

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

**DESCRIPTION.** Work under this item shall include removal of existing fuel storage system and the installation of a new fuel storage system for the existing emergency generator.

The Contractor shall install a new fuel storage system including furnishing all labor, equipment, tools, scaffolding, services, supplies, and materials and perform all testing and operations necessary or incidental to a finished job, in conformity with the Drawings, Specifications, and applicable codes.

Electrical work includes the generator modifications and installation of remote annunciator panels indicating generator fuel storage tank conditions, as indicated on the drawings and specified herein.

Electrical work required under this section includes the following items and incidental work related thereto:

1. Furnish and install a new remote fuel tank low level and rupture basin leak detection alarm panel.
2. Furnish and install a new remote fuel tank high level alarm panel with vandal cage.
3. Furnish and install normally open solenoid valve, wired to close when tank high level alarm annunciates.
4. Furnish and install a new generator remote emergency stop panel.

Mechanical work under this item shall include, but not necessarily be limited to, the following:

1. Removal and salvage of existing unregistered 3785 L fiberglass clad steel fuel storage tank and associated piping.
2. Removal and disposal of the existing generator day tank, fuel transfer pump, and associated piping by the Contractor.
3. Furnishing and installation of a new 682 L secondary containment sub-base fuel storage tank adjacent to the existing emergency generator including associated accessories and piping.
4. Core drilling through existing concrete sidewalk, furnishing and installation of a new fuel fill spill container in the sidewalk with locking fill cap, and 50 mm vent pipe as detailed.

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

### **MATERIALS.**

**Pipe and Fittings.** Pipe and fittings shall conform to the Specifications and Standards of the following: American National Standards Institute (ANSI); American Society of Testing Materials (ASTM); American Society of Mechanical Engineers (ASME); and/or National Fire Protection Association (NFPA).

All piping installed under this Section shall be in accordance with the following:

1. Fuel piping shall be Schedule 40 black steel suitable for No. 2 diesel fuel, conforming to ASTM A53 or ASME B36.10.
2. Vent piping for fuel storage tank shall be Schedule 40 black steel conforming to ASTM A53 or ASME B36.10.
3. Fittings shall be malleable iron ASTM B16.3 or forged steel welding type ASTM A234.

**Joints.** Threaded or welded to ANSI B31.1 and conforming to NFPA 30.

**Pipe Hangers, Anchors, and Guides.** Galvanized steel pipe hangers shall be adjustable clevis hangers. Hanger rods shall be machine threads. Malleable iron brackets of approved type shall be used along the walls. Riser clamps shall be used to support steel riser pipes at floor or deck penetrations.

Hangers shall be as manufactured by Grinnell Company, Carpenter and Patterson, Empire Tool and Manufacturing Company, or equal as approved by the Engineer.

**Fuel Storage Tank.** Fuel storage tank shall be 682 L, secondary containment sub-base type suitable for No. 2 diesel fuel and shall be UL 142 listed. Tank shall be a factory built unit sized to fit adjacent to the existing emergency generator at the Long Beach Bridge and shall be designed to set on pedestal supports as shown on the Drawings and shall be painted with a baked enamel finish.

The fuel storage tank shall include, but not necessarily limited to, the following items:

1. 682 L nominal storage tank suitable for No. 2 diesel fuel.
2. Overflow basin sized to hold 150 percent tank capacity.
3. Steel frame base around fuel storage tank and overflow basin for support on two concrete pedestals.

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

4. 80 mm NPT connection for tank emergency vent.
5. 50 mm NPT connection for fuel fill pipe.
6. 50 mm direct reading fuel level gauge.
7. 50 mm NPT connection with fuel tank high level alarm switch with 50 mm normally open solenoid valve set at 95 percent tank capacity and fuel low level alarm set at 30 percent tank capacity.
8. 50 mm NPT connection for normal tank vent.
9. 10 mm dip tube connection for fuel supply (to generator).
10. 10 mm dip tube connection for fuel return (from generator).
11. Baffle inside fuel tank separating the fuel supply and return sides.
12. 13 mm NPT top tank connection with overflow basin alarm.
13. 10 mm NPT connection for overflow basin drain.
14. Two remote alarm panels; one panel for fuel tank high level alarm mounted on parapet wall of east bridge and one panel for fuel tank low level and rupture basin leak detection alarms mounted in Operator's House office. These items shall be furnished and installed by the electrical contractor.

