

May 5, 2023

To: Plan Holders for Improvements to the
Salina Regional Airport
Salina, Kansas
New Aviation Bulk Fuel Facility

Transmitted herewith is Addendum No. 3 to the Contract Documents, Plans, and Specifications dated April 17, 2023 for Improvements to the Salina Regional Airport, Salina, Kansas, New Aviation Bulk Fuel Facility.

SCHEDULE I:

Construct New Aviation Fuel Facility

SCHEDULE II:

Relocate Self-Serve Dispenser and Tank

SCHEDULE III:

Partially Remove and Decommission Existing Fuel Facility

This addendum contains answers to contractor's questions received this week along with revised specifications and plans. Please note that the last day for contractor questions will be May 17, 2023.

Sincerely,

Jviation, A Woolpert Company



Alex Nodich, P.E.
Project Manager

**ADDENDUM NO. 3
TO
CONTRACT DOCUMENTS, SPECIFICATIONS AND PLANS
FOR IMPROVEMENTS TO THE
SALINA REGIONAL AIRPORT
SALINA, KANSAS
AIP NO. 3-20-0072-047/049**

To All Bidders: You are requested to make all changes and/or additions contained in this addendum to the Bidding Documents. Failure to acknowledge this Addendum in the submitted Bid may result in rejection of the Bid. Bidders are informed that the above referenced Contract Documents, Specifications, and Plans are modified as follows as of May 5, 2023:

1. PLANS

E-700 – Electrical Sheets – These sheets have been updated to show the recommended generator information in the one-line diagram.

Justification: This information was not previously included.

2. SPECIFICATIONS

00 01 20 – Fuel System Scope of Work – This specification was revised to clarify the sloping of the tanks and panels.

Justification: There was previously a discrepancy between the plans and the specifications.

33 52 43.17 – Aviation System Control Valves – This specification was revised to remove a reference to a specific valve. The intent is for the fuel system contractor provide the appropriate valve which will perform as required to assure the intended system performance is realized while being code compliant.

Justification: The intent is to provide a generic design with few, if any, specific products identified.

3. CONTRACTOR QUESTIONS

Question: The Specifications call out a Cla-Val 124-01 Float Valve as the “Tank Overfill Prevention Valve” (33 52 43.13 Item C). That valve is typically mounted in the interior of the tank. Please have location and/or style of valve verified. Being a cylinder shaped tank there is little to no room in the top of tank for the valve. The drawings also show a different style of valve, one that is mounted external of the tank.

Answer: The specifications have been edited to remove the reference to a specific Cla-Val as the intent was to provide a generic design with few if any specific products identified. The intent is for the fuel system contractor provide the appropriate valve which will perform as required to assure the intended system performance is realized while being code compliant.

Question: For the “Filter Separator Rate of Flow Control & Water Slug Valve” (33 52 43.13 Item B). I current are unable to find any current literature on that valve. Please have the engineer verify that they are specifying the correct manufacturer and valve.

Answer: The specifications have been edited to remove the reference to a valve as the intent was to provide a generic design with few if any specific products identified. The intent is for the fuel system contractor provide the appropriate valve which will perform as required to assure the intended system performance is realized while being code compliant.

Question: Please have engineer verify “Truck Fill Stand Control Valve” as the drawings call out a digital register. The digital register has two stage digital valve control ability. This digital register has the control functions for a specific flow rate.

Answer: The intent of the design is to provide a digital register for the Jet-A and SAF systems and a mechanical register for the Avgas system.

Question: Tank Drawings M-100 & M-101 Show Fire Safe butterfly Valves at Tank Fill & Suction Connections. Schematic Drawings: M-200,M-210 &M-220 Do not Show them. Please clarify.

Answer: The Fire Safe Butterfly valves indicated on plan sheets M-100 & M-110 represent the design intent.

Question: Per drawing M-100, it says the tanks are to be sloped. However in the written section page 347 (section 00 01 20; 1.01(D)), it says the pad will be sloped and not the tanks. Please advise.

Answer: The intent of the design is to have the tank saddles fabricated with a 1% slope built in and a 1% slope provided at the footings for a combined 2% slope to rear of tanks for water draw off. This intent is indicated in the form of a note on plan sheet M-100 (AST Notes), as well as in the enlarged fuel farm grading plan provided on plan sheet D-130.

Question: On D-100, Schedule # 23 and 24 refer to “New Jet A Issue (On Load) Pump Skid (300 GPM)” and "New Jet-A Receipt & Issue Pump Skid (300 GPM)," respectively. There is no reference to Schedule # 23 item "New Jet A Issue (On Load) Pump Skid (300 GPM)" found on either M-120 or M-200. As such we believe that this item may be representative of the "300 GPM Jet-A Recirculation Pump Skid" as shown on both M-120 and M-200; and is mislabeled on D-100. Please clarify

Answer: This statement is correct. Item # 23 “New Jet-A Issue (On Load) Pump Skid” is referred to as “Recirculation Pump skid” on plan sheet M-120.

Question: In the Addendum it is mentioned and pointed out and call out the tanks being UL 142 Flameshield. UL 142 Flameshield is a fine double wall tank, that has an “open interstitial” however it does not meet the same spec as a UL 2085 Fireguard, which has a lightweight concrete interstitial fill between the primary and secondary tank. UL 2085 tank is also in the specification addendum #2 as mentioned, attached via snip below. So all bidders are on the same page please clarify which tanks are to be bid on this project.

Answer: All aviation fuel storage tanks proposed for this project are UL-142 Flameshield.

Question: Regarding Area #2, is there a concrete slab and bollard plan with details for this tank system?

Answer: The intent is to install the relocated tanks on the existing concrete. Plan Sheet D-200 provides details for a 6” thick x 2’ x 6’ slab to be installed on top of the existing concrete pavement at the saddle locations. There is also a detail for the new equipment slab for Work Area 2 on this sheet which has been similarly designed.

Question: Can flushing be performed utilizing the new system pumps and equipment (filters will be replaced as needed)?

Answer: Yes, flushing with the new pumps will be acceptable. Filters will need to be replaced and Strainers will be flushed and cleaned or replaced as needed.

Question: Suction side piping will be extremely difficult to flush at rate required-will a lower velocity be allowed? Can swabbing with visual inspection be allowed?

Answer: A lower flushing rate will be acceptable. The minimum flushing rate must be equal to or greater than the design flow rate of the fueling system related to each piping run being flushed. Swabbing with visual inspection is acceptable, however flushing will still need to be performed in accordance with the direction provided above.

Question: Will fuel tanks need to be cleaned after flushing?

Answer: No, fuel tanks should not need to be cleaned after flushing, unless the contractor suspects that particulate matter or any potential contaminant(s) has made its way into the tanks.

Question: The delineation of scope between the base bid and alternates is not clear. Can a concise description be provided (for civil, mechanical, electrical and structural) be provided or clear notation on plans identifying each alternate package? We have had questions internally and from multiple subcontractors with concerns.

Answer: The Bid alternates have been defined in the contract documents provided to all bidders. No bid alternate directions will be provided on the engineered plans. If specific questions arise, they will be responded to in writing.

Question: Sheet C-305 detail for prorated invert is not clear what that applies to. Please advise

Answer: The sections provided on plan sheet C-305 relate to an existing storm water drainage pipe which exists in work area #1. The cross sections were prepared to provide our best assumption as to the depth of pipe which runs under the proposed improvements based on prorated grades provided by the project surveyor at each end of the pipe. No further data is currently available.

Question: Will any striping be required?

Answer: No striping or pavement markings currently proposed.

Question: Is the swale lined or just bare earth?

Answer: No lining required.

Question: Can a canopy footing design/detail be provided?

Answer: Canopy Footings will be designed and detailed by the canopy mfg.

Question: Will the existing canopy be salvaged and reinstalled at new location? Is a canopy required for the new location (can details be provided)?

Answer: No canopy relocation proposed. Existing canopy will need to be dismantled and provided to the airport authority for their use. Contractor shall be mindful of packaging all parts and fasteners for future use.

Question: There is a bid item for tank cleaning-please clarify what tank is to be cleaned, how much fluid and or sludge is anticipated to be present, and what the fluid is?

Answer: Tank Cleaning bid item is for the existing Avgas tank to be relocated. The tank is currently in service so there will be Avgas present. The existence of sludge and the expected quantity if it exists has not yet been confirmed. However, the tank will need to be inspected per STI SP001 after relocation. It is the contractor's responsibility to have the required STI SP001 inspection performed and certified.

Question: Are there any as builts for the building we are to remove?

Answer: We are not aware of any as-Built plans of the existing fuel farm building.

Question: Will any of the existing fueling equipment be salvaged?

Answer: Per the plans, the existing Avgas tank and associated QT Pod card reader will be relocated.

Question: What was the basis of design for the QA/QC shed? Can a specification be provided? Could this be a completely prefabricated unit?

Answer: Prefabricated is anticipated. Please refer to plan sheet D-150 for basis of design details and specifications.

Question: Will gate guards be required?

Answer: Per the construction safety notes, the contractor shall provide a gate guard at all times when a gate is not closed and locked.

Question: Can the seed mix be provided along with application rate? Will bidder be responsible for watering or any maintenance after completion of project?

Answer: Please see T-901 specification for more information.

Question: Please confirm that the owner will provide fuel for testing and start up.

Answer: Yes, the owner will provide fuel for testing and start up.

