SECTION 23 10 01

FLEET MANAGEMENT SYSTEM

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

　A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

　A. Products include the following:

　　1. Fuel Storage Tank Monitoring System.

　　2. Petroleum Dispensing Units.

　　3. Fuel Management System.

　　4. Point of sale.

　B. Related Sections include the following:

　　1. Section 23 10 00 "Facility Fuel Systems.

1.3 GENERAL REQUIREMENTS

　A. System manufacturer must have a minimum of ten (10) years' experience in the design and manufacture of fuel management equipment.

　B. The proposed system must conform to ISO 9001:2000 standards for quality management systems. System shall be UL and CUL approved.

　C. System shall meet these specifications.

1.4 QUALITY ASSURANCE

　A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

　B. Comply with ASME B31.9, "Building Services Piping," for fuel oil piping materials, installation, testing, and inspecting.

　C. Comply with NFPA 30, "Flammable and Combustible Liquids Code."

　D. UL Compliance: Provide fuel components which are listed and labeled by UL.

　E. UL Compliance: Provide fuel components and storage tanks which are listed and labeled by UL.

　　1. UL 567 – "Pipe Connections for Flammable and Combustible Liquids and LP-gas," for pipe connectors for fuel piping systems.

PART 2 - PRODUCTS

2.1 FUEL SYSTEM DESCRIPTION

    A. System Configuration

        1. The site controller shall be a stand-alone unit comprising all required peripherals including the central processing unit, display panel, pump control module, communication modules, and optional receipt printer.

        2. Refueling shall take place regardless of the connectivity to the host computer. Refueling limits and restrictions shall be 'pushed' from the host computer to all fuel site controllers enabling off-line refueling with limits and restrictions also when communication is not available. A time limit should be provided for off-line activity to block possible 'break' of the limits by refueling in several sites through the off-line mode.

    B. System Operation

        1. The site controller shall authenticate the data retrieved from the ID Card and check it against the existing set of limits and restrictions.

        2. If all conditions are met, the site controller shall authorize immediate refueling.

        3. At the end of the refueling process, the nozzle is reinserted into the dispenser cradle and the transaction data is sent from the site controller to the host computer.

        4. Vehicle not installed with passive fuel ring shall have the possibility to use manual authorizing devices including Mifare cards or tags, Magnetic cards, keypad entry, and optional HID cards.

2.2 PETROLEUM DISPENSING UNITS

    A. Provide all associated piping and valves as required for a complete operational system. All piping shall be located above grade.

    B. Fuel Dispenser: Provide each tank with an UL-listed, single E85 fuel product, single hose fuel dispenser. Dispenser shall be Dresser Wayne G6200 series, Or Equal. Each dispenser shall have the following items:

1. Register: Non computer mechanical register with power reset with interlock. Volume only 1" back lighted LCD display.

2. Totalizer: Non resettable totalizer up to 9999999.9. Displays on front dial face.

3. Pulser: Transmit electrical pulses for each register revolution for connection to fuel control systems.

4. Meter: Reliable, micro accurate 2 piston positive displacement design. Weights and Measures sealable.

5. Cabinet: Provide a cabinet fabricated from heavy gauge galvannealed steel. 14 gauge side panels and 18 gauge doors. Extremely durable power coated finish. Black acrylic graphic overlay on dial face. Cabinet shall be constructed of hot-dipped galvanized steel panels for rust resistance. Provide fluorescent lighting to illuminate product panels and register areas.

6. Filter: Adapter with ten micron filter for product purity.

C. Nozzles, Hoses and Hose Retrievers: Safety accessories to include API Color coding, high hose retrievers, swivels, automatic color coded nozzles, breakaways, and double poppet shear valves.

1. E85 fuel nozzles to be OPW #11.

2. Dispensing hose to be 16 feet long as manufactured by Goodyear or Dayco. Provide ¾" for gas.

3. Hose retrievers to be Universal Model #880 for E85 fuel with 78" high long posts, retractor ropes with Universal Model #100HB Hose Bun.

4. Breakaway Coupling: Coupling shall be as manufactured by Catlow Inc., Husky Corp. Model 220, Richards Industries, or Equal. Coupling separation shall be at 200 pounds maximum pulling force and have integral flow preventing seals or valves activated upon coupling separation. Coupling shall be U.L. listed and labeled to retain U.L. rating after separation. Provide a 6" whip hose at the dispenser.

