



Aviation Fuel Storage, Dispensing & Handling Guidelines

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Section 1 - Record of Revisions & Table of Contents

Revision Number	Revision Date	Effective Date	Affected Pages	Summary
09-01 (Revision 1)	10/01/09	10/01/09	All	Reissue – Remove fuel quality testing, incorporate into Fuel Service Operation Remove Airport Authority Training availability Replace WGAA with Phoenix-Mesa Gateway references Revised all sections
09-02	12.2.09	10.23.09	8, 23	Add fuel flowage fee Add Sample retention after mishaps
10-01	03.22.10	03.22.10	All Page 8 2.a)	Formatting- DCM Conformity, headers/footers Responsibility and Authority changed to Director of O&M Appendix B – added Corrected biannual to biennial training for individual certification
12-01	08.01.2012	08.30.2012	25-26	Revised insurance requirements for self-fueling
18-01	08.08.2018	09.01.2018	ALL	Complete formatting and content revision

Section 2 – General

Policy & Purpose

These Guidelines define the policies, procedures and regulatory standards adopted by the Phoenix-Mesa Gateway Airport Authority (Airport Authority) for protecting against fire and explosions in the storage, dispensing and handling of aviation fuel within the boundaries of Phoenix-Mesa Gateway Airport (Gateway Airport), Mesa, Arizona. All information contained herein promotes compliance with the provisions of Part 139 of the Federal Aviation Regulations while seeking to ensure that all aviation fuel storage, dispensing and handling activities are undertaken in strict accordance with FAR 139.321.

Responsibility & Authority

The Operations and Maintenance Director, or his/her designee, has the authority to enforce these Guidelines upon:

- Airport Authority employees whose work duties involve the storage, dispensing and handling of aviation fuel;
- Aviation fuel vendors and fixed base operators (FBO) (including pertinent vendor and FBO staff) who perform aircraft fuel servicing functions using their own fixed fueling cabinets, fuel trucks and/or other related fuel storage or transfer equipment, or that allow general aviation pilots to use fixed fuel cabinet equipment to perform self-service fueling of their own aircraft;
- Aviation maintenance and service organizations (including pertinent staff) involved in storing, dispensing and handling aviation fuel, or that otherwise perform aircraft fuel servicing functions using their own fuel storage and/or transfer equipment;
- Individual tenants and based aircraft owners who are authorized and certified by the Airport Authority to fuel and/or defuel their own aircraft on a self-supervised basis, using their own fuel trucks and/or fuel storage and transfer equipment.

Responsibilities

The Operations and Maintenance Director is responsible for documenting, reviewing and updating the Fuel Storage, Handling & Dispensing Guidelines.

The Operations and Maintenance Director has the authority to review, revise and implement changes to policies and procedures herein. The Operations and Maintenance Director may delegate all or part of this authority at his or her discretion, or as specified herein.

All organizations and individuals coming under the purview of these Guidelines are responsible for:

- Abiding by and adhering to the policies, procedures and regulatory standards contained herein or cited by reference; and

- Cooperating fully with the Airport Authority designated representatives during operational inspections, hazardous material incidents and in reporting information pertinent to safe fuel storage, dispensing and handling operations.

Permits and Licenses

All airport staff and tenant organizations, personnel and equipment involved in the storage, dispensing and handling of aviation fuel require certification by the Airport Authority. This certification may require one or more of the following:

- **Organizations - Fuel Dispensing Permit:** This Permit is required for all airport tenant organizations desiring to participate in the sale, dispensing or handling of aviation fuel on or within authorized airport areas in quantities greater than 100 US gallons, or that otherwise perform aircraft fuel servicing involving aircraft other than those owned and operated by the Permit holder. Once issued, the Permit will become an exhibit to the authorized organization's lease and/or operating agreement. It remains a valid and continuing part of that lease and/or operating agreement until revoked or superseded. The annual fee for this permit is as specified in current edition of the Airport Rates and Charges. All fuel delivered into aircraft or fuel storage and dispensing equipment, or brought onto airport property, is subject to assessment of fuel flowage fees. Those fees are specified in the current edition of the Airport Rates and Charges.
- **Individuals - Fuel Handling Permit:** This Permit is required for all personnel employed by or otherwise operating or performing aviation fuel storage, dispensing and handling on behalf of Fuel Dispensing Permit holders. This permit is required before any person is authorized to conduct self-fueling operations for their own aircraft on their leasehold property, using their own equipment. This Permit is not required for General Aviation pilots or crewmembers who may be self-servicing their aircraft at authorized fixed facilities on the airport.

Prerequisites for Permit issuance and receipt include:

- Biennial participation in appropriate aviation fuel service and fire safety training (initial and refresher training), as required by Federal Aviation Regulation (FAR) Part 139.321;
- Successful, biannual completion of a written Airport Authority Fuel Handling Permit qualification examination, including payment of the examination administration fee specified in the current edition of the Airport Rates and Charges; and
- Annotation of the appropriate Fuel Handler endorsement on the individual's airport credentials.

- ***NOTE:*** Personnel who fail to achieve the minimum, 90-percent score on their Permit examinations require an examination re-test and payment of an additional examination administration fee. No applicant shall be permitted to re-test for a Fuel Handling Permit more than three (3) times within a 30-day period without certification from the Fuel Dispensing Permit holder that the individual has undergone and successfully completed remedial training.

Training

All permitted tenant and other authorized organizations and personnel subject to these Guidelines shall establish, adopt, implement or participate in an appropriate aviation fuel service and fire safety training program that conforms to these Guidelines and, at a minimum, addresses the subjects listed below:

- Grounding and bonding
- Public protection
- Control of access to storage areas
- Fire safety in fuel farms and storage areas
- Fire safety in the operation of fuel service equipment
- Aviation fuel quality control
- Fuel spill handling and cleanup
- The general provisions of NFPA 407, FAA AC 150/5230-4A, and City of Mesa fire prevention codes.

