

## ORDINANCE NO. 175790

An ordinance amending Section 91.106.4.1 and Division 71 of Article 1, Chapter IX of the Los Angeles Municipal Code to establish citywide methane mitigation requirements and include more current construction standards to control methane intrusion into buildings.

**WHEREAS**, there was a fire in the Fairfax Area of the City of Los Angeles in 1985, due to high volume of methane gas seepage through cracks in the concrete floor of a building;

**WHEREAS**, the City of Los Angeles adopted an Ordinance, (Ord. No. 161,552, Eff. 8-31-86) which required mitigation for methane gas intrusion into buildings located in the Fairfax area of Los Angeles;

**WHEREAS**, methane gas which percolates from subsurface geological formations to the atmosphere is a natural phenomenon;

**WHEREAS**, in 1999, large pockets of methane gas in subsurface geological formations were discovered at the Playa Vista project area of West Los Angeles;

**WHEREAS**, in 2001, new methane mitigating systems were developed and used in the Playa Vista Project;

**WHEREAS**, in Council File No. 01-1305, the City Council directed the City's Departments of Building and Safety, Engineering, and Planning, as well as, the Chief Legislative Analyst and Office of Administrative and Research Services, to form a work group and recommend uniform safety requirements regarding methane, for all future development throughout the City;

**WHEREAS**, a study by the work group was conducted regarding areas throughout the City of Los Angeles to identify areas where subsurface methane gas may be found;

**WHEREAS**, from the information and data provided by the Division of Oil, Gas and Geothermal Resources, Department of Conservation, State of California, City of Los Angeles Department of Environmental Affairs, Department of Building and Safety and the Fire Department a map was plotted by the Department of Public Works to show other areas within the City of Los Angeles, where there exists a possible potential hazard of methane gas;

**WHEREAS**, modern construction standards were successfully used as methane mitigation systems for many projects in Playa Vista;

**WHEREAS**, the work group utilized the research and knowledge gained through the development of the Playa Vista methane mitigation systems;

**WHEREAS**, many of the modern construction standards to mitigate potential hazard of methane gas intrusion into building were incorporated into the Los Angeles Municipal Code as more restrictive provisions than found in the 2001 edition of the California Building Code based on local geological conditions;

**NOW, THEREFORE,**

**THE PEOPLE OF THE CITY OF LOS ANGELES  
DO ORDAIN AS FOLLOWS:**

Section 1. Exception 6 of Section 91.106.4.1 of the Los Angeles Municipal Code is amended to read:

**6.** The Department shall have the authority to withhold permits on projects located within a Methane Zone or Methane Buffer Zone established under Sections 91.7101 *et seq.* of this Code. Permits may be issued upon submittal of detailed plans that show adequate protection against flammable gas incursion by providing the installation of suitable methane mitigation systems.

Sec. 2. Division 71 of Article 1, Chapter IX of the Los Angeles Municipal Code is amended to read:

**DIVISION 71  
METHANE SEEPAGE REGULATIONS**

**SEC. 91.7101. PURPOSE.**

This division sets forth the minimum requirements of the City of Los Angeles for control of methane intrusion emanating from geologic formations. The requirements do not regulate flammable vapor that may originate in and propagate from other sources, which include, but are not limited to, ruptured hazardous material transmission lines, underground atmospheric tanks, or similar installations.

## SEC. 91.7102. DEFINITIONS.

For the purpose of this division, certain words and phrases are defined as follows:

**Alarm System** shall mean a group of interacting elements consisting of components and circuits arranged to monitor and annunciate the status of gas concentration levels or supervisory signal-initiating devices and to initiate the appropriate response to those signals.

**Buildings with Raised Floor Construction** shall mean a building with the bottom of the floor system raised above grade where the clearance for each of the following items shall be at least: 12 inches for the girder, 18 inches for the floor joist and 24 inches for the structural floors.

**Cable or Conduit Seal Fitting** shall mean an approved fitting provided in a cable or conduit system to prevent the passage of gases, vapors, or flames through electrical cable or conduit.

**Design Methane Concentration** shall mean the highest concentration of methane gas found during site testing.

**Design Methane Pressure** shall mean the highest pressure of methane gas found during site testing.

**De-watering System** shall mean a permanent water removal system, consisting of perforated pipes, gravel, sump pumps and pits, designed to permanently maintain the ground water level one foot below the sub-slab vent system.

**Gas Detection System** shall mean one or more electrical devices that measure the methane gas concentration and communicate the information to the occupants, building management, central station or alarm company with audible or visual signals.

**Gravel Blanket** shall mean a layer of gravel, sand, or approved material designed to transmit gas to the vent riser without obstructing the venting system.

