

Generator System Preventive Maintenance and Contingency Planning



Agenda

- Types of power generation systems
- Benefits of a preventive maintenance program
- Power generation maintenance items
- Contingency Plans involving the use of Portable/
Rental power generation
- A classroom view of a Portable Generator



Types of Power Systems

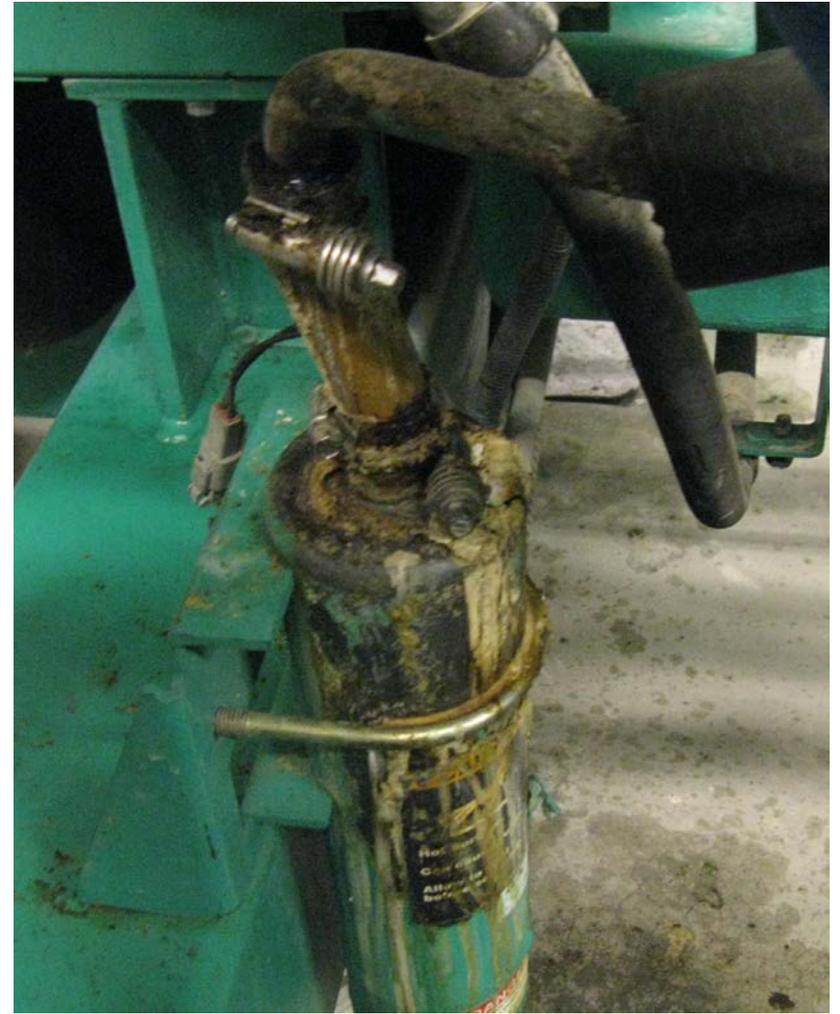
- Emergency Power Supply System (EPSS)
 - Level I (Life Safety) and Level 2
 - Independent Power Generation System
 - Feeds Power to systems whose failures may present a life safety hazard.
 - Legally Required
 - More Stringent Maintenance Guidelines under NFPA (**National Fire Protection Association**), JCAHO (**Joint Commission on Accreditation of Healthcare Organizations**), State and Local Jurisdictions
- Stand-By Power System
 - Independent Power Generation System
 - Allows operation of a facility in the event of normal power failures



Preventive Maintenance



Benefits of a Preventive Maintenance Program



Maintenance Schedule

- Each Manufacturer and Model have a unit specific Maintenance Schedule, normally broken down by daily, weekly, monthly events, etc..

TABLE 5-1. MAINTENANCE SCHEDULE

MAINTENANCE ITEMS	SERVICE TIME						
	See Engine Schedl.	Daily or after 8 Hours	Weekly or after 50 Hours	Monthly or after 100 Hours	6 Months or after 250 Hours	Yearly or after 500 Hours	4000 – 45000 Hours
General Genset Inspection	X ¹	X ²					
Check Coolant Heater		X					
Check Oil Level		X					
Check Coolant Level		X					
Check Fuel Level		X					
Check Charge Air Piping		X					
Check Air Cleaner (Clean if required)			X ³				
Check Battery Charging System			X				
Drain Water and Sediment from Fuel Tank			X ⁵				
Drain Exhaust Condensate Trap				X			
Check Starting Batteries				X			
Change Air Cleaner Element					X ³		
Check Radiator Hoses for Wear & Cracks					X		
Test Generator Insulation Resistance						X ⁷	
Grease generator bearing (P7)							X
Drain Fuel Filter(s)	X ¹						
Check Anti-freeze and DCA Concentration	X ¹						
Change Crankcase Oil and Filter	X ^{1, 6}						
Check Drive Belt Tension	X ¹						
Change Coolant Filter	X ¹						
Clean Crankcase Breather	X ¹						
Change Fuel Filters	X ¹						
Clean Cooling System	X ¹						
Test Rupture Basin Leak Detect Switch						X ⁸	