NOTE: Copies or detailed summaries of training programs instituted or used to satisfy this requirement shall be made available at the Airport Authority's request. Notification of any subsequent changes shall be provided to the Airport Authority within ten- (10) working days of their implementation.

Airport tenants and based aircraft owners desiring to fuel and/or defuel their own aircraft on a self-supervised basis, using their own fuel trucks or related fuel storage and transfer equipment, shall participate in biannual training concerning the procedural and fire safety aspects of their specific fuel servicing operation(s).

Airport aviation fuel vendors, FBOs and maintenance/service organizations coming under the purview of these Guidelines shall have at least one supervisor on staff who has completed an aviation fuel service training course in fire safety and quality control that is acceptable to the Airport Authority and Federal Aviation Administration (FAA). That supervisor shall renew his or her credentials every 24 consecutive calendar months (24 CCM) and be responsible for administering related on-the-job training (initial and refresher) for organization employees who require or have been issued an Airport Authority Fuel Handling Permit. Prior to a Supervisor delivering, conducting or validating training, copies of that supervisors qualification certificate shall be provided to the Airport Authority.

Each Fuel Dispensing Permit Holder shall submit written confirmation once every 12 consecutive calendar months verifying that each Fuel Handling Permitted employee has been trained in compliance with FAR 139.321. This confirmation shall be placed on company letter head and utilize the *Annual Tenant Fueling Agent Training Confirmation Letter Template*. The Airport Authority will maintain written confirmation for 12 consecutive calendar months.

Aircraft Fuel Storage, Handling, Training, and Dispensing on Airports Training Matrix

- Fuel Safety Supervisor
 - Initial Training
 - FAA Approved Fuel Safety Supervisor Course (Reference Advisory Circular AC 15/5230-4B)
 - Hands-on fire extinguisher training provided by an FAA Approved Training Course or Local Fire Authority
 - Note: All training must be completed within 90 days of initiating duties
 - Recurrent Training
 - Must be completed every 24 CCM (Consecutive Calendar Months)
- Line Service Employee
 - Initial Training
 - On-the-job training in fire safety
 - Delivered by a trained Fuel Safety Supervisor
 - Training for employees may also be completed through the use of an approved line service fuel safety course (Reference Advisory Circular AC 15/5230-4B)
 - Recurrent Training
 - Must be completed every 24 CCM (Consecutive Calendar Months)

Inspections and Violations

The Airport Authority shall conduct sufficient announced and unannounced inspections of fuel storage and/or handling sites, fuel service equipment, personnel training records and written procedures to ensure full compliance with these Guidelines. Inspections shall be conducted not less than every three consecutive calendar months (3 CCM) and be documented by a written report that shall be maintained by the Airport Authority for a period of not less than twenty four consecutive calendar months (24 CCM). Inspections shall emphasize protection against fire and explosions in the storage, dispensing and handling of aviation fuel. Copies of inspection reports shall be provided to inspected organizations and other certified personnel within seven-(7) working days of inspection completion.

Violations of any policy, procedure or regulatory standard contained herein, whether specified in these Guidelines or implied by reference, may subject permit holders to issuance of an airport Notice of Violation (NOV) by Airport Authority officials, or suspension or revocation of their privileges. In addition, equipment, if found to be unsafe or improper for use, shall be required to be removed from service until corrective action is accomplished

Any permit holder issued an NOV for failing to adhere to any policy, procedure or regulatory standard contained herein, whether specified in these Guidelines or implied by reference, shall take immediate action to correct that violation and report said action(s), in writing, to the Airport Authority. If circumstances preclude taking immediate corrective action, the permit holder shall report such, in writing, to the Airport Authority and, if desired, may request a hearing with the Airport Authority Deputy Director (or his or her designated representative) to show cause “why” they should not be directed to cease all operations and activities related to that violation until corrective action is taken.

Fuel Storage

The storage of aviation fuel within airport boundaries is restricted to storage containers and/or facilities approved by the Airport Authority. Said containers and/or facilities must, in all instances and if privately-owned, be situated within the owner’s leasehold area, comply fully with all applicable regulatory requirements and conform to the Airport Minimum Standards. Containers or facilities with capacities of 8,000 US gallons or greater qualify as “bulk” storage options that are subject to additional regulation by the City of Mesa, Arizona.

References

Organizations and personnel affected by these guidelines and the underlying reference documents are encouraged to familiarize themselves with those references.

- Federal Aviation Administration (FAA)
 - AC 00-34
 - Aircraft Ground Handling and Servicing
 - AC 150/5230-4B
 - Aircraft Fuel Storage, Handling and Dispensing on Airports

- FAR Part 139
 - Certification and Operations: Land Airports Serving Certain Air Carriers
- Air Transport Association
 - ATA 103
- Environmental Protection Agency
 - The Clean Water Act of 1977
 - The Oil Pollution Act of 1990
- National Fire Protection Association (NFPA)
 - Publication 10
 - Standards for Portable Fire Extinguishers
 - Publication 30
 - Flammable and Combustible Liquid Code
 - Publication 407
 - Standard for Aircraft Fuel Servicing
 - Publication 410
 - Standard on Aircraft Maintenance
- City of Mesa, Arizona
 - Memo (2/22/94)
 - Self-Fueling of Private Aircraft/Defueling Operations

Section 3 – Fire Safety

Introduction

The single greatest hazard associated with the storage, dispensing and handling of aviation fuel is fire. As a result, all organizations and individuals coming under the purview of these Guidelines shall become cognizant of and adhere to the basic fire safety information contained below.