Question: Can water be obtained from hydrant on site?

Answer: Yes, there is a hydrant located near work area 2 that will be accessible.

Question: Has a lead/asbestos assessment been performed for the items to be demolished?

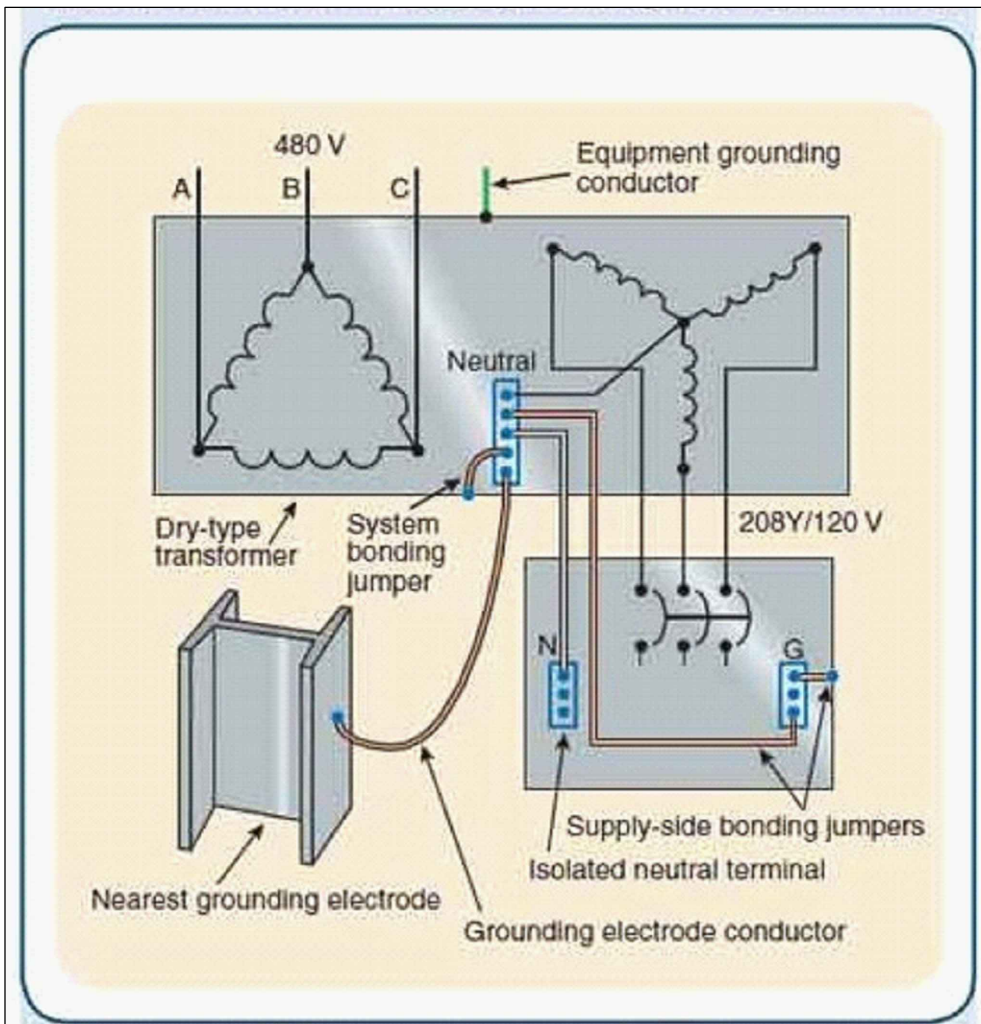
Answer: The Airport authority has confirmed that there is no asbestos in the building. There was a study and a lead abatement project performed for the building in the 90's.

**** END OF ADDENDUM NO. 3 ****

ELECTRICAL ONE LINE DIAGRAM

| CONNECTED VOLTAMPS | | | LOAD DESCRIPTION | WIRES AWG | POLES | AMPS | # C/O | BUS | # LUGS | AMPS | POLES | LOAD DESCRIPTION | WIRES AWG | CONNECTED VOLTAMPS | | |
|--------------------|------|------|----------------------------|--------------|-------|------|----------|-------|-----------|------|-------|-------------------|--------------|--------------------|----|--------------|
| AØ | BØ | CØ | | | | | | A B C | | | | | | AØ | BØ | CØ |
| 1000 | | | CANOPY LIGHTING | 10 | 1 | 20 | 1 | ● | 2 | 20 | 1 | POLE LIGHTS | 10 | 1000 | | |
| | 2500 | | QAQC SUB PANEL | 6 | 2 | 50 | 3 | ● | 4 | 20 | 1 | E-STOP CIRCUIT | 12 | | 0 | |
| | | 2500 | | | | | 5 | ● | 6 | 20 | 1 | E-STOP CIRCUIT | 10 | | | 1200 |
| 1200 | | | JET-A CONTROL #1 | 12 | 1 | 20 | 7 | ● | 8 | | | SPACE | | | | |
| | 1200 | | JET-A CONTROL #2 | 12 | 1 | 20 | 9 | ● | 10 | | | | | | | |
| | | 1200 | JET-A CONTROL #3 | 12 | 1 | 20 | 11 | ● | 12 | | | | | | | |
| 1200 | | | AVGAS CONTROL | 12 | 1 | 20 | 13 | ● | 14 | | | | | | | |
| | 1200 | | JET-A SUMP HEATER #1 | 12 | 1 | 20 | 15 | ● | 16 | | | | | | | |
| | | 1200 | JET-A SUMP HEATER #2 | 12 | 1 | 20 | 17 | ● | 18 | | | | | | | |
| 1200 | | | JET-A SUMP HEATER #3 | 12 | 1 | 20 | 19 | ● | 20 | | | | | | | |
| | 1200 | | CLAY TREATER CONTROL | 12 | 1 | 20 | 21 | ● | 22 | | | | | | | |
| | | 1200 | CLAY TREATER SUMP HEATER | 12 | 1 | 20 | 23 | ● | 24 | | | | | | | |
| 1920 | | | GATE MOTOR OPERATOR (1 HP) | 10 | 1 | 30 | 25 | ● | 26 | | | | | | | |
| | | | SPACE | | | | 27 | ● | 28 | | | | | | | |
| | | | | | | | 29 | ● | 30 | | | | | | | |
| | | | | | | | 31 | ● | 32 | | | | | | | |
| | | | | | | | 33 | ● | 34 | | | | | | | |
| | | | | | | | 35 | ● | 36 | | | | | | | |
| | | | | | | | 37 | ● | 38 | | | | | | | |
| | | | | | | | 39 | ● | 40 | | | | | | | |
| | | | | | | | 41 | ● | 42 | | | | | | | |
| 6520 | 6100 | 6100 | TOTAL CONNECTED VA | 7520 | 6100 | 7300 | | | | | | TOTAL DEMAND VA | | 1000 | 0 | 0 |
| SUB-TOTAL VA | | | TOTAL CONNECTED AMPS | 63 | 50 | 60 | | | | | | TOTAL DEMAND AMPS | | | | SUB-TOTAL VA |

| PANELBOARD RATINGS | | | | PANELBOARD FEATURES | | | |
|---|---|---|--|---|--|---|--|
| VOLTAGE | BUS AMPS | MAIN DEVICE | | ENCLOSURE | BRANCH POLES | BRANCH DEVICES | |
| <input type="checkbox"/> 120/208 3Ø,4W <input type="checkbox"/> 120/240 3Ø,4W <input type="checkbox"/> 277/480 3Ø,4W | <input checked="" type="checkbox"/> 100A <input type="checkbox"/> 400A <input type="checkbox"/> 200A <input type="checkbox"/> 600A <input type="checkbox"/> ___A <input type="checkbox"/> __A | <input type="checkbox"/> MAIN LUGS ONLY <input checked="" type="checkbox"/> 100A CIRCUIT BREAKER <input type="checkbox"/> ___A FUSED SWITCH | | <input type="checkbox"/> FLUSH <input checked="" type="checkbox"/> SURFACE <input type="checkbox"/> NEMA 3R <input checked="" type="checkbox"/> HINGED DOOR <input checked="" type="checkbox"/> KEYED LATCH <input type="checkbox"/> DOOR-IN-DOOR <input type="checkbox"/> STAINLESS STEEL <input type="checkbox"/> PAINTED STEEL <input checked="" type="checkbox"/> NAMEPLATE | <input type="checkbox"/> 12 <input type="checkbox"/> 36 <input type="checkbox"/> 18 <input checked="" type="checkbox"/> 42 <input type="checkbox"/> 24 <input type="checkbox"/> __ | <input checked="" type="checkbox"/> CIRCUIT BREAKERS <input type="checkbox"/> FUSES <input type="checkbox"/> ___ TO BE GFCI BREAKERS <input type="checkbox"/> LOAD CENTER PERMITTED | |
| INTERRUPTING RATING (AIC SYM) <input type="checkbox"/> 10,000A <input type="checkbox"/> 30,000A <input type="checkbox"/> 65,000A <input type="checkbox"/> 14,000A <input type="checkbox"/> 42,000A <input type="checkbox"/> 100,000A <input checked="" type="checkbox"/> 22,000A <input type="checkbox"/> 50,000A <input type="checkbox"/> __,000A <input type="checkbox"/> SERIES RATING PERMITTED | | | | <input type="checkbox"/> SERVICE ENTRANCE RATED <div style="display: flex; justify-content: space-between;"> NEUTRAL BUS <input type="checkbox"/> 50% <input type="checkbox"/> 200% BUS MATERIAL <input checked="" type="checkbox"/> COPPER <input type="checkbox"/> ALUMINUM </div> <input checked="" type="checkbox"/> GROUND BUS REQUIRED <input type="checkbox"/> THROUGH FEED LUGS REQUIRED | | | |
| <input type="checkbox"/> _____ PANELS IN PARALLEL | | | | <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">①</div> <div>②</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">③</div> <div>④</div> </div> <div style="display: flex; align-items: center;"> <div style="margin-right: 20px;">⑤</div> <div>⑥</div> </div> | | | |



