

#### Emergency Power Reliability Considerations for Hospitals and Skilled Nursing Facilities Treating Coronavirus Patients – March 4, 2020

As federal, state and local public health officials collaborate with hospitals and skilled nursing facilities in the collective battle to tackle the Coronavirus threat, Powered for Patients is providing the following guidance for critical healthcare facilities whose emergency power system relies on a single generator.

Powered for Patients has continued to monitor news reports about a potential shortage of respirators should the scale of the outbreak reach a level where tens of thousands of Americans need respirators.

Hopefully things won't get to that point but public health leaders need to prepare for all possibilities. On this front, Powered for Patients has provided guidance material to federal, state and local public health officials about the risk associated with emergency power systems that rely on a single generator.

An estimated 16% of U.S. hospitals use only a single generator and nearly all Skilled Nursing Facilities (SNFs), including those licensed to provide respirator care for patients, rely on a single generator. Facilities relying on a single generator for emergency power support have no redundant emergency power in the event that their single generator fails. This represents an increased risk that should be considered by public health officials and those operating hospitals and SNFs with single generator emergency power systems.

It's important to note that with proper maintenance, single generators may have a low risk of failure. Yet, the consequences of losing emergency power in a facility with a single generator are for more serious than the loss of a single generator in a facility with multiple generators.

#### **Testing Recommendation**

Facilities currently treating or slated to receive Coronavirus patients should consider testing their emergency power system prior to receiving patients (or prior to receiving additional patients.) This suggestion reflects a lesson learned this past fall in California. In the face of a warning from Southern California Edison (SCE) of a pending Public Safety Power Shutoff (PSPS), a hospital took the pro-active step of testing its two generators. The test triggered the failure of one of the hospital's two generators and repair of the failed unit took a significant amount of time. Fortunately in this case, the PSPS was never triggered so the facility continued operating on utility power.

During a second SCE Public Safety Power Shutoff last year, a hospital just outside of Los Angeles County suffered a failure of its emergency power system. Thankfully in this case, the hospital was served by two lines from SCE and the utility was able to maintain utility power to the hospital through the secondary line. Failures of emergency power during last year's Public Safety Power Shut Offs were not limited to hospitals. During a Pacific Gas & Electric shut off, five sub-acute skilled nursing facilities licensed to provide respirator care suffered failures of emergency power. These hospital and nursing home emergency power system failures underscore the reality that even with proper maintenance and testing, emergency power systems can and do fail.

A test of an emergency power system prior to receiving a coronavirus patient can provide peace of mind that a facility's emergency power system is working properly. Should this test trigger a failure, a facility

has the opportunity to quickly address the problem with its service provider while utility power is still available.

#### Best Practices in Safeguarding Emergency Power

In 2017, Powered for Patients, in conjunction with the Rhode Island Emergency Management Agency, published *Protecting Patients When Disaster Strikes*, an emergency power resilience Playbook that detailed the critical steps key stakeholders can take to safeguard emergency power and expedite prioritized power restoration when emergency power failures cannot be avoided. This Playbook includes information from FEMA Guidance Document P-1019 that includes a checklist of steps facility managers can take before, during and after disasters to minimize the risk of an emergency power system failure. The Playbook also includes a spare parts inventory and fuel consumption checklist that facility managers can use to stay on top of fuel supply and help ensure that sufficient generator supplies and consumables are on hand at a facility at all times. Both of these resources are provided in the pages below.

Any individuals needing additional information about emergency power resilience can contact Powered for Patients Project Director Eric Cote at <u>cote@poweredforpatients.org</u> or by calling 401-374-8500.



are to be considered and labeled as emergency vehicles with authorized site passage

## 11. Communications

- a. Portable cell towers available and capable of being placed and made operational in short time
- b. Site two-way radios and cell phones charged and fully operational
- c. Site data reception and transmission systems inspected and proper operation tested with remote facilities and personnel

## 12. Generator

- a. Windings clean
- b. Space heaters operational
- c. Bearings properly greased
- d. Air intake and exhaust air paths cleaned of dirt, debris and obstructions

## 13. Cooling System

- a. Proper levels
- b. Leaks inspected and corrected as needed

Phase III – Rapid Threat Response

Phase IV – Post Disaster Recovery

# D-2 Emergency Power Supply System Checklist for Operating During Emergency from FEMA P-1019 Guidebook 1. Combustion Air Intake a. Louvers Operational with no restricted movement and no obstructions 2. Output Circuit Breakers a. Closed or ready and able to close if electricity operated 3. Fuel Quality tested and storage vessels maintained to prevent water and preve

- a. Fuel quality tested and storage vessels maintained to prevent water accumulation and bacterial growth
- b. Storage vessels, including day tanks, topped to appropriate levels
- c. Fuel transfer pumps powered by emergency system and periodically tested
- d. Water separators drained

# 4. Engine oil

a. Level checked periodically and determined proper

# 5. Consumables – Restock to 10 day supply (minimum) in on-site storage

- a. Fuel filters
- b. Oil filters
- c. Air filters
- d. Oil
- e. Coolant

# 6. Local, State and Federal Authorities and Service Organizations

- a. Emergency plans implemented
- b. Road maintenance crews maintaining site's public access
- c. Fuel delivery and engine generator set parts and service organizations allowed site access
- d. Service organizations implementing emergency plans to assure effective support staffing is available and capable

