FACTS ABOUT LP-GAS

Chicago Transit Authority has been operating LP-Gas (propane) fueled buses for almost seven years. During this time, CTA has operated approximately 203,500,000 LP-Gas bus miles.

The 1,301 LP-Gas buses now owned by CTA are stored and fueled at six different locations within the city limits. The total capacity LP-Gas storage amounts to 270,000 gallons and is contained in 18,000 gallon water capacity tanks, two, three or four at each location.

LP-Gas Safety Record

An outstanding safety record has been established by CTA in its LP-Gas operations. In the past seven years, fueling of LP-Gas has required the double-handling of 87,200,000 gallons of LP-Gas, first from the delivery trucks into the storage tanks, and then from the storage tanks into the bus tanks, and this has been accomplished without any property damage or personal injury.

Even under the hazards imposed by traffic accidents, the safety record of LP-Gas has been outstanding. CTA's

most spectacular and hazardous accident involving a propane bus occurred in the Spring of 1955 when an LP-Gas bus was struck by a train and cut in two. The safety devices in the LP-Gas installation in the bus operated automatically to shut off the fuel supply; the fuel tank withstood the impact of the collision and no fire resulted, and there were no injuries.

One of the most hazardous types of accidents is that in which a bus is struck in the rear, which is the vital area, because of the possibility of a fire or an explosion resulting from the impact. CTA's records show that no such collision involving an LP-Gas bus has caused either a fire or an explosion. In all such accidents, the boiler-plate fuel tanks of the LP-Gas buses have resisted piercing and rupture.

In the beginning safety was engineered into CTA LP-Gas operations, and these rigid safety standards have been meticulously observed since then. These standards conform to the requirements and safety codes established by the National Board of Fire Underwriters, the Interstate Commerce Commission, the State of Illinois and the City of Chicago. Actually, in important respects the safety standards set up by CTA are even more exacting.

Other Public Benefits from LP-Gas

There are no noxious fumes from LP-Gas buses. This important fact has enabled CTA to comply in large measure with franchise ordinance provisions requiring it to take definite and positive steps to reduce or eliminate noxious gases resulting from the operation of its motor buses. Public acceptance of LP-

Gas buses, because of their odor-free operating characteristics, has been highly gratifying.

The History of LP-Gas

Back in 1910 an oil refinery in West Virginia was confronted with a perplexing problem. In storing gasoline, the company was experiencing serious losses due to the natural process of evaporation. To offset this loss at least in part, the company tried condensing the gasoline vapor and thus became the first producer of liquified petroleum gas in the United States.

It was not until 1920, however, that production processes were perfected sufficiently for marketing propane on a commercial scale. The year 1920, therefore, marks the beginning of the "modern era" of LP-Gas - - liquid petroleum gas.

Commercially LP-Gas was first used principally in rural areas as "bottled gas." This is the gas that is delivered in small metal cylinders to homes not having access to city gas mains. "Bottled gas" has brought to rural America and suburban areas some of the aids to comfortable living generally available to city dwellers. In many thousands of farm and suburban homes, LP-Gas is now used for cooking, for heating and for operating household refrigerators.

Use of LP-Gas is no longer confined to homes in rural and suburban areas. Farmers are using it to fuel their tractors, trucks and stationary engines, to heat brooders, water tanks and vats, to burn weeds, and to operate "walk-in" refrigerators and freezer cabinets.

Industry also recognized the poten-

tialities of LP-Gas. Industrial firms are now using LP-Gas for firing heat treating and paint-drying ovens, for melting metals, for heating dip vats, and for oxy-propane cutting of heavy metal plates. Many utilities rely upon LP-Gas in manufacturing gas for household and industrial use. A large number of gas companies use it for blending with other gases, or store it in large quantities to tide them through an emergency arising from a cold wave or a break in the "natural gas" pipe line system.

Chemical applications of LP-Gas range from anesthetics to specialized solvents.

What is LP-Gas?

Natural gas and petroleum, as they occur in nature, consist of many different substances. Chiefly, they are compounds of hydrogen and carbon, called "hydrocarbon."

Among these hydrocarbons are methane (which is the principal constituent of the "natural gas" used in the "natural gas" pipe lines of most cities), hexane (important in ordinary gasoline), and propane and butane.

The term "liquified petroleum gas" -- LP-Gas -- usually refers to propane or butane, two of the highly volatile gases obtained from natural gas or crude petroleum. These gases turn to liquid when subjected to moderate pressure, but readily return to their normal gaseous state when the pressure is released, providing the temperature is above their boiling points.