The fuel storage tank shall be manufactured by:

1. Tramont
2. Onan.
3. Simplex.
4. Equal as approved by the Engineer.

**Fuel Fill Spill Container.** Fuel fill spill containment manhole shall include cast iron cover, epoxy coated cast iron body ring, high density polyethylene bellows, drain valve, and have

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

a 19 L liquid capacity. The fuel fill spill container shall be manufactured by OPW Products, EMCO Wheaton, Universal, or equal as approved by the Engineer.

The Contractor shall provide all labor, equipment, and materials to core drill a 350 mm and 100 mm diameter hole through the 150 mm reinforced concrete sidewalk.

The Contractor to furnish diamond tipped cutting edged drill bit and power drive suitable to core the concrete slab.

The Contractor to provide waterproofing joint sealer as approved by the Engineer.

The Contractor to provide non-shrink grout as approved by the Engineer.

**Fill Cap.** Fill cap shall be lockable type with a cast iron collar and a bronze cap. Fill cap shall be 100 mm diameter, as manufactured by OPW Products, EMCO Wheaton, Universal, or equal as approved by the Engineer. (Key type padlock shall also be provided by the Contractor with Owner approval.)

**Vent Protector.** Vent protector shall be 50 mm cast iron and threaded for standard pipe as manufactured by Preferred Utilities Manufacturing Corporation, OPW Products, Universal, or equal as approved by the Engineer.

**Electrical Equipment.** All metal parts of the electrical installation shall be of corrosion-resisting material such as an aluminum, bronze or stainless steel. Cast iron, malleable iron or steel with a hot-dip galvanized finish shall be used where specified herein or permitted by the Engineer.

Materials will be specified where they appear in the following articles of this section. Materials designated by an asterisk (\*) are proprietary items that the County stocks parts for and, therefore, shall be used in the performance of this Contract.

Notwithstanding any reference in the Specifications except those marked by an asterisk to any article, device, product, material, fixture, form or type of construction by name, make, or catalog number, such references shall be interpreted as establishing a standard of quality and to inform the Contractor as to the type of material and fit required but shall not be construed as limiting competition; and the Contractor, in such cases, may at his option use any article, device, product, material, fixture, form, or type of construction except those marked by an asterisk which in the judgement of the Engineer, expressed in writing, is equal to that specified.

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

**Conduits.** Size of conduits shall be as indicated on the drawings. Where size is not indicated, it shall be in accordance with the requirements of the National Electrical Code. Unless otherwise indicated, the minimum size conduit shall be 19 mm.

Rigid conduits shall be hot dipped galvanized steel, conforming to ANSI C80.1 and UL 6, and coated with a factory applied 1 mm PVC coating, except conduits installed within the operator's house to be uncoated. All breaks, scars and interruptions in the coating shall be repaired as per manufacturer's recommendations. All conduit joints shall be threaded using standard taper thread. Straight or clamp joints shall not be used. Where PVC coated conduit has exposed threads, the threads shall be PVC coated after installation to 1 mm thickness.

Flexible conduits shall be hot dipped galvanized steel, unless indicated otherwise. All flexible conduits shall be UL listed and liquid-tight.

Couplings, connectors and fittings shall be of type specifically designed and manufactured for the purpose. Use flexible liquid tight conduit and connectors where final connection to equipment with rigid conduit is not practicable, such as to equipment with adjustable mountings and to all machinery.

**Wiring Devices.** Outlets, Junctions, and Pull Boxes: All exposed boxes shall be hot dip galvanized cast iron, or stainless steel provided with screw fastened gasketed covers. All boxes shall have threaded hubs. Each box shall have sufficient volume to accommodate the number of conductors in the box, in accordance with the requirements of the National Electrical Code. Boxes shall be not less than 38.1 mm deep. Ceiling boxes shall not be less than 101.6 mm octagonal. Switch and receptacle boxes shall be approximately 101.6 mm by 50.8 mm. Boxes in wet locations shall be NEMA 4 and shall be furnished with screw-fastened gasketed covers.

**Wire and Wiring.** Single Conductor Cable shall be copper conductor cable with cross-linked-thermosetting-polyethylene 600 volt insulation or ethylene-propylene-rubber 600 volt insulation.

**Multiple Conductor Cable.** With the following requirements:

1. Number of insulated copper conductors: As shown on the drawings.
2. Insulation: As specified for single conductor cable.
3. Overall covering: Thermosetting neoprene jacket.

