

1 PURPOSE

This document sets forth the Statement of Work for the Biodiesel Fuel Tank Infrastructure Design and Installation Project (Project) for UT-Battelle, LLC (Company), as the Prime Maintenance & Operations contractor for the United States Department of Energy's Oak Ridge National Laboratory. As part of the Biodiesel Poisoning Research funded by the U.S. Department of Energy's (DOE) Vehicle Technology Office, Company needs to procure the design and installation of a Biodiesel Fuel Tank System at Company's Hardin Valley Campus (HVC) at 2370 Cherahala Blvd., Knoxville, Tennessee. The Biodiesel Poisoning Research is focused on investigating the impact of biodiesel characteristics on emissions control functionality.

2 Scope

Company requires the installation of a 5000-gallon double-walled, aboveground fuel tank outside of building 2370-HVC (Figures 1-2) that is compatible with 100% Biodiesel and can maintain fluid temperature above 50 °F (10 °C) to prevent clouding (metal tank preferred). Seller will design a system capable of maintaining the biodiesel at the required temperatures while continually circulating the fuel between a generator (provided by Company) that is ~100 feet away and back to 5000-gallon tank (Figure 3). There is an existing covered trench in the roadway to allow new fuel lines to transverse this 100 feet. Tees in the fuel line will be needed allow fuel to flow to and from the genset, and shutoff valves will be needed between the recirculating fuel line and the genset. Additionally, shutoff valves will need to be located at the exit of the 5000-gallon tank. Company requests, but does NOT require, design considerations for fuel in 5000-gallon tank to be agitated to maintain mixing of biodiesel-based additive that Company will provide. This would be done in addition to recirculation and can be accomplished with an internal agitator/mixer, or another solution from Seller. Company will provide power for all pumps and heating components inside the fuel cage.

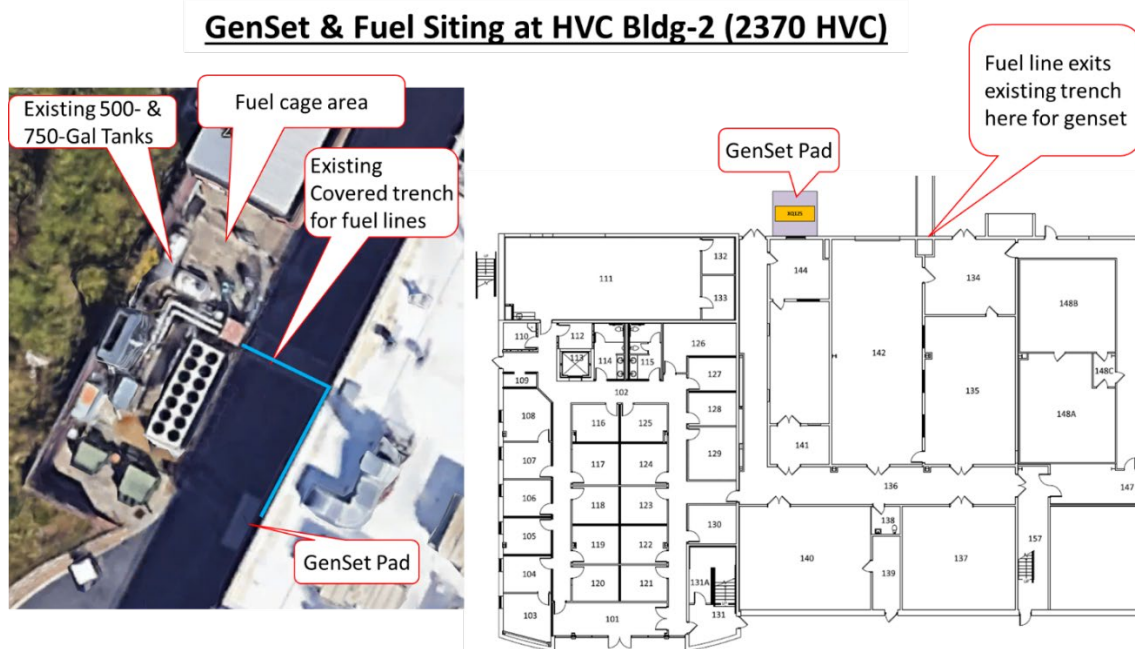


Figure 1. Location of fuel infrastructure installation, which will be in the fuel cage.

Outside Fuel Cage behind 2370HVC



Figure 2. Fuel cage pictures where the 5000 (5k) gallon tank installation will occur.

