

FIRE DEPARTMENT • CITY OF NEW YORK



**STUDY MATERIAL FOR THE
CERTIFICATE OF FITNESS EXAMINATION**

L-19

**SUPERVISION OF SANITARY LANDFILL METHANE RECOVERY
FACILITIES (L-19)**

NOTICE OF EXAMINATION

Title: **Examination for Certificate of Fitness for Supervision of Sanitary Landfill Methane Recovery Facilities (L-19)**

Date of Exam: Written exams are conducted Monday through Friday (except legal holidays) 8:00 AM to 2:30 PM.

REQUIREMENTS FOR WRITTEN EXAM

Applicants who need to take the exam must apply in person and bring the following documents:

1. Applicants must be at least 18 years of age.
2. Applicants must have a reasonable understanding of the English language.
3. Applicant must provide two forms of identifications; at least one identification must be government issued photo identification, such as a State-issued Driver's License or Non Driver's License or a passport.
4. Applicants must present a letter of recommendation from his/her employer. The letter must be on official letterhead, and must state the applicant's full name, experience and the address where the applicant will work. If the applicants are self-employed or the principal of the company, they must submit a notarized letter attesting to their qualifications. For more info:
 - Sample of recommendation letter:
<http://www1.nyc.gov/assets/fdny/downloads/pdf/business/cof-samplerec-letter.pdf>
 - Sample of self-employed letter:
<http://www1.nyc.gov/assets/fdny/downloads/pdf/business/cof-sample-selfrec-letter.pdf>
5. Applicants must present a completed application for certificate of fitness (A-20 Form).
<http://www1.nyc.gov/assets/fdny/downloads/pdf/business/cof-application-form.pdf>
6. Applicants not currently employed may take the exam without the recommendation letter. If the applicants pass the exam, FDNY will issue a temporary letter with picture for the job seeking purpose. The C of F card will not be issued unless the applicants are employed and provide the recommendation letter from his/her employer.
7. Special requirement for the L-19 Certificate of Fitness: The applicant must have at least 6 months of satisfactory work experience under the supervision of L-19 Certificate of Fitness holder.
8. **APPLICATION FEE:**
Pay the **\$25** application fee in person by one of the following methods:
 - Cash
 - Credit card (*American Express, Discover, MasterCard, or Visa*)
 - Debit card (*MasterCard or Visa*)

- Personal or company check or money order (*made payable to the New York City Fire Department*)

For fee waivers submit: (**Only government employees who will use their C of F for their work-related responsibilities are eligible for fee waivers.**)

- A letter requesting fee waiver on the Agency's official letterhead stating applicant full name, exam type and address of premises; **AND**
- Copy of identification card issued by the agency

A convenience fee of 2.49% will be applied to all credit card payments.

9. EXAM INFORMATION

The **L-19** exam will consist of **45** multiple-choice questions, administered on a "touch screen" computer monitor. It is a time-limit exam. Based on the amount of the questions, you will have 68 minutes to complete the test. A passing score of at least 70% is required in order to secure a Certificate of Fitness.

Call (718) 999-1988 for additional information and forms.

Please always check for the latest revised booklet at FDNY website before you take the exam.

<http://www1.nyc.gov/assets/fdny/downloads/pdf/business/cof-119-noe-study-materials.pdf>

If all the requirements are met and pass the exam a certificate will be issued the same day. Applicant who fails the exam will receive a failure report. To retake the exam applicants will need to submit a new application and payment.

RENEWAL REQUIREMENTS

This Certificate of Fitness must be renewed every **THREE YEARS**. The renewal fee is **\$15**. FDNY also reserves the right to require the applicants to take a re-examination upon submission of renewal applications.

You will receive a courtesy notice of renewal 90 days before the expiration date. However, it is your responsibility to renew your Certificate. It is very important to renew your C of F before it expires. Renewals submitted 90 days (up to one year) after the expiration date will incur a \$25 penalty in addition to the renewal fee. Certificates expired over one year past expiration date will not be renewed. New exams will be required.

To change a mailing address:

- Submit a letter requesting the change of mailing address and a copy of your C of F with \$5.00 fee.

To change a work location,

- Submit a letter from your current employer (on company letterhead) confirming that you are an employee and stating your new work location with a copy of your C of F and a \$5.00 fee

To request a replacement certificate:

- Submit a driver's license or passport, social security number, mailing address and a \$5.00 fee.

The certificate can be renewed On-line, by Mail or in Person.

• **Renewal online**

If you are an individual, make sure you have your 12 digit Certificate of Fitness Access ID. This can be found on your Renewal Notice. If you do not have your Renewal Notice, your Access ID is your 8 digit Certificate of Fitness number and the last four digits of your social security number. If you are submitting renewals on behalf of a company's employees, the company must be approved by FDNY and have an 8 digit Company Code. To request approval, email pubrenew@fdny.nyc.gov.

Renewal fee can be paid by one of the following methods:

- Credit card (American Express, Discover, MasterCard, or Visa)
- Debit card (MasterCard or Visa)
- E-check

A fee exempted applicants cannot renew online only by mail or in person.

If all the requirements are met, the certificate of fitness will be mailed out within 10 days.

For online renewal go to: <https://a836-citypay.nyc.gov/citypay/FDNYCOF>

• **Renewal by mail**

Mail your Renewal Notice (or if you did not receive a Renewal Notice, a copy of your certificate), along with your fee payment, Personal or company check or money order (made payable to the New York City Fire Department)

For fee waivers submit: ***(Only government employees who will use their C of F for their work-related responsibilities are eligible for fee waivers.)***

- A letter requesting fee waiver on the Agency's official letterhead stating applicant full name, exam type and address of premises; **AND**
- Copy of identification card issued by the agency and if applicable, supporting documents to:

NYC Fire Department (FDNY)
Cashier's Unit
9 MetroTech Center, 1st Floor
Brooklyn, NY 11201

If all the requirements are met, the certificate of fitness will be mailed out within four to six weeks.

- **Renewal in person**

Submit your Renewal Notice (or if you did not receive a Renewal Notice, a copy of your certificate), along with your fee payment by one of the following methods:

- Cash
- Credit card (*American Express, Discover, MasterCard, or Visa*)
- Debit card (*MasterCard or Visa*)
- Personal or company check or money order (*made payable to the New York City Fire Department*)

For fee waivers submit: ***(Only government employees who will use their C of F for his or her work-related responsibilities are eligible for fee waivers.)***

- A letter requesting fee waiver on the Agency's official letterhead stating applicant full name, exam type and address of premises; **AND**
- Copy of identification card issued by the agency and if applicable, your supporting documents to:

NYC Fire Department (FDNY)
Cashier's Unit
9 MetroTech Center, 1st Floor
Brooklyn, NY 11201

If all the requirements are met, the certificate of fitness will be issued the same day.

A convenience fee of 2.49% will be applied to all credit card payments for original or renewal certificates.

EXAM SITE:

FDNY Headquarters, 9 MetroTech Center, Brooklyn, NY.
Enter through the **Flatbush Avenue entrance (between Myrtle Avenue and Tech Place).**

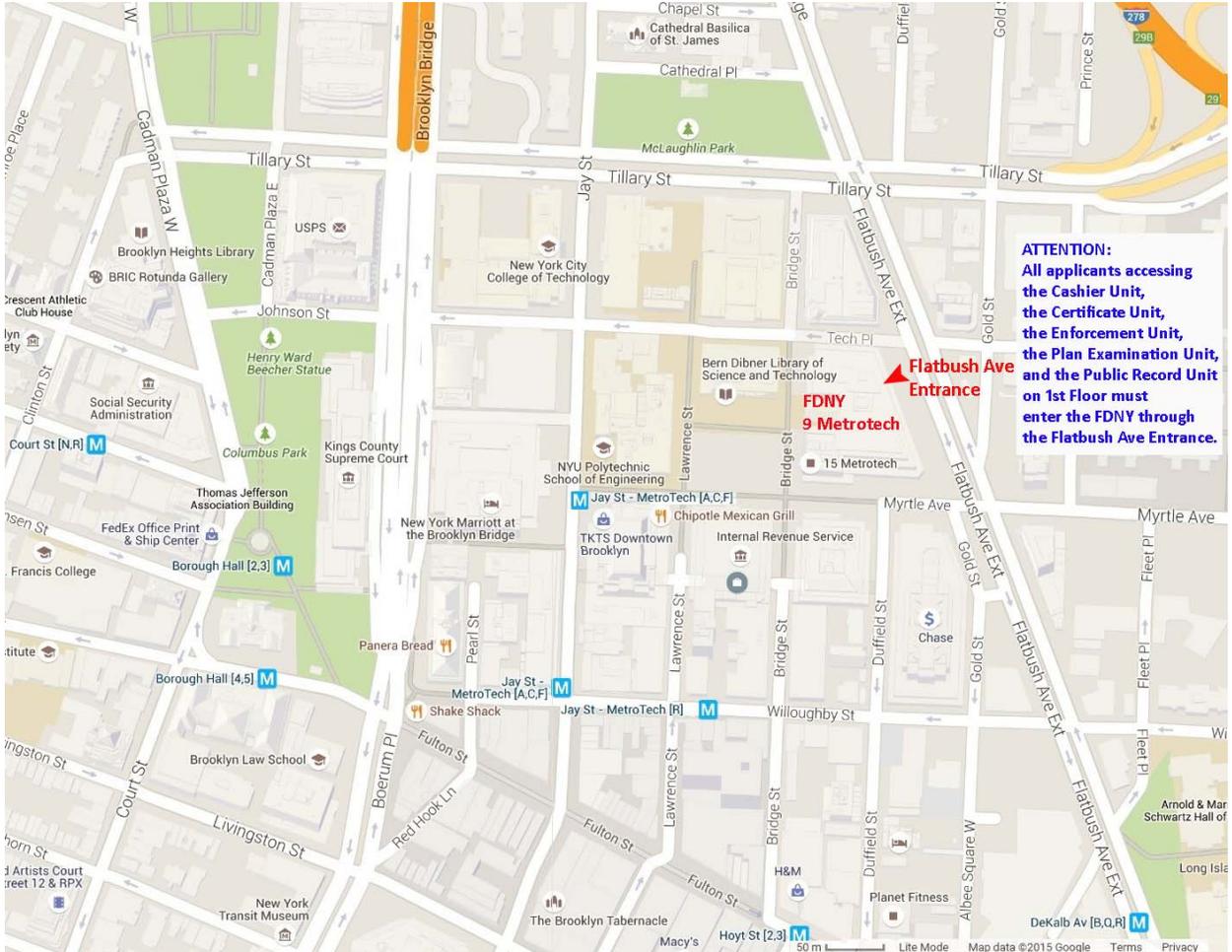


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DEFINITIONS

Central Station / Central Monitoring Station – The hub that contacts NYC Fire Department in case of emergency.

Compressor - A machine which compresses gas for the movement purposes into the piping distribution system.

Control Panel – Control Panel receives the signal from the sensors and transfers the signal to central monitoring station.



Extraction Well -

A gas well is an excavation or structure created in the ground by digging, driving, boring, or drilling to access ground in underground aquifers. Wells can vary greatly in depth (they can be anywhere from 30 feet to 80 feet deep), gas volume, and gas quality. Landfill penetrations are



Horizontal Pipe

Flexible Connection

Valve

made by pipes of different lengths.

Fire Alarm Initiating Device – Fire Alarm Initiating Device is any of the following, or a combination of smoke detectors, heat detectors, UV detectors, IR sensors, pull station and duct detectors.

Fracking – Fracking is a relatively new drilling technology, which makes it possible to reach natural gas reserves. Hydraulic fracturing is the use of sand, water, and chemicals injected at high pressures to blast open shale rock and release the trapped gas inside.

Flare and Blower Station – Landfill gas is collected from decomposition of organic matter. The blowers collect the gas which is then burned in the flare station stack.

Gas Detector - A gas detector is a device which detects the presence of various gases within an area, usually as part of a safety system. This type of equipment is used to detect a gas leak and interface with a control system so a process can be automatically shut down. When activated, these methane detectors will emit audible and visible alarms in the control room.

Heat Sensors - A heat sensor is a fire alarm device designed to respond when the convected thermal energy of a fire increases the temperature of a heat sensitive element. Once the temperature reaches sensor rating the sensor will send a signal to the panel to sound the alarm.



LEL (Lower Explosiveness Limit) - The minimum concentration of a particular combustible gas or vapor necessary to support its combustion in air is defined as the Lower Explosive Limit (LEL) for that gas.

