Ownership matrix	USQ # GCX-2

TABLE OF CONTENTS

1.0 PURPOSE AND SCOPE 2
2.0 IMPLEMENTATION 2
3.0 STANDARD 2
3.1 Liquid Storage 2
3.2 Flammable Liquid Storage Cabinets 3
3.3 Hazardous Materials Storage Lockers 6
3.4 Approved Equipment for Dispensing Operations 7
3.5 Transfer of Flammable/Combustible Liquids 7
3.6 Fuel Transport/Storage/Transfer within Tank Farm Boundaries 8
3.7 Tank Farm Boundary Vehicle Access Requirements 10
3.8 Handling Combustible Solid Waste and Residue 11
3.9 Outdoor Storage Requirements 11
4.0 DEFINITIONS 11
5.0 SOURCES 12
5.1 Requirements 12
5.2 References 12

TABLE OF TABLES

Table 1 – Class I, Class II, and Class IIIA Liquids from Table 9.4.3 from NFPA 30 3
Table 2 – Maximum Allowable Quantities of Flammable and Combustible Liquids from Table 9.6.1 of NFPA 30 4
Table 3 – Maximum Allowable Quantities for Occupancy from Table 9.6.2.1 of NFPA 30 5
Table 4 – Design and Number of Control areas from Table 9.7.2 of NFPA 30 5
Table 5 – Designated Sites from Table 14.5.2 of NFPA 30 7

1.0 PURPOSE AND SCOPE

(5.1.1, 5.1.2, 5.1.3, 5.1.4, 5.1.5, 5.1.6)

This standard defines processes that are credited as Defense in Depth controls from RPP-13033, "Tank Farms Documented Safety Analysis," and describes the requirements for using, storing, and handling flammable or combustible liquids. These requirements apply to all Tank Operations Contractor (TOC) managed facilities, operations, and activities.

This standard does not apply to verifying that the fuel transfer equipment meets applicable U.S. Department of Transportation fuel transfer vehicle requirements. Requiring/verifying the criteria a vendor/equipment must meet is part of the procurement process and is performed in accordance with TFC-BSM-CP_CPR-C-05.

2.0 IMPLEMENTATION

This standard is effective on the date shown in the header.

3.0 STANDARD

Users of flammable/combustible liquids shall be familiar with the liquid's hazard classification to ensure compliance with this standard. In this standard, the use of "liquids" is inferred to address both "flammable/combustible" liquids, storage cabinets, etc., unless stated otherwise. The following applies to all TOC personnel and subcontractor activities and to facilities owned or leased by the TOC, as appropriate.

No storage of liquids in excess of the permitted amounts established in this Standard unless otherwise authorized in writing in the form of a Fire Marshal Permit.

Use of the term "liquids" in this standard will include flammable and combustible liquids with flashpoints below 200° F.

3.1 Liquid Storage

1. Storage of Liquids shall not physically obstruct a means of egress.

2. Liquids used for building maintenance, painting, or other similar infrequent maintenance purposes shall be permitted to be stored in closed containers outside of storage cabinets or inside liquid storage areas, if limited to an amount that does not exceed a 10-day supply at anticipated rates of use.

3. Only approved containers, intermediate bulk containers, and portable tanks shall be used for Class I, Class II, and Class IIIA liquids. See NFPA 30, "Flammable and Combustible Liquids Code" or call your Fire Protection Engineer.

4. The maximum allowable size of a container, intermediate bulk container, or metal portable tank for Class I, Class II, and Class IIIA liquids shall not exceed that specified in Table 9.4.3 from NFPA 30 (see Table 1).

5. If required for liquid purity or to avoid excessive corrosion of metal containers, no more than 5 L (1.3 gal) of Class IA and IB liquids may be stored in glass containers in a control area.

