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Fuel Safety and the Environment

When properly installed, professionally operated and carefully managed, airport fuel storage systems cause no harm to environment, personnel or airport financial health. Here is how one country is cleaning up its approach to airport fueling concerns.

by

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Fuel leaks and spills not only create hazards to safety but also can create havoc on the financial side of airport operations. New rules of the U.S. Environmental Protection Agency (EPA) underscore both these concerns.

International interest in the environment was emphasized when this subject received agenda attention at the economic summit meeting of nations held in Paris during the French celebration of the 200th anniversary of the storming of the Bastille. Thus, besides the natural concern for safety of fuel facilities, an increased public awareness of the environment is focusing public and official attention on an activity which, if not properly handled, poses the potential for severe financial and safety problems.

New rules relating to the environment, issued by the EPA, offer an opportunity to reexamine safety aspects of all fuel storage and delivery systems.

Basic principles for safe receiving, storing and dispensing of aviation fuel also will help to assure a protected environment. These principles are well stated in publications prepared by and available from the American Petroleum Institute (API). The International Civil Aviation Organization (ICAO) suggests API as the source of detailed fuel safety data.

One basic publication prepared by API is titled "Storage and Handling of Aviation Fuel at Airports." This is API publication number 1500, updated with a second edition in November 1988.

Before API prepared this publication, its aviation technical services subcommittee produced several pamphlets on the subject of airport fuel safety. The new work combines them into a single document. It includes information on basic principles for the design of fuel handling facilities and equipment; identification and properties of aviation fuel; basic principles of handling aviation fuel; planning criteria for airport systems; installation of fixed facilities at airports; and, mobile equipment. Price of this booklet is $8 U.S.

Other API publications relating to airport fuel safety include subjects of fuel hose specifications, jet fuel filters and separators, and airport equipment marking for fuel identification. These are publications numbers 1529, 1581 and 1542 respectively.

Another publication, number 1584, discusses standards for uniform coupling configuration and arrangement at the hydrant pit.

Airport hydrant fueling systems are exempt from the new set of regulations issued by the EPA. Although some hydrant fueling systems have underground tanks and most have underground piping, EPA deferred these sys-

tems from the new rules while the agency continues to study efficiency of leak detection and monitoring equipment for this type of facility.

All airport executives, however, can benefit by becoming familiar with these EPA regulations affecting underground storage tanks (UST). They represent basic safety procedures as well as environmental responsibility.

The U.S. Congress passed the Comprehensive Environmental Response, Compensation and Liability Act and amended it over a period of years. An amendment in 1984 required EPA to develop regulations about leaking underground tanks. It specifically mandated requirements for financial responsibility. The law charged EPA to establish rules for leak detection, leak prevention, financial responsibility and corrective action for all USTs containing regulated substances.

More Than Airport Tanks

EPA's regulations hit more than airports. Several million underground storage tank systems in the United States contain petroleum. Tens of thousands of these, including their underground piping, are now leaking. The number that leak could be as much as one out of four, EPA says. A need for corrective measures appears evident considering EPA's statement that 50 percent of the U.S. population uses ground water as a source of drinking water.

Compliance dates for the new regulations vary. Any UST installed after December 1988 must meet the new standards. For existing USTs, deadlines for leak detection extend to December 1993, governed by the date of installation. Suction piping compliance dates are the same as for tanks. All pressurized piping systems must comply by December 1990. For corrosion protection and spill/overfill prevention, the compliance date is December 1998. Because of potential financial liability, EPA urges compliance as early as possible, a move that has safety benefits as well.

Under the U.S. rules, either the owner or the operator of the tank must show financial responsibility to cover cleanup of leaked petroleum and to compensate people for personal injury or property damage. Cleanup could cover correcting environmental damage and supplying drinking water. Federal and state government operators of fuel facilities are exempt from the demonstration of financial responsibility requirement. Local governments, however, must comply.