2.3 FUEL STORAGE TANK MONITORING SYSTEM

A. Available manufacturer:

1. Veeder Root, Model TLS350R

B. The fuel storage tank monitoring system shall provide the functions of tank level gauging/inventory control, tank testing and leak detection. It shall consist of a microprocessor controller, interstitial probe, sump probe and level-sensor probe located in aboveground storage tank.

The system shall be capable of monitoring the level of product and water, gross product volume, temperature-corrected product volume, deliveries, and tank and piping leakage. The system shall provide the ability to monitor up to 8 sensors (interstitial, sump and piping) with the system shall be capable of interfacing with the JBWRF SCADA SYSTEM via Ethernet per Division 17 requirements.

C. All functions shall be programmable through a panel-mounted keypad or through a modem connection.

D. System shall report the following conditions via external modem and panel-mounted display. Each report shall be fully programmable by the Contractor:

1. Overfill of product during deliveries

2. Low product will signal a predetermined reorder point

3. High water will warn of excessive water accumulation

4. Detection of theft or rapid product loss

5. High fuel level

6. Tank leak

7. Hardware failure

8. Product level and volume

9. Record of product deliveries

E. System measurement capability shall be as follows:

1. Product level to ± 0.01" inches

2. Product temperature to ± 0.1°F

3. Gross and temperature-corrected product volume to 0.1 gallon

4. Water level to ± 0.1" inches

F. Tank level gauging and inventory control system shall collect product height and temperature data from a magnetostrictive level sensor and compute gross and temperature-compensated net gallons. System shall be capable to automatically generate an inventory increase report when product has been delivered. System shall provide low inventory alert.

G. Interstitial leak detection system shall monitor tank interstitial space using sensor to perform automatic, continuous leak sensing in the dry interstitial space (annulus) of a double wall tank, to detect a breach in the inner shell. The system shall have the ability to sense the presence of hydrocarbons and/or liquid, and provide an alarm for the worst-case condition (fuel). The form factor of the sensor must provide for easy field installation and removal. The system shall have

the ability to continuously monitor the integrity of the sensor for an open condition, alarm condition, or normal operating condition.

H. Alarms system shall provide audible and visual indication of the following alarm conditions:

1. Maximum product level

2. High level limit

3. Overfill

4. High water

5. Low inventory (delivery needed)

6. Interstitial leak

7. Piping leak

8. Sudden loss (theft)

9. Relay dry contact outputs for the following (5A, SPDT):

   -Low alarms

   -High alarms

   -Leak

   -Not in auto

   -For connection to generator control panel low fuel level alarm.

I. Operator shall be able to disable the audible portion of the alarm. However, visual alarm shall not be capable of being disabled until the alarm condition has been corrected.

J. System shall have an external audible and visual alarm with acknowledgment switch, housed in a watertight gasketed enclosure.

K. Communications system shall have an RS-232 port to allow communication with electronic devices and generator control panel. System shall be installed complete with all software required to perform the functions specified in this section. The tank monitoring system shall provide all reports available on the integral printer through an open protocol communications port. These shall include all reports associated with inventory management, environmental compliance, and diagnostics/troubleshooting.

L. Diagnostics and Troubleshooting shall be generated by the system itself. Diagnostic information shall include data on the probes, software, in-tank leak results, interstitial leak results, and alarm history.

M. Console: Console shall be wall-mounted and have the following features:

1. A two-line, 24-character liquid crystal display for viewing of inventory, leak detection, and alarm information.

2. A 24-button front-panel keyboard with control and alpha-numeric functions for programming, operating, and reporting functions.

3. Three front-panel indicator lights for Power On, Warning and Alarm conditions.

4. Integral 24-character thermal printer.

N. Console shall be intrinsically safe and UL-listed, and comply with FCC testing, FCC Part 68.

2.4 FLEET MANAGEMENT SYSTEM (POINT OF SALE)

A. The Point of Sale Pedestal

1. The pedestal shall be a slim (9.5"x9.5"x61") powder coated metal designed for easy installation and service. The paint application for the entire pedestal terminal shall consist of a positive/negative charged ionization process for superior bonding. All materials shall be tested to sustain Oil, Fuel, Sun, Water and Salt.

2. The pedestal shall allow front door access for maintenance and wiring and shall enable flexible installation on the fueling island.