Methane Gas Detection System - A methane gas detection system that initiates audible and visible alarms in the control center

Odorant room – Methane gas is odorless, colorless and tasteless. Odorant room is an area where ethyl mercaptan (corrosive gas) is added for the purposes of detecting methane release.

Smoke detector - A listed device that senses visible or invisible particles of combustion.

UV Detector / IR Sensor – A UV detector is a device which uses photoelectric cells to detect the presence of UV rays. The Certificate of Fitness holder must ensure that UV detectors are properly operating. If the UV detectors are found to be malfunctioning the Certificate of Fitness holders must get in touch with company that services them and schedule a repair. IR sensors perform similar tasks; however they use different technologies. Infrared sensor is a device that detects an image using infrared radiation, similar to a common camera that forms an image using visible light. Instead of the 450–750 nanometer range of the visible light camera, infrared cameras operate in wavelengths as long as 14,000 nm.



INTRODUCTION

Landfills are the largest source of U.S. anthropogenic methane emissions. Landfill methane is produced when organic materials (such as yard waste,



household waste, food waste, and paper) are decomposed by bacteria under anaerobic conditions (in the absence of oxygen).

Methane (CH₄) is the important component of landfill gas. The amount of methane that is produced varies significantly based on composition of the waste. Most of the methane produced in the landfills is derived from food waste, composite paper, and corrugated cardboard. The rate of landfill gas production varies with the age of the landfill.

The rate of methane production varies greatly from landfill to landfill depending on site-specific characteristics such as waste in place, waste composition, moisture content, pressure created by the excess waste, landfill design and operating practices, and climate. Unless captured first by a gas recovery system, methane generated by the landfill is emitted when it migrates through the landfill cover. During this process, the soil oxidizes approximately 10 percent of the methane generated, and the remaining 90 percent is flared (burned).

Increased recycling and alternative waste disposal methods are contributing to a forecasted decline in landfill methane emissions, by slowing the rate of waste going into landfills. Primarily because of a rise in recycling, the percent of waste going to landfills has been declining, and this percentage decline has

offset the increase in total tons generated, roughly stabilizing the level of waste going into landfills.

Landfill gas utilization is a process of gathering, processing, and treating the methane gas emitted from decomposing garbage to produce electricity, heat, fuels, and various chemical compounds.

The recovery and use of methane from landfills can significantly reduce the overall emissions of greenhouse gases. Landfills are the largest anthropogenic source of methane in the U.S. There are a variety of ways that utilities can reduce overall emissions of methane from landfills. Landfill methane can be collected by gas recovery systems, and it can then be used to generate electricity, as a fuel for nearby industrial purposes, or enriched and sold to gas pipelines.

These projects are popular because they control energy costs and reduce greenhouse gas emissions. They collect the methane gas and treat it, so it can be used for electricity or upgraded to pipeline-grade gas. These projects power homes, buildings, and vehicles.

Capture and use of landfill methane as fuel for electricity generation is done through the development of well fields and collection systems at the landfill. Collected methane can be used for on-site power generation or pipelined to a nearby existing generating station. Where electric generation is impractical, flaring is preferred over direct venting to reduce emissions and fire hazards.

ALL THE METHANE RECOVERY LANDFILLS IN NEW YORK HAVE STOPPED ACCEPTING WASTE.

CERTIFICATE OF FITNESS RESPONSIBILITIES AND DUTIES

Facilities shall be under the continuous personal supervision (24 hour, seven-day-a-week) by at least one (1) person holding a L-19 Certificate of Fitness for Supervision of Sanitary Landfill Methane Recovery Facilities.

PLEASE NOTE: The L-19 Certificate of Fitness DOES NOT qualify the holder to PERFORM AND SUPERVISE FLAMMABLE GAS COMPRESSING (G-29), AND OPERATION OF A REFRIGERATING SYSTEM (Q-01) at a sanitary landfill methane recovery facility. Separate Certificates of Fitness are required for those job duties.

| JOB RESPONSIBILITY | COF | RELATED COF TESTS |
|---|-------------|--|
| PERFORM AND SUPERVISE FLAMMABLE GAS COMPRESSING | G-29 | Safe Use, Handling, Storage and Compression of Flammable Gases With Pressure Above 6 PSI |
| OPERATION OF A REFRIGERATING SYSTEM | Q-01 | Refrigerating System Operating Engineer |

CERTIFICATE OF FITNESS FOR SUPERVISION OF FIRE ALARM SYSTEMS AND OTHER RELATED SYSTEMS IS INCORPORATED INTO THIS STUDY MATERIAL (SEE SECTION 8) AND WILL BE INCLUDED IN THE CERTIFICATE OF FITNESS EXAM.

There are approximately 10 methane recovery landfill facilities in New York City. Some landfills are significantly different; however they all share similar type of mechanical and fire safety equipment. The differences include variations in land methane content, size of plants, and employee work practices. Please use this study material with these facts in mind.

The L-19 Certificate of Fitness holders are RESPONSIBLE for ensuring that ALL New York City Fire Department regulations related to the safe use, handling and storage of methane gas are fully observed on the premises at all times.

The failure of L-19 COF holders to fulfill their duties can result in having their Certificate of Fitness revoked. Upon receiving their Certificates of Fitness, L-19 holders must maintain their Certificates of Fitness for their entire term of



employment. If a L-19 COF holder changes his/her work location, the holder is NOT required to take another Certificate of Fitness exam. However; since L-19 is a site specific Certificate of Fitness, holders must file with FDNY to get a new COF card with correct address. Individuals that do not have a L-19 Certificate of Fitness and are transferring to a new location must provide a recommendation letter on an employer's letterhead with the correct work address prior to taking the L-19 Certificate of Fitness exam. A Certificate of Fitness card should be provided to FDNY representatives upon request. When applying for a L-19 Certificate of Fitness an employee must provide the FDNY with the employer's recommendation letter attesting to employees work experience.

SPECIFIC CERTIFICATE OF FITNESS RESPONSIBILITIES

- Record operational data (such as run times) on all mechanical equipment comprising the groundwater collection system and the landfill gas collection and flare station. **(See an example of daily, weekly, and monthly logs in the pages 38-45 of this study material.)**
- Performing routine maintenance (e.g. lubrication) on mechanical equipment as required.
- Visually observing the performance of mechanical equipment, and associated controls and instrumentation.
- Visually inspecting the condition of the landfill cover system.
- Visual inspection of the fire protection equipment

ANTICIPATED HAZARDS ASSOCIATED WITH CERTIFICATE OF FITNESS RESPONSIBILITIES

- Potential for injury related to slip, trip and fall type accidents during the operator's walking tour of the site.
- Potential for injury/property damage related to the use of manual cranes/hoists when performing corrective maintenance on mechanical equipment.
- Potential for injury to workers' head, face, hands, feet and eyes, when inspecting and working on mechanical equipment, and when performing landscaping tasks.
- Potential for injury related to lock-out/tag-out (ex. Unwanted or unauthorized start-up of motorized equipment, electrocution, etc.), when performing as-needed corrective maintenance on mechanical equipment.
- Potential for exposure to various bio-hazards during the field sampling.

Some sanitary landfill methane recovery facilities may have more than one (1) Certificate of Fitness holder working at the same time, just in case one of them gets injured on the job. The other individual can then seek medical attention. In the case where only one (1) COF holder is on duty, he or she must have specific instructions on whom to contact in case of injury or other emergency. It is best to ask the supervisor about the proper protocol, as each methane recovery facility has a different one.

RESPONSIBILITY OF THE FACILITY OWNER

It shall be the owner's representative/operators responsibility to maintain the sanitary landfill methane recovery facility and related systems. It is also the owner's responsibility to determine the individual qualifications needed

for the Certificate of Fitness holder to perform duties that are related to inspection, testing and maintenance of the facility. It is also the owner's responsibility to maintain a valid FDNY permit.

Records of all system inspections, tests, servicing and other maintenance required by the NYC Fire Code and NYC Fire Rules shall be maintained on the premises for a minimum of 3 years and made available for inspection by any department representative.

The facility owner shall assign an operations and maintenance employee to comply with the requirements of this study guide. In the absence of a specific designee, the owner shall be considered the impairment coordinator.

FDNY PERMITS

Site-Specific Permit

Such permit authorizes the permit holder to recover methane from landfills and related processing, and to conduct an operation or maintain a facility at a specific premises or location, for which a permit is required by the NYC Fire Code.

A site-specific permit is valid for 12 months only. Every permit or renewal will require an inspection by the NYC Fire Department's Bulk Fuel Safety Unit and shall expire after 12 months.

Permits are not transferable and any change in occupancy, operation, tenancy or ownership must require that a new permit be issued. The Certificate of Fitness holder is responsible for ensuring that all fire safety regulations and procedures regarding the premises are fully observed. Permits and Certificates of Fitnesses shall be readily available and posted on the premises for inspection by Fire Department representatives.

| FIRE DEPARTMENT, CITY OF NEW YORK | | | | | BUREAU OF FIRE PREVENTION | | |
|---|----------|------------------------|-----------------------------|------------------------------|---------------------------|----------------|------|
| ACCOUNT NUMBER | TYPE | A.P. | D.O. | ADM. CO. | ISSUANCE DATE | PERMIT EXPIRES | |
| 77777777 | 10 | P | 12 | E284 | 01/28/10 | 01/11 | |
| PREMISES ADDRESS | | | | | ACCOUNT NAME | | |
| 1111 YORK ST STATEN ISLAND NY 11111 | | | | | CARI & RENO | | |
| ITEM CODE | SUB CODE | QTY | DESCRIPTION | | | FLOOR NO. | FEE |
| 338 | 00 | 01 | Methane Recovery Operations | | | 1 | PAID |
| PERMIT TYPE | | | | | | | |
| 1 | | | | | | | |
| 1-REGULAR | | CARI & RENO | | ANNUAL FEE | | PAID | |
| 2-SUPPLEMENTAL | | 1111 YORK ST | | | | | |
| 3-DUPLICATE | | STATEN ISLAND NY 11111 | | | | | |
|  | | | | BY ORDER OF THE COMMISSIONER | | | |
| 2011012938 | | | | | | | |

AN EXAMPLE OF FDNY PREMISES PERMIT

Hot Work Permit

- A Certificate of Fitness (G-60) is needed for conducting torch operations.
- A Certificate of Fitness (F-60) holder must be present to perform fire watch during hot work operations.
- A copy of an insurance policy is required as well for conducting hot work operations.
- FDNY temporary permits are required to conduct hot work:
 - (1) using oxygen and a flammable gas; or
 - (2) storing, using or handling any flammable gas in excess of 400 SCF.
- Hot work authorization (is NOT a FDNY permit) requirements:
 1. Hot work authorizations are to be issued daily and are required at all times for any welding, brazing/soldering, torch cutting, and spark production. A hot work authorization should be prepared by the responsible person for the subcontractor. The L-19 holder may serve as the responsible person or should ensure that such a person is designated to monitor the hot work operations. The L-19 Certificate of Fitness holder must have copies of all FDNY hot work permits and hot work authorizations secured on premises.
 2. Hot work operations are limited to the area and time specified in the hot work authorization.
 3. Subcontractors will identify responsible persons for hot work in Subcontractor Site Specific Safety Plans.
 4. A copy of the FDNY hot work temporary permit and hot work authorization are to be kept by the fire guard. Copies of completed permits will be maintained in the project files.
 5. Hot work authorization must be posted in the area where the work is taking place. It must be available for inspection by any representative of the FDNY during the performance of the work, and for 48 hours after the work is complete.
 6. A pre-hot work check shall be conducted by the responsible person prior to work to ensure that all equipment is safe and hazards are recognized and protected. A report of the check shall be kept at the work site during the work and made available for inspection by any representative of the FDNY.
 7. A hot work permit has to be obtained from CDA (Construction, Demolition and Abatements) Unit of FDNY.
 8. A pre-hot work check shall be conducted at least once per day.

WELDING

(1) Welds of steel process piping shall be made by certified welders, and evidence of their certifications shall be filed with the FDNY. Piping welders shall be certified to the Department of Buildings by their employers after qualifying under the ASME Boiler and Pressure Vessel Code, or API Standard 1104-1999.

Additionally, welders using oxygen and a flammable gas during torch operations must have a G-60 Certificate of Fitness. Fire Guards holding a F-60 Certificate of Fitness issued by the FDNY shall also be present at the time of torch operations.

(2) Upon completion of the installation, the owner or operator of the facility shall arrange to have a FDNY representative witness a hydro-test of all process piping (if needed – is based on the installation).