Fire Hazards in Aircraft Fuel Servicing

Aircraft fuel servicing involves the transfer of a flammable or combustible liquid fuel between a bulk storage system or source and the fuel tanks of an aircraft. During these operations, the movement of fuel through the pumps, piping and filters of the transfer system causes the fuel to become electrostatically charged. If that charge is sufficiently high when it arrives at the fuel tank, a static spark may ignite the fuel vapor and cause a fire.

1. During overwing fuel servicing, the flow and splashing of fuel generates a certain amount of static electricity, while at the same time producing flammable mists and vapors.
2. During underwing or single-point fuel servicing and tank vehicle bottom loading operations, the closed hoses or flexible connections of metal tubing or piping tend to minimize the static charge generation and the misting hazards associated with overwing fuel servicing.
3. Other potential sources of ignition that can present hazards during aircraft fuel servicing include:
 - a) Operating aircraft engines & auxiliary power units
 - b) Arcing of electrical circuits
 - c) Automotive or internal-combustion engine servicing equipment
 - d) Energized aircraft radar equipment
 - e) Lightning

The Fire Tetrahedron

The Fire Tetrahedron represents the four elements needed for fire. For fire to occur and materials (including liquid fuels) to continue burning, four elements must be present: FUEL, HEAT, OXIDIZING AGENT (Generally Oxygen), and AN UNINHIBITED CHEMICAL REACTION. If any of these elements are removed, fire cannot occur or an active fire will be extinguished.

Since most fire prevention measures related to aircraft fuel storage, handling and dispensing tend to focus on the avoidance of fuel spills and eliminating or controlling potential ignition sources, three *Fire Tetrahedron* hazards need to be considered: VAPORS, FLASH POINT and AUTO-IGNITION.

1. Aviation fuel is highly volatile due to its tendency to rapidly evaporate and produce VAPORS that can be easily ignited. Further and because those VAPORS are heavier than air, they are capable of traveling along the ground and finding a source of ignition, such as a spark from a motor, static electricity or even an uncovered headlight. For this reason, the following are prohibited within 50-feet of aircraft or aircraft fuel servicing equipment:
 - Open flames and exposed flame heaters;
 - Smoking;
 - Matches and lighters;
 - Welding or cutting; and
 - Flares, flare pots or open flame lights.

CAUTION: *A partially-filled fuel tank or container will retain vapors in the empty portion, thus presenting a greater danger of explosion and fire than a tank or container that is “full.”*

2. The *FLASH POINT* of a fuel is “*the temperature at which the fuel produces sufficient vapors to form an ignitable mixture in air.*” If escaping fuel vapors are at or above the fuel’s *FLASHPOINT* and come in contact with an ignition source, those vapors can ignite and be carried back to the originating tank or container. This possibility demands that all open fuel and flammable liquid containers, as well as potential vapor ignition sources, be minimized to the maximum extent practicable.

NOTE: *The FLASH POINT of aviation gasoline is minus 50-degrees Fahrenheit (F.), while for Jet-A turbine fuel it approximates plus 100-degrees F.*

3. *AUTO-IGNITION* represents the *temperature at which fuel will ignite and cause self-sustained combustion without a spark or other outside ignition source*. The approximate *auto-ignition* temperatures for aviation gasoline is 840-degrees F and Jet-A turbine fuel is 475-degrees F. While these temperatures may seem very high, such things as residual heat from aircraft turbine engines after shut-down or heat from aircraft brakes can be sufficient to cause spilled fuel to ignite. Even when the fuel temperature is below its *AUTO-IGNITION* threshold, hot components on aircraft and vehicles can cause fuel to vaporize in an explosive mixture. As a result, missing or broken lenses on headlights or clearance lights, faulty exhaust systems and other potential sources of ignition require repair before equipment is placed into or continues in operational service.

Fire Extinguishing Agents

Different types of fires or burning materials require different types of extinguishing agents to be optimally effective. Generally, agents in use at Gateway Airport include water, dry chemical and aqueous film forming foam (AFFF). Water works to eliminate the “heat” side of the Fire Tetrahedron, while dry chemical agents and AFFF work to simultaneously eliminate the Fire Tetrahedron’s “heat” and “Oxidizing Agent” components.

Fires generally are grouped into four (4) categories or classifications. These include:

Class A	Fires involving ordinary combustibles, such as wood, paper, cloth, rubber and many plastics
Class B	Fires involving flammable liquids (including aviation fuel), greases, and gases
Class C	Fires involving energized electrical equipment
Class D	Fires involving combustible metals

At Gateway Airport, only (Class) B:C-rated fire extinguishers are permitted airside, on the flight line or carried aboard aircraft fuel service equipment.

Control of Ignition Sources

Smoking is permitted only in designated safe locations and never on the ramp, in hangars, in public areas or in proximity to fueling equipment or aircraft. “**NO SMOKING**” signs shall be conspicuously displayed everywhere flammable liquid vapors are normally present. These signs also shall be posted on fuel servicing equipment, as required by applicable standards.

Strike anywhere matches and single action lighters shall not be permitted on or in aircraft fuel servicing equipment at any time. Further, matches or lighters shall not be carried when conducting aircraft fuel servicing or aviation fuel handling operations.

Open flames and open flame devices, such as lighted cigarettes, cigars and pipes; exposed flame heaters; heat-producing, welding or cutting devices and torches; and flare pots or other open flame lights shall not be permitted on aircraft fuel servicing ramps or aprons within 50-feet of any aircraft fuel servicing operation or fuel servicing equipment.

Electrical equipment, including battery chargers and aircraft ground power generators shall not be connected, operated or disconnected during aircraft fuel servicing operations. Similarly, electric or similar tools likely to produce sparks or arcs shall not be used during those operations, or anywhere flammable vapors may be present unless these tools are categorized as being intrinsically safe, in accordance with applicable UL standards. Also, battery-powered vehicle equipment shall not be operated within 10-feet of aircraft fuel servicing equipment or any fuel spill.