GROUNDING DIAGRAM 30 KVA TRANSFORMER

[illegible]

STATUS OF PLAN SET

RELEASED FOR BID

APRIL 17, 2023



Central Florida Office

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Spring Hill, FL 34608

Phone: (352) 684-7275

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**2155 Reliable Circle
Colorado Springs, CO 80906**

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NOTICE

IT IS A VIOLATION OF LAW FOR ANY PERSON, UNLESS ACTING
UNDER THE DIRECTION OF A PROFESSIONAL ENGINEER, OR
LICENSED ARCHITECT TO ALTER THIS DRAWING

OWNER

SALINA REGIONAL AIRPORT (SLN)
3237 ARNOLD AVENUE, SALINA, KANSAS 67401

FACILITY OPERATOR



AVFLIGHT SALINA
2035 BEECHCRAFT ROAD, SALINA, KS 67401

CLIENT / CONSTRUCTION MANAGER

A WOOLPERT COMPANY
20 SOUTH COLORADO BLVD., STE. 1200-S
GLENDALE, CO 80246

PROJECT INFO

NEW AVIATION BULK FUELING FACILITY

SHEET DESCRIPTION

ELECTRICAL DIAGRAMS & PANELBOARD SCHEDULES

WORK AREA 1

SEAL & SIGNATURE

Brian E. Lewis, PE
KS P.E. # 19014
Exp Date: 4/30/2024

DATE: APRIL 17, 2023
PROJECT NO.: SALINA, MO
DRAWING BY: MSK
CHK. BY: AGN
DWG No:

E-700

CADD FILE NO.
SALINA_PLANSET.DWG

SECTION 00 01 20
FUEL SYSTEM SCOPE OF WORK

PART 1 – GENERAL

1.01 SUMMARY

- A. This specification covers the procurement, fabrication, shipping off-loading, placement and performance specifications of the fueling systems for the Salina, KS Regional Airport.

The fueling system shall consist of:

Four (4) 30,000 Gallon SwRI 97-04 Flameshield Double Wall Jet tanks
Two (2) 30,000 Gallon SwRI 97-04 Flameshield Double Wall Jet SAF tanks
Two (2) 20,000 Gallon defuel jet storage tanks
One (1) 12,000 Gallon SwRI 97-04 Flameshield avgas tank
One (1) 500 Gallon Double wall waste fuel tank.

The pumping systems shall include;

Two (2) 300 GPM jet pumping skids
One (1) SAF fueling skids
Two (2) 300 GPM load/offload racks
One (1) 300 GPM SAF load/unload skid
One (1) 200 GPM avgas pumping system
One (1) 278 GPM defuel skid.

The fueling system shall include all the necessary pumps, valves and components to provide an operational system in accordance with industry standards for aviation fueling and comply with federal, state and local codes. These specifications are minimum standards and the engineer may consider approved equals. Price shall include all fees, permits, training and inspections required for the fueling systems to be operational. All equipment provided for this system shall be new, no used or refurbished equipment shall be permitted.

- B. **Scope of Work:** The fueling system project at the airport will consist of:

1. **Avgas Bulk System** - 1 – 12,000 Gallon SwRI 97-04 Flameshield Tank for the storage of 100 LL Avgas with a pumping skid capable of off-loading transports and load refuelers at approximately 200 Gallons per Minute (GPM).
2. **Jet Bulk System** - 4 - 30,000 Gallon SwRI 97-04 Flameshield Double Wall Tanks for the storage of Jet-A with pumping skids capable of off-load transports vehicles and

- loading refuelers at 300 Gallons Per Minute (GPM). The pumping system shall incorporate a 150 Gallon Static Relaxation Vessel and the Jet fuel shall pass through the Static Relaxation Vessel going into the storage tank and when filling the refuelers.
3. **SAF Jet Bulk System** - 2 - 30,000 Gallon SwRI 97-04 Flameshield Double Wall Tanks for the storage of SAF Jet-A with a pumping skid capable of off-load transports vehicles and loading refuelers at 300 Gallons Per Minute (GPM). The pumping system shall incorporate a 150 Gallon Static Relaxation Vessel and the Jet fuel shall pass through Static Relaxation Vessel going into the storage tank and when filling the refuelers.
 4. **Defuel System** – 2 – 20,000 Gallon SwRI 97-04 Flameshield “defuel” jet tanks for defueled fuel. One (1) tank shall be for defueled product and one (1) tank shall be used for certified spec fuel. Pumping system shall be 278 GPM.
 5. **Relocation of the Avgas Self-Serve –**
 6. **Catwalk System** – Tank Top catwalk system per the project drawings. The catwalks will allow inspection of the fittings on top of the tank. The catwalks will be galvanized.
 7. The Site Contractor will be responsible to off-load the new tanks and anchor the tanks into place at the site per manufacturer’s specifications.
 8. Proper and complete installation will conform to the manufacturer’s specifications and checklist.

C. TANKS

1. Avgas 100LL Tank: One (1) 12,000 Gallon SwRI 97-04 Flameshield Double Wall Tank, 10’ internal diameter Flameshield tank meeting the requirements of NFPA 30. Tank shall include the following
 - a. Cylindrical Steel Construction conforming to SwRI 97-04 Flameshield for horizontal atmospheric aviation fuel storage tanks.
 - b. All opening shall be above the normal maximum liquid level of the tank.
 - c. Tank shall be mounted on UL approved steel saddles welded to the tank.
 - d. Tank exterior shall be painted carbon steel.
 - e. The exterior surface of the tank shall be factory sand blasted free of any surface oxidation.

- f. The exterior of the tank shall be coated with an epoxy primer.
- g. The exterior of the tank shall be painted white with a white polyurethane paint with a thickness of 10 to 12 mils.
- h. Interstitial space shall be provided and have an emergency vent per NFPA 30. The interstitial space will be monitored by a float operated gauge.
- i. Tank shall have lifting lugs for off-loading the tank onto the concrete pad.
- j. Interior of the tank shall be butt-welded and ground smooth 12 inches on both sides of the bottom center line of the tank. "Lap" welds on primary (internal) tank are prohibited.
- k. Tank interior shall be epoxy coated. The inner tank shall be sand blasted and clean and dry before internally epoxy coating the tank and the epoxy coating shall be white or near white.
- l. The Internally Epoxy Coating shall be:
 - 1. Amercoat 395
 - 2. Tnemec 61
 - 3. Approved Equal
- m. All painting shall be factory applied. No field painting is permitted, except for required touchup painting.

2. Jet/SAF Tanks:

Six (6) 30,000 Gallon SwRI 97-04 Flameshield Double Wall Tank, 10' internal diameter Flameshield tank meeting the requirements of NFPA 30. Tank shall include the following:

- a. Cylindrical Steel Construction conforming to SwRI 97-04 Flameshield for horizontal atmospheric aviation fuel storage tanks.
- b. All opening shall be above the normal maximum liquid level of the tank.
- c. Tank shall be mounted on UL approved steel saddles welded to the tank.
- d. Tank exterior shall be painted carbon steel.
- e. The exterior surface of the tank shall be factory sand blasted free of any surface oxidation.
- f. The exterior of the tank shall be coated with an epoxy primer.
- g. The exterior of the tank shall be painted white with a polyurethane paint with a thickness of 10 to 12 mils.

- h. Interstitial space shall be provided and have an emergency vent per NFPA 30. The interstitial space will be monitored by a float operated gauge.
 - i. Tank shall have lifting lugs for off-loading the tank onto the concrete pad.
 - j. Interior of the tank shall be butt-welded and ground smooth 12 inches on both sides of the bottom center line of the tank. "Lap" welds on primary (internal) tank are prohibited.
 - k. Tank interior shall be epoxy coated. The inner tank shall be sand blasted and clean and dry before internally epoxy coating the tank and the epoxy coating shall be white or near white.
 - l. The Internally Epoxy Coating shall be equal to the properties and performance of the following:
 - 1. Amercoat 395
 - 2. Tnemec 61
 - 3. Approved Equal
 - m. All painting shall be factory applied. No field painting is permitted, except for required touchup painting.
- 3. Defuel Jet Tanks:

Two (2) 20,000 Gallon SwRI 97-04 Flameshield Double Wall Tank, 10' internal diameter Flameshield tank meeting the requirements of NFPA 30. Tank shall include the following:

 - a. Cylindrical Steel Construction conforming to SwRI 97-04 Flameshield for horizontal atmospheric aviation fuel storage tanks.
 - b. All opening shall be above the normal maximum liquid level of the tank.
 - c. Tank shall be mounted on UL approved steel saddles welded to the tank.
 - d. Tank exterior shall be painted carbon steel.
 - e. The exterior surface of the tank shall be factory sand blasted free of any surface oxidation.
 - f. The exterior of the tank shall be coated with an epoxy primer.
 - g. The exterior of the tank shall be painted white with a polyurethane paint with a thickness of 10 to 12 mils.
 - h. Interstitial space shall be provided and have an emergency vent per NFPA 30. The interstitial space will be monitored by a float operated gauge.
 - i. Tank shall have lifting lugs for off-loading the tank onto the concrete pad.