NFPA 1 (2015 edition), Section 3.3.14.2, defines a control area as a building or portion of a building or outdoor area within which hazardous materials are allowed to be stored, dispensed, used, or handled in quantities not exceeding the maximum allowable quantities (MAQ). [400, 2013]

Table 1 – Class I, Class II, and Class IIIA Liquids from Table 9.4.3 from NFPA 30

Table 9.4.3 Maximum Allowable Size — Containers, Intermediate Bulk Containers (IBCs), and Portable Tanks

Container Type	Flammable Liquids			Combustible Liquids	
	Class IA	Class IB	Class IC	Class II	Class IIIA
Glass	1 pt (0.5 L)	1 qt (1 L)	1.3 gal (5 L)	1.3 gal (5 L)	5.3 gal (20 L)
Metal (other than drums) or approved plastic	1.3 gal (5 L)	5.3 gal (20 L)	5.3 gal (20 L)	5.3 gal (20 L)	5.3 gal (20 L)
Safety cans	2.6 gal (10 L)	5.3 gal (20 L)	5.3 gal (20 L)	5.3 gal (20 L)	5.3 gal (20 L)
Metal drum (e.g., UN 1A1/1A2)	119 gal (450 L)	119 gal (450 L)	119 gal (450 L)	119 gal (450 L)	119 gal (450 L)
Approved metal portable tanks and IBCs	793 gal (3000 L)	793 gal (3000 L)	793 gal (3000 L)	793 gal (3000 L)	793 gal (3000 L)
Rigid plastic IBCs (UN 31H1 or 31H2) and composite IBCs with rigid inner receptacle (UN31HZ1)	NP	NP	NP	793 gal (3000 L)	793 gal (3000 L)
Composite IBCs with flexible inner receptacle (UN31HZ2) and DOT/UN-approved flexible IBCs	NP	NP	NP	NP	NP
Non-bulk Bag-in-Box	NP	NP	NP	NP	NP
Polyethylene UN1H1 and UN1H2, or as authorized by DOT exemption	1.3 gal (5 L)	5.3 gal (20 L)*	5.3 gal (20 L)*	119 gal (450 L)	119 gal (450 L)
Fiber drum NMFC or UFC Type 2A; Types 3A, 3B-H, or 3B-L; or Type 4A	NP	NP	NP	119 gal (450 L)	119 gal (450 L)

NP: Not permitted for the container categories so classified unless a fire protection system is provided that is developed in accordance with 16.3.6 and is approved for the specific container and protection against static electricity is provided.
*See 9.4.3.1.

3.2 Flammable Liquid Storage Cabinets

Guidance for flammable liquid storage cabinets applies to all TOC facilities.

1. A single flammable liquids storage cabinet may not contain more than 120 gal (454 L) of Class I, II, and IIIA liquids.

2. The total aggregate volume of Class I, Class II, and Class IIIA liquids in a group of storage cabinets shall not exceed the maximum allowable quantity of liquids per control area based on the occupancy where the cabinets are located.

3. Storage cabinets are not required to be ventilated for fire protection purposes by this Standard.

4. If ventilated for any reason, the storage cabinet vent openings shall be ducted directly to outdoors in such a manner that will not compromise the specified performance of the cabinet.

5. Storage cabinets shall be marked in lettering that is at least 2 in. (50 mm) high as follows:

WARNING: FLAMMABLE – KEEP FIRE AWAY.

6. If a storage cabinet is not ventilated, the vent openings shall be sealed with the bungs supplied with the cabinet or with bungs specified by the cabinet manufacturer.

7. The maximum allowable quantities (MAQ) per control area shall not exceed the amounts specified in Table 9.6.1 from NFPA 30 (see Table 2).

Table 2 – Maximum Allowable Quantities of Flammable and Combustible Liquids from Table 9.6.1 of NFPA 30

Table 9.6.1 MAQ of Flammable and Combustible Liquids per Control Area

	Liquid Class(es)	Quantity		Notes
		gal	L	
Flammable liquids	IA	30	115	1, 2
	IB and IC	120	460	1, 2
	IA, IB, IC combined	120	460	1, 2, 3
Combustible liquids	II	120	460	1, 2
	IIIA	330	1,265	1, 2
	IIIB	13,200	50,600	1, 4

(Source: Table 34.1.3.1 of NFPA 5000, 2006 edition.)

Notes:

(1) Quantities are permitted to be increased 100 percent where stored in approved flammable liquids storage cabinets or in safety cans in accordance with the fire code. Where Note 2 also applies, the increase for both notes is permitted to be applied accumulatively.

(2) Quantities are permitted to be increased 100 percent in buildings equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*. Where Note 1 also applies, the increase for both notes is permitted to be applied accumulatively.

