COUNTY OF LOS ANGELES ♦ DEPARTMENT OF PUBLIC HEALTH
ENVIRONMENTAL HEALTH
BUREAU OF ENVIRONMENTAL PROTECTION
RECREATIONAL WATERS PROGRAM
5050 Commerce Drive, Baldwin Park, CA 91706 – (626) 430-5360

GUIDELINES TO USING ZONE GENERATING EQUIPMENT ON PUBLIC POOLS

A. **General Requirements.** The following apply when ozone generating equipment is used:

1. A free halogen residual shall be maintained in the pool water at all times as required in Section 65529, Title 22 of the California Code of Regulations. Ozone generating equipment shall only be used to augment the required free halogen residual.

2. The owner/operator submitting plans for an ozone generating system shall obtain approval from the local building department, fire authority or other regulatory agencies before placing the ozone generating equipment into operation.

3. Ozone generating equipment and its components shall meet the applicable requirements contained in NSF International standards and be listed by NSF International or equivalent organization recognized by the department.

4. Ozone generating equipment shall be installed, used and maintained in accordance with the manufacturer's specifications and recommendations.

5. All pipes, gaskets, valves, fittings and sealants which come into contact with ozone shall be made of materials which are resistant to ozone and shall be inspected for leaks on a routine basis.

6. Parts of ozone generating equipment requiring cleaning and maintenance, shall be readily accessible.

7. The ozone generating equipment shall be provided with an effective means to alert the operator when a component of the equipment is not operating.

8. Ozone shall be delivered to the pool recirculation system using a vacuum system such as a venturi, where a loss of vacuum will interrupt the flow of ozone.

9. Ozone generating equipment shall be equipped with an air flow meter and a means to control the air flow.

10. A check valve shall be installed between the ozone generator and the injection point.

11. The ozone injection point shall be located in the pool return line after the filtration and heating equipment, prior to the disinfectant injection point and a minimum of 10 feet from the nearest pool return inlet.

12. Ozone injection methods shall provide efficient mixing of ozone with the

recirculation water. Typical injection methods include mixers, diffusers and contact chambers. The injection and mixing system shall not prevent the attainment of the turnover rate required in Section 3124B, Title 24 of the California Code of Regulations.

13. The ozone equipment room shall not be used for storage of chemicals, solvents or any combustible materials other than those required for the operation of the pool recirculation and ozone generating equipment.

14. There shall be standard operating procedure manual containing information on the operation and maintenance of the ozone generating equipment including the responsibilities of workers in an emergency. All employees shall be properly trained in the operation and maintenance of the equipment. Refresher training shall be conducted a minimum of once every 6 months.

B. Ozone Generating Equipment Located Indoors. When ozone generating equipment is located indoors the following apply:

1. The ozone concentration in the equipment room atmosphere shall not exceed 0.1 ppm. The general ventilation system for the room containing the ozone generating equipment shall provide a minimum of 3 air changes per hour. In the event of a leak, an automatic emergency ventilation system that will provide a minimum of 30 air changes per hour shall activate.

2. An audio and visual ozone detection/alarm system shall be located in the room containing the ozone generating equipment. The sensor shall be located at a height of 5 feet above the floor level. The system shall be capable of measuring ozone in the range of 0.01 to 5 ppm. The system shall activate when ozone concentrations reach 0.1 ppm in the room. Activation of the alarm shall shut off the ozone generating equipment and turn on the lights and emergency ventilation system. The alarm system shall consist of the following:

    a. An audible alarm capable of producing a sound level of at least 90 decibels.
    b. A visual alarm consisting of a flashing light which is mounted directly at the Entrance of the ozone equipment room.
    The light shall have intensity which is clearly visible during daylight hours.

3. Properly labeled on/off switches shall be located directly outside of the ozone room that control and indicate the following:

    a. Emergency ventilation systems.
    b. Lighting in the ozone room.
    c. Ozone generator.

4. There shall be posted in a conspicuous place on the exterior of the entry door to the room containing the ozone generating equipment or on the adjacent wall area, a sign stating "Danger: Gaseous Oxidizer - Ozone" with clearly legible letters not less than 4 inches high.

5. Exit doors from the ozone generating equipment room shall open outward.

C. Ozone Removal. The ozone contact concentration in the pool water shall not exceed 0.1 milligrams per liter (mg/L). This may be accomplished by one of the following methods:

1. The ozone generating equipment shall have an approved ozone removal system that will reduce the contact concentration below 0.1 mg/L prior to its introduction into the pool. Examples include granular activated carbon, thermal decomposition or an ozone/bromine system.

2. The ozone generating equipment shall be designed and sized using the following formulas so that the ozone contact concentrations remains below 0.1 mg/L. Either of the following formulas shall be used when determining the largest ozone generator which may be installed without exceeding a 0.1 mg/L maximum ozone contact concentration.

    a. Maximum Ozone Output Allowed in grams/hr = (75% of the required Flow Rate in g.p.m.) x (0.227)

    b. Contact Concentration in mg/L = $\frac{\text{(Ozone Generated in grams/hr) x (4.41)}}{\text{(75\% of the required flow rate in g.p.m.)}}$

D. Automatic Shut Off of Equipment.

1. Ozone generating equipment shall be designed to automatically shut off when any one of the following conditions occur:

    a. Loss of electrical power to the pool recirculation pump or the ozone booster pump.
    b. High or low ozone generator current.
    c. Intake air flow falls below manufacturer's operational minimums.
    d. Ozone generator door or panel is open.

2. In addition, for corona discharge ozone systems, ozone generating equipment shall be designed to automatically shut-off when any one of the following conditions occur:

    a. Loss of water flow through the ozone generator.
    b. High water vapor content of the intake air.
    c. Loss of cooling capacity.
    d. Leaks or failure of the oxygen generation equipment.

3. In addition, for ozone generating equipment not requiring an ozone removal system, ozone generating equipment shall be designed to automatically shut-off when the recirculation system is operating below 75% of the turnover rate required in Section 3124B, Title 24 of the California Code of Regulations.

E. **Ozone Monitoring.** Pool recirculation water shall be monitored with an ORP (oxidation reduction potential) meter which will shut off the ozonator in the event the ORP meter reading exceeds 900 mV. The operational range shall be between a minimum of 650 mV and a maximum of 900 mV.
EXCEPTION: An ORP meter is not required when the ozone generating equipment

does not utilize an ozone removal system.

F. **Testing.** Concentrations of ozone in the air space within 6 inches of the pool water level shall not exceed 0.1 ppm above the air ozone concentration. At the time ozone generating equipment is installed and annually thereafter, the air space within 6 inches of the pool water shall be tested to determine compliance with this requirement. Results of the test shall be provided to the local enforcing agency for review.

Note: Drager tube testing is an acceptable testing method.