DESIGN, INSTALLATION AND OPERATION OF METHANE GAS RECOVERY FACILITIES

Methane gas recovery facilities at sanitary landfills must be designed, installed, operated and maintained in compliance with the requirements of the NYC Fire Code, NYC Fire Rules, NYC Construction Codes and the NYC Electrical Code.

Design and installation documents for the facility, detailing the methane recovery process and fire protection systems, including a process flow diagram showing all vessels (also known as containers) and instrumentation, shall be filed with the NYC Department of Buildings and the FDNY's Bureau of Fire Prevention, together with supporting information and documentation.

DESIGN AND INSTALLATION REQUIREMENTS

Pressure Vessels (Containers) shall be designed to comply with the ASME Boiler and Pressure Vessel Code. Manufacturer ASME data sheets for pressure vessels as well as the results of pressure tests (if required) shall be maintained on the premises and made available for inspection by any Fire Department representative.

Electrical Equipment

(A) Electrical equipment within 25 feet of any process equipment shall be explosion-proof.

That includes the following:

- control center
- electric service
- overhead lights
- air handling equipment
- odorant room



(B) Electrical instrumentation shall be designed to provide for fail-safe operation.

- Instrumentation shall provide for fail safe design and operation.
- Refrigeration systems, if used, shall utilize a non-flammable refrigerant.
- The design and fabrication of the piping systems shall comply with ANSI B31.3-1980 “Chemical Plant and Petroleum Refinery Piping” except as modified by the Fire Department – City of New York.



GAS COLLECTION SYSTEMS

Landfill gas is gathered from landfills through extraction wells. A typical gas extraction well is shown here.

Landfill gas can also be extracted through horizontal trenches instead of vertical wells. Both systems are effective at collecting gas.



Landfill gas is extracted and piped to a main collection header, where it is then sent to be treated or flared. A blower is needed to pull the gas from the collection wells to the collection header and further downstream.

FLARE AND BLOWER STATION

If gas extraction rates do not warrant direct use or electricity generation, the gas can be flared off. One hundred m³/hr is a practical threshold for flaring. Flares are useful in all landfill gas systems, as they can help control excess gas extraction spikes and maintenance down periods. Flares can be either open or enclosed. Enclosed flares are typically more expensive, but they provide high combustion temperatures and specific residence times as well as limit noise and light pollution.



Landfill gas must be treated to remove impurities, condensate, and particulates. This process of purification is done at the flare and blower station.

The process and components of different flare stations do vary from facility to facility; however, common components usually include, extraction wells, headers, pipes, flaring station, sensors, control panels and so forth. Extraction wells and headers are connected with pipe to the flaring station. At the flaring station sensors measure the contents and amount of methane gas on each header.

Some flaring stations have a nitrogen or air operated shutdown valve. A modulating valve may also be present, as it is the valve that controls how much gas is taken from the landfill.

Blowers act as a vacuum that pull the gas from the landfill. A flame arrester, which is a honeycomb of metal, acts as a fail-safe mechanism. If the flame goes backwards, the flame arrester melts and an alarm will sound, and will simultaneously initiate a system shut-down. It is a preventive measure and may save lives.

The flaring station is always on, just in case there is gas that needs to be burned. If the gas is coming into a flare and blower station, it **MUST** be burned. If the flaring station is off and gas continues to be pulled in from extraction wells, it is then sent to the recovery system.

The flaring station has to be under constant maintenance. The lens/iris of the sensors has to be constantly cleaned, rates have to be recorded, and the control panel needs to be constantly checked and calibrated. These are just some of the many responsibilities the L-19 COF holder must perform. The flare has to be run at a minimum temperature; it is done by letting air in and out.

BELOW IS A BRIEF SUMMARY OF HOW THE FLARE AND BLOWER STATION FUNCTION.

The flare and blower process consists of turning on the blower. The blower then cleans the stack, after that the pilot gas gets released and pilot gets lit. Once the pilot gas gets lit and is at a certain temperature, the shutdown valve opens – lets the methane gas in. Blowers turn on automatically and start pulling in the methane gas. The pilot ignites it, and the flare is on.

The pathway of the gas in the FLARE and BLOWER STATION is:
HEADER → BLOWERS → FLAME ARRESTER → STACK

EMERGENCY SHUT DOWN OF THE FACILITY

In case of a fire emergency, the Certificate of Fitness holder shall comply with the following:

- 1) Initiate the emergency shutdown (ESD) of the landfill methane recovery facility
- 2) Call the Fire Department
- 3) Identify the source of the fire hazard
- 4) Direct firefighters to the hazard and assist as necessary

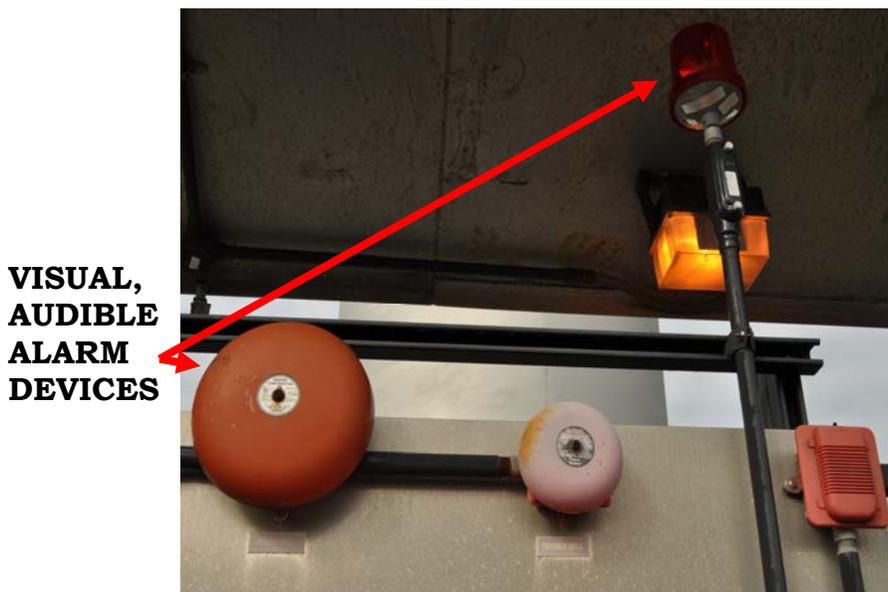
(A) The process equipment shall be provided with an emergency shut-down system capable of automatic and manual operation. The emergency shutdown system shall initiate upon the following activation:

- Manual activation of the system at the process control center (such as a fire, process equipment failure, etc).
- Activation of the fire detection system detectors located in the feed gas engine compressors area, or in other areas as determined by the Fire Department.

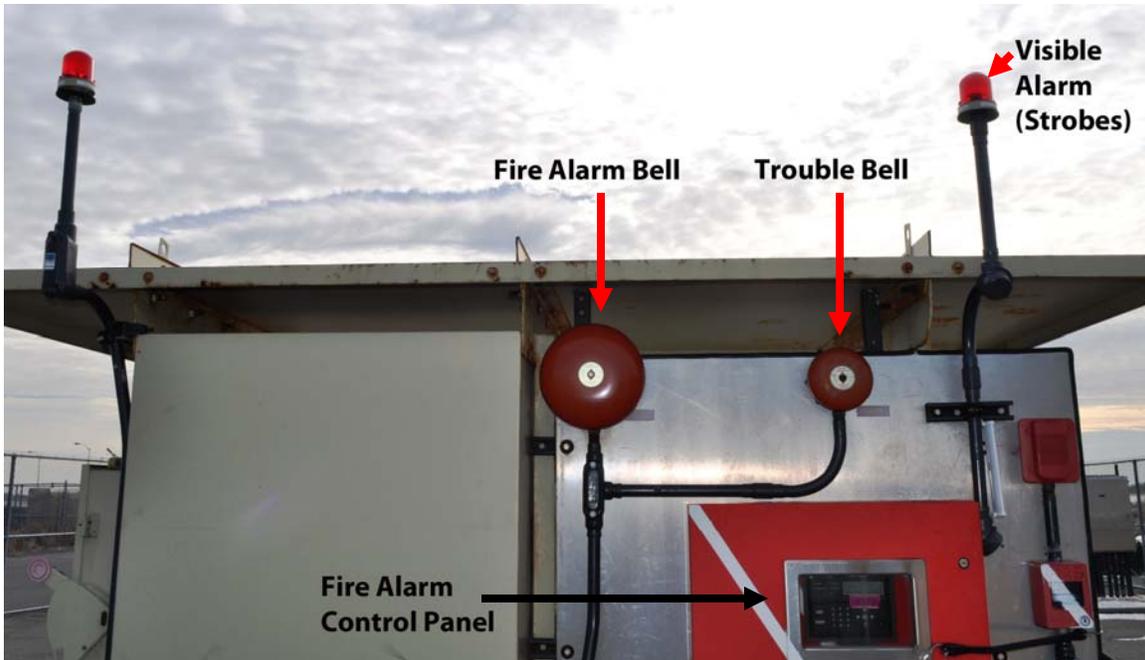


(B) Activation of the emergency shut-down system shall initiate:

- AUDIBLE and VISIBLE ALARMS at the control center
- an AUDIBLE ALARM outside the control center



- a VISIBLE ALARM at the field alarm panel
- automatic shut down of process equipment within two (2) minutes,
- followed by depressurization of process piping to 100 psig or less with seven (7) minutes to 20 psig or less within twelve (12) minutes.



Instrument air compressors are not required to shut down upon activation of the emergency shut-down system.

(C) An EMERGENCY SHUT-DOWN can't be initiated by pulling the EMERGENCY SHUT-DOWN SWITCHES (Class 3 Box). The Certificate of Fitness holder MUST know where Emergency Shut-Down switches are located in their plant.

Should there be a need to release the gas from the system in case of emergency, the release shall only occur when all personnel are at a minimum distance from the system. System build-in timer usually allows 2 minutes for COF to investigate and to release the gas; personnel are required to abandon the facility to avoid breathing in the methane gas.

(D) One (1) or more emergency shut-down system abort switches, manual pull stations may be provided in the control center and/or in the field alarm panel. When activated within the first two (2) minutes it will not interrupt any required transmission of alarms to central station. Manual activation of the



emergency shut-down system shall override any abort switches. A manual pull station is connected to the Fire Alarm Panel and designed to shut-down the plant if necessary.



**FIELD
ALARM
PANEL
(USUALLY
ENCLOSED)**

*Emergency shut-down is initiated with an initiating fire alarm device.

ALARM SYSTEMS

Alarm systems shall be designed and installed in compliance with NYC codes and regulations.

(A) A methane gas detection system that initiates audible and visible alarms in the control center at 25% LEL shall be provided throughout the landfill methane recovery facility.

Such a system shall have an audible alarm outside the control center and a visible alarm on the field alarm panel. The methane gas detection system may be interconnected with the emergency shut-down system, and is arranged to initiate such a shut down if gas detection reaches 50% of LEL. More on this in section 8 of this study material.



METHANE GAS DETECTOR

METHANE GAS DETECTORS SHALL BE PROVIDED IN THE FOLLOWING LOCATIONS:

- Feed gas compressor areas
- Feed gas intercool areas
- Vacuum compressor areas
- Vacuum module
- H.P. flash module
- Pretreatment module
- Solvent recovery system area
- Other area as determined by the FDNY.

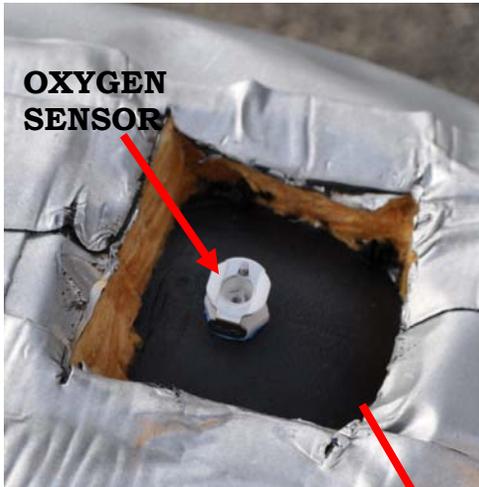
(B) An UV (Ultra-Violet) detectors and/or IR (Infra-Red) sensors shall be provided to protect the methane recovery and flaring plant area. The system shall initiate an audible and visible alarm at the control center, and an audible alarm on the field alarm panel. Activation of the fire detection system shall initiate the facility emergency shut-down system and shall transmit a fire alarm signal to a central monitoring station.