3. The pedestal display panel shall consist of:

   a. Top illumination utilizing an array of high intensity blue LED's

   b. 5" wide x 1.6" high display window

   c. 4 lines, 20 characters (1/4" height) each, or optional graphic LCD

   d. LCD operates well in all lightening conditions

   e. 16 functional keys. The keys shall be rugged and made of metal for higher reliability and longer life (flexible plastic key caps will not be acceptable).

   f. The key's sensors shall use piezoelectric technology for highest reliability

   g. Magnetic Card Reader

   h. Mifare Card/Tag Reader

B. Receipt Printer

1. Optional outdoor receipt printer with 1,000 ft. paper roll including automatic paper cutter and alarms indicating low-paper and paper-out (alarms shall be available via email and displayed online with secured access)

C. Management system shall be capable of handling 500 vehicles and 500 employees.

D. Uses injection-molded smart key for vehicle identification.

E. Limits fuel type, amount dispensed, and number of fuelings per day.

F. Provide optional PC software for real-time logging of transactions to PC memory, backing up and restoring system memory files, and maintaining lockout files.

G. Software: Windows based PC reporting / communication package with manager password protection. Software shall provide following:

1. Odometer entries checked against last odometer stored on key for reasonability.

2. Provide the following reporting fields: (1) Card Number.; (2) Employee number, (3) Date and time; (4) Transaction quantity; (5) Vehicle cumulative quantity; (6) Employee cumulative quantity; (7) Odometer; (8) Miles between fuelings; and (9) Error code.

3. Capable of generating reports that list per vehicle and associated department the following information: (1) total fuel usage, (2) miles, (3) last odometer, and (4) MPG for current time period. Include reports employee and department fuel usage for current time period.

4. Include Reports with the following: (1) card number; (2) lockout status; (3) PIN; (4) cumulative fuelings and (5) quantity per current time period.

5. Provide Inventory Reports listing tank number, product code, current quantity, last delivery amount and date.

6. Provides Pump Report listing pump and tank numbers, product code, cumulative pump totalizer, and reset date.

7. Provide Lockout Reports for particular vehicles and/or employees.

H. Hardware Requirements: The Fuel Management System will use two 4x4 weatherproof membrane keypads located at each fuel tank. The keypads shall be provided with audible feedback, read/write key receptacle, 2 line x 20 character, and backlit LCD. The LCD shall operate using 115 VAC +/- 10%, 47-63 Hz, operates in -30 to +50 Degrees Celsius and have one RS232/RS422 port with optional internal 2400 baud modem port.

I. Representatives of the equipment suppliers for the fuel management system shall provide necessary training and technical support to the OWNER so that the OWNER may properly operate and maintain the system.

Manufacturers, or Equal:

1. OPW K 800 Fuel Control System;

2. Fuel Master;

3. VeederRoot

2.5 FUEL MANAGEMENT SYSTEM SOFTWARE

A. General

1. The software shall support multiple fuel site controllers and allow data consolidation.

2. The software shall support multiple fleets and multiple departments.

3. The software shall synchronize data with all sites.

4. The software shall be used as a centralized issuing and programming facility for passive fuel rings, vehicle data modules and Mifare tags.

5. The software shall be installed on the host computer running Windows operating system and SQL database that supports ODBC connectivity.

6. The system shall be a centralized web server communicating with all sites to provide centralized data base and on-line network access for fleet managers, key personnel and remote maintenance entities.

7. The software shall communicate with all sites to provide 24/7 on-line access through the network.

8. The software shall create and control several fleets and departments and support different privilege levels for limited access for different users (for example, a specific Fleet manager shall only be able to manage only his fleet vehicles).

9. The software shall provide advanced on-line services for multiple sites and multiple fleets in a region.

10. The host software web interface shall use SSL security.

11. The host software application can interface to other applications via Web Services, import and export of files to FTP and ODBC standard.

12. The software shall allow Exporting data to different file formats (using a dropdown menu) such as CSV, TXT, and XML.

B. Limits and Restrictions

1. Host software shall allow limits and restrictions to be configured either by an authorized user or imported from a different external system (using the import/export).

2. The rules shall be transferred to every site controller to enable off-line activity in case of communication failure; hence a fuel

site will be able to refuel a vehicle within its set of limits and restrictions, when communication is down.

3. The limits shall be 'pushed' into the site controller at a predefined time or for a predefined period of time. Site controllers can also use the limits in an off-line mode (in case of communication failure).

4. There shall be a graceful period of time (parametric) for this off-line mode since the vehicle could refuel also in other sites (above its limits) while the sites are disconnected from the host computer.