**Impervious Membrane** shall mean a continuous gas barrier made of material approved by the Department and installed beneath a building for the purpose of impeding methane migration to the interior of the building.

**Mechanical Extraction System** shall mean a system operated by a machine which is designed to remove methane gas from below the impervious membrane through the use of fans, blowers, or other powered devices.

**Mechanical Ventilation** shall mean a fan, blower or other similar group of interacting elements operated by a machine within the building, which introduce and/or remove air from an enclosed space.

**Narrow Building** shall mean a building that has a width less than 50 feet, a footprint of less than 50,000 square feet and having a minimum 2-foot wide landscaped area immediately adjacent to the exterior wall for at least 50 percent of the perimeter of the building.

**Oil Well** shall mean a deep hole or shaft sunk into the earth for the exploration of oil or gas; or which is on lands producing or reasonably presumed to contain oil or gas; or which is drilled for the purpose of injecting fluids or gas for stimulating oil recovery, re-pressurizing or pressure maintenance of oil or gas, or disposing of waste fluids from an oil or gas field.

**Perforated Horizontal Pipe** shall mean an approved pipe which contains a series of small holes or narrow openings placed equidistant along the length of the approved pipe, which is placed horizontally beneath the foundation of a building, for the purpose of venting accumulated methane gas and preventing the development of elevated gas pressures, or for drainage of ground water to an approved location.

**PPMV** shall mean Parts per Million by Volume.

**Pressure Sensor** shall mean a device that measures and communicates surrounding gas pressure to an alarm or control system.

**Single Station Gas Detector** shall mean a device consisting of electrical components capable of measuring methane gas concentration and initiating an alarm.

**Trench Dam** shall mean an approved subsurface barrier installed within a furrow or ditch adjacent to the foundation of a building, for the purpose of preventing the migration of methane gas beneath that foundation.

**Unobstructed Opening** shall mean a permanent clearing or gap in the walls, floors or roof-ceiling assemblies without windows, doors, skylights or other solid barriers that may restrict the flow of air.

**Vent Riser** shall mean an approved pipe which is placed vertically with joints and fittings connected to Perforated Horizontal Pipes to convey and discharge the gas to the atmosphere.

### **SEC. 91.7103. GENERAL METHANE MITIGATION REQUIREMENTS.**

All new buildings and paved areas located in a Methane Zone or Methane Buffer Zone shall comply with these requirements and the Methane Mitigation Standards established by the Superintendent of Building. The Methane Mitigation Standards provide information describing the installation procedures, design parameters and test protocols for the methane gas mitigation system, which are not set forth in the provisions of this division.

Boundaries of the Methane Zones and Methane Buffer Zones are shown on the Methane and Methane Buffer Zones Map designated as Map number A-20960, dated September 21, 2003, which is attached to Council File No. 01-1305.

### **SEC. 91.7104. GENERAL METHANE REQUIREMENTS.**

**91.7104.1. Site Testing.** Site testing of subsurface geological formations shall be conducted in accordance with the Methane Mitigation Standards. The site testing shall be conducted under the supervision of a licensed Architect or registered Engineer or Geologist and shall be performed by a testing agency approved by the Department.

The licensed Architect, registered Engineer or Geologist shall indicate in a report to the Department, the testing procedure, the testing instruments used to measure the concentration and pressure of the methane gas. The measurements of the concentration and pressure of the methane gas shall be used to determine the Design Methane Concentration and the Design Methane Pressure. The Design Methane Concentration and the Design Methane Pressure shall determine the Site Design Level of Table 71.

**EXCEPTION:** Site testing is not required for buildings designed to the requirements of Site Design Level V as described in Table 71, or for buildings designed using the exceptions set forth in Sections 91.7104.3.2 or 91.7104.3.3.

**91.7104.2. Methane Mitigation Systems.** All buildings located in the Methane Zone and Methane Buffer Zone shall provide a methane mitigation system as required by Table 71 based on the appropriate Site Design Level. The Superintendent of Building may approve an equivalent methane mitigation system designed by an Architect, Engineer or Geologist.

Table 71 prescribes the minimum methane mitigation systems, such as, the passive,

active and miscellaneous systems, depending on the concentration and pressure of the methane present at the site. Each component of the passive, active and miscellaneous systems shall be constructed of an approved material and shall be installed in accordance with the Methane Mitigation Standards.

**91.7104.2.1. Passive System.** The passive system is a methane mitigation system installed beneath or near the building. The components of the passive system may consist of a de-watering system, the sub-slab vent system, and impervious membrane. The sub-slab vent system shall consist of Perforated Horizontal Pipes, Vent Risers, and Gravel Blankets for the purpose of collecting and conveying methane from the soil underneath the building to the atmosphere.

