EMERGENCY GENERATOR PLANNING

EXISTING DIESEL GENERATORS AND FUEL CONSUMPTION

The Sunland Water District has existing backup generators at Wells 1 and 2 and the Water Reclamation Facility as shown in the following chart:

Location	Generator Size	Fuel Capacity	Runtime Duration (@100% load)
Well 1 – Upper Res	80 kW	256 gallons	40 hours @100% *Up to 50 hrs. @75% - Conservative. (With one booster pump and well pump set to run only), and assuming at least 160 gals. In tank at any time.
Well 2 – Lower Res	60 kW	256 gallons	8 hours @ 100% *Up to 52 hrs. Runtime if 200 gals of diesel is stored in tank at any given time. (We also store 275 gals of diesel), At 75% load, such as only two boosters enabled and well pump, the lower generator could reach up to 111 Hrs. runtime. Also, only running one reservoir building can sustain even longer hours runtime, by switching to the other reservoir after diesel is exhausted at the other. 111 + 40 = 151 Hrs. Total available water via generator.
Water Reclamation Facility	125 kW	120 gallons	13 hours @ 100%
Taylor Generator Lift Stn #3	30 kW	180 gallons	Up to 90 hrs. at 50 % (only 1 pump at a time)
Main Lift Stn generator #1	60 kW	256 gallons	Up to 67 Hrs. at 75% (only 1 pump operating)
Spare Fuel @ The Barn		275 gallons	

The runtimes shown below are calculated for the generators running at 100% of stated capacity. This scenario is very unlikely and, as such, the runtime estimates are inherently conservative. A diesel generator fuel usage chart is included below to illustrate the difference in runtime between minimum and maximum generator output. The chart shows fuel usage in gallons per hour at various load percentages:

Generator Size	25% Load (gal/hr.)	50% Load (gal/hr.)	75% Load (gal/hr.)	100% Load (gal/hr.)
60 kW	1.8	2.9	3.8	4.8
75 kW	2.4	3.4	4.6	6.1
125 kW	3.1	5.0	7.1	9.1
30 KW	1.3	1.8	2.4	2.9

POWER OUTAGE RUNTIME AND MAX DURATION

With existing diesel generators and spare fuel, the District can operate normally without power for a maximum of 13 hours at the Water Reclamation Facility (WRF). In a realistic conservative approach, SunLand could achieve one day for all stations if barrel reserves are close to full. In the case of an extended outage, Well No. 2 (Lower Reservoir) would be shut down and Well No. 1 (Upper Reservoir) would provide water service to Sunland. If conservative measures are taken, the water supply, (via generators), could be stretched out from four to six days. This could be achieved by assuring that all irrigation is disabled if during summer months.

This time generalization could reach even more considering the stored diesel fuel. The storage building has 5 – 50-gallon barrels of diesel in storage at any given time. This increases available runtime for generators. The WRF only has 13 hours of available fuel at 100% production capacity of generator. Therefore, the WRF will need that extra fuel storage the soonest. This is considering a “Grid Out” failure only, with close to normal operations.

In the event of a major catastrophe such as an earthquake or tsunami, Sunland (and possibly most of the peninsula) could be without power for as long as 2 weeks. The district would need to store 7392 gallons of fuel to supply the existing

generators for that amount of time. Diesel fuel has a usable storage life of 12 months according to the BP oil industry. After 12 months of storage, the diesel forms a fine sediment and gum which clogs fuel filters and forms carbon and soot deposits. Not only would the District need to store over 7000 gallons of diesel, but would need to burn it all every year. This would increase generator runtimes significantly, resulting in more wear on the equipment and significantly higher fuel costs.

The City of Sequim stores enough fuel to power their water system generators for 48 hours and their treatment plant for 72 hours. They have a combination of diesel and propane generators.

If the District were to adopt a 48-hour outage max duration, a total of 1056 gallons of diesel fuel would be needed at the start of the outage. Not including the generator fuel tanks, around 781 gallons of spare fuel would need to be stored at the start of the outage. As the generators are exercised weekly and some diesel fuel is needed for the backhoe, the District would actually need to have the capacity to store roughly twice this amount or 1,680 gallons (1,380 gallons of spare fuel storage). Burning 1,680 gallons of fuel annually would cost roughly $9,441 per year (based on the US EIA current (5/10/22) rate of $5.62/gallon for #2 diesel).