(C) At least one (1) manual fire alarm box (Class 3 box) shall be provided in the control center. At least one (1) additional manual fire alarm box shall be provided within the facility and near the facility entrance, which, if manually activated, shall transmit an alarm to a central monitoring station.

NOTE: The Class 3 Box will only send a signal to an FDNY approved monitoring station. IT WILL NOT INITIATE AN EMERGENCY SHUT-DOWN.

(D) Process alarms for abnormal operating conditions shall be installed and in working order.

(E) Some methane recovery stations have oxygen sensor for monitoring the oxygen levels in the landfill gas. Levels above 5% of oxygen by volume are an indication of a hazard and should initiate a recovery system shut-down.



YARD HYDRANT SYSTEM

A landfill methane recovery facility shall be provided with a yard hydrant system installed in conformance with the requirements of the construction codes, including the NYC Building Code and NYC Fire Code section 508.

The yard hydrant system shall be designed and installed in compliance with the following requirements:

(A) Hydrants shall be of a type complying with the requirements of the NYC Department of Environmental Protection and have Fire Department approved threads;

(B) The hydrant system piping shall be a minimum of eight (8) inches in diameter;

(C) Fire Department connections to the hydrant system piping shall be provided at one (1) or more approved locations;

(D) The system shall be supplied with water from a source capable of providing a minimum of 2,500 GPM (gallons per minute);

(E) A hydrant loop grid system shall be provided with block valves at one (1) or more approved locations for emergency and maintenance purposes;

(F) Hose reels and nozzles shall be provided at one (1) or more approved locations and shall be readily available for use; and



(G) Where required by the Fire Department, fire water monitors shall be provided at one (1) or more approved locations.

If a fire extinguishing system other than a sprinkler system is installed in an interior motor control room, it shall be of an approved type, and shall comply with NYC Fire Code Section 904 and the NYC Building Code.

HYDRANT TESTING

Hydrants shall be tested annually to ensure proper functioning. Each hydrant shall be opened fully and water flowed until all foreign material has cleared.



Flow shall be maintained for not less than 1 minute. After the operation, dry barrel and wall hydrants shall be observed for proper drainage from the barrel. Full drainage shall take no longer than 60 minutes. Where soil conditions or other factors are such that the hydrant barrel does not drain within 60 minutes, or where the groundwater level is above that of the hydrant drain, the hydrant drain shall be plugged and the water in the barrel shall be pumped out.

Dry barrel hydrants that are located in areas subject to freezing weather and that have plugged drains shall be identified clearly as requiring pumping after operation.

MAINTENANCE

Hydrants shall be lubricated annually to ensure that all stems, caps, plugs, and threads are in proper operating condition. Hydrants shall also be kept free of snow, ice, or other materials and protected against mechanical damage so that free access is ensured. After using a fire hydrant, a Certificate of Fitness holder should always secure the cap, roll and properly store the hoses, and check that the hydrant has drained properly.

HOSE CABINETS

Hose cabinets must be painted red and provided with a white strip and number. The cabinet must be accessible at all times. Hoses, nozzles and other fire protection tools are to be kept in the hose cabinet. Hose connections are located in the hose cabinet. These connections will allow fire fighters to connect directly into the yard system.



The Certificate of Fitness holder should ensure that the hose cabinets are in good working order. All equipment inside should be inspected. The standard hose length is 50 feet. The hose cabinet must be closed with specific type of lock. The lock should be of a type that is easily broken in the event the key is not available.



Cabinets and enclosed compartments used to house portable fire extinguishers shall be clearly marked with the words FIRE EXTINGUISHER in letters at least two (2) inches high. Cabinets and the compartments shall be readily accessible at all times.

The hose in the storage shall be kept out of direct sunlight and in a well-ventilated location. The

hose shall be stored only after it has been properly inspected, service-tested if required, cleaned, dried and rolled. The hose that is out-of-service for repair shall be properly tagged and kept separated from any hose that is in storage and ready for service. To maximize the life of the hose, it should be stored in a ventilated area at temperatures between 32°F and 100°F. As per

manufacturer's maintenance requirements, the hose should be wet-tested annually at a working pressure.

A HOSE NOZZLE is attached at the end of the hose. The nozzle is used to direct the stream of water from the hose. An example of a typical nozzle is shown in the picture below:

Nozzles at auxiliary hose stations shall be FDNY approved. Water spray nozzles shall be inspected and maintained by the L-19 COF

holders to ensure that they are in place, continue to be aimed or pointed in the direction intended in the system design, and are free from external loading and corrosion. Where caps or plugs are required, the inspection shall confirm they are in place and free to operate as intended. Misaligned water spray nozzles shall be adjusted (aimed) by visual means, and the discharge patterns shall be checked at the next scheduled flow test.



Water Nozzle

FIRE EXTINGUISHERS

INSTALLATION AND PLACEMENT

Fire extinguishers must be located in conspicuous locations where they will be readily accessible and immediately available for use. These locations must be along normal paths of travel. Fire extinguishers having a gross weight 40 pounds or less must be installed so that the top of the extinguisher is not more than 5 ft above the floor. Hand-held fire extinguishers having a gross weight exceeding 40 pounds shall be installed so that their tops are not more than 3.5 feet above the floor. The clearance between the floor and the bottom of installed hand-held extinguishers shall not be less than 4 inches.

IN OTHER WORDS, NO FIRE EXTINGUISHER IS ALLOWED TO BE ON THE FLOOR.

CLASSES OF FIRES AND THE APPROPRIATE EXTINGUISHERS:

Class A fires are caused by ordinary combustible materials (such as wood, paper, and cloth). A Class A fire extinguisher must use either the heat-absorbing effects of water or the coating effects of certain dry chemicals to extinguish a Class A fire.

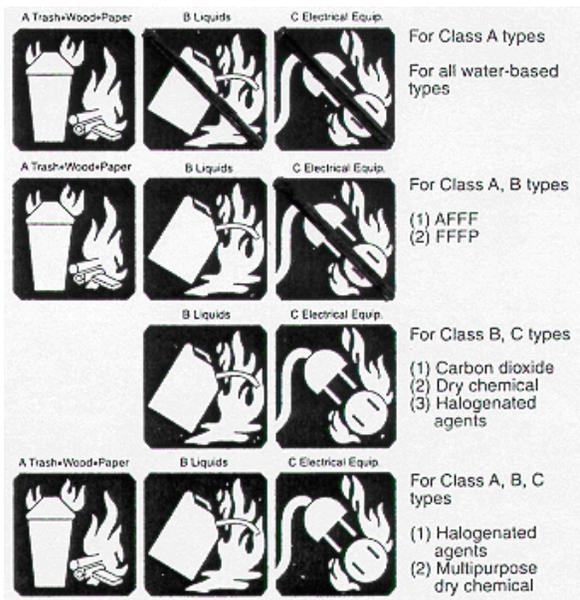
Class B fires are caused by flammable or combustible liquids and gases such as oil, gasoline, etc. A Class B fire extinguisher, using the blanketing-smothering effect of oxygen-excluding media such as CO₂, dry chemical or foam is most effective.

Class C fires involve live electrical equipment. These fires must be fought with Class C fire extinguishers that do not conduct electricity. Foam and water type extinguishers must not be used to extinguish electrical fires. After the power has been isolated from the electrical equipment, extinguishers for Class A or B fires may be used.

Class D fires are caused by ignitable metals, such as magnesium, titanium, and metallic sodium, or metals that are combustible under certain conditions, such as calcium, zinc, and aluminum. Generally, water should not be used to extinguish these fires.

A multi-purpose dry chemical fire extinguisher may be used to extinguish more than two (2) classes of fires. Examples of some fire extinguishers are shown on the next page.

Symbols may also be painted on the extinguisher. The symbols indicate what kind of fires the extinguisher may be used on. Examples of these symbols are shown on the next page. The symbol with the shaded background and the slash indicates when the extinguisher must NOT be used. The Certificate of Fitness holder must understand these symbols. All fire extinguishers should be kept in good working order at all times.



| CLASSES OF FIRES | TYPES OF FIRES | PICTURE SYMBOL |
|------------------|--|----------------|
| A | Wood, paper, cloth, trash & other ordinary materials. | |
| B | Gasoline, oil, paint and other flammable liquids. | |
| C | May be used on fires involving live electrical equipment without danger to the operator. | |
| D | Combustible metals and combustible metal alloys. | |

PORTABLE FIRE EXTINGUISHERS



OPERATION INSTRUCTIONS FOR FIRE EXTINGUISHERS

INSTRUCTIONS



FIRE EXTINGUISHER INSPECTIONS AND MAINTENANCE

The extinguishers are required to be visually inspected monthly. The owner of the premises is responsible to designate a person to perform a monthly inspection. This inspection is a "quick check", that a fire extinguisher is available and will operate. It is intended to give reasonable assurance that the fire extinguisher is fully charged and operable.

“Quick Checks” are done by:

- Verifying that the fire extinguisher is in its designated place,
- Confirmed that it has not been actuated or tampered with and,
- That there is no obvious or physical damage or condition to prevent its operation.

The information of the monthly inspection record must include:

- the date the inspection was performed;
- the person performing the inspection, and
- those portable fire extinguishers found to require corrective action.

MONTHLY INSPECTION TAG

Recordkeeping must be either attached to the extinguisher or on an inspection checklist maintained on file. Labels or markings indicating fire extinguisher use, or classification, or both shall be placed on the front of the fire extinguisher.

***NOTE:** At least once per year, all fire extinguishers must be serviced by a W-96 Certificate of Fitness holder employed by a FDNY approved company.



Wheeled fire extinguishers must be periodically inspected to ensure that they are working properly. They should be tested according to the schedule

recommended by the manufacturer. All inspections should be recorded on the tag attached to the fire extinguisher. These inspections must be conducted by an authorized representative of the manufacturer. The extinguisher must be inspected to ensure that all extinguishers are fully charged. Defective extinguishers must be repaired or replaced. The name of the person conducting the inspections and the date must be recorded on the tag attached to the fire extinguisher. The Certificate of Fitness holder may also record these inspections in his/her log. Depending upon the material from which the extinguishers are made, they are subject to periodic hydrostatic testing.

FIRE EXTINGUISHER MARKINGS

Portable fire extinguishers shall not be obstructed or obscured from view. In rooms or areas in which visual obstruction(s) cannot be completely avoided, signs or other markings shall be provided to indicate the locations of portable fire extinguishers.

Wall hydrants and fire pump test headers located on the exterior of buildings shall be conspicuously marked to indicate their function. FDNY connections shall be marked as follows:

1. FDNY connections serving a standpipe system shall be provided with caps painted red, and shall have the word "STANDPIPE" in letters 1 inch high and 1/8 inch deep cast in the body or on a non-ferrous metal plate secured to the connections. They may also be mounted on the wall in a visible location, except that caps of FDNY connections used for combination standpipe and sprinkler systems shall be painted yellow and the words shall read "COMBINATION STANDPIPE AND SPRINKLER SYSTEMS."
2. FDNY connections serving a sprinkler system protecting an entire building or structure shall be provided with caps painted green and shall have the word "SPRINKLER" in letters 1 inch high and 1/8 inch deep cast in the body or on a non-ferrous metal plate secured to the connections. They may also be mounted on the wall in a visible location, except that caps of fire department connections used for combination standpipe and sprinkler systems shall be painted yellow and the words shall read "COMBINATION STANDPIPE AND SPRINKLER SYSTEMS."
3. FDNY connections serving a non-automatic sprinkler system shall have the entire connection painted silver.
4. FDNY connections serving a sprinkler system protecting only a portion of a building or structure shall have durable metal signs securely fastened to, or above, the connection indicating the portion of the building or structure protected.

HAZARD IDENTIFICATION SIGNS AND MARKINGS

Signs and markings required by Sections Hazard identification signs shall not be obscured or removed, shall be in English as a primary language or in symbols allowed by this code, shall be durable, and the size, color and lettering shall be acceptable to the commissioner.

EXAMPLES OF HAZARD MARKINGS



Unless otherwise exempted by the Fire Commissioner, hazard identification signs as set forth in NFPA 704 for the specific material contained shall be conspicuously affixed on stationary containers and aboveground tanks and at entrances to locations where hazardous materials are stored, handled or used, including dispensing, in quantities requiring a permit, including locations where such materials are dispensed, and at such other locations as may be designated by the Fire Commissioner.

Sources of ignition such as smoking, shall comply with the section below. It shall be unlawful to smoke in the following locations, and “No Smoking” signs shall be provided in English as a primary language.