Preventive Maintenance Events

- An Emergency Power Supply System or Stand-By Power System are recommended to receive at least two maintenance events per year by a factory trained technician, but may occur quarterly or even monthly depending on system needs. Types of preventive maintenance events include:
 - Inspections (Minor Service)
 - Full Service (Major Service)
 - Load Bank Testing
 - Confidence Testing (system functionality test)
 - Fuel Restoration/ Tank Cleaning (Diesel Units)
 - Fluid Analysis

Inspections and Full Service Events

- An inspection event (minor service) is a comprehensive inspection of the generator and related components of the Power Generation System. Normally does not include fluid and filter replacement.
- A full service (major service) event contains the same inspection items or more than the inspection events. Full services generally include fluid and filter replacement.



Load Bank Testing

- Detects potential deficiencies in system which may appear in extended operation.
- Insures full rated output capacity.
- Removed potentially damaging deposits commonly referred to as “wet stacking” in the combustion chamber and exhaust system which may have accumulated under lightly loaded operation.
- Re-seat piston rings in the cylinder walls or liners.
- May be required annually by local code or regulations.

Any question you might have on . . .

PREVENTATIVE MAINTENANCE



Power Generation Contingency Plans

- A contingency plan for is a means to reduce future business risks caused by power disruption by understanding a facilities needs and how to react quickly.



Power Generation Contingency Plans

- **1. Choose a Connection:**

There are several ways to connect a back-up generator to your facility's power supply, and the connection you choose should be appropriate to your organization's needs.



Power Generation Contingency Plans

- **2. Choose a Location:**

After choosing the means by which you will connect your generator, you should determine its optimal placement at your facility.



Power Generation Contingency Plans

- **3. Plan for Exhaust and Emissions:**

All diesel engines produce exhaust, but by planning ahead you can keep it out of your building. Do not park your generator near your building's air intakes or under covered areas or overhangs where fumes can collect. Know your HVAC inlets locations.



Power Generation Contingency Plans

- **4. Determine Your Noise Abatement Needs:**
Generator noise can be a nuisance. Do you plan to operate your generator in a noise sensitive environment? While most quality rental generators are enclosed in sound-attenuated housings, noise can still be an issue. Check with your city or county ordinances, as noise regulations vary from place to place. You may face restrictions on running your generator at night.



Power Generation Contingency Plans

- **5. Plan to Provide Service Access:**

Service access is an additional point to consider in situating your generator. All generators need periodic maintenance and regular fueling.



Power Generation Contingency Plans

- **6. Prepare to Refuel:**

You should plan your generator's fuel needs in advance. People often overlook this aspect of emergency response planning.



Power Generation Contingency Plans

- **7. Provide Airflow:**

Mobile diesel generator sets need a steady supply of “breathing” air for combustion, and they are also typically air-cooled.



Power Generation Contingency Plans

- **8. Determine Your Voltage Needs:**

Do you need to power equipment that operates at different voltages? For example, does your facility need 120/208V “house power” in addition to 480V power for process equipment or air conditioning? Without the necessary transformers, a single generator set can cover only one voltage.



Power Generation Contingency Plans

■ 9. Secure Your Site:

Like all high-voltage electrical equipment, your emergency generator poses risks of injury and liability, and you should allow only qualified personnel access to it.



Power Generation Contingency Plans

- **10. Obtain the Necessary Operating Permits:**

Many jurisdictions require an operating permit to use a temporary generator. You may not need it for emergency power, but if there are permit rules and restrictions, you should secure them in advance.



Northwest

Power Generation Contingency Plans

■ **11. Identify Your Key Contacts:**

With your generator in place, you'll need to prepare a list of key contacts to reach in an emergency. These are the personnel who will be responsible for carrying out your plan.

- Electrical Contractor
- Fuel Company
- Generator Vendor
- Key Company Personal
- After hours contact phone numbers for the above.



Power Generation Contingency Plans

■ **12. Test Drive Your Plan:**

Many organizations work hard to create a contingency plan, but never test it. When their power fails, it's as if they never made a plan at all.

- Full on site test run with out normal power if possible.
- With rental generator on site.
- With site running on generator power.
- Take notes of what worked and what did not.
- Do not test drive your plan in a power outage.



Any questions
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Thank You for your time.