Photographic and communications equipment, including cellular telephones, shall not be used or operated within 10-feet of fuel servicing equipment, or aircraft fueling points or vents. Any communications equipment requiring use inside that 10-foot restriction shall be classified as intrinsically safe, in accordance with applicable UL standards.

Aircraft Operations - Aircraft fuel servicing operations shall not be conducted on any fixed wing aircraft while an onboard aircraft engine is operating. In addition, combustion heaters aboard aircraft shall not be operated during those operations.

Lightning - All aircraft fuel servicing operations shall be suspended when there are lightning flashes visible in the immediate vicinity of the airport (3-miles or less). In addition, aviation fuel vendors, fixed base operators and aviation maintenance organizations involved in aircraft fuel servicing or aviation fuel handling operations shall establish written criteria for suspending those operations when lightning flashes are observed. Those criteria shall be incorporated into the organization's training program or manual, as required by Training provisions listed on page 3 of these Guidelines.

Static Electricity and Bonding

Prior to making any fuel servicing equipment connection to an aircraft, operators of that equipment shall bond the equipment to the aircraft using a cable that will provide a conductive path to equalize the static electricity charge potential between the fuel servicing equipment and the aircraft. This bond shall be maintained until all fuel servicing is complete and all fuel servicing connections to the aircraft have been removed.

When performing overwing aircraft fuel servicing, equipment nozzles shall be bonded using a nozzle bond cable having a clip or plug that can be metallically connected to the aircraft or its fuel tank filler port. This bond shall be established before the aircraft fuel tank filler cap is removed. If there is no plug receptacle or other means for attaching a clip to the aircraft, the operator shall touch the filler cap with a metal component of the nozzle before removing that cap. This will allow an electrostatic bond between the nozzle and aircraft before fuel flow commences. The operator shall keep the nozzle spout in contact with the aircraft fuel filler port until fuel servicing is complete.

All organizations and individuals engaged in the storage, dispensing and handling of aviation fuel at Gateway shall wear clothing that is suitable for the task(s) performed, and that will minimize the potential for generating static electricity. Such clothing shall, whenever possible, be made of 100-percent (100%) cotton, incorporate a predominant cotton blend or be thoroughly fire retardant.

Reporting Fires

The first immediate action to be taken when encountering a fire is to **CALL THE FIRE DEPARTMENT**. This may be accomplished by dialing **9-1-1** on the telephone, or by relaying a related request to the air traffic control tower (ATCT) or a company operations dispatcher via radio.

Fire Fighting

Attempts to fight an active fire shall be undertaken only by personnel who have been appropriately trained and deem it safe to do so. If any fire situation becomes too severe to handle, personnel shall depart the building or area immediately and standby to assist fire department personnel by keeping other personnel at least 50-feet away from the fire area.

No person shall enter a liquid fire area without proper protective clothing and enough fire extinguishing agent to completely extinguish the fire. In addition, consideration must be given to remaining upwind of the fire at all times, and never turning one's back on any active fire even if it seems to have been extinguished because of the potential for reignition and flashback.

Section 4 – Fuel Spills

Spill Prevention

Fuel spill prevention shall be a paramount consideration in all aircraft fuel servicing and aviation fuel handling activities because of the associated fire, safety and environmental hazards. Ensuring equipment complies with applicable design and operating standards, removing leaking or malfunctioning equipment from service and not dragging fuel nozzles on the ground are simple preventive measure examples that should be followed to help avoid the occurrence of dangerous and costly mistakes.

When aircraft are fueled from supplies contained in drums, only pumps that are either hand- or power-operated shall be used. Pouring or gravity flow is not permitted from any container with a capacity greater than 5-gallons because of the increased potential for spillage and fire.

To guard against fuel spills that could endanger aircraft and their occupants, the transfer of fuel from one aircraft fuel service vehicle to another shall not be permitted within 200-feet of any aircraft.

No more than one aircraft fuel service vehicle or equipment item at a time shall be connected to the same aircraft fuel service manifold at any one time. The only exception to this restriction shall be one in which specific means are provided to prevent fuel from flowing back into a tank vehicle when there is a difference in pumping pressure.

*NOTE: Fuel sample retention canisters have been placed along the flight line to provide a place for pilots to dispose of their aircraft fuel system samples prior to flight. Please use these canisters, as Arizona Department of Environmental Quality penalties can be significant if pilots are caught disposing fuel samples on the apron or ramp. **PAYMENT OF ANY FINANCIAL PENALTIES WILL BE THE RESPONSIBILITY OF THE VIOLATOR.***

Control and Clean Up

If a fuel spill occurs or is observed during aircraft fuel servicing, the equipment operator shall:

1. Stop the flow of fuel immediately
2. Activate the EMERGENCY SHUT-OFF control
3. Immediately contact supervisor for assistance in contacting the Fire Department, or stopping or containing the spill to minimize any further hazard that could result.

Aircraft fuel servicing operations shall not resume until:

1. The spill has been cleared
2. Conditions are determined to be “safe”
3. The cause of the spill has been corrected

If the Fire Department is called, equipment operators shall standby upwind of the spill with a fire extinguisher in hand. They shall be prepared to keep unauthorized personnel at least 50-feet clear of the spill area and to assist Fire Department personnel as required. If aircraft need to be evacuated, operators shall also be prepared to lay down a protective path of fire extinguishing agent to allow personnel to safely exit the aircraft and spill area.

CAUTION: DO NOT move aircraft fuel service vehicles or equipment to or from the spill site, and **DO NOT** start or turn off any equipment, including ground power units to preclude any potential engine backfire possibly igniting the spill and causing a fire.