Commercial propane, which is the fuel the CTA uses, boils at minus 51 degrees below zero, Fahrenheit. In its

liquid form, propane is as colorless and clear as water. It has no odor, and must be artificially odorized before it is distributed to commercial users so that leaks in storage facilities, should any occur, may be easily and quickly detected.

Unlike gasoline, propane remains in a liquid state only so long as it is kept under pressure. For this reason, it is transported to storage tanks under pressure, transferred from storage tanks to bus tanks under pressure, and carried in the bus tanks under pressure.

LP-Gas Is Safer

Propane is as safe as any volatile substance, and safer than most. For example, it is safer than gasoline in most respects. Gasoline is highly inflammable in either liquid or vapor form. In case of fire, flaming gasoline runs and spreads until it is extinguished, or burns itself out.

Propane, on the contrary, can be ignited only when it is a gas and properly porportioned with air. A propane fire does not spread. This is due to the fact that it changes rapidly from a liquid to a gas as it is released to the air. Consequently, it will only burn at the source of the fire -- in the manner of a blow torch -- until the fire is put out, or the supply of liquid propane cut off.

LP-Gas Buses Pioneered in 1935

In 1935 the first LP-Gas buses were pioneered by a northwestern transit company. It was not until the post-war years, however, that operation of local transit buses was feasible on a large

scale. The biggest obstacle was overcome by design and production of a high compression automotive engine capable of taking full advantage of the estimated 125 octane rating of propane. Gasoline for automobiles and trucks has an octane rating of 70 to 90. Aviation gasoline octane rating varies from 100 to 145.

At the present time more than 20 transit companies are operating, or have ordered, propane-fueled buses. CTA's fleet of 1,301 LP-Gas buses, however, is the largest such fleet in the world.

From outward appearance, one can't tell a propane bus from any other bus. The important differences are in the engine, and in engine performance. The engine is specially designed to burn high octane fuel, and consequently has a higher compression ratio than automobile and truck motors burning gasoline.

Bus Equipped with Boiler-Plate Steel Tanks

The fuel tank on a propane bus is constructed of heavy quarter-inch boiler-plate steel, capable of withstanding a pressure of 1,000 pounds per square inch, although actual working pressures are approximately 190 pounds per square inch. In the event of a collision, a propane tank has over twenty times the resistance of an ordinary gasoline or diesel bus tank. In addition to cylindrical design advantages, pressure within the propane bus tank resists crushing or damage. Securely mounted on the bus frame, and with valves and fittings recessed for added safety, the tank outlets are provided with shut-off valves

that function automatically in case the fuel line or valves break. The fuel line is extra heavy copper tubing such as used in a home mechanical refrigerator.

Between the tank and the engine, the liquid propane must be changed to a gas, and air must be added. The liquid is forced from the tank by its own pressure, thus eliminating conventional fuel pumps. The transformation to gas is accomplished by means of a vaporizer heated by hot water from the engine cooling system and a gas pressure regulator. The gas is then taken into the carburetor where it is mixed with air. From the carburetor, the gas and air, mixed in proper proportions, enter the engine. The mixture is then ignited by spark plugs, just as atomized gasoline is fired in a gasoline motor.

LP-Gas Advantages

Through extensive research, laboratory tests, and closely observed "in service" operations, petroleum and automotive engineers have determined that propane offers a number of advantages over gasoline or diesel oil as a fuel for automotive equipment, particularly buses and trucks.

Propane results in a noticeably smoother engine performance and, consequently, produces a smoother transit ride.

Power output at low and high speeds is materially increased. This is an important factor in local transit operations where heavy loads, and frequent stopping and starting, put heavy strains upon engines.

Because propane enters bus motor

cylinders as a true gas, there is no crank case oil dilution. Consequently, oil consumption is reduced and the effectiveness of lubrication is improved. The interval between oil change is doubled, even trebled, as compared with the life of lubricating oil in a gasoline or diesel engine.

Propane burns completely and cleanly. There is no residue left in the cylinders, little if any carbon deposit on rings and pistons. Because propane has a high octane rating, there is no knock or ping.

Since there is less wear on moving parts, less strain under heavy loads, maintenance costs are reduced. The period between complete overhauls is often twice that normal for a gasoline or diesel bus motor.

In propane's favor there is considerably more than its proven economic advantages.

Propane is a completely odorless motor fuel. It burns without the trace of a smell.

It is also a non-strategic fuel, and consequently should be abundantly available if national defense considerations should require the rationing of gasoline, and the fuel oils that power jet planes.

CHICAGO TRANSIT AUTHORITY