

- (g.) Adequate means shall be provided for immediately indicating any defect in the insulation of a system.
- (h.) The insulating material of each cable-end shall be efficiently sealed as to prevent diminution of its insulating properties, and when necessary to secure gastightness there shall be properly constructed bushes.
- (i.) Generators, rotary converters, accumulators, or other equipment for supplying the current shall not be erected within a distance of at least 150 ft. from any well, tank, or gasometer.
- (j.) Transformers may be erected within the limits of the preceding paragraph, but not inside the derrick or adjacent buildings.
- (k.) The voltage of supply for lighting purposes shall not exceed 110 volts.
- (l.) When oil-gas commences to raise from any well, or from the time of shutting off the water with hermetic casing, only electric filament lamps shall be used in lighting the derricks and the adjacent buildings. Every electric lamp shall be enclosed in an airtight fitting with a substantial protecting iron basket, and the lamp-globe itself shall be hermetically sealed. Switches shall on no account be placed near to a lamp in the prohibited area.
- (m.) No oil-lamp shall be permitted for the lighting of derricks, or buildings adjacent thereto, unless authorized in writing by the Inspector. Such lamps shall be in special weather-proof boxes, placed outside the derrick or building, and protected by a strong and tight-fitting glass. The burner of the lamp shall be so arranged that the light may be extinguished without opening the box.
- (n.) The use of any electric hand safety-lamp shall not be permitted until the type of lamp has been approved by the Inspector.
- (o.) The use of electric filament lamps connected to sockets with flexible conductors is prohibited. Arc lamps shall not be used within a distance of at least 150 ft. from any well, tank, or gasometer, and the point of light when using such lamps shall be at least 40 ft. high.
- (p.) Within a radius of 150 ft. from any well, tank, or gasometer the conductors shall be covered with approved insulation, such as double cotton insulation or double cotton braiding impregnated with red lead, or with simple cotton braiding and asbestos covering. The use of rubber insulation is not permitted within the area hereinbefore specified.
- (q.) If the switches and fuses are within 150 ft. of a well switches of gastight construction shall be used, and fuses shall be enclosed in gastight boxes. The use of ordinary lead wire for fuses is prohibited.
- (r.) Every fuse shall be enclosed in a properly constructed box, and shall be of such construction, or so protected by a switch, that it may be renewed without danger.
- (s.) Joints in conductors shall be carefully made, soldered, and completely insulated and protected by water-proof tape. The jointing of wires by simple bending is not sufficient, and is prohibited.
- (t.) At the derricks and adjacent buildings all conductors shall be run in metal conduits, which shall be electrically continuous and effectively earthed.
- (u.) All motors shall be constructed so that when any part is live all rubbing-contacts (commutators and slip-rings) are so arranged or enclosed as to prevent open sparking.
- (v.) The pressure shall be switched off the apparatus immediately any open sparking occurs, and during the whole time an examination or adjustment disclosing parts liable to open sparking is being made. The pressure shall not be switched on again until the apparatus has been examined and the defect (if any) has been remedied or the adjustment made.
- (w.) Every portion of the electrical installation, including all structural parts and electric appliances and devices belonging to or connected therewith, shall be duly and efficiently maintained. The plant shall be examined at least every six months, and at such examination it shall be specially ascertained if the whole installation complies with the regulations for safety from fire. The examination shall be made by the Inspector, and the faults which are discovered shall be immediately rectified.
- (x.) During stoppages of work all pressure shall be switched off, and in the event of a dangerous blowout from any well the lights at the derrick shall be immediately switched off.
- (y.) All broken or damaged protecting glasses shall be immediately replaced by new ones, and the replacement of lamps shall only be done after the pressure has been switched off. Whenever possible, repairs shall be effected in daylight.
- (z.) In installing new plant and effecting repairs and alterations none other than an authorized person, or a competent person acting under his immediate supervision, shall undertake any work where technical knowledge or experience is required to secure safety.

*General Regulations.*

277. In the case of every oil-well there shall be kept on the premises or in the office—

- (a.) An accurate plan or plans drawn to the scale of 1 in. to a chain, or to such other scale as may be approved by the Inspector, and kept up to date not more than three months previously, showing the boundaries of the property, the position of all well operations, tanks, gasometers, machinery, buildings, refineries, pipe-lines, electrical transmission-lines, installations, fences, and roads falling within the area covered by the plan or plans, together with, where more than one sheet is required for the above purpose, a general plan to a scale approved by the Inspector, showing all the boundaries of the property, the position of all wells, and as many of the other details specified for the one-chain plans as can be clearly shown:
- (b.) Accurate sections of all wells drilled or being drilled up to a date not less than one month previously, showing the dimensions of the well and the casing, the character of the strata penetrated, and quantity of oil, water, or gas encountered and how dealt with. Such sections to be drawn to a vertical scale of 1 in. to 100 ft., and a horizontal scale of 1 in. to 1 ft., or to such smaller scales as may be approved by the Inspector.
- (c.) An accurate journal of the drilling of every well up to twenty-four hours previously, such journal showing the character and depth of the strata penetrated, the dimensions of the well and of the casing, the quantity and character of the oil, water, or gas encountered and how dealt with, and the dates during progress.

278. The owner, operator, or manager shall at all reasonable times produce such plan, sections, or journal, and permit the same to be copied by an Inspector, or by any other person whom any Inspector authorizes on that behalf, and also—

- (a.) Shall, whenever requested by an Inspector or other person so to do, accurately mark on such plan or section the progress of the well operations up to the time of such request, and shall allow such Inspector or person to examine and take a copy or tracing thereof; and also
- (b.) Shall forward to the Inspector once in every three months a copy or tracing of such plan and section, showing the well operations up to one month previously marked accurately thereon.

279. Every plan and section of well operations shall be signed and dated by the person who surveyed such operations, upon every occasion when additions are made to such plan or section.

280. Every journal of well operations shall be signed and dated by the well-manager.

281. Drilling shall be discontinued during lightning, when all workmen shall leave the derrick and connected buildings.

282. During a dangerous outburst of gas or oil operations shall be restricted to bring the outburst under control.

283. There shall be provided and maintained at all well operations a stretcher and ambulance box containing first-aid appliances for use in cases of accident.

284. Every manager and supervisor shall be acquainted with the methods of first aid to the injured.

285. If oil-engines are used for pumping in wells they shall be subject to the regulations prescribed for steam boilers, so far as the same are applicable.

286. If electric or gas motors are used for pumping in wells the foregoing regulations for the working of motors and electric installations shall be observed.

287. No explosive shall be used in or about any well or well operations without written authority from the Inspector.

288. A printed copy of these regulations shall be posted on a building or board in some conspicuous place in connection with every well.

289. (1.) The owner of any well, and any manager and any person in charge of or giving orders or directions relating to the carrying-on of well operations, who contravenes or does not comply with any of the foregoing regulations shall be