**91.7104.2.1.1. De-watering System.** The de-watering system is used to lower the ground water table to a level more than 12 inches below the bottom of the Perforated Horizontal Pipes. The de-watering system shall conduct ground water to an approved location.

**91.7104.2.2. Active System.** The components of the active system shall consist of one or more of the following, sub-slab system, gas detection system, mechanical ventilation, alarm system and control panel. All components shall be constructed of an approved material, installed in accordance with the Methane Mitigation Standards.

**91.7104.2.3. Miscellaneous System.** The components of the miscellaneous system may consist of Trench Dam, Cable or Conduit Seal Fitting, or Additional Vent Risers. The component of the miscellaneous system shall be a material approved by the Department and shall be installed in accordance with the Methane Mitigation Standards.

**91.7104.3. Exceptions to Table 71.** The provisions of this section are exceptions to the construction requirements of Table 71.

**91.7104.3.1. Narrow Buildings.** Narrow Buildings may substitute Pressure Sensors below the Impervious Membrane in lieu of the Gas Detection System and Mechanical Ventilation, if the installation of the Pressure Sensors below the Impervious Membrane is not required per Table 71 and the Narrow Building is constructed with a minimum two feet wide landscaped area covering at least 50 percent of the ground immediately adjacent to the exterior building walls.

**91.7104.3.2. Buildings with Raised Floor Construction.** If a Building with Raised Floor Construction has underfloor ventilation construction in accordance with the standards below, then the utilities shall be installed with Trench Dams and Cable or Conduit Seal Fittings and a four inch thick gravel blanket shall be installed under and around the elevator pits.

Underfloor ventilation shall be provided by an approved mechanical ventilation system capable of exhausting underfloor air an equivalent of every 20 minutes, or by openings in the underfloor area complying with the following:

**A.** The top of the openings shall be located not more than 12 inches below the bottom of the floor joists.

**B.** The openings shall be distributed approximately equally and located to provide cross ventilation, for example, by locating the opening along the length of at least two opposite sides of the building.

**C.** The openings shall be the larger of:

1. Openings of not less than 1.5 square feet for each 25 linear feet or fraction of exterior wall; or

2. Openings shall be equal to 1 percent of underfloor area.

**D.** The openings may be covered with corrosion-resistant wire mesh with mesh openings of greater than 3 inch and less than 2 inch in dimension.

**91.7104.3.3. Buildings with Natural Ventilation.** A building with natural ventilation is a building constructed with the following:

**A.** The Unobstructed Openings shall exchange outside air.

**B.** The size of the Unobstructed Opening shall be the larger of:

1. Opening equal to at least 25 percent of the total perimeter wall area of the lowest level of the building, or

2. Opening equal to at least 25 percent of the floor area of the lowest level of the building.

**C.** The Unobstructed Openings shall be evenly distributed and located within the upper portion of at least two opposite exterior walls of the lowest level of the building.

Buildings with natural ventilation that are constructed as described above, shall have the utilities constructed with Trench Dams and Cable or Conduit Seal Fittings. If there is an enclosed room or space less than 150 square feet within the building, then the enclosed room or space shall be constructed with vent openings

that comply with the requirements of Section 91.7104.3.4.

**91.7104.3.4. Enclosed Room or Space within Building.** Individual enclosed rooms or enclosed spaces with floor area less than 2,000 square feet may be exempt from providing the Active System as required by Table 71, provided the vent openings comply with all of the following:

1. Vent openings are Unobstructed Openings, except screens made with at least 3 inch mesh or wind driven turbines on the roof shall be permitted.
2. The aggregate size of vent openings shall be the larger of either five percent of the total floor area of the room or the area of enclosed space, or ten percent of the area of walls on the perimeter of the room or enclosed space.
3. The vent openings shall be located to prevent the accumulation of methane gases within the room or enclosed space.
4. The top of the vent opening shall be located not more than 12 inches below roof joists or ceiling joists if located in a wall of a building.
5. The vent openings shall be located on either two opposite walls or two adjacent walls of the room or enclosed space if located in a wall of a building.
6. The vent openings shall be located no more than 50 feet from any point within the room or enclosed space.
7. When using wind driven turbine, the area of the vent opening shall be calculated by the area of the opening at the attachment of the wind driven turbine at the roof.
8. When the vent opening is located in a wall of an adjoining room, then the adjoining room shall be constructed of either an Active System, or have Natural Ventilation as described in Section 91.7104.3.3.