It should be prohibited:

1. In rooms or areas where hazardous materials are stored or used in open systems in amounts requiring a permit.
2. Within 25 feet of outdoor hazardous material storage, handling and use areas, including dispensing areas.

3. In facilities or areas within facilities in which smoking has been entirely prohibited shall have “No Smoking” signs conspicuously placed at all entrances to the facility or area. Facilities or areas within facilities in which smoking is permitted in designated areas shall have signs indicating that smoking is permitted in designated areas only.
4. In rooms or areas where flammable or combustible hazardous materials are stored, handled or used.

Warning markings

Cabinets shall be clearly identified in an approved manner with red letters on a contrasting background to read: HAZARDOUS — KEEP FIRE AWAY.

Fire protection and other critical piping, as well as other processes, shall be identified in accordance with NYC Fire Code Chapters 9 and 27.

LIGHTNING PROTECTION, GROUNDING AND SECURITY

LIGHTNING PROTECTION, GROUNDING

Lightning protection and grounding is used for pre-caution. It is to prevent accidental fire.

- (A) The highest structural steel, process vessels and columns shall be provided with lightning protection in accordance with the NYC *Electrical Code*.
- (B) All process equipment and piping shall be electrically grounded.

Flammable and combustible liquids, in the gas recovery and treatment system, and in *stationary tanks*, shall be stored, *handled* and used in compliance with the requirements of NYC Fire Code Chapter 34 and the NYC Fire Rules. Solvents with low *flash points* and solvents used at a temperature above their *flash points* may be used only when *approved*.

Natural gas compressors shall be located outdoors, except that such compressors may be partially enclosed in light-weight noncombustible construction for protection against the weather, provided such enclosure is open at the top and bottom in an approved manner that provides for adequate ventilation and explosion venting.

The design and installation of any flaring system shall be *approved*.

SECURITY

A fence constructed of noncombustible material shall be provided around the perimeter of the *facility*, at least 25 feet away from any process equipment.

At least two (2) means of fire apparatus access shall be provided to the methane gas recovery facility.

SPACE HEATING SYSTEMS

Only hot water space heating systems may be installed within the facility. The location of any space heating plant shall be *approved*.

ODORANT ROOM

Odorant room is limited in the methane industry and is used for detecting quality of methane gas that is being sold to utility companies.

(A) A *sprinkler system or other approved non-water fire extinguishing system* designed and installed in accordance with NYC Fire Code Chapter 9 and the NYC *Building Code* shall be provided for protection of a gas odorant room.

(B) A fire detection system shall be provided in the odorant room. Activation of the fire detection system shall cause the gas valves to close gas valves and initiate audible and visible alarms locally and in the control center.

(C) A flammable gas detection system shall be provided in the odorant room. Activation of the flammable gas detection system shall initiate audible and visible alarms locally and in the control center.

(D) The odorant room shall be equipped with absorbing or neutralizing equipment to prevent escape of any odorant to the atmosphere.

Note: The Odorant Room is restricted to the utility company that works with the Methane Recovery Facility. COF holders are restricted from entering the Odorant Room.

SUPERVISION OF FIRE ALARM SYSTEMS

The 2008 NYC Fire Code (adopted July 2008) vastly changed the requirements for the supervision of all fire alarm systems. The old Fire Prevention code only required supervision for Interior Fire Alarm Systems. The 2008 NYC Fire Code affects thousands of fire alarm systems in facilities which previously did not require a Certificate of Fitness holder (COF).

You are being tested on these systems because your facility has one or more of the following:

1. Emergency voice/alarm communication system
2. Fire Department communication system
3. Carbon monoxide alarms and detectors
4. Automatic
5. Manual
6. Manual and automatic
7. Emergency alarm systems (gas detection system)
8. Smoke control systems

Ordinary a separate COF would be required to supervise these systems. This L-19 COF will incorporate Fire Alarm related questions to eliminate the need for an additional certification.

All COF holders should ensure that their respective premises have fire alarm systems approved by the Fire Department City of New York.

FIRE ALARM SYSTEMS

The primary purpose of fire alarm systems within protected premises is to warn facility occupants and transmit signals indicating a fire condition to the Fire Department via an FDNY approved central station company.

A Fire Alarm System is a system consisting of components and circuits arranged to monitor and annunciate the status of fire alarm and supervisory signal-initiating devices, and to initiate the appropriate response to these signals.

In general, a fire alarm system can be classified as automatic, manually activated, or both. If a fire condition occurs, the alarm system warns the occupants within the premises by actuating loud sirens, gongs, bells, speakers, horns and flashing lights (strobes).

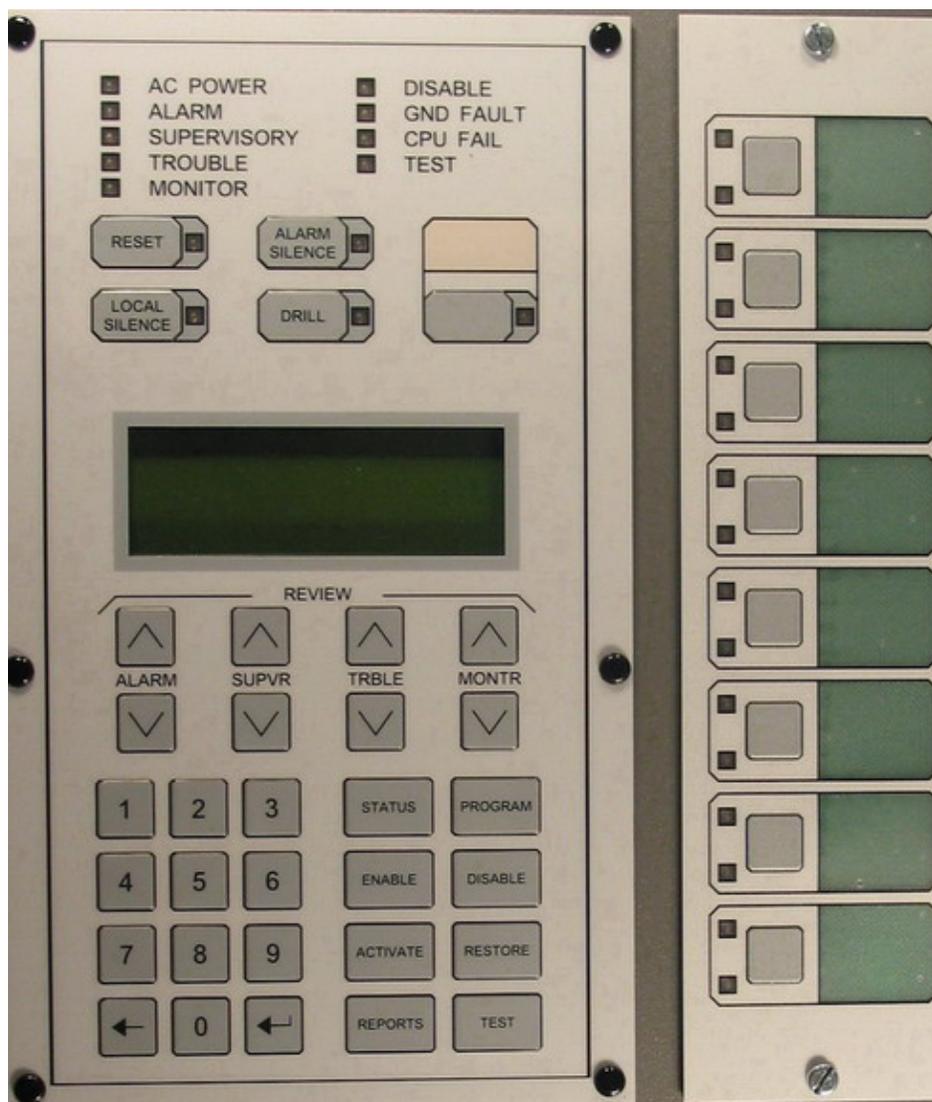
The entire fire alarm system shall be visually inspected weekly. This inspection must be conducted and logged by the L-19 Certificate of Fitness holder.

Defective equipment must be replaced immediately by an authorized service technician.

FIRE ALARM SYSTEM COMPONENTS

Fire Alarm Control Panel (FACP)

The FACP monitors inputs and control output through various types of circuits. FACP processes all abnormal conditions (alarm, trouble & supervisory) and indicates appropriately based on action programmed for the respective device.



Fire Alarm Control Panel (FACP)

Three types of signals initiated by FACP:

- **Alarm Signal:** A signal initiated by a fire alarm initiating device such as a manual fire alarm pull station, automatic fire detector, water flow switch, or other device in which activation is indicative of the presence of a fire or fire signature. When a fire signal is generated, the FACP activates the facility audible and visual devices connected to the fire alarm (i.e. horn/strobes), sends a signal to an FDNY approved central station, and activates control of certain facility function which will be described later in this study booklet.
- **Supervisory Signals:** A supervisory signal indicates a system or device being monitored which has been compromised or is in an abnormal state. A supervisory signal will audibly annunciate at the FACP to indicate the supervisory condition which needs to be investigated and corrected. A visual message will appear on the screen but the strobe will not flash. The FACP will also send a supervisory signal to an FDNY approved central station. The central station must be notified not to dispatch the FDNY for a supervisory signal; however, the central station must notify the COF holder so that the situation can be corrected immediately. A supervisory signal can also be programmed to turn off a system or close a valve as needed to prevent a potentially unsafe condition. For example, a landfill gas flaring system can be set to shut off the main gas inlet valve in the event that the oxygen level inside of the piping reaches a predetermined set point and triggers a supervisory alarm signal. Since the threat of fire is eliminated once the system is shut down, there is no need for an FDNY response. The central station will notify the COF holder so that the situation can be corrected immediately.
- **Trouble Signals:** A signal initiated by the fire alarm system or device indicative of a fault in a monitored circuit or component. A trouble signal will audibly annunciate at the FACP to indicate that the trouble condition needs to be investigated and corrected. The trouble signal could be sent to the central station who would notify the operator but not the FDNY. Common trouble conditions monitored by the FACP would be battery condition, Alternative Current failure (electric), ground fault, open or short circuit on a wire, phone line failure, or internal component failure. The battery backup should take over in the event of a power outage.

Acknowledge switch or button

An acknowledge button, also abbreviated as (ACK) is used to acknowledge alarm, trouble or supervisory condition.

The sequence of operations may differ in various fire alarm systems; however, it is necessary for the L-19 COF to report to the FACP location whenever the alarm is activated.

Alarm silence switch or button

The alarm silence switch is used to silence the facility audible and visual devices after evacuation is complete while the source of an alarm is being investigated. Never reset the fire alarm system until the condition is verified. Depending on the configuration of the alarm system, this function will either silence the system's notification appliances completely, or will silence only the audible alarm, with strobe lights continuing to flash. The silence switch does not prevent a signal from being transmitted to a FDNY approved central station company. Audible silence allows for easier communication for facility personnel while responding to an alarm.

System reset switch or button

This switch is used to reset the fire alarm system after an alarm condition has been cleared. All initiating devices should return to normal condition after manually resetting.

If an initiating device is still in alarm after the system is reset, such as smoke detectors continuing to sense smoke, or a manual pull station is still in an activated position, another alarm will be generated.

A system reset is often required to clear supervisory conditions. A system reset does not clear trouble conditions. Most trouble conditions will clear automatically when conditions are returned to normal.

A FACP indicating an alarm signal cannot be reset to “normal” if the device or devices signaling the alarm to the FACP have not returned to “normal” from “alarm”.

Remote Annunciator panel:

A remote annunciator panel when installed shall function for visual notification of alarm, supervisory or trouble conditions only.