- j. Interior of the tank shall be butt-welded and ground smooth 12 inches on both sides of the bottom center line of the tank. "Lap" welds on primary (internal) tank are prohibited.
 - k. Tank interior shall be epoxy coated. The inner tank shall be sand blasted and clean and dry before internally epoxy coating the tank and the epoxy coating shall be white or near white.
 - l. The Internally Epoxy Coating shall be equal to the properties and performance of the following:
 - 1. Amercoat 395
 - 2. Tnemec 61
 - 3. Approved Equal
 - m. All painting shall be factory applied. No field painting is permitted, except for required touchup painting.
4. Waste Tank – for the collection of waste fuel.
- One (1) 500 Gallon SwRI 97-04 Flameshield Double Wall, Flameshield tank meeting the requirements of NFPA 30. Tank shall include the following:
- a. Cylindrical Steel Construction conforming to UL142 Double Wall tank for horizontal atmospheric aviation fuel storage tanks.
 - b. All opening shall be above the normal maximum liquid level of the tank.
 - c. Tank shall be mounted on UL approved steel saddles welded to the tank.
 - d. Tank exterior shall be painted carbon steel.
 - e. The exterior surface of the tank shall be factory sand blasted free of any surface oxidation.
 - f. The exterior of the tank shall be coated with an epoxy primer.
 - g. The exterior of the tank shall be painted white with a white polyurethane paint with a thickness of 10 to 12 mils.
 - h. Interstitial space shall be provided and have an emergency vent per NFPA 30. The interstitial space will be monitored by a float operated gauge.
 - i. Tank shall have lifting lugs for off-loading the tank onto the concrete pad.
 - j. Interior of the tank shall be butt-welded and ground smooth 12 inches on both sides of the bottom center line of the tank. "Lap" welds on primary (internal) tank are prohibited.

- k. All required e-vents and a tank mounted spill bucket and a 2" suction pipe for removing the waste product.

D. Tank Slope and Anchoring

1. The tanks proposed herein shall be fabricated with a 1% slope built into the tank saddles. An additional 1% slope has been proposed for the tank footing elevations. The slope in the footings and the tank saddles will provide a combined slope of 2% from front to rear (lower in rear). The Jet, SAF and Avgas tanks shall be sloped to the rear to accommodate water removal. Tank interstitial monitoring, tank sump and water removal systems shall be located at the rear of the tank. See drawings for referenced slopes and elevation.
2. Tank shall be anchored to the concrete bases in accordance with the tank manufactures specifications and according to local seismic codes at the project location.
3. Tank shall be electrically grounded per local electrical codes.

E. Tank Equipment

1. Avgas Tank Equipment:
 - a. Suction Piping:
 - i. The primary storage tank will be outfitted with a 3" suction pipe properly sized for the require flow rate and pump capacity. The suction piping will terminate approximately 6" from the bottom of the tank. Suction piping will be outfitted with a fire shut-off valve with a fusible link.
 - b. Tank Gauging and Alarm:
 - i. Tank gauges shall be placed as close as possible to the centerline of the tank
 - ii. Tank gauge shall be ground readable in feet and inches.
 - iii. Tank gauging shall include an audible alarm that will sound at 90% capacity of the tank. Tank alarm shall be mounted close to the transport off-load connection, in view of the transport off-load area and shall be audible in the transport off-load area.
 - c. Tank Overfill Protection:
 - i. Tank shall be outfitted with overfill protection that will provide a non-shocking fail-safe positive shut-off the flow of product into the tank at 95% capacity.
 - ii. Overfill protection will utilize a float device to positively shut-off the flow into the tank.
 - d. Tank Fill Piping:

- i. Suction piping will incorporate a fire shut-off valve with a fusible link.
 - ii. The fill piping will include a drop tube that will terminate within 6" of the bottom of the tank and terminate with a 45-degree angle, angled toward the rear of the tank or an approved diffuser.
- e. Emergency Vent Primary and Secondary (interstitial) Tank:
 - i. Tank will be outfitted with an emergency vent for the primary tank in accordance with NFPA 30.
 - ii. Tank will be outfitted with an emergency vent for the secondary tank in accordance with NFPA 30
- f. Operating Vent:
 - i. Avgas Tank shall be outfitted with a 3" approved Pressure / Vacuum Vent. Operating vents shall be a minimum of 12' above grade and a minimum of 24" above the tank top.
- g. Tank Openings:
 - i. Tank will be outfitted with one (1) 36" manway and one (1) 24" manways.
- h. Interstitial Opening:
 - i. Interstitial space shall be provided and have an emergency vent per NFPA 30.
 - ii. Interstitial Space shall be monitored by a float gauge.
- i. Tank Fittings:
 - i. Tank shall be outfitted with the proper number of opening plus two additional 4" openings for future use. Additional opening shall be as close to the midpoint of the tank as possible and capped for future use.
- j. Tank Sump
 - i. Tank will have hand pump, mounted at the rear of the tank, anti-siphon valve, and the piping shall enter the top of tank on the centerline of the tank and shall terminate within 1" of the bottom of the tank. Hand pump shall be mounted on a bracket at the rear of the tank and shall be located proximately 40" from the ground level for operation at ground level. The drain shall terminate approximately 12" from grade at the rear of the tank. Piping shall be stainless steel.
- k. Tank Testing

- i. Tank shall be pressure tested at the factory in accordance with UL142.
 - ii. Tank shall be field tested for tank tightness, after the installation of the tank at the airport.
 - I. Anti-Siphon:
 - i. Tank shall have a means to prevent the release of liquid from the tank by siphon flow on the primary fill and suction piping.
 - m. Manual Gauge Port:
 - i. Tank shall have a 2" watertight gauge port located near the center of the tank, accessible from the maintenance platform, for manually "sticking" the tank to determine the level of product in the tank. Contractor will provide a calibrated gauge stick and strapping chart for the tank.
 - n. Vapor Recovery:
 - i. The storage tank shall be provided with stage 1 vapor recovery and will include vapor adaptor and cap. Vapor recovery connection at the tank shall be through the top of the tank.
 - ii. Vapor recovery connection shall be within the spill containment pan area.
 - o. Fire Valve: Fire shut-off valve on the suction line as close as possible to the tank head.
- 2. Jet/SAF - Tank Equipment:
 - a. Suction Piping:
 - i. The primary storage tank will be outfitted with a 3" floating suction with "pull to test" cable, properly sized for the require flow rate and pump capacity. The floating suction will terminate approximately 6" from the bottom of the tank. Suction piping will be outfitted with a fire shut-off valve with a fusible link.
 - b. Tank Gauging and Alarm:
 - i. Tank gauges shall be placed as close as possible to the centerline of the tank
 - ii. Tank gauge shall be ground readable in feet and inches.
 - iii. Tank gauging shall include an audible alarm that will sound at 90% capacity of the tank. Tank alarm shall be mounted close to the transport off-load connection, in view of the transport off-load area and shall be audible in the transport off-load area.
 - c. Tank Overfill Protection:

- i. Tank shall be outfitted with overfill protection that will provide a non-shocking fail-safe positive shut-off the flow of product into the tank at 95% capacity.
 - ii. Overfill protection will utilize a float device to positively shut-off the flow into the tank.
- d. Tank Fill Piping:
 - i. Suction piping will incorporate a fire shut-off valve with a fusible link.
 - ii. The fill piping will include a drop tube that will terminate within 6" of the bottom of the tank and terminate with a 45-degree angle angled toward the rear of the tank or an approved diffuser.
- e. Emergency Vent Primary and Secondary (interstitial) Tank:
 - i. Tank will be outfitted with an emergency vent for the primary tank in accordance with NFPA 30.
 - ii. Tank will be outfitted with an emergency vent for the secondary tank in accordance with NFPA 30
- f. Operating Vent:
 - i. Jet Tank shall be outfitted with a 6" updraft vent. Operating vents shall be a minimum of 12' above grade and a minimum of 24" above the tank top.
- g. Tank Openings:
 - i. Tank will be outfitted with two (2) 24" manways.
- h. Interstitial Opening:
 - i. Interstitial space shall be provided and have an emergency vent per NFPA 30.
 - ii. Interstitial Space shall be monitored by a float gauge.
- i. Tank Fittings:
 - i. Tank shall be outfitted with the proper number of opening plus an additional 4" opening for future use. Additional opening shall be as close to the midpoint of the tank as possible and capped for future use.
- j. Tank Sump
 - i. Tank will have hand pump located at the rear of the tank, anti-siphon valve, and the piping shall enter the top of tank on the centerline of the tank and shall terminate within 1" of the bottom of the sump bowl. Hand pump shall be mounted on a bracket at the

rear of the tank and shall be located proximately 40" from the ground level for operation at ground level. The drain shall terminate approximately 12" from grade at the rear of the tank. Piping shall be stainless steel.