EPA suggests financial responsibility can be shown in several ways. Insurance coverage, surety bond, letter of credit or trust fund are acceptable. Some states within the U.S. have established funds that will pay for cleanup costs. If such a fund exists, airports do not have to duplicate the coverage. Obviously, prevention is preferred to payment.

Cleaning up the environment after a leak is but one of the safety concerns. Volatile flammable liquids that leak from containers or piping are conducive to vapor accumulation, one of the three elements needed for fire. The other two are air (oxygen) and a source of ignition. Even small amounts of vapor present a hazard. Approximately one percent to eight percent vapor by volume in air is combustible.

Valves, pumps and flanges should be maintained in leakproof condition. Spills and overflows should be removed or covered immediately. The U.S. Federal Aviation Administration reminds airport executives that any fuel spill presents a potential fire hazard.

Pint-size spills are of no major consequence. Spills involving an area from about 18 inches to six feet in any dimension require, as a minimum of protection, the posting of a fire guard to maintain a restricted area around the spill and to keep out unauthorized persons. The fire guard should have at least one dry chemical or carbon dioxide extinguisher.

Any spill exceeding six feet poses an extreme hazard. The airport fire crew should be called at once. Cease all operations in the vicinity until the area has been made safe.

Absorbent cleaning agents, emulsion compounds or rags can clean small spills. Of these, rags are the least preferred because fuel soaked rags can act as wicks. If rags are used, store them in metal containers with self-closing lids until they can be disposed of safely.

New Mop-up Device

A new roller-type device picks up small spills from ramps or storage areas. It is similar to one used to squeegee water from greens on golf courses. An outer layer of absorbent material picks up the liquid as it rolls and squeezes the gathered fuel into a drum in the center of the device.

Use foam to blanket large spills of gasoline or Jet B fuel (JP-4). The spill should then be washed away with water and any residue left to evaporate before the area is again used for normal operations. Care should be taken to avoid washing the fuel into sewers or drains. If such action must be taken, it should be only on orders of the fire department. If any spillage reaches drains or sewers, they should be liberally flushed with water and operations involving any ignition source should be kept from the vicinity. Fuel flushed into a storm sewer system should be collected before it enters a natural waterway.

The first essential for fire and accident prevention is a clean and orderly facility. Four general guidelines set the basis for establishing and maintaining safe fueling facilities:

- Fence and placard fuel storage areas with "Danger-Flammable" and other warning signs.

- Mark all fuel storage tanks, trucks and dispensers properly as to type and grade of fuel, and post "no smoking" signs. Operable fire extinguishers should be available at each facility.

- All fuel dispensing units should be maintained in a clean and operable condition and have grounding cables for static electrical discharge protection.

- Personnel should be trained in and follow safety procedures for storing, handling and dispensing fuel, lubricants and oxygen.

These are common-sense guidelines. Yet, it often is the familiar, the obvious, that is overlooked or ignored. Human error rates high on the causes of accidents. Carelessness permits leaks and spills; thoughtlessness causes some contaminants such as mixed types or grades of fuels.

Of far greater danger than contaminants in the fuel, is human error in placing the wrong type or grades of fuel into aircraft, mixing of grades, or otherwise allowing off-specification fuels to be placed aboard an aircraft.

Human error will never be eliminated, but it can be minimized by careful design of fueling facilities, good operating procedures, checks, and adequate training and refresher programs for personnel.

Fueling systems under direct control of the airport management are not our only concern. A growing number of airports in the United States — many now used as hubs by air carriers — face the additional concern of self-fuelers. These are operators of corporate aircraft who maintain their own hangar, office and fueling systems separate from those provided by the airport or fixed base operators located on the field.

No current data are available about the actual number of corporate aircraft operators who maintain their own fuel systems. A survey conducted in 1982, however, revealed that at least one-third of all the airports had one or more self-fuelers. As additional corporate aircraft users seek the savings and convenience of self-fueling, this number increases.