NOTE: Fuel spill control can be aided greatly by pre-positioning containment and cleanup materials on aircraft fuel service vehicles and equipment, and in close proximity to aircraft fuel servicing locations.

Used spill cleanup materials, including pads, dikes and granular absorbents shall be treated as hazardous waste and stored in fireproof containers and disposed of accordingly. Under no circumstances are these used materials to be discarded in normal trash receptacles or dumpsters.

Reporting

ALL FUEL SPILLS shall be reported in writing to the Airport Authority within 48-hours of spill occurrence. Reports shall include the date, time and location of the spill; the cause and contributing circumstances; the persons involved (if any); and actions taken.

The Mesa Fire Department (Station 215) shall be notified (via 9-1-1) of all fuel spills that:

1. Comprise 5-gallons or more
2. Cover an area extending 10-feet in any direction or an area of 50-square feet
3. Continues to flow
4. Otherwise poses a hazard to persons or property.

During the corresponding Fire Department response, tenant organizations and/or persons involved or witnessing the spill shall immediately notify Airport Operations and Environmental Coordinator.

NOTE: Any failure to report a fuel spill or conceal a fuel spill occurrence may subject the organization and equipment operator(s) to fines, revocation of privileges, or other appropriate action by the Airport Authority.

Investigations

The Airport Authority shall investigate all fuel spills requiring response by the Fire Department. This investigation shall focus on determining the cause of the spill, whether emergency procedures were carried out properly and if necessary and appropriate corrective measures were taken.

NOTE: Response of the Mesa Fire/Medical Department and supporting units may subject organizations and individuals involved in the spill to the payment of fees for spill cleanup.

Spill Prevention, Control, and Counter Measures (SPCC) Plan

All aviation fuel vendors, FBOs, aviation maintenance organizations and aircraft owner tenants involved in storing, dispensing or handling aviation fuel on or at the airport shall develop an SPCC Plan. This plan shall take inventory of all aviation fuel tanks and equipment that could present a fire or environmental hazard and describe the actions that will be taken to minimize those hazards and/or respond to them should an incident occur.

Plans shall include, as a minimum, the information requirements listed below. Copies of completed SPCC Plans shall be provided to the Airport Authority Environmental Coordinator and, if appropriate and desired, the relevant information incorporated into the overall Airport Authority SPCC Plan.

1. Name, address and telephone number of the organization or aircraft owner tenant preparing the plan;
2. Name, address and telephone number of a designated Emergency Response Team Coordinator, an individual who would work with the Airport Authority officials in the event an incident occurs;
3. A physical description of all storage tanks and equipment used to store, dispense or otherwise handle aviation fuel at Phoenix-Mesa Gateway Airport;
4. A detailed description of the preventive measures to be employed to minimize and/or prevent fuel spills, including those associated with actual aircraft servicing locations and equipment staging areas; and
5. An inspection checklist describing daily, weekly, monthly and/or other periodic actions that will be taken to ensure equipment condition is suitable to minimize spill potential, identifies the form(s) to be used to document those actions and identifies methods for ensuring personnel are cognizant of all pertinent SPCC Plan elements.

Calibration of Fuel Meters and Gauges

All aircraft fuel service vehicle and equipment meters used in the retail or contract fuel servicing of aircraft shall be certified annually by the Arizona Department of Weights and Measures, or its authorized agent. In addition, all fuel meters at airport storage facilities that service multiple airport tenants shall also be certified. Copies of certification reports shall be retained in company or individual files for a period of not less than 12-months, and are subject to Airport Authority review.

All aircraft fuel service vehicles and equipment that employ non-digital gauges to measure nozzle fueling pressure shall have those gauges calibrated and certified annually by a qualified technician. Copies of calibration/certification reports shall be retained in company or individual files for a period of not less than 12-months, and are subject to Airport Authority review.

Section 5 – Fuel Service Operations

Personal Safety

Understanding the technical aspects of aviation fuel handling and aircraft fuel servicing can have a significant impact on avoiding unsafe practices. However, technical knowledge is only useful when combined with alertness and dedication to performing all tasks in a thoroughly safe and professional manner.

To enhance personal safety, pertinent and appropriate personal protective equipment (PPE) items shall be used when handling aviation fuel, conducting aircraft fuel servicing or performing any other related activities. Minimum PPE items shall include hand, eye and hearing protection, as appropriate.

Portable Fire Extinguishers

Fire extinguishers shall be available on aircraft servicing ramps and/or aprons. Also, aircraft fuel servicing equipment shall be equipped with at least two (2) UL-listed fire extinguishers, each having a minimum rating of 20B:C, with one extinguisher mounted on each side of the vehicle/equipment.

When the open hose discharge capacity of any fuel service equipment is greater than 200-gallons per minute (gpm), at least one (1) UL-listed wheeled fire extinguisher having a minimum rating of 80B:C and a capacity of 125-pounds of agent shall be readily accessible to equipment operators.

Aircraft Fuel Servicing Locations

All aircraft fuel servicing shall be conducted outdoors, on paved ramp surfaces and in locations that facilitate accessibility by emergency fire equipment at all times. In addition, aircraft being fueled shall be positioned so that aircraft system vents and/or fuel tank openings are no closer than 25-feet to any terminal building, hangar, service building or enclosed passenger concourse other than a loading walkway, or no closer than 50-feet to any combustion or ventilation air-intake to any boiler, heater or incinerator room. During servicing, aircraft fuel servicing equipment shall not be positioned between the aircraft and any terminal building, hangar, service building or enclosed passenger concourse.

Equipment Operation Around Aircraft

Internal combustion equipment other than that performing aircraft servicing functions shall not be permitted within 50-feet of aircraft during fuel servicing, or within 10-feet of aircraft fuel system vent openings. During overwing fuel servicing where aircraft have fuel system vents located on upper wing surfaces, equipment shall not be positioned under the trailing edge of the wing.