(3) Containing not more than the maximum allowable quantity per control area of Class IA, Class IB, or Class IC flammable liquids, individually.

(4) Quantities are not limited in a building equipped throughout with an automatic sprinkler system installed in accordance with NFPA 13, *Standard for the Installation of Sprinkler Systems*

8. For Assembly, Business, and Educational Occupancies; the MAQ per control area shall not exceed the amount specified in Table 9.6.2.1 from NFPA 30 (see Table 3).

Table 3 – Maximum Allowable Quantities for Occupancy from Table 9.6.2.1 of NFPA 30

Table 9.6.2.1 MAQs — Special Occupancy Limits

	Quantity	
Liquid Class(es)	gal	L
I and II	10	38
IIIA	60	227
IIIB	120	454

9. For the occupancies specified in Section 3.3, item 2, storage in excess of 10 gal of Class I and Class II liquids combined or in excess of 60 gal of Class IIIA liquids shall be permitted where stored in flammable liquids storage cabinets and where the total aggregate quantity does not exceed 180 gal.

10. Control areas shall be separated from each other by fire barriers in accordance with Table 9.7.2 from NFPA 30 (see Table 4).

Table 4 – Design and Number of Control areas from Table 9.7.2 of NFPA 30

Table 9.7.2 Design and Number of Control Areas [*5000*: Table 34.2.4.1.1]

Floor Level	Maximum Allowable Quantity per Control Area (percent)*	Number of Control Areas per Floor	Fire Resistance Rating for Fire Barriers (hr)†
Above grade			
>9	5	1	2
7–9	5	2	2
4–6	12.5	2	2
3	50	2	1
2	75	3	1
1	100	4	1
Below grade			
1	75	3	1
2	50	2	1
Lower than 2	NA	NA	NA

NA: Not allowed.

*Percentages represent the maximum allowable quantities per control area shown in Table 9.6.1, with all of the increases permitted in the footnotes of that table.

†Fire barriers are required to include floors and walls, as necessary, to provide a complete separation from other control areas.

11. Control areas located below grade (basements) shall not be utilized for the storage of Class I liquids.

12. Liquids used for building maintenance, painting, or other similar infrequent purposes shall be limited to a ten-day supply in closed containers.

3.3 Hazardous Materials Storage Lockers

Hazardous materials storage lockers are movable, modular, prefabricated storage lockers, specifically designed and manufactured for storage of hazardous materials, in the following:

- Containers that do not exceed 119 gal (450 L) individual capacity.
- Portable tanks that do not exceed 660 gal (2500 L) individual capacity
- Intermediate bulk containers that do not exceed 793 gal (3000 L) individual capacity.

1. Lockers shall not exceed 1500 ft^2 (140 m^2) gross floor area.
2. Lockers shall include a spill containment system to prevent the flow liquids from the structure under emergency conditions.
    a. The containment system shall have sufficient capacity to contain 10 percent of the volume of containers allowed in the locker or the volume of the largest container, whichever is greater.
3. Electrical area classification shall not be required for liquid storage areas where all containers, intermediate bulk containers, and portable tanks are sealed and are not opened.
4. Lockers used to store Class I liquids shall be wired per NFPA 70, “National Electric Code®” to meet Class 1, Division 2, (Zone 2).
5. Miscellaneous combustible material, including but not limited to idle pallets, excessive vegetation, and packing materials, shall not be permitted within 5 ft of the designated site approved for lockers.
6. More than one locker shall be permitted on a designated site, provided that the separation distance between individual lockers is maintained in accordance with Table 14.5.2 from NFPA 30 (see Table 5).

Table 5 – Designated Sites from Table 14.5.2 of NFPA 30

Table 14.5.2 Designated Sites

	Minimum Separation Distance (ft)		
Area of Designated Site[a] (ft^2)	Between Individual Lockers	From Locker to Property Line That Is or Can Be Built Upon[b]	From Locker to Nearest Side of Public Ways or to Important Buildings on Same Property[b,c]
≤100	5	10	5
>100 and ≤500	5	20	10
>500 and ≤1500[d]	5	30	20

For SI units, 1 ft = 0.3 m; 1 ft^2 = 0.09 m^2.