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

**Fixture Wire.** With the following additional requirements:

1. Type: SF 2 Silicon rubber insulated.
2. Conductor: Stranded copper conductor 16 AWG or larger as shown.

**Bare Conductor:** ASTM B3 class B stranded annealed copper conductor unless otherwise shown, size as shown for grounding.

Deliver conductors to the site of the project in original packaging or on factory reels, fully identified with tags or labels, indicating the manufacturer's name and date of manufacture. In addition, the name of the manufacturer, insulation type, voltage rating, and wire size shall be clearly and permanently imprinted throughout the length of each conductor.

**Connectors, Terminals and Tape.** Connector, Terminal Lugs and Fittings:

1. For 12 AWG to 4/0 AWG insulated cable: Compression type tin plated copper connectors and terminal lugs having conductor insulation grip.
2. Terminal blocks shall be heavy duty, 600 volt, tubular screw type.

Bundling Straps: Self-locking steel barb on one end, with tapered strap of self-extinguishing nylon of minus 36 degrees to plus 138 degrees C temperature rating.

1. For outdoor use: Ultraviolet resistant nylon strap with the above characteristics.

Insulating Tape:

1. Plastic tape: Vinyl plastic tape with rubber-based pressure-sensitive adhesive, pliable at a low temperature of zero degrees F and having following minimum properties:

Thickness - 0.2 mm  
Breaking strength - 33.18 kilograms per meter (width)  
Elongation - 200 percent  
Dielectric breakdown - 10,000 volts  
Insulation resistance - 1,000,000 megohms  
(Indirect method of electrolytic corrosion)

2. Rubber tape: Silicon rubber tape with silicon pressure-sensitive adhesive and having following minimum properties.

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

Thickness - 0.4 mm  
Breaking strength - 21.57 kilograms per meter (Width)  
Elongation - 525 percent  
Dielectric breakdown - 13,000 volts  
Insulation resistance - 1,000,000 megohms  
(Indirect method of electrolytic corrosion)

**Generator Fuel Tank Remote Alarm Annunciators.** Provide and install remote fuel tank alarm panels as shown in the plan set. Console should display a visual indication of alarm condition and include an audible alarm horn with reset button. Visual indication should remain on until alarm condition is corrected. A test button on the alarm console should be provided to function test audible and visual alarm circuits. The console should provide a SPDT switch output, rated 3 amps at 120 VAC for controlling external devices. Electrical circuitry to tank mounted process sensors should be listed intrinsically safe for hazardous areas. The sensor wiring must be run in separate conduit containing no line voltage.

Alarm console should consist of solid state electronic operated from 120 VAC power, housed in a weatherproof enclosure, Model LC 1000 series (see plan set) manufactured by the Pneumercator Company, Farmingdale, New York 11735 (516) 293-8450.

**Alarm Panel Vandal Cage.** The Contractor shall construct a vandal cage to conceal the "Remote Fuel Tank High Level Alarm Panel." The caging material shall be 3/4-inch (19.05 mm), 9 gauge carbon steel flattened mesh expanded metal, as supplied by McMaster-Carr, Grainger or Armstrong, or equal approved by the Engineer. The carbon steel mesh must conform to Military Specification MIL-M-17194C. The vandal cage must be painted using an epoxy powder, color to match the door and window trim.

**Nameplates.** All compartment doors and visual components shall be identified with nameplates. Nameplates shall be white laminated phenolic plates engraved with black letters. Lettering shall be vertical. Letter size and stroke shall be consistent and coordinated with the panel layout. Where nameplates are not suitable due to location or nature of the information, stamped metal tags shall be used.

### **Quality Assurance**

**Codes and Standards.** All installations shall conform to all Federal, State and local codes, ordinances, and laws having jurisdiction over this project. In the event of a conflict between these specifications and the above-mentioned codes, the more stringent of the two shall govern.

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

Provide shop drawings, catalog cuts, or other descriptive certification as required for compliance with the requirements established in the General Provisions. Provide working drawings, diagrams, and related data including but not limited to:

1. Layout details of all electrical equipment and mechanical connection data.
2. Schematic and wiring diagrams.

Comply with the provisions of the following regulatory and directive documents:

1. American National Standards Institute (ANSI) C80.1: Rigid Steel Conduit, Zinc Coated, Spec. for.
2. American Society for Testing Materials (ASTM)  
A-525-79: Sheet Steel, Zinc Coated (Galvanized) by the Hot Dip Process, General Requirements, Spec. for.