**91.7104.3.5. Single Family Dwelling.** Single Family Dwellings and buildings accessory to single family dwellings shall comply with all the Methane Mitigation requirements of Table 71, except that the following mitigation system may be substituted:

- A. Pressure Sensors below Impervious Membrane may be installed in lieu of



Gas Detection System when Pressure Sensors below Impervious Membrane is not required; or

**B.** Single Station Gas Detectors with battery back-up may be installed in lieu of Alarm System and Gas Detection System; or

**C.** 6 mil thick Visquene may be used in lieu of Impervious Membrane, when the Site Design Levels are I or II; or

**D.** Additional Vent Risers or Mechanical Ventilation may be omitted for buildings with width less than 50 feet and footprint less than 6,000 square feet in area; or

**E.** Vent Risers may be substituted in lieu of Mechanical Extraction System, provided the Vent Risers are designed at a rate twice that established by the Methane Mitigation Standards.

**91.7104.3.6. Buildings Located in the Methane Buffer Zone.** A building, located entirely or partially in the Methane Buffer Zone, shall be designed to the requirements of the Methane Buffer Zone. Buildings located in the Methane Buffer Zone shall not be required to provide any methane mitigation system, if the Design Methane Pressure is less than or equal to two inches of water pressure and is either of the following:

**A.** Areas which qualify as Site Design Level I or II; or

**B.** Areas which qualify as Site Design Level III and the utilities are installed with Trench Dams and Cable or Conduit Seal Fitting.

**91.7104.3.7. De-watering System.** A De-watering system is not required for either of the following:

**A.** If during the site testing, the groundwater level is deeper than 10 feet below the Perforated Horizontal Pipes, or

**B.** If the soil investigation or analysis, as approved by the Department, reveals the groundwater level is more than 12 inches below the bottom of the Perforated Horizontal Pipes.

**91.7104.3.8. Buildings Located in the First Phase Playa Vista Project.** The First Phase Playa Vista project, as approved by the City on September 21, 1993 and December 8, 1995, shall comply with the methane mitigation program as required by the Department pursuant to the Methane Prevention, Detection and Monitoring Program approved by the Department on January 31, 2001, in lieu of the requirements of this

division.

**91.7104.4. Paved Areas.** Paved areas that are over 5,000 square feet in area and within 15 feet of the exterior wall of a commercial, industrial, institutional or residential building, shall be vented in accordance with the Methane Mitigation Standards.

**EXCEPTION:** Paved areas located in the Methane Buffer Zone and which qualify for Site Design Levels I, II or III.

#### **SEC. 91.7105. EXISTING BUILDINGS.**

Additions, alterations, repairs, changes of use or changes of occupancy to existing buildings shall comply with the methane mitigation requirements of Sections 91.7104.1 and 91.7104.2, when required by Divisions 34, 81 or 82 of this Code.

Approved methane mitigation systems in existing buildings shall be maintained in accordance with Section 91.7106.

#### **SEC. 91.7106. TESTING, MAINTENANCE AND SERVICE OF GAS- DETECTION AND MECHANICAL VENTILATION SYSTEMS.**

All gas detection and mechanical ventilation systems shall be maintained and serviced in proper working condition and meet all requirements of the Electrical and Mechanical Code. The testing, maintenance and service procedure for each gas detection and mechanical ventilation systems shall be performed in accordance with the manufacturer's current written instructions and the following:

**A. Fire Department.** The manufacturer's instructions shall be approved by the Fire Department. Testing and servicing of each system shall be performed by a person certified by the Fire Department.

**B. Notification Placard.** A permanent notification placard shall be posted and maintained at the front entrance of a building that is constructed with Impervious Membrane, except in residential buildings. The placard shall indicate the presence of the Impervious Membrane.

#### **SEC. 91.7107. EMERGENCY PROCEDURES.**

With the exception of single-family dwellings, all buildings required by this division to have a gas-detection system or sub-slab vent system shall, subject to Fire Department approval, have established emergency procedures that include, but are not limited to, the following:

**A.** Assignment of a responsible person as safety director to work with the Fire Department in the establishment, implementation and maintenance of an emergency plan.

**B.** Conspicuous posting of the Fire Department's telephone number in areas designated by the Fire Department.

**C.** Conspicuous posting of emergency plan procedures approved by the Fire Department.

**SEC. 91.7108. APPLICATION OF METHANE SEEPAGE REGULATIONS TO LOCATIONS OR AREAS OUTSIDE THE METHANE ZONE AND METHANE BUFFER ZONE BOUNDARIES.**

Upon a determination by the Department of Building and Safety that a hazard may exist from methane intrusion at a geographical location or in an area outside the boundaries established in Section 91.7103 of this Code, the Department of Building and Safety and the Fire Department may enforce any or all of the requirements of Division 71 of this Code as required to preclude potential fire or explosion from methane concentration.