Do not silence facility audible/visual devices or reset the fire alarm panel until the fire alarm condition is verified by authorized person.

| TYPE OF DEVICE | ACTIVATED BY | TYPE OF SIGNAL | ACTION NORMALLY REQUIRED TO RETURN DEVICE TO “NORMAL” CONDITION |
|---|---|--------------------|---|
| Manual pull station | Manually pulling handle | Fire Alarm | Return handle to normal position. A key or other method may be required to reset the station to a normal condition. |
| Smoke, beam, and duct detectors | Detection of particles of combustion *see note below | Fire Alarm | Smoke detectors will normally reset when the reset button is pressed at the FACP if the condition activating the detector has been cleared. |
| UV/IR detectors | UV or IR rays | Fire Alarm | After activation detectors will not self-restore and will require replacement/service by a qualified service technician. Once the detector is cleared, the COF holder will manually reset the panel switch responsible for that detector. Consideration should be given to false signals from the sun reflecting off of metallic objects. Trouble signals will be transmitted when the lens is obstructed by snow/ice/rain. The trouble alarm should be “non latching” so that the alarm will go away once the lease is clear. For most sensors, the heat from the detector is sufficient to clear any condensation on the lens. Lenses should be cleaned weekly to prevent buildup of dust and dirt. |
| Heat detectors | Abnormally high temperature (fixed temperature detector) or rapid temperature rise(rate of rise detector) | Fire Alarm | After activation most Fixed temperature heat detectors will not self restore and will require replacement by a qualified service technician. Rate of rise detectors will normally self-restore after activation. |
| Methane gas detectors | Methane level | Supervisory Signal | After activation most detectors will not self-restore and will require replacement by a qualified service technician. Detector has to be cleared, COF holder manually resets the panel. |
| Oxygen Detectors | Minimum allowable level of oxygen | Supervisory Signal | System automatically shuts off or yields a collection of methane. |
| <p>NOTE: There are other circumstances which will cause a smoke detector to signal an alarm condition when there is none, creating false alarms and causing unnecessary Fire Department responses. Care must be taken at all times to protect all smoke detectors from the entrance of foreign particles which may be airborne. Smoke detectors which have not been properly cleaned and maintained will also create false alarms. Smoke detectors must be cleaned at least once every six month by the S-78 COF. holder.</p> <p>ALL ABNORMAL CONDITIONS MUST BE INVESTIGATED AND NOTED IN THE LOG BOOK.</p> | | | |

FIRE ALARM SYSTEM POWER SUPPLIES

Primary Power Supply

The main power supply for a fire alarm system shall be provided with a dedicated circuit from a local utility.

Secondary Power Supply

The fire alarm system shall have a secondary power supply which provides power to the alarm system within 10 seconds of failure of the primary power supply. Storage batteries dedicated to the fire alarm system or engine driven generators are acceptable as secondary power source for the system.

TYPES OF FIRE ALARM INITIATING DEVICES

Automatic Detection Devices

Automatic detection devices have sensors which detect heat, smoke in a fire alarm system. Note as follows:

Area Smoke Detector

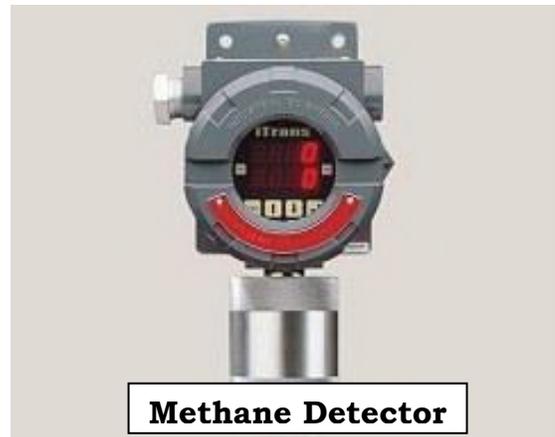
A smoke detector is a device that detects visible or invisible particles of combustion. Smoke detectors have been shown to be very effective in reducing fire damage and loss of life.



Smoke Detector

Methane Gas Detector

Methane gas detector is part of a detection system. The methane gas detectors may be interconnected with the emergency shut-down system, and are arranged to initiate such a shut down if gas detection reaches 50% of LEL. When activated, these methane detectors will emit audible and visible alarms in the control room.



Methane Detector

Flame (UV, IR) Detector

A UV detector is a device which uses photoelectric cells to detect the presence of UV rays. IR sensors perform similar tasks; however, they use different technologies. An infrared sensor is a device that detects an image using infrared radiation, similar to a common camera that forms an image using visible light.

UV/IR Detector



Duct smoke detector

Is designed to sample air flow in a duct and detect the presence of particles of combustion.



**Duct Smoke
Detector**

Heat Detector

A sensor that detects abnormally high temperatures or rate of temperature rise. Heat detectors have been shown to be very effective in reducing fire damage. An illustration of a heat detector is shown below:



Heat Detectors

Heat detectors are available in two general types: **rate-of-rise and fixed temperature**. Heat detectors can only be tested by authorized fire alarm technicians. COF holders are responsible for ensuring that operational heat detectors are in place. They must notify fire alarm maintenance companies to make all necessary repairs.

The rate-of-rise heat detectors activate the alarm when the room or surrounding area temperature(s) increases at a rapid rate. This type of detector is more sensitive than the fixed temperature detector. The rate-of-rise heat detector does not have to be replaced after it has activated the fire alarm. All heat detectors require special attention. They must be carefully installed according to the manufacturer's instructions.

Rate-of-rise Heat Detector



Where subject to mechanical damage a heat detector shall be protected by an approved UL/FM mechanical guard as shown in the picture below.

Heat Detector with Protective Mechanical Guard



MANUAL OR PULL STATION DEVICES:

A manually operated device used to initiate an alarm signal. Some fire alarm systems are activated automatically. When sensors detect heat or smoke and sound an alarm. Other fire alarm systems must be activated manually. A person who notices a fire emergency must activate the alarm by hand. Fire alarm systems that are manually activated use fire alarm pull stations. Fire alarm pull stations shall be located near the exits throughout the protected area so that they are conspicuous, unobstructed, and accessible. There must be at least one manual fire alarm station in a landfill methane recovery facility. Approved plastic covers are permitted to protect fire alarm manual pull stations and provide relief from false alarms.

Single Action Stations

Single action stations require only one step to activate the alarm. For example, the alarm might be activated by pulling down on a lever. An example of a single action station is shown below. This type of alarm station is often found indoors, e.g., in office buildings.

The cover on these alarm stations serves as a lever. When the cover is pulled down, it allows a switch inside to close. This sends the alarm signal.



Double Action Stations

Double action stations require two steps in order to activate the alarm. The user must first break a glass, open a door or lift a cover. The user can then gain access to a switch or lever which must then be operated to initiate the alarm. To activate this type of alarm the station the cover must be lifted before the lever is pulled. This kind of double action station is often found indoors. Another kind of double action break glass station requires someone to break a small pane of glass with a small metal mallet.

The Certificate of Fitness holder must know how to manually operate each manual pull station. Once activated, the fire alarm system can not be re-set at the fire alarm manual pull station. The alarm must be re-set at a main FACP after the pull station is reset to its normal condition. The alarm may be turned off only by a Certificate of Fitness holder or by a Fire Department representative. Once activated, a key may be required to reset the manual pull station.

All fire alarm pull stations installed or relocated after April 1, 1984 should be installed so that the handle is approximately four feet from the adjusted level and it is located within (5 ft) of the exit egress. Manual stations should never be blocked or obstructed.

SUPERVISORY DEVICES

Supervisory devices are commonly installed as part of a landfill gas recovery facility. The supervisory devices monitor important parts of the system. A supervisory alarm such as a bell will be sounded when there is an off normal condition with a system or device being monitored. This type of signal is commonly called a supervisory signal. The signal is always transmitted to the main control panel. When a supervisory condition is indicated, the Certificate of Fitness holder must check the system in order to identify the part of the system that caused the signal. Then that part of the system should be identified and dealt with accordingly. The supervisory signal at this type of facility is not transmitted to a FDNY approved central station company.

Some control panels indicate the exact location of the trouble. Other panels only display a general supervisory signal. For example, a lighted panel might indicate only that there is a problem somewhere in the fire protection system. Each supervised device must then be inspected to determine which part is causing the signal.

Common supervised conditions include:

- 1) Oxygen Sensor
- 2) Heat Detectors



Tamper switch on a sprinkler valve



Temperature Supervisory Switch

rights reser

SUB-SYSTEM

Sub-System is an activating (voluntary or required) system installed in a specific area or floor for a specific purpose in a facility that has a required (mandated) base facility fire alarm system.

All Sub-Systems including **Smoke Detection** shall be subject to Fire Department inspection and test for the issuance of a Letter of Approval for such Sub-System(s).

Thereafter, all such Sub-Systems shall be maintained in proper working order, and a person holding a COF shall be in charge of the supervision and maintenance of all such activating systems. A detailed record of such system shall be kept available for examination by the NYC Fire Department.

All Sub-Systems shall be interconnected to the base facility fire alarm system for alarm and trouble supervision and shall annunciate specific type and location of such sub-system(s).

Activation of the sub-system shall activate the base facility audible and visual appliances and notify the Fire Department via the base facility Central Station.

AUDIO AND VISUAL NOTIFICATION DEVICES

A fire alarm system component such as a bell, horn, speaker, light or text display that provides audible, tactile or visible out puts or any combination thereof.

Horns, Horn/Strobes



Combination speaker / strobe appliances



Speaker



Speaker Strobe

Gongs Bells



ACTIVATION OF AUDIO / VISUAL NOTIFICATION DEVICES

There are two methods used to notify the occupants of a facility in case of a fire.

The **first** is the general alarm method. This method activates all audio/visual devices throughout the facility when a fire is detected.

The **second** is the selective method. The selective method activates the audio/visual devices only in the floor of alarm as well as the floor immediately above and the floor below.

After the fire alarm system for all methods has been activated it must be reset manually. When on the premises the Certificate of Fitness holder shall investigate. The fire alarm system must be reset at the control panel. The fire alarm must remain in operating condition at all times.

COMMUNICATION SYSTEM

A functioning communication system is required as part of the fire alarm system when it is applicable. There are one and two-way communication system.

The Certificate of Fitness holder must make sure that all communication units are working correctly.

A. One way communication entails use of a public address system. Some facilities also have a public address system installed which is not part of the approved fire alarm system. Although not approved, the public address system may be used to warn and instruct facility occupants in case of a fire emergency. All communication systems may be used to issue evacuation instructions in facility requiring two way communications.

B. The two way communication system uses warden phones. Warden phones must be placed at several locations in the facility. The warden phones are usually located near exit stairways in the facility. A warden phone must also be installed in the FACP. The FACP is used to issue instructions during a fire emergency. Portable two-way radios may also be used as a means of communication.

Two-way communication systems must be tested at least once every 6 months according to NFPA 72 (2002). If a telephone system is used, a signal should sound at the command center as soon as the receiver is lifted from the cradle. It should be noted that in some systems voice communication are not required.

CENTRAL STATION TRANSMITTER

A central station transmitter is a device that receives alarm signals from protected premises and retransmits those signals to the Fire Department's Bureau of Fire Communication thru an FDNY approved central station. A central station transmitter must have primary and secondary means of communication.

The COF holder must make sure that the central station transmitter is operable at all times. When transmitter malfunctions are discovered, the COF holder must report the malfunctions to the FDNY approved central station company, and they must be recorded into a log book. Authorized central station companies must be approved by FDNY. The central station company must arrange for any and all repairs as soon as possible.

COF holders are **prohibited** from performing any repairs on the central station transmitter. They are also prohibited from installing or modifying any component of the fire alarm system.

TEST, INSPECTION, AND REPAIR PROCEDURES FOR FIRE ALARM SYSTEMS

A Certificate of Fitness holder must supervise the operation and testing of the fire alarm system. A record of all tests, inspections, and other operations of the fire alarm system must be noted in the log book. Log books can be combined or separated depending upon your in house procedures.

The Certificate of Fitness holder must keep the log in a safe location inside the facility for a minimum of 3 years. The log must be bound in hard cover. The log must be made readily available at all times on the premises to any representative of the Fire Department.

Entries must include:

- Inspection of Fire Alarm system and actions taken if defective equipment or abnormal conditions are discovered.
- Tests conducted by COF holder (i.e. manual stations)
- Fire drill conducted
- Facility with fire safety directors shall follow high rise bulleting guide lines.
- Further log book requirements may be specified in the Rules of City of New York.

Information to be found at the beginning of the log book:

- Premise address
- Fire alarm system FDNY approval date – type of system/manufacturer
- FDNY approved central station information:
 1. account number
 2. company name
 3. telephone number
 4. supervisors name
- Fire alarm maintenance contractor:
 1. company name
 2. telephone number
 3. supervisors name

SUGGESTED FORMAT FOR LOG BOOK ENTRY

| Date | Time | Name of COF holder | COF Number | Events/Test results | Disposition/Date (follow up) | Initials |
|-------------|-------------|---------------------------|-------------------|--|--|-----------------|
| 1/06/09 | 1:00PM | Joe Doe | 89924922 | Conducted visual inspections fire alarm panel-system normal | System normal | JD |
| 1/07/09 | 2:00PM | Jane Doe | 89353423 | Tested exit "A" pull station found pull station to function satisfactorily | System normal | JD |
| 1/23/09 | 1:00PM | Steve Doe | 89887789 | Visual inspections discovered defective horn/strobe on 6 th floor and notified ABC Fire alarm Co. for service call. | ABC fire Alarm replaced the defective device 1/23/09 | SD |
| 1/27/09 | 1:00PM | Peter Pan | 89345678 | Test exit "B" pull station on 5 th Floor found to be defective & notified fire alarm co. for service (placed " out of service " sign over the pull station). | Repair made and sign removed. 1/28/09 | PP |

Any time a fire alarm system is to be activated during a test, inspection, or fire drill, ***it is mandatory to take the system "off line". The FDNY approved central station company monitoring the fire alarm must be notified beforehand to prevent the unnecessary dispatching of the Fire Department.*** The telephone number for the FDNY approved central station should be readily available to the COF holder. The telephone number for the FDNY approved central station and the account number associated with the fire alarm system are required to be located on the FACP and central station transmitter.