Note: If the locker is provided with a fire resistance rating of not less than 4 hours and deflagration venting is not required in accordance with Section 9.15, all distances required by Table 14.5.2 are permitted to be waived.

[a]Site area limits are intended to differentiate the relative size and thus the number of lockers that are permitted in one designated site.

[b]Distances apply to properties that have protection for exposures, as defined. If there are exposures and such protection for exposures does not exist, the distances should be doubled.

[c]When the exposed building has an exterior wall, facing the designated site, that has a fire resistance rating of at least 2 hours and has no openings to above grade areas within 10 ft (3 m) horizontally and no openings to below grade areas within 50 ft (15 m) horizontally of the designated area, the distances can be reduced to half of those shown in the table, except they should never be less than 5 ft (1.5 m).

[d]When a single locker has a gross single story floor area that will require a site area limit of greater than 1500 ft^2 (140 m^2) or when multiple units exceed the area limit of 1500 ft^2 (140 m^2), the authority having jurisdiction should be consulted for approval of distances.

3.4 Approved Equipment for Dispensing Operations

Use only nationally recognized testing laboratory listed dispensing devices.

3.5 Transfer of Flammable/Combustible Liquids

1. When transferring liquids between conductive containers, the containers shall be bonded with a wire/strap, or metal-to-metal contact between the dispensing nozzle and container/ vessel shall be maintained throughout. The bonding wire/strap or one of the containers must be grounded.

2. When transferring Class I liquids in non-laboratory areas, mechanical ventilation meeting the following criteria shall be provided.

    a. Mechanical ventilation systems shall provide at least 1 cfm of exhaust air for each square foot of floor area (0.3 m^3/min/m^2), but not less than 150 cfm (4 m^3/min).

    b. Exhaust air shall be taken from a point near a wall on one side of the room and within 12 in. (300mm) of the floor, with one or more make-up inlets located on the opposite side of the room within 12 in. of the floor.

c. The location of both the exhaust and inlet air openings shall be arranged to provide air movement across all portions of the floor to prevent accumulation of flammable vapors.

d. The mechanical ventilation system for dispensing areas shall be equipped with an airflow switch or other equally reliable method that is interlocked to sound an audible alarm upon failure of the ventilation system.

3.6 Fuel Transport/Storage/Transfer within Tank Farm Boundaries

The purpose of these controls and compensatory measures is to mitigate the chance of a fire within the tank farm boundaries that could be initiated by the storage, transport, or transfer of flammable/combustible liquids/fuels.

Fuel contained within the fuel tanks of authorized fuel-powered vehicles and equipment is not considered storage and is excluded from the requirements of this procedure.

3.6.1 Transfer of Flammable/Combustible Liquid from Portable Fuel Containers

- Vehicles and equipment are fueled outside of tank farms whenever practical.
- The transport of portable flammable/combustible liquid fuel containers via vehicle is prohibited.
- The use of portable fuel containers in quantities greater than five gallons is prohibited.
- Storage of flammable/combustible liquid fuel is prohibited.
- Five gallons or less of "in-use" flammable/combustible liquids" ARE ALLOWED at an active work site for refueling equipment.
- The fuel shall be in a nationally recognized testing laboratory-listed portable container.
- The transport/transfer of flammable/combustible liquid fuel within the tank farm boundaries via portable fuel canister IS ALLOWED in accordance with the following:
  - Portable fuel containers shall not traverse open risers or cover blocks.
  - If the vehicle/equipment does not require continuous operation, the motor(s) of the vehicle/equipment shall be shut off during the refueling process.
  - The portable fuel canisters used for refueling purposes shall be certified by a nationally recognized testing laboratory.
  - The receiving vehicle or equipment shall be bonded with the portable fuel canister to preclude the occurrence of sparks during the fuel transfer.

