Bid Specifications and General Description
OPW SiteSentinel® Integra 500™ Automatic Tank Monitoring System
Part 1. General Overview

1.1 Summary
This document describes the minimum required technical and compliance specifications for prospective bidders for an integrated tank-monitoring system that provides complete tank monitoring, inventory management and environmental-compliance testing through the incorporation of the latest computer technology, which allows users to view data in real-time remotely from anywhere in the world.

1.2 Approval, Certification and Accreditation
Probes and Sensors: Level 1 Magnetostrictive tank probes and sensors must be approved for use in the following Hazardous Location Classifications:

EEX ia IIA T4
Class 1, Division 1, Group D

The manufacturer shall maintain an ISO-9001 certification, ensuring quality management of design manufacturing.

The manufacturer shall calibrate rigid probes in a laboratory that maintains an ISO/IEC-17025 accreditation.

The tank-monitoring system has attained the following Certifications and Listings:

- Electronic Testing Labs (ETL), per Underwriters Laboratories UL 1238
- ATEX approval for use in hazardous atmospheres
- CE certification
- IEC certification

1.3 Testing
The automated tank-gauge system shall be tested by an independent third-party in accordance with test procedures of the applicable national and/or local standards. Tests performed will include, but will not be limited to, applicable sections, standards and requirements of the following agencies:

- U.S. Environmental Protection Agency (EPA)
- National Bureau of Standards (NBS)
- National Electrical Code (NEC)
- Underwriters Laboratories Inc. (UL)
- Federal Communications Commission (FCC)
- Underwriters Laboratories of Canada (ULC)
- Electrical Equipment Certification Service (EECS)
- European Conformity Directives (CE Marketing)
- International Standards Organization (ISO-9001)
- ATEX
Part 2. System Description

The following technical specifications provide the specific parameters, requirements and capabilities to which the tank-gauge and supporting system components shall comply.

The tank-monitoring system shall consist of a Controller that allows all digital devices to be detected and configured automatically through the use of the touch-screen interface on the Controller.

The tank-monitoring system shall offer optional volumetric line leak detector (VLLD), statistical leak detection (SLD) and automatic calibration and reconciliation (ACR) capabilities that can be connected to the system’s internal I.S. module.

The tank-monitoring system shall also offer an optional external USB thermal printer with shared-network printer interface.

2.1 Technical Specifications

A. Dimensions

The Controller shall have a width of 14.5” (37 cm), a height of 12” (30 cm) and a depth of 4” (10 cm).

B. Power Requirements

The tank-monitoring system’s power requirements shall be 96-264 VAC, 50/60 Hz.

C. Operating Temperature

The tank-monitoring system shall operate at a temperature range of 32°F to 122°F (0°C to 50°C).

D. Graphics Display

The tank-monitoring system shall have a 15” (38.1 cm) graphic touch-screen display that uses international user-friendly icons (MIL-STD-1472).

The touch-screen graphics display shall provide one-touch access to real-time inventory data, delivery status, alarm conditions and leak-detection information.

E. PC Requirements

The tank-monitoring system shall have the following minimum PC requirements:

- An Internet browser capable of rendering Flash 7.0 or higher

The tank-monitoring system shall offer two (2) methods of logging into the Internet:

- Dynamic Host Configuration Protocol (DHCP)
- Static IP

F. Software

The tank-monitoring system shall offer software that allows the configuration of an entire fueling site from a PC. This software shall allow:

- Statistical Leak Detection (SLD)
- Automatic Leak Detection (ALD)
- Certified automatic or on-demand Line Leak detection (LLD)
- Real-time, accurate inventory information
- Gross and net-corrected tank volume, product level, water level and temperature for individual tanks
- Configurability to meet localized date/time formats and metric/English units
- Downloadable and Flash-upgradeable capabilities
- Communication with industry-standard, third-party POS protocols
- Programmable correction factors for restrapping tanks; maximum number of correction points shall be 2,000
- An Address Book of contacts that the unit can send text messages, fax and/or emails on any alarms or events
• The ability to schedule reports to automatically run at specific times
• Automatic Calibration and Reconciliation (ACR)
• Non-volatile memory for event storage up to 10 years
• Compliance calendar accessible with a single touch
• Capability to switch language and measurement settings according to user login

G. Additional Components
The Controller shall have the following module capacity:
• One (1) output and two (2) input internal relay connection
• Up to 16 relays maximum, with four (4) output relays per module using optional OM4
• Four (4) Line Interface Modules
• Seven (7) Probe/Sensor Interface Modules (optional)
• Nine (9) communication ports:
  o One (1) Ethernet
  o One (1) RS-485
  o Two (2) RS-232
  o Two (2) USB
  o Two (2) internal USB
  o One (1) modem

The Controller shall have the ability to connect to an external thermal printer via external USB or network to an optional printer.