The FACP and fire alarm devices should be visually inspected for indicated abnormal conditions by the COF holder at the beginning of each day. Manual (pull) stations -Each fire alarm system manual pull station should be tested a minimum of once monthly where practical. The results of the test shall be recorded in the log book. Defective devices must be replaced immediately by qualified personnel. The manual stations may also be used to conduct fire drills.

Smoke detectors must be cleaned at least once every six months. This procedure makes sure that the detector is kept in good working condition. Smoke detectors must be cleaned by a person holding S-78/W-78 (Certificate of Fitness to maintenance smoke detector) only. The FDNY website provides a

monthly list of approved Smoke Detector maintenance companies on the FDNY website @ www.nyc.gov/html/fdny/pdf/fire_prevention/instruct_smoke_detectors.pdf

The L-19 COF **DOES NOT** allow individual to perform the smoke detector cleaning. The smoke detectors are extremely sensitive and easily damaged. They should never be painted or altered in any way. All testing shall be consistent with manufacturer's specifications.

All maintenance and repairs of fire alarm systems and related components shall be performed by **qualified personnel** in the inspection, testing, and maintenance of fire alarm systems as per the NYC Building and Fire Codes.

OUT-OF-SERVICE SITUATIONS & THE IMPAIRMENT COORDINATOR

Out of service system: A fire protection system that is not fully functional; or whose operation is impaired or is otherwise not in good working order.

System off-line entries:

The date and time the alarm system was taken off-line, the reason for such action, the name and operator number of the person notified at the FDNY approved central station (or other evidence of notification satisfactory to the Department), and the date and time the system was restored to service, shall be entered in the alarm log book in every instance.

Out of service Signage:

The COF holders notify the appropriate supervisor and place a placard over the defective box indicating that a particular device is out of service.

EMERGENCY SITUATIONS

The following steps must be taken immediately to call the FDNY depending upon the location of the facility:

| | |
|---------------|--------------|
| Manhattan | 212-570-4300 |
| Bronx | 718-430-0200 |
| Brooklyn | 718-965-8300 |
| Queens | 718-476-6200 |
| Staten Island | 718-494-4296 |

The notification should include:

1. a brief description of condition.
1. area affected.
2. type of occupancy.
3. estimated time until it becomes operational.
4. name and Telephone number of Impairment Coordinator making the notification.

Any impairment to a fire Alarm or related system poses safety risks to a facility and its occupants. The impairment coordinator shall be responsible to ensure appropriate posting of a fire guard detail, notifications to tenants, and posting out of service signage when appropriate.

APPENDIX

Daily Log (Example 1)

LANDFILL GAS MANAGEMENT SYSTEM DAILY INSPECTION LOG

| | | | |
|--------------------------|----------------------|-----------------------------|--|
| Date | | Time | |
| Technician | Wind Speed/Direction | | |
| Ambient Temperature (°F) | | Barometric Pressure (in Hg) | |
| Weather | | GEM I.D. | |

| FLARE STATION | | | |
|--|--|--|-----|
| Blower in Service (circle) | | | |
| Blower Inlet Temp. (°F) | | Demister Inlet Valve Position (% Open) | |
| Blower Vacuum (in. WC) | | Demister Delta Pressure (in WC) | |
| Blower Discharge Temp. (°F) | | Nitrogen Regulator Press. (psi) | |
| Blower Discharge Pressure (in. WC) | | Nitrogen Tank Pressure (psi) | |
| Blower Outlet Valve Position (% Open) | | Propane Regulator Press. (psi) | |
| Vacuum Control Transmitter (Digital %) | | Propane Tank Pressure (psi) | N/A |
| Vacuum Control Valve Position (% Open) | | Flame Arrestor Delta Pressure (in WC) | N/A |

| | Header #1 | Header #2 | Header #3 | Header #4 | Header #5 | Header #6 | Flare Inlet |
|-------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-------------|
| Pipe Diameter (in.) | 8 | 12 | 12 | 12 | 12 | 8 | 16 |
| Valve Position (% Open) | | | | | | | |
| Temperature (°F) | | | | | | | |
| Gauge Vacuum (in. WC) | | | | | | | |
| Methane (% Vol) | | | | | | | |
| Carbon Dioxide (% Vol) | | | | | | | |
| Oxygen (% Vol) | | | | | | | |
| Vacuum (in. WC) | | | | | | | |

Note: Header readings are taken on the field side of the valve.

| ANALOG DATA MENU | | | | | | | |
|---------------------------------|-----|----|---------------------------------------|--|-----|--|--|
| Flow - Chart Recorder (SCFM) | | | | Top Flare Temp. (°F) | | | |
| Flow Rate (SCFM) | | | | Middle Flare Temp. (°F) | | | |
| Flow Totalizer (1000 SCF) | | | | Bottom Flare Temp. (°F) | | | |
| Landfill Vacuum (in. WC) | | | | Pilot Temperature (°F) | | | |
| Blower I/S Current (Amps) | | | | Controlling Thermocouple | | | |
| Blower X Running Hours | | | | Control Temperature (SP) | | | |
| Blower Y Running Hours | | | | Control Mode | | | |
| Blower Z Running Hours | | | | Area #1 LEL (Next to Blowers) | | | |
| LFG Oxygen (%) | | | | Area #2 LEL (Next to Flare) | | | |
| Flow/Temp Chart Change (circle) | Yes | No | | Print Daily Condensate Tank Report (check) | | | |
| Visible Smoke or emissions? | Yes | No | Flame Condition (Color and Stability) | Good | Bad | | |

| |
|------------------|
| Comments: |
| |
| |
| |

KEY
 °F = degrees Fahrenheit
 % Vol = percent by volume
 psi = pounds per square inch

in WC = inches water column
 in Hg = inches Mercury
 SP = Set Point

SCFM = standard cubic feet per minute
 SCF = Standard Cubic Feet
 NA = Not Available

Daily Log (Example 2)

LANDFILL GAS MANAGEMENT SYSTEM DAILY INSPECTION LOG

| | | | | | |
|----------------|--|---------------------------|--|----------------------------------|--|
| Date | | Time | | Technician | |
| Weather | | Ambient Temp. (°F) | | Wind Speed/Direction | |
| | | | | Barometric Press. (in Hg) | |

| HEADER DATA | | | | | |
|------------------------|----------|----------|----------|---------------------------------|----------------|
| | Header A | Header B | Header C | Header D | Main Header |
| Methane (% Vol) | | | | | |
| Carbon Dioxide (% Vol) | | | | | |
| Oxygen (% Vol) | | | | | |
| Inlet Vacuum (in WC) | | | | | |
| Valve Setting (% Open) | | | | | Vac/Flow Valve |
| | | | | Vac/Flow Control Valve (circle) | Manual Auto |

| BLOWER STATION | | | | FLARE STATION | |
|------------------------------|--------|-----------|------------|---------------------------------------|---------------------------------------|
| | % Open | inches WC | Temp (°F) | Flare Inlet Pressure (in WC) | Flame Arrestor Diff. Pressure (in WC) |
| Demister | | | ////////// | | |
| Blower Inlet | | - | | Aux Fuel Press. (in WC) - Natural Gas | |
| Blower Discharge | | + | | Nitrogen Pressure (psi) - Regulator | |
| Blower in operation (circle) | | | | Nitrogen Pressure (psi) - Tank | |

ANALOG DATA MENU

| Process Overview (YIC-1 From Main Menu Screen) | | Flare Temperature | |
|--|--|----------------------------|--|
| Landfill Vacuum (in WC) | | Top Flare Temp. (°F) | |
| Flow Rate (SCFM) | | Middle Flare Temp. (°F) | |
| LFG Oxygen (%) | | Bottom Flare Temp. (°F) | |
| Blower Current (Amps) | | Controlling Thermocouple | |
| Flare Top Temp. (°F) | | Louver Position (% Closed) | |
| Flare Middle Temp. (°F) | | Control Temperature (SP) | |
| Flare Bottom Temp. (°F) | | Control Mode | |
| Area LEL (%) | | | |

| Blower Data | | Flow & Totalizer | |
|----------------------------|--|--------------------------|--|
| Blower 301 Current (Amps) | | Current Flow (SCFM) | |
| Blower 301 Current (Hours) | | Today's Total Flow (SCF) | |
| Blower 302 Current (Amps) | | Total Flow (SCF) | |
| Blower 302 Current (Hours) | | | |

| 7 Day Flow History | | Resettable Flow | |
|------------------------|--|--|--|
| Yesterday's Flow (SCF) | | Resettable Total Flow (SCF) | |
| 2 Days Ago Flow (SCF) | | Reset Time | |
| 3 Days Ago Flow (SCF) | | Reset Date | |
| 4 Days Ago Flow (SCF) | | | |
| 5 Days Ago Flow (SCF) | | Area LEL (Calibrated Detronics Methane Sensors) | |
| 6 Days Ago Flow (SCF) | | Area #1 LEL | |
| 7 Days Ago Flow (SCF) | | Area #2 LEL | |

| | | | |
|----------------------|------|------|--|
| Date and Time | Date | Time | |
|----------------------|------|------|--|

KEY

°F = degrees Fahrenheit
 % Vol = percent by volume
 psi = pounds per square inch

in WC = inches water column
 in Hg = inches Mercury
 SP = Set Point

SCFM = standard cubic feet per minute
 SCF = Standard Cubic Feet
 NA = Not Available

Weekly/Bi-weekly Log

| WEEKLY / BI-WEEKLY INSPECTION | | | | | | | |
|---|--|-------------|--------|------|--------|--------|------|
| | | Date: | | | | | |
| | | Time: | | | | | |
| | | Technician: | | | | | |
| 1. OPERATING BLOWER (Circle) | | X | Y | X | Y | | |
| <i>1A</i> | Noise or Vibration | OK | Bad | OK | Bad | | |
| <i>1B</i> | Measurable or Odiferous Gas Leaks | No | Yes | No | Yes | | |
| 2. CONTROL PANEL – Motor Control | | | | | | | |
| <i>2A</i> | Blower Running Light (Circle) | Off | On | Off | On | | |
| <i>2B</i> | Blower 1 or 2 Current Alarm | Off | On | Off | On | | |
| <i>2C</i> | High Motor Current Alarm | Off | On | Off | On | | |
| <i>2D</i> | Alarm Shutdown Reset Button | | | | | | |
| 3. CONTROL PANEL | | | | | | | |
| <i>3A</i> | Panel Power Switch | Off | On | Off | On | | |
| <i>3B</i> | System | Test | Off | Auto | Test | Off | Auto |
| <i>3C</i> | Blower Operation | Test | Off | Auto | Test | Off | Auto |
| <i>3D</i> | Blower Run Green Light | Off | On | Off | On | | |
| <i>3E</i> | Purge System | Test | Off | Auto | Test | Off | Auto |
| <i>3F</i> | Purge On Green Light | Off | On | Off | On | | |
| <i>3G</i> | Flare Pilot | Test | Auto | Test | Auto | | |
| <i>3H</i> | Flame On Green Light | Off | On | Off | On | | |
| <i>3I</i> | Auxiliary Fuel (Natural Gas) | Hand | Off | Auto | Hand | Off | Auto |
| <i>3J</i> | Flare Shutdown Valve | Open | Closed | Auto | Open | Closed | Auto |
| <i>3K</i> | Shutdown Valve Open Green Light | Off | On | Off | On | | |
| <i>3L</i> | Condensate Tank Overfill Alarm Amber Light | Off | On | Off | On | | |
| <i>3M</i> | Condensate Tank High Alarm Light | Off | On | Off | On | | |
| <i>3N</i> | Condensate Tank Leak Alarm Light | Off | On | Off | On | | |
| <i>3O</i> | Condensate Tank Alarm Test | Yes | No | Yes | No | | |
| <i>3P</i> | Condensate Tank Power Green Light | Off | On | Off | On | | |
| <i>3Q</i> | Condensate Tank Warning Amber Light | Off | On | Off | On | | |
| <i>3R</i> | Condensate Tank Alarm Red Light | Off | On | Off | On | | |
| 4. FLARE | | | | | | | |
| <i>4A</i> | Flame Condition (Color & Stability) | Good | Bad | Good | Bad | | |
| <i>4B</i> | Abnormal Burner Hot Spots | Yes | No | Yes | No | | |
| <i>4C</i> | Unusual Sounds or Odors | Yes | No | Yes | No | | |
| <i>4D</i> | Damper Motor Running | Yes | No | Yes | No | | |
| <i>4E</i> | Manual Damper Position – Left Lever | Up | Down | Up | Down | | |
| <i>4F</i> | Manual Damper Position – Right Lever | Up | Down | Up | Down | | |
| 5. PIPING | | | | | | | |
| <i>5A</i> | Piping General Condition | | | | | | |
| <i>5B</i> | Inlet Valve Position | | % Open | | % Open | | |
| <i>5C</i> | Gauges Operational | Yes | No | Yes | No | | |
| 6. SITE CONDITIONS (Vandalism, Cleanliness) | | | | | | | |
| <i>6A</i> | | Good | Bad | Good | Bad | | |
| 7. SUPPLEMENTAL NATURAL GAS VALVE | | | | | | | |
| <i>7A</i> | | Open | Closed | Open | Closed | | |
| 8. NATURAL GAS METER READING (CUFT) | | | | | | | |
| | Temp compensated | | | | | | |
| | Non-compensated | | | | | | |