**SEC. 91.7109. ADDITIONAL REMEDIAL MEASURES.**

**91.7109.1. General Remedial Measures.** In the event the concentration of methane gas in any building located in a Methane Zone or Methane Buffer Zone reaches or exceeds 25 percent of the minimum concentration of gas that will form an ignitable mixture with air at ambient temperature and pressure, the owner shall hire an engineer to investigate, recommend and implement mitigating measures. These measures shall be subject to approval of this Department and the Fire Department.

**91.7109.2. Abandoned Oil Well.** Any abandoned oil well encountered during construction shall be evaluated by the Fire Department and may be required to be re-abandoned in accordance with applicable rules and regulations of the Division of Oil, Gas and Geothermal Resources of the State of California. Buildings shall comply with these provisions and the requirements of Section 91.6105 of this Code, whichever is more restrictive.

**TABLE 71. MINIMUM METHANE MITIGATION REQUIREMENTS.**

Site Design Level		LEVEL I		LEVEL II		LEVEL III		LEVEL IV		LEVEL V	
Design Methane Concentration (ppmv)		0-100		101-1,000		1,001-5,000		5,001-12,500		>12,500	
Design Methane Pressure (inches of water pressure)		#2	>2	#2	>2	#2	>2	#2	>2	All Pressures	
PASSIVE SYSTEM	De-watering System <sup>1</sup>		X	X	X	X	X	X	X	X	
	Sub-Slab Vent System	Perforated Horizontal Pipes	X	X	X	X	X	X	X	X	X
		Gravel Blanket Thickness Under Impervious Membrane	2"	2"	2"	3"	2"	3"	2"	4"	4"
		Gravel Thickness Surrounding Perforated Horizontal Pipes	2"	2"	2"	3"	2"	3"	2"	4"	4"
		Vent Risers	X	X	X	X	X	X	X	X	X
	Impervious Membrane		X	X	X	X	X	X	X	X	X
ACTIVE SYSTEM	Sub-Slab System	Pressure Sensors Below Impervious Membrane							X	X	
		Mechanical Extraction System <sup>2</sup>							X	X	
	Lowest Occupied Space System	Gas Detection System <sup>3</sup>		X		X	X	X	X	X	X
		Mechanical Ventilation <sup>3,4,5</sup>		X		X	X	X	X	X	X
		Alarm System		X		X	X	X	X	X	X
	Control Panel			X		X	X	X	X	X	X
MISC. SYSTEM	Trench Dam		X	X	X	X	X	X	X	X	
	Conduit or Cable Seal Fitting		X	X	X	X	X	X	X	X	
	Additional Vent Risers <sup>6</sup>										X

X = Indicates a Required Mitigation Component

<sup>1.</sup> See Section 91.7104.3.7 for exception.

<sup>2.</sup> The Mechanical Extraction System shall be capable of providing an equivalent of a complete change of air every 20 minutes of the total volume of the Gravel Blanket.

<sup>3.</sup> See Section 91.7104.3.1 for Narrow Buildings.

4. The Mechanical Ventilation systems shall be capable of providing an equivalent of one complete change of the lowest occupied space air every 15 minutes.
5. Vent opening complying with Section 91.7104.3.4 may be used in lieu of mechanical ventilation.
6. The total quantity of installed Vent Risers shall be increased to double the rate for the Passive System.

Sec. 3. The City Clerk shall certify to the passage of this ordinance and have it published in accordance with Council policy, either in a daily newspaper circulated in the City of Los Angeles or by posting for ten days in three public places in the City of Los Angeles: one copy on the bulletin board located in the Main Street lobby to the City Hall; one copy on the bulletin board located at the ground level at the Los Angeles Street entrance to the Los Angeles Police Department; and one copy on the bulletin board located at the Temple Street entrance to the Los Angeles County Hall of Records.

I hereby certify that this ordinance was passed by the Council of the City of Los Angeles, at its meeting of February 12, 2004.

J. MICHAEL CAREY, City Clerk  
By Maria Kostrencich, Deputy  
Approved February 12, 2004  
JAMES K. HAHN, Mayor  
Approved as to Form and Legality  
January 8, 2004  
Rockard J. Delgadillo, City Attorney  
By Sharon Siedorf Cardenas  
Assistant City Attorney  
C.F. 01-1305

***EFFECTIVE DATE: 3-29-04***