5. Customizable vehicle and driver limits and restrictions shall include:

   a. Limit of daily, weekly and monthly refueling volume in gallons as well as in currency.

   b. Enable or disable vehicle refueling on specific days (weekdays for example) and / or specific time slots within a day (night time for example)

   c. Limit the maximum refueling sessions for a specific vehicle per transaction, per day, week or month.

   d. Limit the maximum refueling sessions for a specific vehicle per transaction, per day, week or month.

   e. Block specific stations for a specific vehicle (if vehicle is restricted for operation in a specific zone).

   f. Block specific stations for a specific vehicle (if vehicle is restricted for operation in a specific zone).

   g. Restriction of specific fuel types for refueling of a specific vehicle

C. Fuel Management System Software

   1. The host computer shall collect the transactions and TLS information from all fuel sites for centralized fuel management activities including required deliveries, forecasting, reconciliation and more for optimal usage of fuel.

   2. The system shall provide the following capabilities:

      a. Reports regarding fuel consumption with filters of sites, dates, volumes and more

      b. Customized templates for specific reports

      c. History of fuel consumption from every product with graphical representation

      d. Forecasting consumption for every product based on the consumption history with graphical representation

      e. Reconciliation

      f. Manual entry or editing of fueling transactions

      g. Provide unified view of ALL stations with regards to fuel level status

      h. Provide consolidated view of each specific fuel tank, per station

      i. Provide a centralized system for maintenance reporting and reporting of different system alarms, per station

      j. Provide an interface for managing of manual stations (without Fuel Controllers)

  3. Tanks status screen from TLS system per site with graphical representation of the tanks

  4. Alarms (High/Low tanks level, Leak detection, No communication, Etc.)

  5. Export capabilities to other systems (ERP)

D. Reporting System

  1. Consolidate data from multiple stations and generate reports, including exception reports, reconciliation reports, trends, forecast, consumption, tank capacity and more. There shall be two types of Reports:

      a. Custom Reports

      b. Fuel Management System Reports (built-in)

  2. Custom Reports

      a. The software shall provide a highly flexible custom reporting utility. Data elements can be selected and put in any order by the user to create their own custom report.

      b. This report shall have the ability to be saved as a template for later use.

      c. Must have advanced customized reporting capabilities with filters and templates (Web based).

      d. The custom reports feature shall enable report generation of transactions performed in the fuel station in various profiles.

      e. The following field names shall be used to generate custom reports tables:

         1) Station, Date, Time, Fleet, Transaction Type, Vehicle #, Product, Quantity, Total Sale, Receipt No., Fleet Code, Pay Mode, Transaction Id, Authorized By, Department, PPV,

Odometer, Engine Hour, Pump, Tank, Nozzle, Density, Temperature, Vehicle Type, Ref/Slip No., Driver name, Dept code, Card number, Device name.

f. The custom report shall allow summary by the following fields (Break by):

1) Date, Plate, Pump, Product, Pay Mode, Station name, Fleet code, Authorized by, driver name, Dept. code, or a selection of any of the above fields

g. The custom reports shall allow sorting by the following fields (Sort by):

1) Date & Time (Ascending/Descending), Pump, Transaction ID, Product, Amount (Ascending/Descending), Qty, Plate, Pay mode, Station name, fleet code, Receipt ID, Driver name, Dept. code or a selection of any of the above fields.

h. The above powerful capabilities shall allow flexible reporting such as:

1) Summary Report – summarizing all transactions of a specific fleet of vehicles.

2) Vehicle Report – offering the Fleet Manager a detailed transaction report of vehicles pertaining to his fleet, in three cross sections:

   a) Transactions - providing information regarding each transaction, including the vehicles license plate number, odometer reading, engine hours, fuel type, fuel volume and the transaction ID.

   b) Consumption - listing information regarding each vehicle (device) providing a summation of data (volume consumption, fuel cost, other costs) for each vehicle in a specified time frame.

   c) OBD Vehicle Data – provide OBD statistics report which displays On-Board Diagnostics error codes from vehicles equipped with DataPass+ components. The report will present statistics for the selected period (Distance, EH, PTO, idle time, over speeding, fuel level, etc.) and the latest error codes from the vehicle. Data from both light duty vehicles with OBD11 and heavy duty vehicles with J1708/J1939/J1587 protocol will be supported in the reports.

3. Exception Reports

    a. The software shall provide Exception Reports for the Fleet Manager. It must provide the ability to spot any abnormal incidents that occurred within his fleet. The following exception reports are required for each fleet:

        1) Volume Exception Report – shall list noted exceptions relating to the fuel volume consumed in the transactions compared with the related vehicle's fuel tank volume.

        2) Mileage Exception Report – shall list the exceptions related to the elapsed distance of the vehicles, according to odometer readings.