Weekly/Bi-weekly Log (continued)

DATE: _____ Technician: _____

| BI-WEEKLY INSPECTION GAS MANAGEMENT SYSTEM | | | | | | | | | | | | |
|--|----------|-----------------------|------|----------------------------------|-------|---------------------------------------|----------------------|------|--------------|-------|-----|----|
| CONTROL PANEL – POWER & ALARM | | | | | | | | | | | | |
| Power Toggle Lever | ON | OFF | | Alarm Light | ON | OFF | | | | | | |
| Power Key | ON | OFF | | Reset Button | | | | | | | | |
| Power Light | ON | OFF | | Emergency Stop | IN | OUT | | | | | | |
| CONTROL PANEL – INDICATOR LIGHTS (Outside Door) | | | | | | | | | | | | |
| Green Lights | | | | Red Lights | | | | | | | | |
| Purge Blower | ON | OFF | | Purge Failure | ON | OFF | | | | | | |
| Ignition Sequence | ON | OFF | | Flare High Temp | ON | OFF | | | | | | |
| Flame Prove | ON | OFF | | Flame Failure | ON | OFF | | | | | | |
| Inlet # 1 Open | ON | OFF | | Flare Temp Low | ON | OFF | | | | | | |
| Automatic Blocking Valve On | ON | OFF | | Automatic Blocking Valve Failure | ON | OFF | | | | | | |
| Blower No. 1 (Running Light) | ON | OFF | | Blower No. 1 Failure | ON | OFF | | | | | | |
| Blower No. 2 (Running Light) | ON | OFF | | Blower No. 2 Failure | ON | OFF | | | | | | |
| Blower No. 3 (Running Light) | ON | OFF | | Blower No. 3 Failure | ON | OFF | | | | | | |
| | | | | High Blower Pipe Pressure | ON | OFF | | | | | | |
| CONTROL PANEL SWITCHES (Inside Door) | | | | | | | | | | | | |
| MODE SELECTION | | | | MANUAL CONTROLS | | | | | | | | |
| Control Mode | MAN | OFF | AUTO | Purge Blower | OFF | ON | | | | | | |
| Blower No. 1 | MAN | OFF | AUTO | Pilot Gas | OFF | ON | IGNITE | | | | | |
| Blower No. 2 | MAN | OFF | AUTO | Inlet No. 1 | CLOSE | OPEN | | | | | | |
| Blower No. 3 | MAN | OFF | AUTO | Mod. Valve Bypass | OFF | ON | | | | | | |
| CONDENSATE TANK | | | | | | | | | | | | |
| Tank Lights | Good | Bad | | Tank Alarm Test | Yes | No | Printer Paper Roll | | | | | |
| ALARMS (From PLC Screen) | | | | | | | | | | | | |
| Active Alarms | Yes | No | | Alarm History Check | Yes | No | Cond. Overfill Light | ON | OFF | | | |
| Alarm: _____ | | | | | | | | | | | | |
| VERBATIM AUTO-DIALER | | | | | | | | | | | | |
| Armed | Disarmed | | | Check Status | Yes | No | | | | | | |
| BURNER CONTROL | | | | | | | | | | | | |
| Power | ON | OFF | | Flame | ON | OFF | Alarm | ON | OFF | Reset | Yes | No |
| VIGILANTE (CHECK IF LIGHT IS ON) | | | | | | | | | | | | |
| CH ₄ No. 1 | | CH ₄ No. 2 | | O ₂ | | O ₂ Sample Pump-not needed | Power | | All Flashing | | | |
| Oxygen Sensor Operation: | | | | Good | Bad | Calibration Date | | | | | | |
| LEL Sensors Operation: | | | | Good | Bad | Calibration Date | | | | | | |
| FLARE | | | | | | | | | | | | |
| Flame Condition (Color & Stability) | Good | Bad | | Abnormal Burner Hot Spots | Yes | No | | | | | | |
| Damper Motor Running | Yes | No | | Unusual Sounds or Odors | Yes | No | | | | | | |
| PIPING | | | | | | | | | | | | |
| Piping General Condition | Good | Bad | | Insulation Condition | Good | Bad | | | | | | |
| Press. Gauges Operational | Yes | No | | Temp. Gauges Operational | Yes | No | | | | | | |
| SITE CONDITIONS (Vandalism, Cleanliness, Weeds) | | | | | | | | Good | Bad | | | |

Monthly Log (Example)

Month: _____, Year: _____

Monthly Facility Safety Inspection

Facility or Site:

Jobsite Address:

Reviewed by Supervisor Signature: _____

Inspected by: _____ Date: _____

| Yes | No | Worksite General | Comments |
|--------------------------|--------------------------|---|----------|
| <input type="checkbox"/> | <input type="checkbox"/> | Safety signs/warnings posted where appropriate? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Emergency phone #'s posted where they can be found easily? | |
| <input type="checkbox"/> | <input type="checkbox"/> | First Aid Kit available and adequately stocked? | |
| <input type="checkbox"/> | <input type="checkbox"/> | All work areas clean and orderly? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Combustibles, scrap, debris, and waste removed and stored away from work area? | |
| | | Fire Protection | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fire suppression equipment inspection current? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Fire extinguishers provided in adequate #, type and location? | |
| | | Exiting or Egress | |
| <input type="checkbox"/> | <input type="checkbox"/> | All Doors marked and illuminated by reliable light source? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Doors, passageways, or stairway appropriately marked? | |
| <input type="checkbox"/> | <input type="checkbox"/> | "Exit" sign lettering at least 5 inches high and 1/2 inch wide? | |
| | | Walkways | |
| <input type="checkbox"/> | <input type="checkbox"/> | Aisles and passageways kept clear and clean? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Pits and floor openings covered or guarded? | |
| | | Personal Protective Equipment (PPE) | |
| <input type="checkbox"/> | <input type="checkbox"/> | Protective goggles or face shield provided and worn where there is a danger of flying particles or corrosive materials? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Approved respirators provided for regular and emergency use as needed? | |
| <input type="checkbox"/> | <input type="checkbox"/> | PPE maintained in a sanitary condition and ready for use? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Eye wash and quick drench shower within work area where employees are exposed to injurious materials? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Hearing protection required when noise levels are exceeded? | |
| | | Self Contained Breathing Apparatus | |
| <input type="checkbox"/> | <input type="checkbox"/> | Face piece in sealed bag? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Lenses clear and clean? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Cylinder pressure full? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Straps, buckles, hardware in good condition? | |
| | | Ladders | |
| <input type="checkbox"/> | <input type="checkbox"/> | Ladders inspected and maintained in good condition? | |

Monthly Log (Continued)

Month: _____, Year: _____

| Yes | No | Rotating Equipment | Comments |
|--------------------------|--------------------------|--|----------|
| <input type="checkbox"/> | <input type="checkbox"/> | Signs posted warning of automatic starting feature of the unit? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Belt drive system totally enclosed? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Coupling guards in place where needed? | |
| | | Compressed Gas Cylinders | |
| <input type="checkbox"/> | <input type="checkbox"/> | Cylinders legibly marked to clearly identify the gas contained? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Compressed gas cylinders stored in areas which are protected from heat? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Cylinders stored or transported in a manner to prevent them from creating a tripping, falling or rolling hazard? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Valve protector caps always placed on cylinders when not in use? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Bottles maintained with current hydro inspection dates? | |
| | | Lockout / Tagout Procedure | |
| <input type="checkbox"/> | <input type="checkbox"/> | LOTO equipment available and inventoried? | |
| | | Confined Spaces | |
| <input type="checkbox"/> | <input type="checkbox"/> | All permit required confined spaces properly identified and marked? | |
| | | Environmental Conditions | |
| <input type="checkbox"/> | <input type="checkbox"/> | Work areas properly illuminated? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Caution labels and signs used to warn of hazardous conditions? | |
| | | Flammable and Combustible Materials | |
| <input type="checkbox"/> | <input type="checkbox"/> | Combustible materials stored in covered metal receptacles and removed from work area promptly? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Approved containers and tanks used for storage and handling of flammable and combustible liquids? | |
| | | Hazardous Chemical Exposure | |
| <input type="checkbox"/> | <input type="checkbox"/> | Containers labeled? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Piping system clearly marked as to their contents? | |
| <input type="checkbox"/> | <input type="checkbox"/> | PPE provided, used and maintained where needed? | |
| | | Hazardous Substance Communication | |
| <input type="checkbox"/> | <input type="checkbox"/> | MSDS readily available for each hazardous substance used? | |
| | | Electrical | |
| <input type="checkbox"/> | <input type="checkbox"/> | Extension cords in use have the grounding conductor? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Disconnecting switches and circuit breakers labeled to indicate their use or equipment served? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Sufficient work space and access provided around all electrical equipment to provide safe operation and maintenance? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Unused openings in electrical enclosures and fittings protected with appropriate covers, plugs, or plates? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Each Motor disconnecting switch or circuit breaker located within sight of the motor control device? | |
| <input type="checkbox"/> | <input type="checkbox"/> | Employees who regularly work on or around energized electrical equipment or lines instructed in CPR methods? | |

Monthly Log (Continued)

Month: _____, Year: _____

| Yes | No | Material Handling | Comments |
|-----|----|---|----------|
| | | Safe clearance for equipment through aisles and doorways? | |
| | | Aisles properly marked and clear? | |
| | | Motorized vehicles and mechanized equipment inspected daily or prior to use? | |
| | | Hooks and safety latches or other arrangements used when hoisting materials to prevent accidentally slip off? | |
| | | Securing chains, ropes, chokers, or slings adequate for the job? | |
| | | Shelves secure and constructed to withstand maximum designed storage weight? | |
| | | Hoist and Auxiliary Equipment | |
| | | Rated load of hoist legibly marked and visible to the operator? | |
| | | Controls of hoist plainly marked to indicate the direction of travel or motion? | |
| | | Hoist and load bearing structures load tested and certified? | |
| | | Industrial Trucks and Forklifts | |
| | | Industrial truck checklists in use and completed forms filed? | |
| | | Hand Tools and Equipment | |
| | | All tools maintained and in good condition? | |
| | | Appropriate safety glasses, face shields, etc. used while using hand tools or equipment which might produce flying materials or be subject to breakage? | |
| | | Power Tools and Equipment | |
| | | Grinders, saws and similar equipment provided with appropriate safety guards? | |
| | | Effective guards over belts, pulleys, and sprockets? | |
| | | Abrasive Wheel Grinders | |
| | | Work rest used and kept adjusted within 1/8 inch of the wheel? | |
| | | Adjustable tongue on the top side of the grinder used and kept adjusted to within 1/4 inch of the wheel? | |
| | | Bulk Storage | |
| | | Adequate secondary containment? | |
| | | Proper labeling? | |
| | | Fire Extinguishers available on fuel storage tanks? | |
| | | Visible signs of leaks? | |