Outside Fuel Cage behind 2370HVC

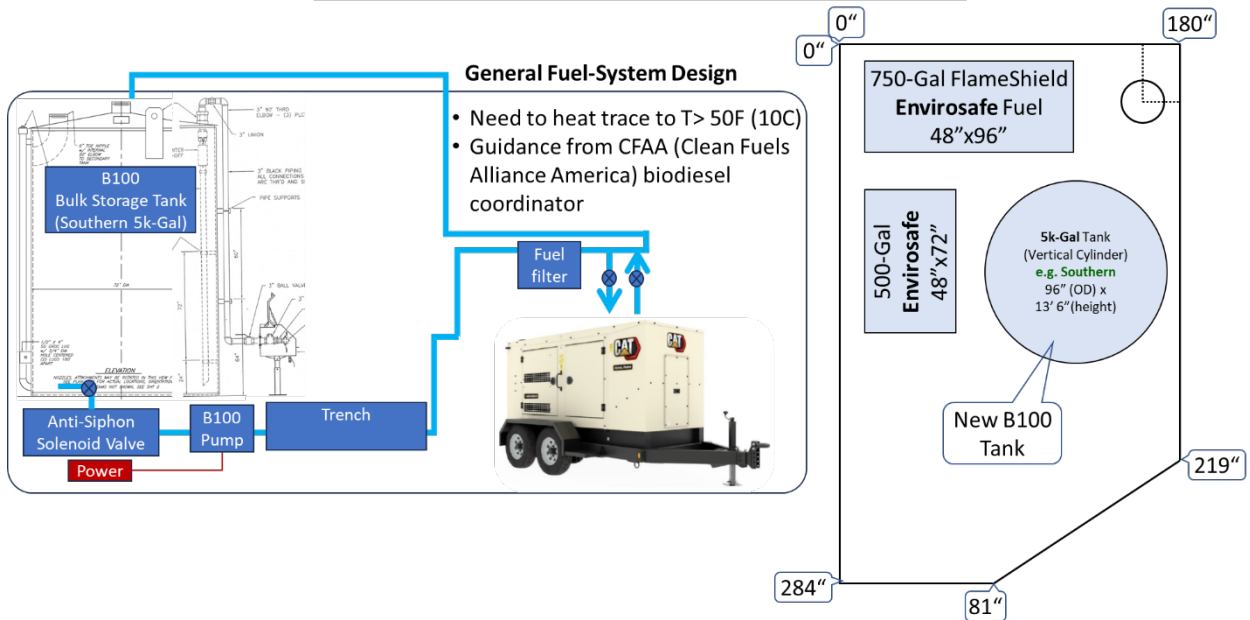


Figure 3. Schematic of fuel flow needs.

3 APPLICABLE STANDARDS, CODES, REGULATIONS, & DESIGN GUIDES

All equipment and installations shall be in accordance with the local jurisdictional requirements, applicable codes and standards, and any additional requirements listed below. The seller is responsible for any special permits required.

Seller will meet or exceed the following applicable standards:

- Double walled 5000-gallon tank for secondary containment with UL 142/UL 142A specification
- Biodiesel compatibility of all parts
- 40 CFR 112 - Oil Pollution Prevention regulation
- NFPA 30 is applicable.
 - This includes pressure/leak checking upon installation

4 DESIGN REQUIREMENTS

A design kick-off meeting will be held at ORNL following contract award to review Preliminary Design Documents, including concept design proposed by Seller.

4.1 General

The fuel infrastructure has the following requirements:

1. All components compatible with 100% Biodiesel
2. All electrical systems should be NRTL listed
3. Entire fueling system must be able to heat fuel to 50 °F (10 °C)
4. A vertical double walled 5000-gallon heated and insulated tank with diameter <110" (metal design preferred)
 - a. U.L.-142 Spec
 - b. NRTL listed electrical heating
5. Heated and insulated fuel lines (~100 ft) to enable transfer across a road via an existing road plate from 5000-gallon tank to genset
 - a. Will need to attach to Company-provided raceway that is attached to the wall of building and goes over the roll up door
6. Pump to allow transfer of fuel from 5000-gallon tank to genset
 - a. NRTL listed
 - b. 10 - 20 GPM
7. Appropriate fuel filter that is serviceable
8. Heated and insulated fuel lines (~100 ft) to enable recirculation from genset back to 5000-gallon tank
 - a. NRTL listed

9. Heated and insulated ~6 ft transfer line from recirculation lines to genset with valve
 - a. NRTL listed
10. Heated and insulated ~6 ft return line for fuel from the genset to the recirculation lines with valve
 - a. NRTL listed
11. Pressure gauge in heated lines
12. Volume level indicator on fuel tank
13. OPTIONAL, Agitator in tank to maintain mixing or other proposed solution
 - a. NRTL listed

4.2 Installation

Upon installation Seller will demonstrate leak tightness of system.