H. Leak Test Certification
The tank-monitoring system shall be certified using the EPA Static Leak and Continuous Test, using ATGS and CITLDS methods, to the following parameters:
• 0.2 gph (0.76 L/hr) Statistical Leak test at 397,000 gallons (1,502,809 liters)/month throughput for single-tank, two-tank or three-tank manifold installations with a combined maximum capacity of 30,000 gallons (113,562 liters)
• 0.2 gph (0.76 L/hr) Static Leak Test
• 0.1 gph (0.38 L/hr) Static Leak Test
• 3.0 gph (11.4 L/hr) Catastrophic Line Leak Test
• 0.2 gph (0.76 L/hr) Precision Line Leak Test
• 0.1 gph (0.38 L/hr) Precision Line Leak Test

2.2 Security
The Controller shall have configurable Security Rights allowing administrators the right to view and modify data based upon user access rights (administrator, technician, etc.).

The Controller shall have multiple password levels for data access.
Part 3. System Capabilities
The following provides the capabilities of which the tank-monitoring system shall possess.

3.1 Products
The Controller shall measure API-listed products, including but not limited to, motor fuels, LPG, alcohol and alcohol blends.

3.2 Units
The Controller shall allow for the selection of U.S., Imperial, or Metric measurement units.

3.3 Monitoring
The Controller shall monitor up to 24 magnetostrictive probes and 960 sensors in any combination.

3.4 Installation
The tank-monitoring system’s installation must be in accordance with the following:

- National Electric Code (NFPA No. 70)
- Automotive and Marine Service Station Code (NFPA No. 30A)

The Controller shall be mounted on a wall in a secure indoor location where it will be protected against extreme temperature and humidity conditions, or placed on any flat indoor surface.

Installation shall be through the use of three (3) mounting holes, and no holes shall be drilled in the Controller cabinet.

3.5 Precision Leak Test
A precision leak test shall be performed on each tank before the installation of the tank-monitoring system. This test shall ensure that leak data generated by the tank-monitoring system is accurate and reliable.

3.6 POS Connectivity
The Controller shall have the ability to interface with point-of-sale (POS) devices according to industry-standard protocols.

3.7 Alarm Thresholds:
The Controller shall feature sensors that are serialized and no compliance or alarm data shall be lost if the sensor needs to be replaced. The following shall be the specific Alarm Thresholds:

- Hydrocarbon liquid sensor with water indicator
  - Hydrocarbon
  - Water
  - Disconnect/Communication Loss
- Discriminating STP sump sensor
  - Detects hydrocarbons
  - Detects water
  - Disconnect/Communication Loss
- Single-level sump sensor
  - Alarm Conditions
  - Disconnect/Communication Loss
- Hydrocarbon Vapor Sensor
  - Alarm Conditions
  - Disconnect/Communication Loss
- Liquid-only float sensor
  - Alarm Conditions
  - Disconnect/Communication Loss
• Discriminating interstitial sensor
  • Hydrocarbon
  • Water
  • Disconnect/Communication Loss

• Interstitial hydrocarbon liquid sensor with water indicator
  • Hydrocarbon
  • Water
  • Disconnect/Communication Loss

• Interstitial level sensor-float switch
  • Alarm Condition
  • Disconnect/Communication Loss

• Discriminating dispenser pan sensor
  • Detects hydrocarbons
  • Detects water
  • Disconnect/Communication Loss

• Dual-float dispenser sump sensor
  • High-Level
  • Low-Level
  • Disconnect/Communication Loss

• Dual-float STP sump sensor
  • Produces liquid alarm when bottom float is activated
  • Produces high-liquid alarm when both floats are activated
  • Disconnect/Communication Loss

• Dual-float brine sensor
  • High-Level
  • Low-Level
  • Disconnect/Communication Loss

• USTs
  • High-High Product
  • High-Product
  • Low-Product
  • Low-Low Product
  • High-High Water
  • High-Water
  • High-Temperature
  • Low-Temperature
  • Theft
  • Tanks-Down

• Manifold Tanks
  • High-High Product
  • High-Product
  • Low-Product
  • Low-Low Product

• Probe
  • Probe Down
  • Density Probe
  • AST Long

• System
  • Line Leak .01
  • Line Leak .02
  • Line Leak .03
  • Communication
  • Leak
  • Reconciliation
  • Subsystem
  • SLD Leak test
• SLD Manifolded Leak Test
• Manifold Broken
• Leak Test Warning

3.8 Alarm Escalation
The Controller shall allow for the definition of contacts (SMS, Fax, Email) to notify in the event that an alarm goes unacknowledged or is not ended.