        3) OBD Exception Report – shall list the vehicles which crossed the over speed, RPM or idling limits specified for the device, according to OBD readings.

        4) Consumption Exception Report – shall list the exceptions related to the fuel consumption of the vehicles, according to odometer readings and the specified fuel consumption ratio of the vehicle.

        5) Mileage Exception Report – shall list the exceptions related to the elapsed distance of the vehicles, according to odometer readings.

        6) Consumption Exception Report – shall list the exceptions related to the fuel consumption of the vehicles, according to odometer readings and the specified fuel consumption ratio of the vehicle.

        7) Mileage Exception Report – shall list the exceptions related to the elapsed distance of the vehicles, according to odometer readings.

        8) Consumption Exception Report – shall list the exceptions related to the fuel consumption of the vehicles, according to odometer readings and the specified fuel consumption ratio of the vehicle.

        9) Not Used Exception Report – shall list the vehicles which did not carry out any transaction in a specified time frame. The report should include the license plate number, the odometer reading and the date and time of the last transaction performed by the vehicle.

4. Fuel Management System Reports (Built-in)

   a. Sales Reports

    Sales by Tanks Report

    Local Account Transactions

    Pump-wise Delivery Report

    Product-wise Dispenser Delivery

    Fuel Sales Trends Graph

    Fuel Volume Forecast Report

   b. Reconciliation Report

    Shift Report

    Environmental Report

    Tank Reconciliation Trends

   c. Maintenance Reports

    Exception Log Reports

    Alarm Duration Reports

   d. Stock Data Reports

    Tanks by Sites

    Tanks Trends Graph

    Total Wet Stock Report

 E. Back-up

  1. The system shall provide several back-up mechanisms for maximal data protection as follows:

   a. The database is transmitted periodically to a remote server. The backup can be for the entire database or differential.

   b. Built-in data base back-up mechanism (Customer FTP).

   c. All transactions are exported to a Customer FTP site through an Export Module.

   d. RAID mechanism at the host computer

PART 3 – EXECUTION

 A. Installation shall be in compliance with the latest version of the Petroleum Equipment Institute Publications RP100, RP 200, and RP 300, NFPA-30, 30A, and 31 and all manufacturers' current installation instructions.

 B. Comply with NFPA 30 "Flammable and Combustible Liquids Code" and NFPA 30A "Automotive and Marine Service Station Code" for design and construction, installation, inspection, and testing of fuel dispensing system components and accessories.

 C. Comply with NFPA 70 "National Electric Code" for equipment, wiring, and conduit installed under this section.

D. Fuel Storage Tank Monitoring Systems: Install the Tank Monitoring System in strict accordance with the manufacturer's recommendations, National Electrical Code NFPA 70, and NFPA 30A. Electrical work shall be rated for hazardous areas as required.

    1. Install the monitoring system control panel as indicated on the drawings.

    2. Install the tank level probe and the interstitial leak probe in the proper locations in the fuel tank. Install the piping sump sensor in the piping sump.

    3. Install the overfill alarm and acknowledgment switch as shown in the plan.

    4. The leak monitoring system installation shall be inspected and approved by the equipment supplier or its certified contractor. The leak monitoring system supplier shall submit a comprehensive checklist of quality and safety items critical to the system and verify that the installation has been in accordance with these standards and applicable fire and environmental codes.

3.1 CONNECTIONS

A. Ground equipment according to Division 26.

B. Connect wiring according to Division 26.

3.2 FIELD QUALITY CONTROL

A. Start fuel pump to verify for proper operation of pump and check for leaks.

3.3 COMMISSIONING

A. Test and adjust controls and safeties. Replace damaged or malfunctioning controls and equipment.

B. Before activating system perform these steps:

    1. Remove and clean filter screens.

    2. Check pump for proper direction of rotation.

    3. Fill aboveground fuel storage tank with proper fuel type.

C. Testing: Leak testing of the primary tank shall be in accordance with the UL 142. Results of the testing shall be documented.

    1. Test and adjust fuel management and leak monitoring systems controls and devices. Replace damaged and malfunctioning controls and devices.

    2. Submit reports of test and procedure in writing to the Engineer.

D. Inspection: Inspection and field tests shall be performed in accordance with API 620 and the manufacturer's instructions.

3.4 PERSONNEL TRAINING

    A. Train Owners maintenance personnel on procedure and schedules related to start-up and shutdown, troubleshooting, servicing, and preventive maintenance.

    B. Representatives of equipment suppliers for the leak monitoring system shall provide necessary training and technical support to the Owner so that the Owner may properly operate and maintain the systems.

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