Maintenance and Inspection Standard

1.00 Purpose:
The purpose of the Standard is to operate and maintain the fuel system for readiness to reliably provide fuel to the emergency generators. The system must be operated and maintained in accordance with all applicable safety requirements. The system must be maintained in accordance with local, State and federal environmental regulations.

2.00 Scope:
The scope of the fuel system includes receiving of fuel supplies through consumption at the generator.

3.00 Responsibility:
The facility manager has responsibility for operation and maintenance of the fuel system.

4.00 Change Management:
Maintenance and testing of the fuel system shall be accomplished in accordance with any change management procedures established for facility operations.

5.00 Personnel Safety:
Operation and maintenance procedures shall be in accordance with all facility safety standards. The specific hazards are (a) pressurized piping, (b) energized electrical circuits, (c) fire hazards associated with diesel fuel, (d) exposure to fuel vapors, (e) skin contact exposure to diesel fuel.

The following safety rules shall apply to all fuel system maintenance work:

1. Pressure piping systems shall be de-pressurized prior to performing work. Pumps and valves shall be locked out and tagged in accordance with established procedures.

2. Electrical systems shall be de-energized prior to performing work. The circuits shall be locked out and tagged in accordance with established procedures.

3. Fire extinguishers shall be present in the work area.

4. Cabinets, sumps, and other places of vapor accumulation shall be ventilated by portable fans prior to starting work.

5. Personnel shall use safety glasses and gloves where the potential exists for exposure to fuel.

6.00 Environmental Safety:
Operation and maintenance procedures shall be performed in a manner that prevents leaks or spills of diesel fuel. Oily waste shall be separated from other waste and shall be disposed of in accordance with all applicable regulations.

7.00 Fire Safety

Diesel fuel is a fire hazard. Storage and equipment areas shall be appropriately marked with fire hazard signs. Maintenance work in fuel storage and equipment areas should exclude activities that could produce spark or flames. Storage and equipment areas shall be kept free of debris.

8.00 Documents

The following documents shall be checked for completeness and shall be maintained in a readily accessible location: (a) fuel system operation and maintenance manuals, (b) fuel system training manuals, (c) Spill Prevention, Control, and Countermeasure (SPCC) plan.

9.00 Records

Records for fuel system operation and maintenance shall be prepared as follows:
(a) Records of Inspections and Tests, (b) Records of Fuel Deliveries, (c) Records of Alarms, (d) Records of Maintenance / Repair Services. Records shall be maintained for a minimum of 3 years.

10.00 Parts and Service

Spare Parts List and Vendor Contacts shall be checked for completeness and shall be included in the Operations and Maintenance Manuals. Recommended spare parts shall be maintained in parts inventory at the facility.

Service, Maintenance, and Emergency Response Vendor Lists shall be maintained with current contact information. The list shall include a service for periodic removal and disposal of oily waste such as rags, spill cleanup materials, and used oil filters.

11.00 Posted Information

Emergency Numbers and Contacts shall be posted in the maintenance office, control room, and in the fuel storage area.

Posted Instructions shall be maintained where required. The instructions shall be reviewed to confirm that they are clear and correct. The instructions shall be periodically checked to confirm that they are legible and undamaged.

12.00 Supplies

Spill Cleanup Kits including absorbent material shall be maintained at the site. The kits should be periodically checked and re-filled as required to maintain supplies of absorbent material.

Fire Extinguishers shall be maintained in a ready state and shall be periodically inspected for a valid test or recharge date.

13.00 Training / Qualifications

Training of New Personnel: New personnel shall be trained in accordance with the original system training manual. Personnel shall be specifically trained in SPCC plan requirements and emergency response procedures

Demonstrated Competency: Personnel shall demonstrate competency in operating and maintaining the fuel system. The competency shall be proven by demonstration of an understanding of the following items:

The overall system function
Method for safe filling of bulk tanks
Method of determining fuel inventory
Normal operating status of control panels and valves
Manual pump activation and manual valves for filling of generator day tanks
The function of special equipment such as filters
Emergency response procedures
SPCC procedures

14.00 Handling of Oily Waste

Oily waste includes rags, absorbents, used filters, and other items generated during operation and maintenance. Oily waste shall be stored separately from other wastes, especially waste paper and cardboard. Oily waste shall be stored in liquid-tight steel drums. Plastic drums may be used if examined for resistance to diesel fuel. Oily waste shall be handled and disposed of by a licensed service provider.

15.00 Inspections and Tests

Inspections and tests shall be performed on a periodic basis in accordance with the attached Inspection and Test Standard and checklist.

