checkbox"/>	
7. Set voltage if required • AOC - voltage will not set	<input type="checkbox"/>	<input type="checkbox"/>	
8. Set instrument zero • AOC - will not set to zero (CGI) will not auto zero displaying "nogo" (Ranger)	<input type="checkbox"/>	<input type="checkbox"/>	
9. Conduct 5% gas-in-air range test • AOC - incorrect sample reading	<input type="checkbox"/>	<input type="checkbox"/>	
10. Conduct 100% gas-in-air test • AOC - incorrect sample reading	<input type="checkbox"/>	<input type="checkbox"/>	

Operator Qualification
Observation Form

Employee: _____

Employee Number: _____

Evaluation Method:

Performance on the Job

Simulation

Evaluator: _____

Covered Task(s):

FID equipment and operation maintenance (260/261)
(CGI test and observation form is a FID pre-requisite)

Module 47 – Leak Detection

STEPS	PASS	FAIL	Unsatisfactory Performance Comments
1. Visually inspect FID to detect any damage or flaws • AOC - damaged equipment	<input type="checkbox"/>	<input type="checkbox"/>	
2. Check intake filter(s). Install new filters according to manufacturer's specifications	<input type="checkbox"/>	<input type="checkbox"/>	
3. Check probe and clean as needed	<input type="checkbox"/>	<input type="checkbox"/>	
4. Fill FID's fuel supply tank according to manufacturer's procedures and specifications	<input type="checkbox"/>	<input type="checkbox"/>	
5. Turn on fuel supply bottle and adjust regulator to 10-20 psig	<input type="checkbox"/>	<input type="checkbox"/>	
6. Turn power switch "ON"	<input type="checkbox"/>	<input type="checkbox"/>	
7. Press ignition switch. Check that flame out indicator is working • AOC - will not ignite	<input type="checkbox"/>	<input type="checkbox"/>	
8. Adjust sensitivity control up and down. Watch indicator to make sure needle moves freely • AOC - will not adjust properly	<input type="checkbox"/>	<input type="checkbox"/>	
9. Adjust sensitivity control above and below alarm point. Ensure alarm comes ON and goes OFF as control is adjusted • AOC -alarm not functioning properly	<input type="checkbox"/>	<input type="checkbox"/>	

QUALIFICATION METHODS

Indicate how knowledge, skill and ability will be evaluated

COVERED TASK NAME: Leak detection; CGI operations and maintenance; FID operation and maintenance

MODULE: 47-Leak Detection

WRITTEN

X Demonstrate knowledge (80% passing score) #

OBSERVATION – Performance on the Job

X Demonstrate knowledge

X Demonstrate skills

X Demonstrate abilities

OBSERVATION – Simulation *

X Demonstrate knowledge

X Demonstrate skills

X Demonstrate abilities

Evaluators need to ensure missed questions are discussed and there is understanding of the subject matter including any AOCs related to the question.

* When simulation is used, evaluator shall note any employee limitations that may interfere with covered task and refer this evaluation to the Training Department for special consideration.

Performance of task includes abnormal operating conditions