- k. Tank Testing
 - i. Tank shall be pressure tested at the factory in accordance with UL142.
 - ii. Tank shall be field tested for tank tightness, after the installation of the tank at the airport.
 - l. Anti-Siphon:
 - i. Tank shall have a means to prevent the release of liquid from the tank by siphon flow on the primary fill and suction piping.
 - m. Manual Gauge Port:
 - i. Tank shall have a 2" water-tight gauge port located near the center of the tank, accessible from the maintenance platform, for manually "sticking" the tank to determine the level of product in the tank. Contractor will provide a calibrated gauge stick and strapping chart for the tank.
 - n. Fire Valve: Fire shut-off valve on the suction line as close as possible to the tank head.
3. Jet - Defuel Tank Equipment:
- a. Suction Piping:
 - i. The primary storage tank will be outfitted with a 4" floating suction with "pull to test" cable, properly sized for the require flow rate and pump capacity. The floating suction will terminate approximately 6" from the bottom of the tank. Suction piping will be outfitted with a fire shut-off valve with a fusible link.
 - b. Tank Gauging and Alarm:
 - i. Tank gauges shall be placed as close as possible to the centerline of the tank
 - ii. Tank gauge shall be ground readable in feet and inches.
 - iii. Tank gauging shall include an audible alarm that will sound at 90% capacity of the tank. Tank alarm shall be mounted close to the transport off-load connection, in view of the transport off-load area and shall be audible in the transport off-load area.
 - c. Tank Overfill Protection:

- i. Tank shall be outfitted with overfill protection that will provide a non-shocking fail-safe positive shut-off the flow of product into the tank at 95% capacity.
 - ii. Overfill protection will utilize a float device to positively shut-off the flow into the tank.
- d. Tank Fill Piping:
 - i. Suction piping will incorporate a fire shut-off valve with a fusible link.
 - ii. The fill piping will include a drop tube that will terminate within 6" of the bottom of the tank and terminate with a 45-degree angle angled toward the rear of the tank or an approved diffuser.
- e. Emergency Vent Primary and Secondary (interstitial) Tank:
 - i. Tank will be outfitted with an emergency vent for the primary tank in accordance with NFPA 30.
 - ii. Tank will be outfitted with an emergency vent for the secondary tank in accordance with NFPA 30
- f. Operating Vent:
 - i. Jet Tank shall be outfitted with a 3" updraft vent. Avgas Tank shall be outfitted with an approved Pressure / Vacuum Vent. Operating vents shall be a minimum of 12' above grade and a minimum of 24" above the tank top.
- g. Tank Openings:
 - i. Tank will be outfitted with two (2) 24" manways.
- h. Interstitial Opening:
 - i. Interstitial space shall be provided and have an emergency vent per NFPA 30.
 - ii. Interstitial Space shall be monitored by a float gauge.
- i. Tank Fittings:
 - i. Tank shall be outfitted with the proper number of opening plus an additional 4" opening for future use. Additional opening shall be as close to the midpoint of the tank as possible and capped for future use.
- j. Tank Sump
 - i. Tank will have hand pump located at the rear of the tank, anti-siphon valve, and the piping shall enter the top of tank on the centerline of the tank and shall terminate within 1" of the bottom of the sump bowl. Hand pump shall be mounted on a bracket at the

rear of the tank and shall be located proximately 40" from the ground level for operation at ground level. The drain shall terminate approximately 12" from grade at the rear of the tank. Piping shall be stainless steel.

- k. Tank Testing
 - i. Tank shall be pressure tested at the factory in accordance with UL142.
 - ii. Tank shall be field tested for tank tightness, after the installation of the tank at the airport.
- l. Anti-Siphon:
 - i. Tank shall have a means to prevent the release of liquid from the tank by siphon flow on the primary fill and suction piping.
- m. Manual Gauge Port:
 - i. Tank shall have a 2" water-tight gauge port located near the center of the tank, accessible from the maintenance platform, for manually "sticking" the tank to determine the level of product in the tank. Contractor will provide a calibrated gauge stick and strapping chart for the tank.
- n. Fire Valve: Fire shut-off valve on the suction line as close as possible to the tank head.

F. Pumping System

- 1. Avgas System – Bulk Loading System – Island Mounted: As per NFPA 407 piping valves and fittings shall be of metal suitable for aviation fuel service and designed for working pressure and mechanically and thermally produced structural stresses to which they could be subjected. Cast iron, copper, copper alloy and galvanized steel piping, valves and fittings shall not be permitted. Fueling system butterfly valves shall be ¼ turn butterfly style rated at 250 psi. Valve bodies and lugs shall be constructed of ductile iron with stainless steel stems and viton seals.
- 2. All electrical, wiring and grounding shall be of a type specified by, and installed in accordance with NFPA 70. All fuel facility control boxes, wiring components, motors, starters and electrical equipment located in the hazardous area shall be explosion proof. All electrical components shall be rated Class 1 Division 1.
- 3. The fueling system with a cabinet enclosure and drainable containment pan, will be designed with the off-load connection and vapor recovery connection. The pumping system will be designed to off-load transports at approximately 200-240 GPM, through filtration and load refuelers through filtration at approximately 200 GPM. Loading of the refueler shall be deadman controlled. The system will also be capable of re-circulating product at approximately 200 GPM. The system will incorporate the following equipment:

- i. 3" Positive Displacement or Centrifugal Pump with a 3 phase explosion proof motor and explosion proof starter. A means of releasing air shall be incorporated into the pumping system. Pump and motor shall be base mounted and the base shall be welded to the frame. Base shall be welded steel channels or I-Beams.
- ii. Motor Starter – Explosion proof starter box with appropriate sized motor starter. Red "Mushroom" start-stop button to stop pump/motor operation.
- iii. Pump Motor – Pump motor shall be Class I Division I Group D explosion proof motors, 208 – 230 Volt three (3) Phase, 60 Hertz. Motor shall be appropriately sized for the pumping requirements of the system.
- iv. Electronic overfill protect that prevents the flow of avgas fuel into the fueler trucks. The System will either close the deadman valve (if equipped) or stop the pump and motor. The system will have a "keyed" override to allow loading of refueler, if necessary. Scully, Civicon or approved equal.
- v. Filtration – 200-240 GPM filter separator with coalescer / separator filter elements, externally testable water defense (Gammons 1cc, Crown Products or approved equal), piston style differential pressure gauge, air eliminator, pressure relief, and ¾" spring load drain valve. Stainless Steel drain lines will be routed to edge of the containment pan for draining into Stainless Steel buckets.
- vi. Filter Vessel – Filter vessel shall be 6th edition and internally epoxy coated. Filter Vessel shall be an ASME code vessel and have 150# flanges, pressure relief set at 125 PSI and air eliminator. The air eliminator and pressure relief shall be drained back into the tank. Filter vessel shall be manufactured by Facet or Velcon.
- vii. Spare Elements – Provide one set of spare elements to be changed after flushing the system.
- viii. Static Relaxation Vessel – Static relaxation vessel shall be internally epoxy coated. Filter Vessel shall be 100 Gallons and an ASME code vessel and have 150# flanges, air eliminator and a pressure relief set at 125 PSI. Air Eliminator and Pressure relief shall be piped back into the tank. Stainless Steel drain lines will be routed to edge of the containment pan for draining into Stainless Steel buckets.
- ix. Off-Load Connection – 3" off-load connection including 3" camlock adapter and lockable aluminum dust cover, 3" quick closing butterfly valve, 3" top cleanout 40 mesh stainless steel strainer.
- x. Stage 1 Vapor Recovery – Stage 1 vapor recovery with a 3" vapor recovery connection, lockable cap, quick closing butterfly valve, with a vapor recovery line piped back into top of tank.

- xi. 15 Gallon Product Recovery Tank - Product Recovery Tank shall be self-contained and utilized to separate water and particulate from the fuel. It shall be piped to allow draining of the water and particulate into a waste bucket. The product recovery system will be piped through sump suction and filtered before returning to tank. The product recovery system will incorporate a spring-loaded ball valve on the return line to prevent water and particulate from being released into pump suction.
 - xii. 2" x 12' of API-1529 hose and a camlock connection.
 - xiii. Spring rewind grounding reel 50 feet of coated steel cable and military style clamp. Grounding reel shall be bonded to the pumping skid. Cable shall have a ball stop installed next to the clamp.
 - xiv. Positive Displacement Meter with an electronical register (TCS, Liquid Control or approved equal), non-resettable totalizer.
 - xv. Valves: Valves in the fill and suction piping at the tank head shall be API 607 fire rated valves.
 - xvi. Fusible Link Emergency Fire Valve: In Accordance with NFPA 407, prior to the bulk loading hose, the piping will incorporate an in-line fire valve that will close when temperatures excess of 165 degrees.
- 4. Jet System - Bulk Pumping System: As per NFPA 407 piping valves and fittings shall be of metal suitable for aviation fuel service and designed for working pressure and mechanically and thermally produced structural stresses to which they could be subjected. Cast iron, copper, copper alloy and galvanized steel piping, valves and fittings shall not be permitted. Fueling system butterfly valves shall be ¼ turn butterfly style rated at 250 psi. Valve bodies and lugs shall be constructed of ductile iron with stainless steel stems and buna seals.
- 5. All electrical, wiring and grounding shall be of a type specified by, and installed in accordance with NFPA 70. All fuel facility control boxes, wiring components, motors, starters and electrical equipment located in the hazardous area shall be explosion proof. All electrical components shall be rated Class 1 Division 1.
 - a. Pumping Systems: The pumping system will be designed to off-load transports at approximately 300 GPM, through filtration and a static relaxation vessel and push fuel to individual load racks to load refuelers at approximately 300 GPM. The pumping systems shall also be capable of re-circulating product at approximately 300 GPM. The system will incorporate the following equipment:
 - i. Pumps – 4" Positive Displacement Pumps or Centrifugal Pumps with a 3 phase explosion proof motor and explosion proof starter.