Electrical equipment, such as battery chargers, ground power generators, electric tools or similar tools likely to produce sparks or arcs shall not be connected, operated or disconnected while fuel servicing is being performed on any aircraft. Photographic equipment also shall not be used within 10-feet of fuel servicing equipment, or the fill or vent points of aircraft fuel systems.

Positioning Fuel Service Equipment

1. Aircraft fuel servicing equipment shall be positioned so that a clear path of egress from the aircraft for that equipment is maintained.
2. The propulsion or pumping systems of aircraft fuel servicing equipment shall not be positioned under the wing of an aircraft during overwing fueling, or where aircraft fuel system vents are located on the upper wing surface.
3. Parking brakes shall be set on all aircraft fuel servicing vehicles before operators begin the fueling operation.
4. Wheeled equipment shall have at least one if its wheels chocked during the entire fuel servicing operation.
5. Fuel servicing equipment shall NOT be within 50-feet of a fuel spill, or of any aircraft leaking fuel.

When required to maneuver between or among aircraft, fuel servicing equipment shall NOT be driven or positioned closer than 25-feet to either aircraft, unless a spotter is used to direct the equipment's movement. In addition, fuel servicing equipment shall be positioned a minimum of 10-feet from the aircraft to be serviced and, when the fueling equipment set-up will permit, with the operator's side of the equipment adjacent to the aircraft. Whenever the fueling equipment set-up will not permit positioning the equipment with the operator's side adjacent to the aircraft, that equipment shall NOT be positioned closer than 15-feet to that aircraft.

A minimum radius of 10-feet shall be maintained between aircraft fuel vents and the fuel servicing equipment.

All aircraft fuel servicing shall cease or be suspended whenever the fuel servicing operation is being conducted downwind and within 75-feet of an operating turboprop engine or 150-feet of an operating jet engine.

Aircraft Fueling Hose

Aircraft fueling hose shall be inspected before use each day by extending it per normal aircraft fuel serving procedures, checking it for evidence of blistering, carcass saturation or separation, cuts, nicks or abrasions that expose the reinforcement material, and for slippage, misalignment or leaks at couplings. If coupling slippage or leaks are found, the cause of the problem shall be determined before the equipment is placed into operational service. Defective hose shall be removed from service.

At least once monthly, fueling hoses shall be completely extended and inspected as above. Hoses that show evidence of soft spots anywhere, but specifically within 12-inches of all couplings, shall be removed from operational service. Nozzle screens shall be inspected for rubber particles that may indicate possible deterioration of the hose interior. With the hose fully extended, it shall be checked at the working pressure of the equipment to which it is attached. Any abnormal twisting or ballooning during this test will indicate a weakening of the hose carcass and the hose immediately shall be removed from operational service.

Deadman Control Monitoring

Fuel flow shall be controlled by use of a deadman control device and the use of any means to defeat this control is prohibited. In addition, fuel service equipment operators shall monitor the panel of the fueling equipment and the aircraft control panel during underwing or single-point (pressure) fueling, or shall monitor the aircraft fuel filler port during overwing fueling.

Operation of Aircraft Defuel and Re-service Equipment

During aircraft defueling operations, tank overfill protection systems will usually be disabled, necessitating special care to avoid overfilling the receiving tank. Consequently, all aircraft defueling operations require the presence of two persons. One shall operate the defueling equipment controls while an observer monitors the filling of the receiving tank. For reasons of thermal expansion, no receiving tank shall be filled to more than 95-percent of its rated capacity.

All aircraft defueling equipment shall be electrostatically bonded to the aircraft being serviced and shall be positioned no closer than 10-feet from aircraft fuel vents.

CAUTION: Tank overfill protection systems may be disabled and not operate during aircraft defueling operations.

Loading Aircraft Fuel Service Tank Vehicles and Carts

Tank bottom-loading is the preferred method for replenishing aircraft fuel service vehicle tanks. Operators shall perform a pre-check of the vehicle tank's overfill or automatic high-level shut-off system during the commencement of tank filling operations to determine if the system is functioning properly. Inoperative systems shall immediately be brought to the attention of the operator's supervisor. If the supervisor determines it is appropriate to continue filling the tank, the procedures specified below shall be followed.

The filling of all aircraft fuel service vehicle and equipment cargo tanks shall be accomplished under the supervision of a qualified and authorized operator at all times. In addition, the following general guidelines shall be strictly observed:

1. The engine of the aircraft fuel service vehicle shall be shut off before starting to fill the tank.

2. The vehicle shall be bonded to the storage pumping system.
3. The vehicle parking brake engaged and chocks in place before replenishment operation begins.
4. Required deadman controls shall be in normal operating condition. Tank over fill protection shall be in normal operating condition or non-standard fueling loading methods will be used.
5. Fuel service vehicle tanks shall NOT be loaded beyond 95-percent (95%) of their rated capacity. This is to allow for thermal expansion of the product.

Note: If the tank overfill protection system controls are inoperative, filling the tank shall only be accomplished when a qualified observer is positioned on top of the fuel service vehicle tank where he or she can observe the filling of the tank and stop (or signal the operator to stop) the flow of fuel when the overfill protection cup is filled.

Top loading of fuel service vehicle tanks is discouraged because of the potential for splashing and free fall of fuel that can cause the fuel to become electrostatically charged. Additional risks include the potential of loading the wrong fuel type in the tank. Top loading shall be accomplished using metal drop tubes attached to the loading assemblies and extending to the bottom of the tank. When the tank of a fuel service vehicle is completely empty or the level of fuel does not cover the tank internal valve, the flow rate into the tank shall be restricted to 25-percent (25%) of the normal, maximum flow from the storage system. In addition, the fuel level in the receiving tank shall be visually monitored throughout all top loading replenishment operations.