Most of the self-fuelers maintaining their own fuel farms have their bases on larger airports. Prompted first by the oil embargo and fuel shortage of the early 1970s, self-fueling grew as more corporate operators discovered monetary savings. One U.S. operator of two corporate jets reports savings of more than $1 (U.S.) a gallon even after the cost of special training for personnel. Installation of tank farms is paid for in as little as three months, some self-fuelers declare.

Besides cost savings, self fuelers claim an advantage of controlling the fuel that goes into their aircraft and having it available any time day or night.

Operators of these self-fueling facilities are known for their safety concerns in flight and these characteristics can be expected to extend to fuel farms and tanks. However, they become another element for airport safety checks and procedures.

Maintaining the safety of fuel operations on an airport requires constant dedication and alertness. The activity is far more complex than could be covered in a brief safety bulletin.

Fortunately, help for installing and maintaining safe fuel systems can be found from many sources. Videos, brochures, handbooks, slide shows, and consultants offer detailed information for not only compliance with environmental regulations, but safe and proper standards and procedures for installation, maintenance, cleanup and removal of tank systems.

Fuel suppliers offer a prime source for guidance. They not only know the appropriate safety measures but usually are well versed on state and local laws. (The API cautions that its informational bulletins and pamphlets are guidelines only and airport operators should consult local and federal authorities for specific requirements.)

Properly installed, carefully managed and professionally operated, fuel systems will not threaten health, environment, safety or the financial health of an airport.♦

Where to Get More Information

Below are sources of information about EPA regulations and standards and safety procedures for handling fuel on airports. Some provide free information, others charge.

American Petroleum Institute, 1220 L Street NW, Washington, D.C. 20005 U.S. API publications are also available in England. European airports are urged to send orders or requests for price information to: British Standards Institution, Linford Wood, Milton Keynes MK14 6LE, England.

London Information Ltd., Index House, Ascot, Berkshire SL5 7EU, England.

Technical Standards Services, Ltd., Blake House, 68 Ickleford Road, Hitchin Herts SG5 1TL, England.

U.S. Environmental Protection Agency, Office of Underground Storage Tanks, P.O. Box 6044, Rockville, MD 20850 U.S.

U.S. Federal Aviation Administration, Office of Airport Standards, 800 Independence Avenue S.W., Washington DC 20591 U.S.

U.S. National Fire Protection Association, Publication Sales Division, Battermarch Park Quincy, MA 02269 U.S.

American Association of Airport Executives, 4224 King St., Alexandria, VA 22302 U.S.

National Air Transportation Association, 4226 King St., Alexandria, VA 22302 U.S.

Petroleum Equipment Institute, Box 2380, Tulsa, OK 74101 U.S.

National Leak Prevention Association, P.O. Box 29809, Cincinnati, OH 45229 U.S.

Fiberglass Petroleum Tank and Pipe Institute, One SeaGate, Suite 1001, Toledo, OH 43604 U.S.

National Association of Corrosion Engineers, Box 218340, Houston, TX 77218 U.S.

Association for Composite Tanks, 108 North State Street Suite 720, Chicago, IL 60602 U.S.

Steel Tank Institute, P.O. Box 4020, Northbrook, IL 60065 U.S.

References:

American Petroleum Institute, 1989 Publications and materials catalog.

API publication 1500, *Storage and Handling of Aviation Fuels At Airports*, Second Edition, November 1988.

FAA *Advisory Circular AC No: 150/5230-4*, dated August 27, 1982.

U.S. *Federal Register*, September 23, 1988.

U.S. *Federal Register*, October 26, 1988.

U.S. EPA "Musts for USTs" *EPA/530/UST-88/008*, September 1988.

About The Author

Charles Spence developed his interest in aviation safety as a pilot in the mid-1950s and as an executive with the Aerospace Industries Association and later, Aircraft Owners and Pilots Association.

A former newspaperman, he now writes for many aviation publications, including frequent contributions to FAA World, *published by the U.S. Federal Aviation Administration. He is a coauthor of a college textbook on transportation and the recipient of numerous writing awards.*

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