5 MATERIAL REQUIREMENTS

5.1 General

- 5.1.1 All materials must be identified on the Seller's drawings by specification number, by generic name, and by grade or type. Company approval of the drawings and documents wherein materials are so identified constitutes Company approval of the materials.
- 5.1.2 Portions of the installation that are not corrosion resistant shall be painted with an epoxy coating system. The Seller shall provide a Paint Specification for Company approval.

6 DESIGN DOCUMENTATION

A complete set of Design Documentation describing key physical aspects of the installation shall be submitted for approval. A review of the detailed design data shall be scheduled. The review will take place either at the Company's facility or via teleconference.

6.1 Drawings

- 6.1.1 Drawings to include as a minimum the following information:
 - Parts list of all components
 - Basic dimensions for all major elements
 - Weight of major components
- 6.1.2 Drawings shall be dimensioned in inches and formatted on "B" (11 inch x 17 inch) or "D" size (24 inch x 36 inch).
- 6.1.3 The Seller shall provide As-Built Drawings documenting all changes that occurred after the original design.

- 6.1.4 Seller to notify company of electrical requirements for operation at time of proposal including length needed to power input, which will be available in the fuel cage.

7 ACCEPTANCE TESTING

7.1 Factory Acceptance Testing

- 7.1.1 The Seller shall notify Company prior to the start of installation and inspections
- 7.1.2 Company shall have the right to witness final functional testing and inspection of the equipment.
- 7.1.3 Seller shall supply Final Inspection and Testing Reports to ensure full compliance of the equipment with the requirements of this specification prior to shipment.

7.2 Site Acceptance Testing

Final acceptance of the equipment shall be based on tests and inspection results designated in the Test and Inspection Plan.

8 QUALITY ASSURANCE

The Seller shall perform all work in accordance with this specification and a Company-approved Quality Assurance Program or Quality Control System.

8.1 Nonconforming Items

The Seller shall establish a system for controlling nonconforming items, including procedures for identification, segregation and disposition. Repair and rework of nonconforming items, if required by Company for acceptance of the equipment, shall be conducted in accordance with documented procedures approved by Company. All nonconformances shall be reported on Form ORNL-311 (See Appendix).

8.2 Deviation Requests

Requests for deviations from the technical requirements of this specification shall be submitted to the Company on Deviation Request Form ORNL-313 (See Appendix).

9 PREPARATION FOR DELIVERY

Each component shall be stored, packed, and protected according to Company-approved plans.

9.1 Packing, Shipping and Handling

The Seller shall submit a Packing, Shipping and Handling Plan for Company approval.

9.2 Storage

The Seller shall provide Storage Requirements to be used by Company for storage of the tank following receipt from the Seller. Company shall approve the Storage Requirements.

9.3 Equipment Identification

Each major component shall be tagged indicating the Seller's name and address, the Seller's equipment identification information, date of manufacture, and Company information as stated in the following:

Todd J. Toops
Oak Ridge National Laboratory
Building 2370-HVC
Purchase Order Number
Knoxville, TN 37932

10 DOCUMENT SUBMISSION SCHEDULE

Table 1 Document Submission Schedule

Item Description	Seller's Submittal Date	No. of Copies*	Company Approval Required
Quality Assurance Program Or Quality Control System Documents	With Proposal	1	Yes
Concept Drawings	30 days after Award	1	Yes
Fabrication Drawings, Design Calculations and associated Documents	60 days after Award	1	Yes
Test and Inspection Plan	30 days after final design approval	1	Yes
Storage Requirements	30 days after final design approval	1	Yes
Packing, Shipping and Handling Plan	60 days after final design approval	1	Yes
As-built Drawings	after installation	1	No
Final Inspection and Test Reports	after installation	1	No
Operating and Maintenance Manual	after installation	1	No

*Documentation shall be submitted in .PDF format when possible. Multiple copies are not needed if submitted electronically.

11 AUTHORIZATION FOR TECHNICAL DECISIONS

11.1 The following ORNL personnel are the persons authorized to make technical decisions concerning this purchase:

Scott Brackett
Oak Ridge National Laboratory
Building 8600, Room H-G16
P.O. Box 2008
Oak Ridge, TN 37831
Phone: 865-241-7294
brackettsw@ornl.gov

Todd J. Toops
Oak Ridge National Laboratory
Mail Stop 6472
2360 Cherahala Blvd.,
Knoxville, TN 37932
Office: 865-341-1207
Mobile: 865-382-1684
toopstj@ornl.gov