Maintenance of Aircraft Fuel Service Tank Vehicles and Carts

Aircraft fuel service vehicles and carts shall not be operated unless they are in proper repair and free of accumulations of grease, oil and other combustibles. Leaking vehicles or carts shall be removed from service and parked in a safe area until repaired.

Maintenance and servicing of aircraft fuel service vehicles and carts shall be performed outdoors or in a building approved for that purpose.

Parking Aircraft Fuel Service Tank Vehicles and Carts

Parking areas for unattended aircraft fuel service tank vehicles shall be arranged to provide the following:

- Dispersal of the vehicles in the event of an emergency
- A minimum of 10-feet of clear space between parked vehicles for accessibility for fire control purposes
- Prevention of any leakage from draining into an adjacent building or storm drain that is not suitable designed to handle fuel
- A minimum of 50-feet from any parked aircraft and buildings other than maintenance facilities and garages for those vehicles.

Fuel Quality Testing

Aviation fuel can be contaminated by waters and solids. Contamination of fuel is an extremely hazardous situation, therefore, fuel suppliers must carry out fuel quality testing. In addition to quality testing to detect contaminants, fuel suppliers must follow a comprehensive program of inspection and maintenance of equipment to ensure clean dry fuel is delivered.

Testing fuel quality is accomplished by visually inspecting a fuel sample. Draining a small amount of fuel for quality testing is known as sumping. Sump buckets used for testing fuel should be metal with a porcelain liner. Do not use plastic buckets as dangerous static electricity may result. Fuel should be sumped daily and inspected using the Clear, Bright, and Dry visual test:

- Clear: The fuel should be absence of sediment or emulsion
- Bright: The fuel should be free of clouding or haze caused by fine water droplets
- Dry: The fuel should be consistent with no separate water layers

Sample Retention – Aircraft Mishaps

Upon receiving any report of a mishap involving an aircraft that has received fuel at Gateway, the fueling agent organization or authorized self-fueler that delivered the fuel shall notify the Airport Operations Department and quarantine the fuel service vehicle or equipment used to deliver that fuel.

Section 6 – Self Service & Self Fueling Operations

Aircraft Self-Service Fueling

Aviation fuel vendors, FBOs and tenant organizations may be permitted to conduct aircraft self-service fueling within their leasehold area(s), provided such is specifically authorized in their lease with the Airport Authority, they possess an appropriate Airport Authority Fuel Dispensing Permit, the equipment is registered with the Airport Authority and they adhere to the following provisions:

1. Only fixed fueling cabinets shall be used for aircraft self-service fueling operations. These cabinets shall meet all applicable regulatory specifications and standards for safety and design, be registered for use by the Airport Authority and be made available for periodic inspection by Airport Authority officials.
2. Aviation fuel storage tanks and related equipment that supply self-service fueling cabinets shall be fire-rated by Underwriter Laboratories (UL) and meet all applicable safety, design and operation standards, including those pertinent to leak detection, fire suppression and the avoidance of fuel spills. Fuel storage systems shall be registered biannually with the Airport Authority and be subject to periodic inspection by Airport Authority officials.
3. Fuel vendors, FBOs and tenant organizations authorized to conduct aircraft self-service fueling shall be responsible for the proper and safe operation of all fuel storage systems and fixed fueling cabinet equipment, and for ensuring all items are inspected and maintained in a safe and operable condition at all times.
4. All fuel storage and fixed fueling cabinet equipment shall be placarded in accordance with pertinent guidelines. In addition, instructions for fueling cabinet equipment use shall be posted in close proximity to those cabinets.
5. All fixed fueling cabinet equipment shall incorporate a positive bonding system, such that the equipment shall not operate and fuel not be dispensed unless the equipment senses a positive, electrostatic bond between the equipment and the aircraft to be fueled.
6. Organizations authorized to conduct self-service fueling shall maintain public liability, property damage and chemical and environmental damage liability insurance (combined single limit per occurrence) in the amount of not less than \$5 million, \$5 million and \$1 million, respectively, unless other coverage limits are specified in the fuel vendor's, FBO's or tenant's lease with the Airport Authority. Should be addressed under minimum standards.

Aircraft Self-Fueling

Individual tenants may be permitted to conduct self-fueling of aircraft they own and/or operate at the Phoenix-Mesa Gateway Airport, provided those activities are conducted solely within their leasehold/ tiedown area, the equipment used is registered with the Airport Authority and:

1. Operations are conducted solely by the tenant, using the tenant's own equipment, and appropriate Airport Authority permits have been received. Further, all aircraft fuel servicing activities shall be conducted in strict accordance with all provisions of these Guidelines.
2. Aviation fuel storage tanks, if used, shall be fire-rated by UL and meet all applicable safety, design and operation standards, including those pertinent to leak detection, fire suppression and the avoidance of fuel leaks and spills. Fuel storage systems shall be registered for use by the Airport Authority and made available for periodic inspection by Airport Authority officials.
3. Tenant personnel, including based aircraft owners, authorized to conduct self-fueling operations shall satisfy all Airport Authority personnel training and certification requirements specified within these Guidelines. These persons also shall satisfy all equipment certification requirements and make that equipment available for periodic inspection by Airport Authority officials.
4. Tenants, including based aircraft owners authorized to conduct self-fueling operations using fuel containment tanks in excess of 150 gallons (parked on airport or towed into the aircraft operating area) shall maintain public liability, property damage and chemical and environmental damage liability insurance (combined single limit per occurrence) in the minimum amount of \$5 million, \$5 million and \$1 million, respectively, unless otherwise specified by lease or agreement with the Airport Authority.

Tenants, including based aircraft owners authorized to conduct self-fueling operations using fuel containment tanks having a capacity between 6 and 150 gallons and not stored on-site shall maintain Automotive Liability Insurance.