A means of releasing air shall be incorporated into the pumping system Pump and motor shall be base mounted and the base shall be welded to the frame. The piping shall include a 2" by-pass loop to circulate fuel to prevent the pump from overheating. Base shall be welded steel channels or I-Beams.

- ii. Motor Starter – Explosion proof starter box with appropriate sized motor starter. Re “Mushroom” start-stop button to stop pump/motor operation.
- iii. Pump Motor – Pump motor shall be Class I Division I Group D explosion proof motors, 208 – 230 Volt Three (3) Phase, 60 Hertz. Motor shall be appropriately sized for the pumping requirements of the system.
- iv. Filtration – 300 GPM filter separator with coalescer / separator filter elements, sump heater, externally testable water defense (Gammons 1cc, Crown Products or approved equal), Full flow sampling ports piped to the front of the skid, piston style differential pressure gauge, air eliminator, pressure relief, and $\frac{3}{4}$ " spring load drain valve. Stainless Steel drain lines will be routed to edge of the containment pan for draining into Stainless Steel buckets. Filter shall be appropriately sized to accommodate the off-load flow rate.
- v. Filter Vessel – Filter vessel shall be a 6th edition filter separator with Class- C coalesce / separator filters. Filter vessel shall be internally epoxy coated. Filter Vessel shall be an ASME code vessel and have 150# flanges and a pressure relief set at 125 PSI. Filter vessel shall be manufactured by Facet or Velcon.
- vi. Spare Elements – Provide one set of Class C spare elements to be changed after flushing the system.
- vii. Millipore test Ports – Millipore test ports with closeable valves. The test ports will be extended to the front of the skids via in Stainless Steel lines.
- viii. Static Relaxation Vessel – Static relaxation vessel shall be internally epoxy coated. Filter Vessel shall be 150 Gallons and an ASME code vessel and have 150# flanges, air eliminator and a pressure relief set at 125 PSI. Air Eliminator and Pressure relief shall be piped back into the tank. Stainless Steel drain lines will be routed to edge of the containment pan for draining into Stainless Steel buckets.
- ix. 15 Gallon Product Recovery Tank - Product Recovery Tank shall be self-contained and utilized to separate water and particulate from the fuel. It shall be piped to allow draining of the water and particulate into a waste bucket. The product recovery system will

be piped through sump suction and filtered before returning to tank. The product recovery system will incorporate a spring-loaded ball valve on the return line to prevent water and particulate from being released into pump suction.

- x. Grounding reel shall be a spring rewind grounding reel with 50 feet of coated steel cable and military style clamp. Cable shall have a ball stop installed next to the clamp.
6. Load Rack Dispensers - As per NFPA 407 piping valves and fittings shall be of metal suitable for aviation fuel service and designed for working pressure and mechanically and thermally produced structural stresses to which they could be subjected. Cast iron, copper, copper alloy and galvanized steel piping, valves and fittings shall not be permitted. Fueling system butterfly valves shall be ¼ turn butterfly style rated at 250 psi. Valve bodies and lugs shall be constructed of ductile iron with stainless steel stems and buna seals.
7. All electrical, wiring and grounding shall be of a type specified by, and installed in accordance with NFPA 70. All fuel facility control boxes, wiring components, motors, starters and electrical equipment located in the hazardous area shall be explosion proof. All electrical components shall be rated Class 1 Division 1.
- a. Load Racks:
 - i. Electronic overfill protect that prevents the flow of jet fuel into the fueller trucks. The System will either close the deadman valve (if equipped) or stop the pump and motor. The system will have a “keyed” override to allow loading of refueler, if necessary. Scully, Civicon or approved equal.
 - ii. Off-Load Connection – 4” off-load connection including 3” camlock adapter and lockable aluminum dust cover, 3” quick closing butterfly valve, 3” top cleanout 40 mesh stainless steel strainer.
 - iii. Grounding reel shall be a spring rewind grounding reel with 50 feet of coated steel cable and military style clamp. Cable shall have a ball stop installed next to the clamp.
 - iv. 2 1/2” x 12’ of API 1529 Aviation Hose with a 2” Singlepoint Nozzle and Dust Cap.
 - v. Flow control and pressure control valve for product regulation (Cla-Val, OCV or approved equal)

- vi. Positive Displacement Meter with electronic register head register (TCS or LC Meters or approved equal) and a non-resettable totalizer.
 - vii. Fusible Link Emergency Fire Valve: In Accordance with NFPA 407, prior to the bulk loading hose the piping will incorporate an in-line fire valve that will lose when it senses temperatures in excess of 165 degrees.
 - viii. Offload connection with a 4" camlock connection, 4" swing check valve, 4" butterfly valve and a 4" strainer with 40 mesh Stainless Steel basket.
 - ix. Note: The third load rack will have a 3 product injector system for military operations.
8. Jet-A System – Defuel Fuel: As per NFPA 407 piping valves and fittings shall be of metal suitable for aviation fuel service and designed for working pressure and mechanically and thermally produced structural stresses to which they could be subjected. Cast iron, copper, copper alloy and galvanized steel piping, valves and fittings shall not be permitted. Fueling system butterfly valves shall be ¼ turn butterfly style rated at 250 psi. Valve bodies and lugs shall be constructed of ductile iron with stainless steel stems and Buna seals.
9. All electrical, wiring and grounding shall be of a type specified by, and installed in accordance with NFPA 70. All fuel facility control boxes, wiring components, motors, starters and electrical equipment located in the hazardous area shall be explosion proof. All electrical components shall be rated Class 1 Division 1.

The operation of the system shall be controlled by a deadman valve, not through stopping and starting of the motor.

- a. Pumping System: The Jet-A pumping system will be designed so that the bowser or refueler pump will push the defuel fuel at approximately 278 GPM, through a 278 GPM Clay Treater, filtration and static relaxation. The system will be piped to the "certified pumping system top allow recirculating the product through both the Clay Treater to "clean" the fuel. The system will incorporate the following equipment:
 - i. Pump – 4" Positive Displacement Pump or Centrifugal Pump with a 3 phase explosion proof motor and explosion proof starter. A means of releasing air shall be incorporated into the pumping system. Pump and motor shall be base mounted and the base shall be welded to the frame. The piping shall include a 3" by-pass loop to circulate fuel to prevent the pump from overheating. Base shall be welded steel channels or I-Beams.
 - ii. Clay Treater – 278 GPM Clay Treater piped into the system so that the defuel fuel passed through the clay treater before the filtration and static relaxation vessel. Piping shall allow product to

be pulled from the defuel tank, over to the certified fuel skid and then back through the clay treater, filter static vessel and back into the defuel tank.

- iii. Filtration – 300 GPM horizontal filter separator with a coalescer / separator filter elements, externally testable water defense (Gammons 1cc or Crown Products), full flow sampling ports piped to the front of the skid, piston style differential pressure gauge, air eliminator and pressure relief. The drain valve shall have a stainless-steel piping and a spring load drain valve and piped to a location that easily accessible and high enough to have a white bucket under the opening. Water defense shall stop flow of the fuel until the excessive water condition is addressed. Filter shall be appropriately sized to accommodate the off-load flow rate. Filter vessel will have a thermostatically controlled filter sump heater, suitable for aviation fuels. The air eliminator and pressure relief shall be piped back to tank through either stainless-steel tubing or stainless steel pipe. There shall be isolation valves on the inlet and out let of the filter vessel for maintenance
- iv. Filter Vessel – Filter vessel shall be a 6th edition filter separator with coalesce / separator filters. Filter vessel shall be internally epoxy coated. Filter Vessel shall be an ASME code vessel and have 150# flanges and a pressure relief set at 125 PSI. Filter vessel shall be manufactured by Facet or Velcon.
- v. Spare Elements – Provide one set of spare elements to be changed after flushing the system.
- vi. 150 Gallon Static Relaxation Vessel – Static relaxation vessel shall be internally epoxy coated. Filter Vessel shall be an ASME code vessel and have 150# flanges, air eliminator and a pressure relief set at 125 PSI. Spring loaded drain valve shall have a stainless-steel piping and a spring load drain valve and piped to a location that easily accessible and high enough to have a white bucket under the opening. Air Eliminator and Pressure relief shall be piped back into the tank. The air eliminator and pressure relief shall be piped back to tank through either stainless-steel tubing or stainless-steel pipe. There shall be isolation valves on the inlet and outlet of the static relaxation vessel for maintenance.
- vii. Off-Load Connection – The off-load connection for the bowser and/or refueler will be a male singlepoint connection with dust cover. The off-load connection will incorporate a 4” butterfly valve, 4” swing check valve and 4” strainer with a 40 mesh stainless steel basket strainer.
- viii. 15 Gallon Product Recovery Tank - Product Recovery Tank shall be self-contained and utilized to separate water and particulate

from the fuel. It shall be piped to allow draining of the water and particulate into a waste bucket. The product recovery system will be piped through sump suction and filtered before returning to tank A spring-loaded ball valve on the return line to prevent water and particulate from accidentally being released into pump suction.