Fuel System Inspection and Test Standard

Facility Name and Address	
Frequency of Inspection and Test	Items 1-6 Monthly Items 1-17 Quarterly
Date of this Inspection and Test	
Performed By:	

Item	Description	Complete
1.00	General Items	
2.00	Visual Inspection: General	
3.00	Visual Inspection: Piping	
4.00	Visual Inspection: Equipment	
5.00	Visual Inspection: Electrical	
6.00	Visual Inspection: Controls	
7.00	Tank Level Gauge / Leak Detection	
8.00	Day Tank / Generator Tank Level Controls	
9.00	Duplex Pump Set Controls	
10.00	Filter Sets	
11.00	Fill Stations with Automatic Equipment	
12.00	Tank Selection Controls	
13.00	Tank Equipment	
14.00	Heating Equipment	
15.00	Remote Annunciation / BMS Alarms	
16.00	Special Interfaces / Fire Alarms	
17.00	Fuel Quality	

Fuel System Inspection and Test Standard

1.00	General Items	Acceptable	Initial
1.01	Regulatory registrations and fees current		
1.02	SPCC plan is current		
1.03	New personnel received training		
1.04	Interview operating personnel for any open or recurring issues		
Comments:			

2.00	Visual Inspection: General	Acceptable	Initial
2.01	Signage and posted instructions in place		
2.02	Locked and secured items		
2.03	Evidence of fuel stains from leaks or spills		
2.04	Location and condition of spill cleanup kit		
2.05	Emergency numbers posted		
Comments:			

3.00	Visual Inspection: Piping	Acceptable	Initial
3.01	Fuel Leaks		
3.02	Damage or deflection		
3.03	Wear at pipe supports		
3.04	Condition of paint		
3.05	Condition of ID markings		
3.06	Condition of insulation		
3.07	Valves in normal position		
Comments:			

Fuel System Inspection and Test Standard

4.00	**Visual Inspection: Equipment**	**Acceptable**	**Initial**
4.01	Spill container: presence of water or spilled fuel. Evidence of damage, wear, or fuel leaks.		
4.02	Fuel tank containment sumps: presence of water or spilled fuel. Evidence of damage, wear, or fuel leaks		
4.03	Visual inspection of aboveground tanks: spilled fuel stains, condition of exterior finish, integrity of exterior shell, ID markings, condition of paint on tank fittings		
4.04	Pump enclosures: presence of water or spilled fuel. Evidence of damage wear or leaks		
4.05	Filter enclosures: presence of water or spilled fuel. Evidence of damage, wear, or leaks		
4.06	Day tanks / generator tanks: presence of water or spilled fuel in containment. Evidence of damage, wear, or leaks.		
Comments:			

5.00	**Visual Inspection: Electrical**	**Acceptable**	**Initial**
5.01	Conduit damage or deflection		
5.02	Open or damaged junction boxes		
5.03	Water in junction boxes		
5.04	Disconnects and switches in normal position		
5.05	Circuit breakers in ON position		
Comments:			

Fuel System Inspection and Test Standard

6.00	**Visual Inspection Controls**	**Acceptable**	**Initial**
6.01	Panels in ON condition		
6.02	Test panel lights		
6.03	No ALARM conditions		
6.04	Test audible alarms		
6.05	Selectors in AUTO position		
6.06	Check panel interior for disconnected wires, moisture, damage		
Comments:			

7.00	**Tank Level Gauge / Leak Detection**	**Acceptable**	**Initial**
7.01	No alarm conditions		
7.02	Check printer paper if applicable		
7.03	Tank levels in normal range		
7.04	Confirm tank gauge reading with manual stick gauge check		
7.05	Confirm high level audible alarm functional		
7.06	Annual: remove level transmitter, move float to high and low range and confirm level alarms match panel settings. Confirm high level remote alarm activation		
7.07	Annual: remove all leak sensors, activate sensors, confirm panel alarm and correct identification of sensor		
7.08	Annual: Confirm water in tank bottom reading with manual stick gauge check with water indicating paste		
Comments:			

Fuel System Inspection and Test Standard

8.00	**Day Tank / Generator Tank Level Controls**	**Acceptable**	**Initial**
8.01	No alarm conditions		
8.02	Tank levels in normal range		
8.03	Confirm tank level with manual gauge check		
8.04	Confirm direct read level gauge matches actual		
8.05	Operate in manual mode: confirm pump on, confirm fuel flow		
8.06	Isolate primary inlet solenoid valve by closing manual valve. Operate in manual mode. Confirm flow through secondary valve		
8.07	Isolate secondary inlet solenoid valve by closing manual valve. Operate in manual mode. Confirm flow through primary valve		
8.08	Return flow pump where applicable: Operate in manual mode to confirm operation of pump		
8.09	Annual: Use portable pump to lower fuel level to low and critical alarm values. Confirm alarm indication. Allow tank to fill to normal fill OFF level. Manually operate tank fill to high level. Confirm high level indication. Confirm operation of return flow pump or high level shutoff valve		
8.10	Annual: Inspect strainers for dirt and debris. Replace filters where applicable		
Comments:			