3.6.2 Transfer of Flammable/Combustible Liquids from a Non-Regulated Fuel Tanker

The transfer of flammable/combustible liquid fuel from a non-regulated (vehicle is not authorized to enter into the tank farm fenced area) fuel tanker via pressurized fuel line IS ALLOWED in accordance with the following:

- The non-regulated fuel tanker shall remain outside of the tank farm boundaries.
- The pressurized fuel line (limited to one at a time) shall not traverse open risers or cover blocks.
- The fuel transfer activity shall be physically manned with an attendant located at the fuel tanker distribution point AND an attendant at the receiving vessel fuel receiving point. Constant communication shall be maintained between the attendants during fuel transfers.
- The receiving vehicle/equipment and the fuel line/dispenser shall maintain metal-to-metal contact or use a bonding wire/strap during fuel transfer. This will preclude the buildup of a static charge and mitigate the chance of a spark being generated.
- If the vehicle/equipment does not require continuous operation, the motor(s) of the vehicle/equipment shall be shut off during the refueling process.
- The applicable Department of Transportation (DOT) codes and regulations applying to fuel tankers are outside the scope of this procedure (see Section 1.0.).

3.6.3 Transfer of Flammable/Combustible Liquids from a Regulated Diesel Fuel Transfer Pump

- The transfer of diesel fuel (only) from a regulated diesel fuel tank containing less than 100 gallons of diesel fuel using a transfer pump IS ALLOWED in accordance with the following:
  - The regulated diesel fuel tank shall be fueled before entering the tank farm.
  - An approved route map shall be followed.
  - A spotter shall be available and observing during vehicle movement.
  - Drip pans and wheel chocks shall be utilized in accordance with TO-020-960.
  - Refueling is taking place a minimum of 10 feet from any open riser.
  - If equipment does not require continuous operation, the motor(s) shall be shut off during the refueling process.

- If regulated diesel fuel tank runs dry before equipment refueling is completed, refueling the regulated diesel fuel tank inside the tank farm IS ALLOWED in accordance with the following:

  – The non-regulated fuel tanker shall remain outside of the tank farm boundaries.

  – The regulated diesel fuel tank and associated transfer pump shall be relocated to an approved area near the fence line utilizing the approved route map and spotter.

  – The rest of the refueling shall be in accordance with Section 3.6.2.

- The regulated diesel fuel tank shall be stored outside the tank farm fenced area unless otherwise authorized by the Washington River Protection Solutions LLC Fire Protection Engineer using the Fire Marshal Permit process.

3.7 Tank Farm Boundary Vehicle Access Requirements

Vehicle access within tank farm boundaries shall be limited to vehicles whose fuel systems are protected from damage to the integrity of the fuel systems caused by potential collisions with tank structures. Shift Operations shall ensure that each vehicle entering a tank farm boundary meets one of the following criteria and safeguards are implemented in accordance with TFC-OPS-OPER-C-10.

The vehicle's fuel system components are protected from contacting aboveground tank structures from both the front and the rear (e.g., by the vehicle's front and rear axles, bumpers, chassis cross members, rear differential housings, etc.). Additionally, fuel tanks mounted external to chassis cross member will have no part extending beyond the widest part of the vehicle,

OR

The vehicle is equipped with a skid plate or engineered side guard to protect the fuel system.

3.7.1 Tank Farm Boundaries Outside Fenced Area

The controlling organization for each tank farm shall maintain physical barriers (e.g., chain-linked fencing, metal interlocking rail systems, concrete or concrete filled piping posts, concrete barriers, T-posts connected with a chain, etc.) outside the tank farm fenced area to restrict vehicle access in the vicinity of aboveground waste tank structures.

Authorized vehicles ARE allowed entry within the physical barrier areas.

3.7.2 Physical Barrier Surveillance

Periodic surveillance shall be performed and documented by Shift Operations, or designee, to verify that the physical barriers are being maintained. An annual surveillance is required, but Shift Operations may determine more frequent surveillance intervals on a case-by-case basis, as necessary.

3.8 Handling Combustible Solid Waste and Residue

Combustible solid waste and residue from handling flammable/combustible liquids shall be stored in approved, closed, metal containers, and shall be disposed of daily. This requirement does not apply to new or unused materials.

3.9 Outdoor Storage Requirements

Requirements for outdoor storage of flammable/combustible liquid are specified in NFPA 30 and 29 CFR 1910.106. Call the TOC fire protection engineer for assistance with these requirements.