The Controller shall allow for initial alarm event then up to three (3) designated alarm escalations above initial alarm.

3.9 Reconciliation
The tank-gauge system shall also include a Reconciliation Interface Module for the purpose of reconciling product.

The system shall include a Reconciliation Interface Module, which performs automatic calibration and reconciliation. The Reconciliation Interface Module shall allow for users to set up the dispensers in the system and link them to their corresponding tanks for the purpose of reconciling product. The Reconciliation Interface Module shall monitor from one (1) to 32 dispensers via the dispensers’ communication links using existing PV4 protocol. The reconciliation device shall accumulate fueling transactions for retrieval by the Controller.

• Hose Mapping
  o Dispenser Address
  o Edit Dispenser
  o Hose Maps
  o Site Diagnostics
  o Site Schematics

• Thresholds
  o Test Vend
  o Loss Warning
  o Loss Alarm
  o Unaccounted
  o Daily Unaccounted
  o Unexpected Sale

The Reconciliation Interface Module shall include the ability to perform the following reports and the following alarms:

• Reports
  o Unaccounted Losses
  o Hourly Losses
  o Daily Report
  o Deliveries (stable or unstable)

• Alarms:
  o Losses Warning
  o Losses Alarms
  o Console Fault
Part 4. System Components

4.1 Probes

The probe shall have five-point temperature-sensing elements that provide accurate temperature compensation for product-volume expansion and contraction for accurate inventory management and in-tank leak detection.

The probes shall be installed without requiring calibration, special filtering or alignment devices.

The calibration of the probes shall take place in a laboratory that is accredited by A2LA (American Association of Laboratory Accreditations) to the requirements of ISO/IEC 17025.

The Probe/Sensor Interface Module shall include a 12V barrier for use with Magnetostrictive Probes.

The Probe/Sensor Interface Module shall include a 24V barrier for use with Flex Probes.

Probes for gasoline and diesel (LPG probe optional) shall be installed with a modified adaptor collar and riser cap. Up to four (4) types of floats can be used with the probes:

- Stainless steel (three different density configurations)
- 2” Diesel
- 2” Gasoline
- AEF Sensor

A. Rigid Magnetostrictive Probes

The Level 1 Magnetostrictive Probes shall be evaluated per EPA 40 CFR, Part 290, have Class I, Division 1, Group D classification, and have IECEx UL 11.0012X and DEMKO 11 ATEX 1012670X certifications.

The rigid probe shall have the following capabilities:

- Monitor density (with a density sensor) without the need of modifications or additional wiring
- Be wired together in a sequence, or “multi-dropped,” during installation allowing four (4) probes per I.S. channel
- Measure product level change to a resolution of 0.00005” (0.0127 mm)
- Measure product temperature change to a resolution of 0.018° F (0.01° C)
- Measure product accuracy to 0.09ºF (0.5ºC)
- Measure water level changes to a resolution of .04” (1.02 mm)
- Linearity over the entire probe length of ± 0.04” (±1 mm)
- Be able to operate in temperatures ranging from -40ºF to 158ºF (-40ºC to 70ºC)

The rigid probe shall be unsusceptible to programming errors, containing an EPROM database of the following specific setup data to be downloaded to the Controller during start-up:

- Probe serial number
- Probe length
- Probe velocity
- RTD locations

The rigid probe shall be constructed of welded stainless steel construction.

The Controller shall be capable of handling 20’ (6.1 m) rigid, inventory-only probe.

The maximum wiring distance between the probe and the intelligent Probe/Sensor Interface Module shall be 1,000 feet (305 m).

Tank Access for Level 1 Magnetostrictive Probes shall be a minimum of 2” (5.1 cm).

The probe shall have five-point temperature-sensing elements that provide accurate temperature compensation for product-volume expansion and contraction for accurate inventory management and in-tank leak detection.
B. **Flex Magnetostrictive Probes**

The flex probe shall utilize magnetostrictive technology constructed of Kynar® for aboveground tanks up to 70 ft (15.2 m) in height.

The Controller shall allow for parameter setup for flex probe with the capability to connect one (1) flex probe per I.S. channel.

The flex probe shall be used in a variety of liquids, including gasoline, diesel and water.