- ix. Grounding reel shall be bonded to the pumping skid. There shall be hose hanger to prevent the hose and nozzle from lying on the concrete.
- x. Positive Displacement Meter with an electronical register (TCS, Liquid Control or approved equal), non-resettable totalizer.
- xi. Flow control and pressure control valve for product regulation (Cla-Val, OCV or approved equal)
- xii. Valves: Valves in the fill and suction piping shall be API 607 fire rated valves. Non-fire rated isolation valves on the pumping skid shall be allowed.
- xiii. Fusible Link Emergency Fire Valve: In Accordance with NFPA 407, the suction line at the tank shall have an in-line fire valve that will close when it senses temperatures in excess of 165 degrees just prior to the loading hose. Location of the valves shall be approved by the engineer.
- xiv. Gauge Panel in the pumping skids shall incorporate both Millipore test ports, pump pressure gauge, pump vacuum gauge and differential pressure gauge with peak hold feature.

G. Tank Monitoring System

- 1. The tanks will be outfitted with the new electronic tank gauging systems that will be capable of transmitting the information to the cloud (Veeder Root TLS 450 or Omntech Tank monitoring system, or approved equal) with new Magneto strictive Probes and hard-wired back to the panel mounted in the Fuel QC Building. The systems will be used to provide inventory levels in the tanks. The Monitoring system will also sump sensors in the transition sumps feeding out to the remote fueling cabinets. The tank gauging system will have a remote (on the exterior of the QC Building) annunciator alarm to inform the fueling personnel of a potential overfill condition.

H. Piping

- 1. Piping shall be Schedule 10, 304 Stainless Steel with 304 Stainless Steel 150 # Flanges.
- 2. Piping shall be air pressure tested at 120 PSI for 30 minutes.
- 3. All piping 2" and greater shall be welded.

4. Piping less than 2" in diameter can be threaded or welded. Minimal threaded pipe shall be utilized in the construction of the fueling system.
 5. Product piping shall include a low point drain to drain product from the piping.
- I. Signs and Markings:
1. Product Piping: All product piping shall be clearly marked as to the type of product and the direction of flow.
 2. Arrows – Product piping shall be labeled with the appropriate flow arrows.
 3. An engraved placard shall be created and installed in the fueling area outlining specific instructions on:
 - a. The proper procedure for off-loading transports, including proper valve selection.
 - b. The proper procedure and valve placement for re-circulation fuel.
 - c. The proper procedure for fueling directly into aircraft.
- J. Decals:
1. The tank shall be appropriately decaled on all sides, according to the product stored (Jet fuel) and marked with all safety decals and shall be in accordance with the Fire Marshall's requirements and the requirements or NFPA.
 2. Tank shall be labeled with the appropriate UL labels, UL number, date of manufacture, model number, capacity and fabricator of the tank
- K. Fire Extinguishers
1. Provide one (1) 20 Class B:C Fire Extinguisher, mounted at a location within 20 feet of each tank. Fire Extinguisher shall be easily accessed in case of a fire and shall be protected from the weather with a cover. Fire extinguisher shall be UL listed.
- L. Installation and Start-up
1. The manufacturer of the fueling system to have a factory trained representative on site to instruct the owner(s) on the operation of the fueling system. The technician shall be on-site for the arrival and off-loading of the first load of fuel into the tank to ensure there are no leaks or issues during this operation. Contractor will Coordinate all required inspections by the airport and the Fire Marshall. Contractor will have a representative on site for 2 days of training and commissioning.
- M. Warranty Period
1. The tank, pumping system and all other components shall have a warranty for a period of one (1) year after start-up. The one (1) year warranty period shall not commence until the system is installed, tested, certified by the State for weights and measures, and accepted by the owner. Tank shall carry a 30-year warranty.

N. Operation and Maintenance Manuals

1. The contractor shall provide one (1) hard copy of the operation and maintenance manual and two (2) copies loaded onto “jump stick/drives”. The Operation and Maintenance Manuals shall have list all equipment and materials used in the manufacturer of the fueling system, including the General Arrangement, Piping Schematic and Electrical Schematic drawings for the new fueling system.

END OF SECTION

SECT 33 52 43.17
AVIATION FUEL SYSTEM CONTROL VALVES

PART 1 – GENERAL

1.01 SCOPE

- A. Control valves specified in this Section include the following:
 - 1. Truck Fill Stand Control Valve
 - 2. Filter Separator Rate of Flow Control and Water Slug Valve
 - 3. Tank Overfill Prevention Float Operated Control Valve

1.02 REFERENCES

- A. American National Standard Institute - (ANSI)
- B. National Electrical Manufacturers Association - (NEMA)

1.03 RELATED SECTIONS

- A. Divisions 00 and 01 apply to all Sections of the Project Manual
- B. See also Aviation Fuel System General Provisions, 33 52 43.11
- C. See also Aviation Fuel System Controls, 33 52 43.42
- D. For electrical elements, see also Division 26

1.04 QUALITY ASSURANCE

- A. Contractor shall inspect and clean the valve upon arrival and ensure that the valve stays sealed from contamination of any sort until prepared for immediate installation.
- B. Contractor shall hire Cla-Val (or approved equal mfg) to adjust and certify the operation of the valves.
- C. Contractor shall not flush through the valve but shall spool through instead.

1.05 GENERAL

- A. Control valves shall be as manufactured by Cla-Val (or approved equal mfg).
- B. Control valves shall be single-seated globe type, diaphragm actuated, hydraulically operated valves. Valves shall consist of 3 major components: the valve body, valve cover, and diaphragm assembly. The diaphragm assembly shall be the only moving part. In the event of diaphragm failure, valve shall fail closed against flow, unless otherwise indicated. The main valve shall be drip-tight when closed. Each valve shall have an external indicator to show the position of the valve disc at all times. Control valves shall

be shipped from the factory as a complete assembly with all pilot controls and pilot auxiliary piping properly installed on the main valve. Materials which come in contact with the fuel shall be resistant to the effects of and not harmful to aircraft engine fuel and shall be stainless steel, or electroless nickel plated ductile iron unless noted otherwise. High level shut-off valve bodies shall be electroless nickel plated ductile iron. Materials for control valves, and items to be mounted on the valves shall be as follows:

C. Bodies, Bonnets, and Covers

1. Shall be constructed of one of the following materials:
 - a. Ductile Iron conforming to ASTM A536, internally plated with chromium, nickel or internally electroless nickel plated.
 - b. Cast stainless steel 300 series valve trim.
 - c. Bodies shall have flanged inlet and outlet connections. Valve shall have a screwed bottom drain plug.
2. Valve Seats
 - a. Valve seats shall be stainless steel in accordance with ASTM A743/A743M.
 - b. It shall be possible to remove the valve seat while the valve is connected in the line.
 - c. Valve seat and upper stem bearing shall be removable and screwed in the body and/or cover.
 - d. The lower stem bearing must be concentrically contained in the valve seat and shall be exposed to flow on all sides.
 - e. The diameter of the valve seat shall be the same size as the inlet and/or outlet flanges of the main valve.
3. Valve Discs
 - a. Valve discs shall contain a resilient fluor elastomer (FKM), commonly referred to as Viton disc conforming to SAE AMS 3216 for Avgas and Buna-n Disc for Jet-A having a rectangular cross section, contained on 3.5 sides by a disc retainer and a disc guide, forming a drip tight seal against the seat.
 - b. The disc shall be usable on either side.
 - c. The disc guide shall be the contoured type capable of holding disc firmly in place during high differential pressure conditions that may develop across the seating surface.
 - d. The disc retainer shall be capable of withstanding rapid closing shocks.

4. Diaphragm Assembly

- a. Diaphragm Assembly shall form a sealed chamber in the upper portion of the valve, separating the operating fluid from the line pressure. The diaphragm assembly shall contain a valve stem which is fully guided at both ends by a bearing in the valve cover and an integral bearing in the valve seat.
- b. Valve body and cover shall be sealed by the diaphragm. Valve stem shall be stainless steel.
- c. The bearing material shall be compatible with the fuel specified and shall not contain zinc coated metals, brass, bronze, or other copper bearing alloys.
- d. The diaphragm shall be of a non-wicking material or design, with a minimum of 2 layers of nylon fabric bonded with a minimum of 3 layers of synthetic rubber (valves 2-1/2 inches and smaller one layer of nylon fabric). The edge area of the center hole for the valve stem shall be sealed by vulcanization. Materials to be resistant to aromatics of up to 50 percent in accordance with ASTM D2000 (SAE J200). The diaphragm must have a MULLINS-burst rating according to ASTM D751 of a minimum of 600 psi per layer of nylon fabric.
- e. All diaphragm sizes must be cycle tested to a minimum of 100,000 cycles, by alternately applying pressure under the diaphragm (main valve pressure) and above the diaphragm (cover chamber pressure). That test shall be certified by the manufacturer. The diaphragm shall not be used as a seating surface. The diaphragm must be fully supported by the body and cover in either the open or closed position.

5. Bolts, Screws and Nuts

- a. For Ductile Iron, and Cast Steel Body Valves.
- b. Bolts and Screws, cadmium plated steel in accordance with SAE J429, Grade 5.
- c. Nuts, Teflon coated steel, Grade 2 H.