# 7. Communications

- a. Portable cell towers available and capable of being placed and made operational in short time
- b. Site two-way radios and cell phones charged and fully operational
- c. Site data reception and transmission systems properly operating

# 8. Generator

- a. Winding temperatures acceptable
- b. Bearings properly greased
- c. Air intake and exhaust air paths cleared of debris and obstructions
- d. Stable output voltage and frequency
- e. Ensure safe and easy access to Generators, Switchgear, Transfer Switches & Fuel Systems. Make sure that all debris is cleared from around your emergency power generators. Also, move or remove vehicles, trash compactors, containers, and other items that may block access to personnel and service trucks, including fuel providers.
- f. Behind fuel system problems, cooling system failures are the second most common source of failure during extended run times. Be sure that coolant is topped off to the proper level and that all hoses are free of leaks. Ensure that radiators are free of debris and that the radiator fan is working properly.
- g. Make sure that generators, switchgear, transfer switches and pumps are all in the On and/or Auto setting.

# 9. Condition Monitoring

- a. Receiving data
- b. Results normal

		Phase II – System Fortificatio & Mitigation		Phase III – Rapid Threat Response	Phase IV – Post Disaster Recovery						
D-3 Emergency Power Supply System Checklist for Recovery Following Emergency from FEMA P-1019 Guidebook											
1. Combustic a. Lou b. Rain c. Exh d. Insp	on Air Intake and I vers closed and no n cap closed aust piping inspect pect for wet stacking	Exhaust Systems obstructions ed and drain conden g and develop correc	sation	ion plan							
2. Batteries											
a. Cha b. Spe c. Cab	rging system opera cific gravity and vo le connections corr <b>set controller</b>	ational and alarms te Itages checked and rosion free and tight	sted accepte on both	d ends							
a. All le	ock-out faults inves	tigated, corrected ar	nd cleare	ed							
b. AUT	O start engaged										
4. Output cire	cuit breakers										
a. Clos	sed or ready and al	ole to close if electric	ally ope	erated							
5. Load cable	s		, i								
a. Clea 6. Engine blo a. Ope	aned and termination <b>ck, generator spa</b> Prational and circula	ons checked for prop <b>ce heaters, circula</b> t ating warm coolant a	er spac t <b>ing pur</b> nd oil (if	ing and torque <b>mp(s)</b> <sup>•</sup> equipped with a p	pump)						
7. Fuel delive	ery system										
a. Fue b. Stor	l quality tested and age vessels, inclue	storage vessels ma ling day tanks, toppe	intained ed to ap	to prevent water a propriate levels	accumulation and bacterial growth						
8. Engine Oil											
a. Cha	nge oil and filter(s) el proper	and sample as need	ded								
9. Consumat	les - Re-stock 10	day supply (minim	um) in d	on-site storage							
a. Fue b. Oil f c. Air f d. Oil	l filters ilters ilters										
10 Local Sta	ate and Federal A	uthorities and Servi	ice Ora	anizations							
	ergency plans revie	wed and improved	oc org								
b. Roa	d maintenance cre	ws remove debris ar	nd repai	r damage to allow	site access						
	cations										
	able cell towers re	racted maintained a	and pror	erly stored							
	two-way radios an	d cell phones charge	and and f	ully operational							
	data recention and	transmission system	ns insne	ected and proper o	peration tested with remote						
facil	ities and nersonne										
12. Insulation	system test con	ducted and results	analyze	ed to detect erosi	on						
	ce heaters operation	nal	anary 20								
h Air i	ntake and exhaust	air paths cleared of	debris a	nd obstructions							
c. Air g	ap between rotor p	oole and stator meas	ured at	12:00, 3:00, 6:00,	and 9:00 positions, recorded,						

- and analyzed to detect bearing wear or misalignment
- d. Excitation system inspected and tested
- e. Voltage regulator connections inspected and properly torqued
- f. Insulation system test conducted and results analyzed to detect erosion properly operating

# 13. Cooling System

- a. Proper levels
- b. Drain, flush and replace coolant as needed
- c. Inspect and correct leaks

# Inventory of Key Generator Parts & Fuel Consumption Rates

Key Part	Manufacturer	KW Rating	# of Units on	Fuel	Size of	# of Units on				
			Hand (as of	Consumption	tank	Hand (as of				
			Pre-Disaster	full load	fuel	Post-Disaster				
Generator #										
Thermostat (Engine)										
Thermostat (Water Heater Jacket)										
Motor Starter										
Fuse (multiple sizes)										
Water Heater Jacket										
Fanbelt(s)										
Heater Hose										
Fuel filter										
Fuel Water Separator Filter										
Air filter										
Coolant										
Coporator #										
Thormostat (Engine)										
Thermostat (Water Heater Jacket)										
Motor Starter										
Water Heater Jocket										
Fuel Water Separator Fliter										
Air filter										
Oil										
Coolant										
Generator #										
Thermostat (Water Heater Jacket)										
Motor Starter										
Fuse (multiple sizes)										
Water Heater Jacket										
Fanbelt(s)										
Heater Hose										
Fuel filter										
Fuel Water Separator Filter										
Oil filter										
Air filter										
Oil				ļ						
Coolant										
Automatic Transfer Switch										
Parts Ordering:										
Parts Department Contact Information:										
Point of Contact: Phone Number:										
Cell phone: Email:										
Secondary Point of Contact: Phone Number:										
Cell phone: Email										

NOTE: For facilities with more than three generators, copy this form to document parts inventory for additional generators.