4.0 DEFINITIONS

Bonding. The process of connecting two or more conductive objects together by means of a conductor (e.g., wire, strap, etc.). Bonding eliminates the potential difference between conductive objects. No other bonding is necessary with metal-to-metal contact between dispensing nozzle and container/equipment/vehicle. When wire is used for dissipating static electricity, the currents are quite small, and the minimum size wire is adequate to carry the current. Stranded or braided wire should be used for bonding wire that will be connected and disconnected frequently. Uninsulated wire is recommended for bonding because it is easier to detect defects, but insulated wire is also acceptable if closely inspected before use. The connection can be made using bolts, pressure-type ground clamps, battery clamps, magnets, brazing, welding, etc., as long as there is good metal-to-metal contact.

Combustible liquids. Liquids with flash points at or above 37.8°C (100°F). Combustible liquids are subdivided as follows:

- Class II liquids have flash points at or above 37.8°C (100°F) but below 60°C (140°F)
- Class IIIA liquids have flash points at or above 60°C (140°F) but below 93°C (200°F)
- Class IIIB liquids have flash points at or above 93°C (200°F).

Control areas. A space within a building where quantities of liquids that do not exceed the maximum quantities allowed are stored (see Sections 3.1.7.1 and 3.1.7.2). Control areas shall be separated from each other by fire barriers.

Flammable liquids. Liquids with flash points below 37.8°C (100°F) with a vapor pressure not exceeding 276 Kpa absolute (40 lb/in^2) (2068 mm Hg) at 37.8°C (100°F) are called Class I liquids. Class I liquids are subdivided as follows:

- Class IA liquids have flash points below 22.8°C (73°F) and boiling points below 37.8°C (100°F).
- Class IB liquids have flash points below 22.8°C (73°F) and boiling points at or above 37.8°C (100°F).
- Class IC liquids have flash points at or above 22.8°C (73°F) but below 37.8°C (100°F).

Grounding. The process of connecting one or more conductive objects to the earth and is a specific form of bonding. Grounding eliminates the potential differences between objects and the earth. When wire is used for dissipating static electricity, the currents are quite small, and the minimum size wire is adequate to carry the current. Stranded or braided wires should be used for bonding wires that will be connected and disconnect frequently. Uninsulated wire is recommended for bonding because it is easier to detect defects, but insulated wire is also acceptable if closely inspected before use. The connection can be made using bolts, pressure-type ground clamps, battery clamps, magnets, brazing, welding, etc., as long as there is good metal-to-metal contact.

In-use. Equipment that is continuously operating/running or that is intermittently used within a 24-hour period.

Non-regulated. Used in this Standard to identify vehicles/equipment not authorized to enter into the tank farm fenced area.

Process area. In an "industrial occupancy," it is the section of the building that a process or manufacturing task takes place. The term applies to an industrial occupancy only.

Regulated. Used in this Standard to identify vehicles/equipment authorized to enter into the tank farm fenced area.

Staged/stored fuel. Fuel at the work site for refueling equipment that is in-use is "staged" fuel. If the equipment is not used within a 24-hour period, the fuel that was staged for in-use purposes is considered "stored" fuel.

Tank farm boundaries. The fenced tank farm boundary areas and areas outside the tank farm fenced boundary areas for which physical barriers (e.g., chain link fencing, metal interlocking rail systems, concrete filled piping posts, concrete barriers, T-posts connected with chain, etc.) have been maintained to restrict vehicle access in the vicinity of aboveground waste tank structures.

5.0 SOURCES

5.1 Requirements

5.1.1 10 CFR 851, "Worker Safety and Health Program."

5.1.2 29 CFR 1910.106, "Flammable Liquids."

5.1.3 DOE O 420.1C, Change 3, "Facility Safety."

5.1.4 DOE O 420.1C, Change 3, "Implementation Direction."

5.1.5 DOE-STD-1066-2016, "Fire Protection."

5.1.6 RPP-13033, "Tank Farms Documented Safety Analysis."

5.2 References

5.2.1 NFPA 30, "Flammable and Combustible Liquids Code."

5.2.2 NFPA 70, "National Electric Code®," (Registered trademark of the National Fire Protection Association, Quincy, Massachusetts 02169).

5.2.3 TFC-BSM-CP_CPR-C-05, "Procurement of Materials and Services."

5.2.4 TFC-OPS-OPER-C-10, "Vehicle and Dome Load Control in Tank Farm Facilities."

5.2.5 TO-020-960, "Operate Diesel Fuel Transfer Pump Inside Tank Farm Facilities."