6. For Stainless Steel Body Valves.

- a. Bolts, Screws and Nuts, ASTM A320/A320M, Grade B8M C.1.1.

7. Pilot Control System and Auxiliary Piping

- a. Pilot Control System and auxiliary piping shall be stainless steel, seamless, fully annealed tubing conforming to ASTM A269/A269M, Grade TP316, Rockwell hardness B80 or less. Wall thickness for 1/2-inch tubing to be

0.049-inch. Threaded connections shall be used in pilot system piping and shall be O-ring type with FKM O-rings. Tubing connections shall not be welded.

8. Pilot Valves

- a. Pilot valves shall have stainless steel bodies conforming to ASTM A743/A743M with stainless steel internal working parts. Disc and diaphragm assemblies shall be as specified herein before. The setting of adjustable type pressure operated pilot valves shall be easily adjusted by means of a single adjusting screw. The adjusting screw shall be protected by a threaded cap drilled to accommodate a lead-seal wire and a lock nut shall be provided on the adjusting screw to lock it in position at the desired setting. The lead seal wire shall be installed after final acceptance of the system. Spare wire seals and the "embossing" tool will be turned over to the Contracting Officer for the LFM shop.

9. Serviceability of Main Valve Internal Part

- a. Main valve movable parts including strainers, valve seat, stem bearings, and control system shall be replaceable without removing the main valve from the line. All nonmetallic parts shall be replaceable.

D. Total Lengths

1. The total valve length does not include the orifice plate flange (when used). If the control valve being supplied has the orifice plate built into its flange, the spacer provided shall bring the valve face-to-face dimension equal to those listed below plus 0.0875 inch. The lengths of the valves shall be equal for the following materials: cast stainless steel, and cast steel.

PART 2 - PRODUCTS

2.01 INDIVIDUAL CONTROL VALVE OPERATIONAL REQUIREMENTS

Operation, performance, and specific features of the individual control valves shall be as specified herein.

A. Truck Fill Stand Control Valve

1. Combined pressure reducing and solenoid-controlled fuel shut-off control valve shall be used on the refueler loading rack to control the flow rate to 300 gpm and 200 gpm for the Jet-A and AvGas systems respectively and also provide means of deadman control via the Scully system.
2. Combination Pressure Reducing and Solenoid Shutoff Valve shall be as manufactured by Cla-Val (or approved equal).
3. Valve shall be hydraulically operated, pilot and solenoid controlled, diaphragm actuated control valve. Valve body shall be Cast Steel with flanged ends conforming to ANSI B16.5 class 150#, suitable for a maximum pressure of 275 psig.

4. Valve shall have the following components (or approved equal) as required for proper system functionality:
 - a. 100-34 Hytrol (Reverse Flow)
 - b. CRD Pressure Reducing Control
 - c. X47A Ejector
 - d. CS3XM Solenoid Control
 - e. 100-01 Hytrol (Reverse Flow)
 - f. X101 Valve Position Indicator
 - g. X46A Flow Clean Strainer
 - h. CK2 Cock (Isolation Valve)
 - i. CV Flow Control (Closing)
 - j. Check Feature with Cock
 - k. Quick Connect Assembly
 - l. CV Flow Control (Opening)
5. Valve materials
 - a. Body and cover shall be cast Steel ASTM A216-WCB.
 - b. Valve trim shall be 303 stainless steel.
 - c. Elastomers shall be Buna-N for Jet-A and Viton for Avgas.
6. Solenoid Control Feature
 - a. Solenoid control is a direct acting, 3-way solenoid control that changes position when the coil is de-energized for energized. This applies or relieves pressure in the cover chamber of the auxiliary Hytrol, providing the operation as follows.
 - 1) The solenoid when de-energized keeps the Hytrol closed which keeps the main valve normally.
 - 2) When energized, the solenoid will open the Hytrol position which will cause the main valve to open.
 - b. The solenoid control shall have a manual actuator which will be used to operate the solenoid without electrical power.

- c. The deadman shall be electronically connected through the Scully unit and electrically connected from the Scully unit to the control valve solenoid. The main control valve shall open via solenoid control when the deadman control lever is pressed and shall close the valve when the lever is released.
 - d. Solenoids for operation of the pilot valves shall be housed in an explosion-proof case suitable for Class I, Division 1, Group D with maximum temperature rating of 419 degrees F, hazardous locations as defined in NFPA 70. Solenoids shall operate on 120 volts, 60 Hz, single phase, alternating current.
- 7. Pressure Reducing Feature
 - a. The pressure reducing control shall be a normally open control that senses main valve outlet pressure changes. An increase in outlet pressure shall close control and a decrease in outlet pressure shall open control causing the main valve to modulate (opens and closes) maintaining a constant outlet pressure.
- 8. Valve shall limit the surge pressure on the bottom loader of a tank truck to a maximum of 85 psig when filling at 200 GPM with a tank truck valve closure of 0.5 second.
- 9. Opening Speed Control
 - a. Valve shall control the opening speed of the main valve. The control shall be adjustable with a range of 2 to 30 seconds. Factory set at 10 seconds.
- 10. Strainer
 - a. A 40-mesh stainless steel wire, self-cleaning strainer shall be provided in the pilot valve supply piping.

B. Filter Separator Rate of Flow Control and Water Slug Valve

- 1. Filter Separator Control Valve shall limit flow to 300 gpm for Jet-A & SAF, and 200 gpm for Avgas. Controlling to be by orifice plate. Rate of flow to be manually adjustable and utilize a downstream orifice plate holder. Valve shall modulate to regulate maximum flow, but shall also hold its setpoint if flow is restricted. Valve shall include a check feature to prevent backflow into the vessel. The valve must stay in control and not go wide-open.
- 2. Water Slug Shut-Off
 - a. Valve shall close rapidly when water is sensed at the filter separator sump high level as sensed by the vessel's stainless-steel Flanged Float Control mfg by Cla-Val or approved equal. Manual testing of operation shall be possible.
- 3. Rate of Flow and Water Slug Valve shall be as manufactured by Cla-Val (or approved equal mfg).

4. Valve shall be hydraulically operated, pilot controlled, diaphragm actuated control valve that limits flow to a preselected maximum rate, regardless of changing line pressure. The pilot control responds to the differential pressure produced across an orifice plate installed downstream of the valve.
5. Valve body shall be Cast Steel with flanged ends conforming to ANSI B16.5 class 150#, suitable for a maximum pressure of 275 psig.
6. Valve shall have the following components (or approved equal) as required for proper system functionality:
 - a. 100-34 Hytrol
 - b. X47A Ejector
 - c. CDHS18 Pressure Differential Control
 - d. X101 Valve Position Indicator
 - e. X52A Orifice Plate Assembly
 - f. 100-01 Hytrol
 - g. CDB7 Differential Control
 - h. X46A Flow Clean Strainer
 - i. CV Flow Control (Closing)
 - j. Check Feature (81-01)
 - k. CV Flow Control (Opening)
7. Valve materials
 - a. Body and cover shall be cast Steel ASTM A216-WCB.
 - b. Valve trim shall be 303 stainless steel.
 - c. Elastomers shall be Buna-N.
8. Quick Closure check valve tubing sized at $\frac{3}{4}$ inch diameter.
9. Opening Speed Control
 - a. Valve shall control the opening speed of the main valve. The control shall be adjustable with a range of 2 to 30 seconds. Factory set at 10 seconds.
10. Thermal Relief

- a. Valve to open for pressure equalization and return flow when downstream pressure exceeds upstream pressure.

11. Strainer

- a. A 40-mesh stainless steel wire, self-cleaning strainer shall be provided in the pilot valve supply piping.

C. Tank Overfill Prevention Float Operated Control Valve

1. The tank overfill prevention valve shall be a float operated valve, non-modulating to control the liquid level in the tanks. The valve shall open fully when the liquid level reaches a pre-set low point and close drip-tight when the level reaches a preset high point based on the mechanical float settings.
2. Valve shall be a Mechanical Float Valve manufactured by Cla-Val (or approved equal mfg).
3. Valve shall be hydraulically operated, pilot controlled, diaphragm actuated control valve with a float mechanism remotely connected to the main valve as shown on the Contract Drawings. The float shall position the pilot control to close the main valve when the float contacts the upper stop level. The high and low liquid levels shall be adjusted by positioning the stop collars on the float rod. The float mechanism shall be Cla-Val (or approved equal).
4. Valve body shall be Cast Steel with flanged ends conforming to ANSI B16.5 class 150#, suitable for a maximum pressure of 275 psig.
5. Valve shall have the following components:
 - a. X46A Flow Clean Strainer
 - b. CK 2 Cock (Isolation Valve)
 - c. CV Flow Control (Closing)
 - d. CV Speed Control (Opening)
 - e. X43 Y-Strainer
6. Valve materials
 - a. Body and cover shall be cast Steel ASTM A216-WCB.
 - b. Valve trim shall be 303 stainless steel.
 - c. Elastomers shall be Buna-N.

PART 3 - EXECUTION

3.01 MANUFACTURER'S SERVICE ENGINEER

- A. Furnish the services of an experienced service engineer for a minimum of two days on the jobsite to verify proper installation and assist in start-up, check-out, and calibration for each tank.
- B. Allow for two separate trips to the jobsite by Cla-Val, (or approved equal mfg). If the technician arrives and finds that the installation is incorrect, and is forced to schedule another trip, all costs are the responsibility of Contractor.

END OF SECTION