Fuel System Inspection and Test Standard

9.00	Duplex Pump Set Controls	Acceptable	Initial
9.01	Operate pump 1 in manual mode. Confirm suction and discharge gauges for normal range		
9.02	Operate pump 2 in manual mode. Confirm suction and discharge gauges for normal range		
9.03	Disable pump 1 at circuit breaker. Operate day tank in manual mode to activate pump set. Confirm automatic switch to pump 2. Place circuit breaker in ON position.		
9.04	Disable pump 2 at circuit breaker. Operate day tank in manual mode to activate pump set. Confirm automatic switch to pump 1. Return circuit breaker to ON position		
9.05	Where applicable confirm setting of back pressure regulating valve		
9.06	Annual: Inspect strainers for dirt and debris		
9.07	Annual: Close pump set discharge valves. Operate pumps to confirm operation and set pressure of safety relief or bypass valve.		
9.08	Annual: Manually operate all valves to confirm free movement. Return to normal position		
9.09	Annual: Confirm amp draw on pump motors for normal range		
Comments:			

Fuel System Inspection and Test Standard

10.00	**Filter Sets**	**Acceptable**	**Initial**
10.01	Operate pumps in manual mode. Confirm filter differential pressure in normal range. Where pump integral to filter set confirm pump suction and discharge pressure in normal range		
10.02	Operate vent valves slowly with pumps ON to remove air in vessel		
10.03	Open water drain valve to remove water		
10.04	Where applicable confirm setting of back pressure regulating valve		
10.05	Annual: Replace filter cartridges		
10.06	Annual: Manually operate all valve to confirm free movement		
10.07	Annual: Confirm amp draw on pump motors for normal range where pump integral to filter set		
10.08	Annual: Confirm operation of timers		
Comments:			

11.00	**Fill Stations with Automatic Equipment**	**Acceptable**	**Initial**
11.01	Operate system in manual mode. Confirm automatic valves open and return to closed position.		
11.02	Where applicable operate pump momentarily in manual mode to confirm operation		
11.03	Annual: remove high level sensors from tanks. Manually operate sensors to confirm proper activation of status lights, alarms, automatic valves, and pump lockouts.		
11.04	Annual: Confirm amp draw on fill pump motor		
Comments:			

Fuel System Inspection and Test Standard

12.00	Tank Selection Controls	Acceptable	Initial
12.01	Operate tank selection in manual mode. Confirm operation of automatic valves		
12.02	Place tank 1 in OFF position. Operate pump in manual mode. Confirm that tank 2 is automatically selected.		
12.03	Place tank 2 in OFF position. Operate pump in manual mode. Confirm that tank 1 is automatically selected.		
12.04	Annual: Remove tank sensors. Operate sensors manually to confirm activation of status lights, alarms, automatic valves, and pump lockouts.		
Comments:			

13.00	Tank Equipment	Acceptable	Initial
13.01	Aboveground Tank Direct Read Gauges: where applicable confirm reading with actual tank levels		
13.02	Annual: Tank vents: confirm that vents are free moving and clear of any debris		
13.03	Every 3 Years: Remove and inspect overfill prevention valves for free movement		
Comments:			

14.00	**Heating Equipment**		
14.01	Visually inspect control panel for alarms		
14.02	Confirm that temperature reading agrees with actual		
14.03	Annually: Set temperature at 10 degrees above ambient, allow heater to power up, confirm that temperature rises and heater turns off at set point. Reset control to required temperature set point.		
	Comments:		
15.00	**Remote Annunciation / BMS Alarms and Data**	**Acceptable**	**Initial**
15.01	Confirm that remote annunciators and BMS display indicate normal conditions. Check lamps where applicable.		
15.02	Simulate a summary alarm and confirm function of remote annunciator or BMS display		
15.03	Annual: Simulate all alarm conditions and confirm indication at remote annunciator or BMS display. Where applicable move tank level gauge through range and confirm accurate response of BMS system		
Comments:			
16.00	**Special Interfaces such as Fire Alarms**	**Acceptable**	**Initial**
16.01	Annual: Simulate activation of interface devices and confirm lockout or other required response of fuel system		
Comments:			

Fuel System Inspection and Test Standard

17.00	**Fuel Quality**	**Acceptable**	**Initial**
17.01	Annual: Check storage tanks for water accumulation in bottom using water indicating paste on gauge stick. Remove water where applicable.		
17.02	Annual: Check storage tanks for evidence of biological contamination		
17.03	Annual: Add biocide to storage tanks. Circulate fuel through tank with portable pump for full tank turnover while adding biocide		
Comments:			