The input voltage for the flex probe shall be a range of 23-28 VDC.

The flex probe shall have the following capabilities:

- Temperature measurement resolution of the flex probes shall be +/- 0.01°F (0.02°C).
- Temperature sensing range of the flex probes shall be a range of -40°F to +150°F (-40°C to +65°C).
- Operating temperature range of the flex probes shall be a range of -40°F to +160°F (-40°C to +71°C).
- Temperature accuracy of the flex probe shall be +/- 2°F (1.11°C), absolute.

4.2 **Sensors**

The Controller shall have the capability to automatically detect sensor type, part number and sensor serial number.

The sensors shall have the capability to be wired together in parallel, or “multi-dropped,” during install, allowing sixteen (16) sensors per I.S. channel.

The sensors shall be constructed in such a way that the Controller and Probe/Sensor Interface Module shall automatically and digitally detect sensor connection, sensor type and sensor status.

A. **Interstitial Level Sensor – Float Switch**

- Shall detect the presence of liquid in the interstitial area of a double-walled tank
- Shall monitor for the presence of liquid in sumps/dispenser pans
- Shall be constructed of chemical-resistant, non-metal material
- In the event of a break or short in the field wiring, the Controller shall activate an alarm

B. **Single-Level Sump Sensor**

- Shall monitor for liquids in sumps, dispenser pans and other locations where the presence of a liquid could indicate a leak
- Shall utilize float-switch technology
- Shall be constructed of chemically resistive non-metallic material
- In the event of a break or a short in the field wiring, the Controller shall activate an alarm

C. **Universal Sump Sensor**

- Shall be used in an attached manway riser, double-wall piping or an attached collar riser
- Shall detect the presence of any liquid in a piping sump
- Shall activate the sump sensor when enough liquid enters the sump riser

D. **Liquid-only Float Sensor**

- Shall detect the presence of fluid in the interstitial space of a double-walled tank or a containment sump
- Shall utilize float technology
- Shall provide an alarm condition on the presence of fuel
- In the event of a break or a short in the field wiring, the Controller shall activate an alarm

E. **Discriminating Dispenser Pan Sensor**

- Shall be capable of producing liquid and high-liquid alarms
- Shall distinguish liquid type
• Shall utilize polymer strips and float technology
• Shall activate an alarm condition on detection of water, hydrocarbon, sensor malfunction or a break or short in the field wiring

F. Discriminating STP Sump Sensor
• Shall be capable of producing liquid and high-liquid alarms
• Shall distinguish liquid type
• Shall utilize polymer strips and float technology
• Shall activate an alarm condition on detection of water, hydrocarbons, sensor malfunction or a break or short in the field wiring

G. Hydrocarbon Vapor Sensor
• Shall detect hydrocarbon vapors in monitoring wells.
• Shall return to “normal state” after vapors have dissipated, allowing the sensor to be reused after vapors are detected
• Shall be constructed of a long-life resistive element that increases in resistance in the presence of hydrocarbon vapors
• Shall activate in alarm in the event of a break or short in the field wiring

H. Discriminating Interstitial Sensor
• Shall detect the presence of fluid in the annular space of a tank and distinguish fluid type
• Utilizes solid-state optical technology and conductive probes
• Shall activate an alarm condition on detection of liquid, sensor malfunction or a break or short in the field wiring

I. Interstitial Hydrocarbon Liquid Sensor with Water Indicator
• Shall monitor for hydrocarbon liquid and/or water in the interstitial area of a double-walled tank
• The water sensor shall rely on the conductivity of water to detect the presence of water
• Shall be constructed of a long-life resistive element that increases in resistance in the presence of hydrocarbon liquid
• In the event of a break or short in the field wiring, the Controller shall activate an alarm

J. Hydrocarbon Liquid Sensor with Water Indicator
• Shall monitor wells with fluctuating groundwater tables
• Shall monitor for hydrocarbons and/or water in containment areas of tanks and dispensers
• The water sensor shall monitor for absence of groundwater in monitoring well
• Shall discriminate between hydrocarbon liquid and water
• Shall be constructed of a long-life resistive element that increases in resistance in the presence of hydrocarbon liquid
• In the event of a break or short in the field wiring, the Controller shall activate an alarm

K. Interstitial Sensor
• Shall detect the presence of liquid in the interstitial area of a double-walled tank
• Shall be constructed of chemical-resistant, non-metallic material
• In the event of a break or short in the field wiring, the Controller shall activate an alarm