B-3: Soft or Annealed Copper Wire, Spec. for.

B-8: Stranded Copper Wire, Spector Conductors, Hard, Medium Hard, or Soft, Spec. for.

B-33-74: Tinned Soft or Annealed Copper Wire for Electrical Purposes, Spec. for.

3. National Electrical Code (NEC).
4. National Electrical Safety Code (NESC).
5. National Electrical Manufacturers Association (NEMA). Publication No. 250: Enclosures for Electrical Equipment.
6. U.S. Department of Labor - OSHA.
7. Comply with local codes which are more stringent than the above.

Final approval of shop drawings, details, and catalog cuts will not be given until the Contractor affixes a statement to each submittal indicating his review of the applicable contract drawings, and confirming compatibility.

## **CONSTRUCTION DETAILS**

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

**Drawings.** All work shown on the Drawings is approximately to scale, but shall be taken in a sense as diagrammatic. Size of pipes and general method of running them is shown, but it is not the intent to show every offset and fitting, or every structural difficulty that may be encountered. To carry out the true intent and purpose of the Drawings, all necessary parts to make complete working systems ready for use shall be provided.

The Drawings and Specifications are intended to supplement each other so that any work shown on the Drawings and not mentioned in the Specifications or vice versa shall be provided as if mentioned in the Specifications and shown on the Drawings.

Prior to commencing installation it is pointed out that:

1. During construction it will be mandatory to keep the bridge in operation. It will be the Contractor's responsibility to maintain service.
2. Verify that all surfaces upon or in which enclosures are to be mounted are properly prepared and that all pre-mounting wire pulling has been completed and properly tagged. Take corrective action if necessary.
3. Verify that enclosure mounting provisions are suitable for intended mounting. Make corrective adjustments, if necessary.

**Codes, Ordinances, and Permits.** All work shall be performed in strict accordance with all applicable conditions and regulations as set forth in the Plumbing Code for Nassau County, Nassau County Fire Prevention Ordinance Article III, Flammable and Combustible Liquids Ordinance No. 407-86, and the requirements of any other local or governing body having jurisdiction.

Any material or workmanship called for in the above mentioned conditions and regulations, which is not specified or shown on the Drawings, shall be furnished and installed by the Contractor as though same has been specifically mentioned or indicated. If the Drawings and Specifications are at variance with any regulations, the Bidder shall notify the Engineer at the time of submitting his bid.

If the Contractor fails to notify the Engineer at this time and installs work in variance with the above mentioned codes and regulations, he shall assume full responsibility and expense to rectify the installation.

Secure all permits necessary in connection with the installation of this equipment.

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

**Coordination.** Furnish full information to all trades relative to the work which they are to do in connection with work under this Section, which includes data for wiring, openings for pipes, equipment foundations, pipe chases, etc.

Confer with other trades as to the location of their work before beginning work and install pipes in such manner as to avoid interference with other trades.

**Shop Drawings.** Shop Drawings shall include descriptive data and/or catalog cuts which shall be submitted for all equipment and other accessories of the mechanical and electrical systems that may be required by the Engineer.

**Cleaning and Protection.** All materials and equipment shall be carefully protected during shipment and protected during installation and properly handled and stored at the job site so as to prevent damage. The Contractor shall assume full responsibility for protection of the fuel supply systems and equipment until its completion and final acceptance.

Upon completion of the work, the Contractor shall clean all equipment and replace damaged parts.

**General Procedures.** The Contractor shall give the required notice relative to the work when inspections are required, shall obtain and pay for all permits, and shall make all deposits necessary for the work to be performed.

**Removal of Existing Mechanical Systems.** The Contractor shall store all items, earmarked for removal, at the site and shall turn over material to the Department of Public Works - Highways and Bridge Maintenance Division for storage or shall dispose of any items directed by the Engineer.

**Pipe Inserts.** Install inserts or other anchoring devices in concrete and masonry construction as required to support piping and equipment. Inserts shall be of the adjustable type as manufactured by Phillips Red Head, Grinnel Company, Star Expansion Company, or equal as approved by the Engineer.

**Pipe Hangers, Anchors, and Guides.** All piping shall be supported from the building structure by means of approved hangers and support. Piping shall be supported to maintain required grading and pitching of lines, to prevent vibration and to secure piping in place, and shall be so arranged as to provide for expansion and contraction.