Operations & Equipment Use – Special Provisions

Aircraft being fueled or defueled shall have battery and ignition switches in the “off” position. When it is necessary to monitor aircraft fuel gauges during servicing operations, the aircraft battery switch may be left “on,” provided a qualified person is monitoring those gauges and turn that switch “off” in an emergency.

Occupancy of aircraft during self-service and self-fueling operations is prohibited.

Gravity feed fueling systems shall not be used for aircraft self-service and self-fueling operations. Pumps, either hand- or power-operated, shall be used when aircraft are fueled from drums or other metal containers or tanks that exceed 5-gallons in volume. When fuel nozzles are used, they shall be equipped with deadman flow control devices. Notches or latches in the nozzle handle that could allow the valve or device to be locked or blocked open are prohibited.

All self-fueling equipment shall be staged within the authorized tenant's or individual's leasehold area(s), unless otherwise approved in advance by the Airport Authority or specified within their agreement or lease. In addition, all equipment and the aircraft being serviced shall be parked and/or staged on hard, asphalt or concrete surfaces located away from storm drains or other locations where a fuel spill could enter public water supplies, or otherwise cause a hazard to personnel and property.

Appendix A - Glossary

Aircraft: A vehicle designed for flight that is powered by liquid petroleum fuel.

Aircraft Fuel Servicing: The transfer of fuel into or from an aircraft.

Aircraft Fuel Servicing Ramp or Apron: Hard surface (concrete or asphalt) area of position at the airport used for aircraft fuel servicing.

Aircraft Fuel Servicing (Tank) Vehicle (Refueler): A vehicle having a cargo tank (tank truck, tank trailer, tank semi-trailer) designed for or used in the transportation and transfer of fuel into or from an aircraft.

Airport: Phoenix-Mesa Gateway Airport.

Airport Authority Fuel Dispensing Permit: A biennial certification granted by the Airport Authority that permits specific organizations/persons to dispense and/or handle aviation fuel at the airport.

Airport Authority Fuel Handling Permit: A biannual certification granted by the Airport Authority that permits specific persons to conduct aircraft fuel servicing at the airport.

Airport Authority Fuel Storage & Service Equipment Permit: A biennial certification granted by the Airport Authority that validates the safety and suitability of equipment items to be used for aviation fuel storage, dispensing and handling at the airport.

Airport Fueling System: An arrangement of aviation fuel storage tanks, pumps, piping and associated equipment, such as filters, water separators or aircraft fuel servicing vehicles installed and/or operating at an airport and/or designed to service aircraft at fixed positions.

Ambient Temperature: The air temperature surrounding a specific area.

Approved: Acceptable to Airport Authority.

Aviation Fuel: Any petroleum fuel designed for and used by aircraft engines.

Aviation Gasoline (Avgas): Specifically blended fuels used to power reciprocating piston aircraft engines.

Bulk Storage System (also Fuel Farm): Above or below ground storage tanks equipped for receiving, storing and transferring fuel to truck fill stands and/or aircraft fuel servicing vehicles.

Carcass Saturation: A condition where fuel has permeated and weakened the reinforcing materials of a fuel hose carcass.

Cargo Tank: A container used for carrying aircraft fuels and mounted permanently or otherwise secured on a tank vehicle. The term, "cargo tank," does not apply to any container used solely for the purpose of supplying fuel for the propulsion of the vehicle on which it is mounted.

Compartment: A liquid-tight division in a cargo tank.

Contaminants: Substances, either foreign or native, that may be present in fuel that detract from its performance.

Deadman Control: Device that needs a positive, continuing action by a person to allow the flow of fuel.

Defueling: Transfer of fuel from an aircraft to a tank vehicle or container through a hose.

Emergency Fuel Shut-off: A function performed to stop the flow of fuel in an emergency.

Fixed Base Operator (FBO): Common title for aviation fuel dealers at airports.

Flash Point: Temperature at which a liquid gives off sufficient vapors to form an ignitable mixture in air. It is the lowest fuel temperature at which the vapor about the fuel will ignite.

Freezing Point (fuel): Lowest fuel temperature before ice crystals begin to form.

Labeled: Equipment or materials containing an attached label, symbol or other identifying mark of an organization that is acceptable to the Airport Authority. An example is Underwriter Laboratories (UL).

Mis-fueling: Accidental fueling of an aircraft or refueling tank vehicle with an improper grade of fuel product.

Overshoot: The quantity of fuel passing through a valve after the deadman control is released.

Overwing Refueling: Process whereby fuel is transferred into an aircraft by means of a nozzle into a fuel tank opening.

Self-Fueling: The dispensing of aviation fuels into fuel tanks of aircraft that are owned or operated by an authorized airport tenant, using tenant-owned equipment within the tenant's leasehold area.

Self-Service Fueling: The dispensing of aviation fuel into fuel tanks of aircraft by the operator of that aircraft using dispensing equipment contained in fixed cabinets that are owned and made available by authorized airport tenants within their leasehold area.

Shall: Indicates a mandatory requirement.

Should: Indicates a recommendation or that which is advised, but not mandatory.

Sump: A low point in a system for collection and removal of water and solid contaminants.

Underwing Refueling (*also Single Point Refueling and Pressure Fuel Servicing*): A system used to fuel an aircraft by closed coupling under pressure.

Volatility: Refers to the tendency of a liquid fuel to evaporate or change into a vapor.

Water Slug: A large amount of free water.

Appendix B – Forms Index

- Regulatory and Inspection
 - Aviation Fuel Storage, Dispensing and Handling Permit Application
 - Fuel Storage, Handling, & Dispensing Equipment Inspection Form
 - Annual Tenant Fueling Agent Training Confirmation Letter Template
- Supplementary
 - Sample Fueling Program Training Roster