nection, a break in the bottom of the tank, sludge, sediment, or sidewall scale, or wood structures soaked with the liquid The interior framing of floating tank roofs can trap quantities of liquids that will release vapors Therefore, periodic tests with a combustible gas indicator should be made during the work

Burning or cutting may release lead fumes from paint on either the inner or outer surface of the tank or from some other source An approved mask for protection against lead may be necessary, or it may be advisable to exhaust the fumes Wood supports inside the tank should be protected or removed before hot work is begun

Some companies use low-voltage transformers to eliminate the danger of electric shock, especially when men are required to work in wet areas

All portable electrical equipment should be grounded

Cold work in a tank may present a dust problem, and approved dust respirators and goggles should be worn if tests definitely show that wearing of a hose mask is not necessary

Gas tests should be made frequently if the presence of gas is suspected The concentration of gas or vapor in a tank or vessel may increase as work progresses, especially if the inside of the tank is scraped or heated during the operation

Forced ventilation may be required in many cases where repair work is to be done inside a tank

Where fumes develop from welding or other repair work, mechanical air movers should be used or the workmen should wear fresh air hose masks On a large tank, a door sheet or sheets may be removed for ventilation after the tank has been made gas free The opening also can be used to expedite removal of sediment and to increase illumination

If a tank has been closed for some time, there may be a deficiency of oxygen due to rusting (oxidation) of the metal of the tank In that case, no one should enter the tank without a supplied air mask or, for a relatively brief stay, a self-contained or self-generating breathing apparatus

Cleaning aboveground tanks

Here in step-by-step form is a summary of a typical procedure for cleaning tanks that have contained flammable or combustible liquids

1 Remove all sources of ignition (matches, open flames, smoking, gas engines, welding, exposed electrical wiring and equipment) from the vicinity of the tank

2 Empty the tank by pumping, draining, and floating tank contents with water The water should be introduced through fixed tank connections

3 Disconnect and blank all product, steam smothering, foam, and similar lines Do not rely on valves

4 Open all manholes and allow the tank to air thoroughly Ventilate or steam the tank for the number of hours required by its size If steam is used, cool and ventilate afterward

5 Have available the required personal protective equipment fresh air hose masks, approved flashlights, safety belts and lifelines, rubber boots and gloves

6 If light is needed, use only flashlights or electric lanterns approved for combustible atmospheres by Underwriters' Laboratories Inc

7 Test for vapor content with a combustible gas indicator For entering the tank before it becomes vapor-free, wear a fresh air hose mask, air supply tanks, and safety belt and lifeline, if the tank atmosphere contains more than the maximum acceptable concentration of vapor Have ample help available outside for the number of men inside

8 If a storage tank has contained leaded gasoline subsequent to its last thorough cleaning, follow instructions of suppliers of tetraethyl lead

9 Bond steam lines and water wash nozzles to the tank

10 Wash sludge sediment, and scale from the tank through the drain or remove it with a pump Flush out well and overflow the tank with water if necessary

11 Make a gas test and, if the tank is found