Hanger spacing for black steel shall be at the joints with the spacing not exceeding 1.5 m.

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

Vertical lines shall be adequately supported at their bases by a suitable hanger placed in the horizontal line near the riser and by supports at not less than 3 m intervals.

Piping shall not be hung from the hangers of other trades.

**Fuel Storage Tank.** Contractor shall install the sub-base fuel storage tank on concrete pedestals adjacent to existing generator per manufacturer's instructions and as detailed on the Drawings.

Contractor shall be responsible for adjusting all piping connected to the emergency generator.

All accessories on the new fuel storage tank shall be installed per manufacturer's instructions. Provide flexible pipe adapters on fuel supply and return piping connected to the emergency generator.

**Fuel Fill Spill Container.** Spill container shall be installed in the pre-drilled concrete opening as shown on the Drawings. Provide 100 mm diameter riser pipe inside the spill container for installation of the lockable fill cap.

Install spill container cast iron cover in sidewalk as detailed.

**Fuel Storage Tank Removal.** The existing fiberglass clad steel unregistered 1,000 gallon fuel storage tank located in the counterweight pit shall be removed and salvaged of by the Contractor. The method of removal shall be approved by the Engineer.

**Enclosures.** Install at indicated or approved locations in accordance with manufacturer's instructions, and at convenient operating height such that unless shown otherwise no manually operable device will be within 0.80 m of the floor or more than 2.0 m above the floor.

Adjust straight and plumb and fasten securely in place. Align and securely and independently fasten each section of multi-section enclosures.

Install wall mounted enclosures and cabinets on structural channel erector systems, such as Kindorf or equivalent.

Perform circuit wiring as specified elsewhere herein.

Neatly route, harness and support conductors in gutters, wiring spaces and compartments. Bending radii not less than recommended by conductor manufacturer.

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

**Conduit and Fittings.** Conduit to motors and other electrical vibrating equipment shall terminate in conduit fittings on the motors and equipment, the final connection being made with liquid-tight flexible conduit and suitable liquid-tight connectors.

Install liquid-tight unions where standard threaded couplings cannot be used.

Repair all nicks, cuts, and abrasions to PVC coating on rigid conduit with factory supplied repair compound.

Equip conduit terminations 32 mm and larger with insulating bushing.

Conduits shall be concealed or exposed as shown on the Drawings. Install conduits in accordance with the requirements of the National Electrical Code.

Support all conduits not more than 3.0 m apart with at least one support between couplings, and install parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings with right-angle turns consisting of cast metal fittings or symmetrical bends. Support conduit on galvanized strap hangers, pipe straps or by means of expansion bolts on concrete, wood screws on wood, machine screws on metal surfaces. Provide conduit supports on each side of conduit bends or elbows and not more than 1.0 m on each side of each outlet.

Make all bends with an approved hickey or conduit bending machine.

Fasten conduits securely to all enclosures, junction and pull boxes and light fixtures with galvanized locknuts and bushings with full number of threads projecting through to permit the bushing to be drawn tight against the box to insure good electrical contact. Use gasketed or O-ring waterproof conduit hubs on outside boxes as required.

Furnish sleeves and insert and install as required for the electrical work.

Conduits crossing expansion joints shall be provided with expansion fittings or other means to compensate for expansion and contraction. Expansion fittings shall allow for movement as required for each specific location.

The Contractor shall exercise the necessary precautions to prevent the lodgment of dirt, plaster or trash in conduit, fittings and boxes during the course of installation. A run of conduit which has become clogged shall be entirely freed of these accumulations or shall be replaced.

**ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

Carefully open conduit ends closed during the construction to prevent foreign materials entering the conduit. Do not install conduits which have been crushed or deformed in any way.

Conduits and conduit sleeves for use by others shall be capped until used.

Make up all conduit connections tight to provide good electrical conductivity throughout the entire length of the conduit run including flexible conduits.

**Installation of Conductors and Wiring.** Install wiring and conductors only when the raceway system has been completed. Thoroughly clean the inside of all conduits of any dirt, moisture or other foreign materials before pulling wire and cable. Pull wires and cables in conduits after an application of suitable lubricant that will have no injurious effect on the insulation of the conductor. No oil or grease shall be used.

Make no splices or joints in either feeders or branch circuits except at outlets, accessible junction boxes or accessible raceway fittings.