L. Dual-Float Dispenser Sump Sensor
• Shall be capable of producing liquid and high-liquid alarms
• Shall distinguish liquid type
• Shall utilize polymer strips and float technology
• Shall activate an alarm condition on detection of water, hydrocarbon, sensor malfunction, or a break or short in the field wiring
M. Dual-Float STP Sump Sensor
• Shall be capable of producing liquid and high-liquid alarms
• Shall distinguish liquid type
• Shall utilize polymer strips and float technology
• Shall activate an alarm condition on detection of water, hydrocarbon, sensor malfunction or a break or short in the field wiring

N. Dual-Float Brine Sensor
• Shall measure the level of brine solution already present in the tank
• Utilizes advanced float technology
• When either the sensor has triggered the upper float or the level has dropped below the bottom float, the Controller will activate an alarm

O. Reservoir Sensor
• Shall be used with hydrostatically monitored tanks
• Shall monitor the level of liquid in the reservoir of a double-walled tank
• Shall activate the sensor when the liquid level is abnormally high or low

P. Density Measurement Sensor
• Installs on pre-existing probe and continuously measures average density of the fuel in the tank
• Shall provide a measure of even the smallest change in product density within the API density range
• Shall be constructed of Nitrophyl®, Delrin® and stainless-steel spring

Q. Volumetric Line Leak Detector Sensor
• Shall utilize volumetric displacement
• Shall detect a leak in pressurized product piping by monitoring flow when a submersible pump is running and no fuel is being dispensed
• Shall utilize internal flow meter to detect and measure flow
• Provides an alarm condition if leak is detected or a there is a break or short in the field wiring

4.3 Line Interface Module (LIM)
The LIM shall be a device that features a magnetic contactor that supplies line/tank activity by monitoring the input/output status of nozzle signals and Submersible Turbine Pump (STP) contactors.
Each tank-monitoring system shall have a maximum of four (4) LIMs
Each LIM shall monitor up to four (4) pressurized lines for a total of 16 sensors per system.
LIM shall have a maximum capacity of 16 pressurized piping settings or 16 STPs depending upon the site configuration.
In the event of manifolded submersible pumps, each manifold shall require one (1) LIM position for each submersible pump.
The LIM shall work in conjunction with the tank-monitoring system to test lines during periods of inactivity to monitor the site for line leaks.
The LIM shall have a width of 16” (15 cm), a height of 8” (20.3 cm) and a depth of 5.4” (13.5 cm).
Power requirements shall be 110/220 VAC, 50/60 Hz, 0.5A maximum.
LIM power and dispensers must be on the same phase unless isolation relays are present.
The operating temperature range shall be -40°F to 158°F (-40ºC to 70ºC).
Part 5. Manufacturers Support and Service

5.1 The manufacturer shall provide technical phone support to Authorized Warranty Service Organizations, Authorized Distributors and their service personnel.

5.2 The manufacturer shall require training and certification for all of its authorized distributors and installers.

5.3 The manufacturer shall provide certification information on authorized distributors and installers.

5.4 The manufacturer shall offer re-certification training to keep authorized distributors and installers updated with current product information, installations and procedures.

5.5 The manufacturer shall maintain a service staff to provide customer support training.

5.6 The distributor or service organization shall be available to offer on-site training of company maintenance personnel on installation, programming and troubleshooting of the system.

5.7 The manufacturer shall offer replacement parts to authorized service organizations for servicing systems.

5.8 The manufacturer shall offer overnight shipping on replacement parts to minimize system downtime.

5.9 The manufacturer shall offer system upgrades and enhancements on the setup software.

5.10 The manufacturer will supply, upon request, a formal list of all authorized and certified distributors and service contractors for sales, support and installation.
Part 6. Warranty

6.1 The manufacturer warrants that all Tank Monitoring Systems supplied by the manufacturer to the Original Purchaser will be free from defects in material and/or workmanship under normal use and service for a period of 12 months from the date of installation or 18 months from the date of shipment from manufacturer. Additionally, the manufacturer warrants that all upgrades and replacement parts (new and remanufactured) supplied by the manufacturer will be free from defects in material and workmanship under normal use and serviced for a period of 90 days from the date of installation or for the remainder of the system's original warranty, whichever is greater, as set forth in the first sentence of this statement. The foregoing warranties will not extend to goods subjected to misuse, neglect, accident, or improper installation or maintenance or which have been altered or repaired by anyone other than the manufacturer or its authorized representative. The buyer’s acceptance of delivery of the goods constitutes acceptance of the foregoing warranties and remedies, and all conditions and limitations thereof.