Secure joints in circuit wiring mechanically and electrically. Conductors shall be joined by compression-type splicing sleeves, by means of bolted type pressure connectors having cast-metal bodies, or on terminal blocks. Split-bolt type connectors are not acceptable. Unless properly insulated by the connector, all joints shall be insulated at least equal to the insulation of the conductors.

Identify all power conductors insulation by color coding as follows:

Conductor	System Voltage	
	240/120	240
Phase A	Black	Black
Phase B	Red	Red
Phase C	Blue	Blue
Neutral	White	--
Ground	Green	Green

Note: Conductors No. 6 AWG or larger, permanent plastic colored tape may be used to mark conductor end instead of coded insulation. Tape shall cover not less than 50 mm of conductor insulation within enclosure.

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

Identify control wiring by color-coded, plastic-coated, self-sticking printed markers, permanently attached stamped metal foil markers, or equivalent means. The identification of each control wire shall consist of a number and a letter based on the final approved Control Schematic. The number shall correspond to the line number on the schematic. The letter shall be determined as follows: The left most wire on line 21 shall be 21A, the next right wire is 21B, etc. Provide conductor identification within each enclosure where a tap, splice, or termination is made. Identify control circuit terminals of equipment also. Terminal and conductor identification must be shown on approved shop Drawings. Hand lettering or marking is not acceptable.

Verify that circuits are wired as indicated and are continuous and free of shorts. Energize and test each circuit, including lights and outlets. Check voltage at outlets. Test other electrical equipment as recommended by manufacturer. Measure grounded conductor resistance to true ground and resistance between insulation and ground. Resistance must be within limits specified in Paragraph 2-b below. Troubleshoot and correct as necessary.

Repeat the tests specified above in the presence of and to the satisfaction of the Engineer.

1. Test operate each circuit and circuit control the number of times specified by the Engineer.
2. Acceptable Resistances:
  - a. Grounded Conductor to True Ground: 2 ohms, maximum.
  - b. Between Insulation and Ground: 100 megohms, minimum.

**Permanent Removal and Reinstallation Items.** The Contractor shall disconnect and remove permanently or temporarily, as indicated on the Drawings, any and all items of electrical equipment, conduits and wiring existing on the bridge or mounted in the Operator's House, as required to permit the installation of new electrical work shown on the drawings. The Drawings do not necessarily show every electrical item which may exist in these areas but the Contractor shall temporarily remove any such item when directed by the Engineer. Upon completion of the fuel tank installation the Contractor shall reinstall the electrical items temporarily removed as well as the new work detailed on the Drawings.

**Testing and Adjusting.** The Contractor shall provide all labor, equipment, and materials and make all arrangements for testing the completed fuel system work. Tests may be applied to a system either in its entirety or in sections. No part of the fuel system shall be covered or

## **ITEM 10599.2721 M - FUEL STORAGE SYSTEM REPAIRS**

concealed until it has been approved and tested. The fuel system shall be tested in accordance with the local codes and in no case less than the following:

1. The entire system of piping shall be thoroughly blown out for the purpose of removing dirt and grease. This shall be continued for as long a period of time as is necessary to thoroughly clean the installations.
2. The new fuel oil storage tank shall be tested liquid-tight per manufacturer's instructions.
3. Piping shall be tested to a hydrostatic pressure equivalent to at least 30 kPA of head of water for at least four hours. Any defects in materials or workmanship found to exist and cause leakage shall be repaired or replaced with new material as may be required by inspectors or the Engineer and the test repeated until work is shown to be watertight.
4. The Contractor shall be responsible for testing the complete fuel supply system and its operation with the emergency generator. All alarm panels, floats, and switches shall be tested for compliance as detailed on the Drawings and described in these Specifications.

**METHOD OF MEASUREMENT.** Payment for this item will be made at the lump sum price bid. Progress payments will be made in accordance with the following: The Contractor shall submit a schedule of work outlining each work phase, with a percentage figure assigned to each phase. The percentages assigned to each phase are subject to the approval of the Engineer. The Engineer will use this schedule to set progress payments. The Engineer may request a revised work schedule at any time. Failure by the Contractor to supply a revised work schedule upon request will cause the progress payment process to be immediately terminated.

**BASIS OF PAYMENT.** The lump sum price bid for this item shall include the cost of all labor, material, and equipment necessary to complete the work outlined herein.