

# Black Start Minimum Tank Suction Level

Operating Committee

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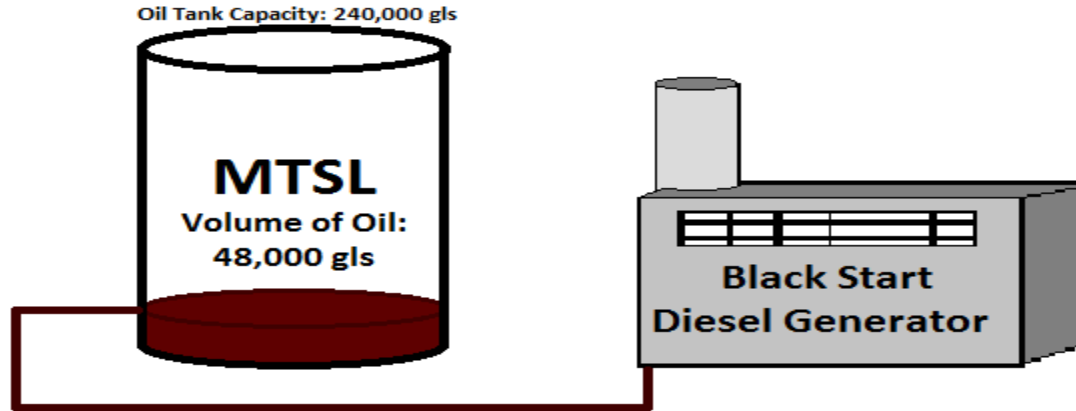
Monitoring Analytics

# Minimum Tank Suction Level. Stand Alone

- **Some units that participate in the PJM energy market have oil tanks.**
- **All oil tanks at generating units have minimum tank suction levels (MTSL). (Unless they use direct current pumps.)**
- **MTSL is not a result of black start capability.**



# Minimum Tank Suction Level. Black Start Only



# Minimum Tank Suction Level. Black Start Only

- **Black Start MTSL = MTSL**
  - **Where:**
  - **Black Start Tank Ratio = 100 Percent**



# Minimum Tank Suction Level. Black Start Only

- **Example:**
  - **Tank Capacity: 240,000 gals**
  - **MTSL: 48,000 gals**
  - **Unit Fuel Burn Rate: 12,000 gals per hour**
  - **Minimum Run Hours: 16 hours**
  - **Total Black Start Fuel Burn: 192,000 gals**
  - **Black Start Tank Ratio = 100 %**
  - **Black Start MTSL = 48,000 gals**
  - **Tank Capacity = Black Start Fuel Burn + MTSL**

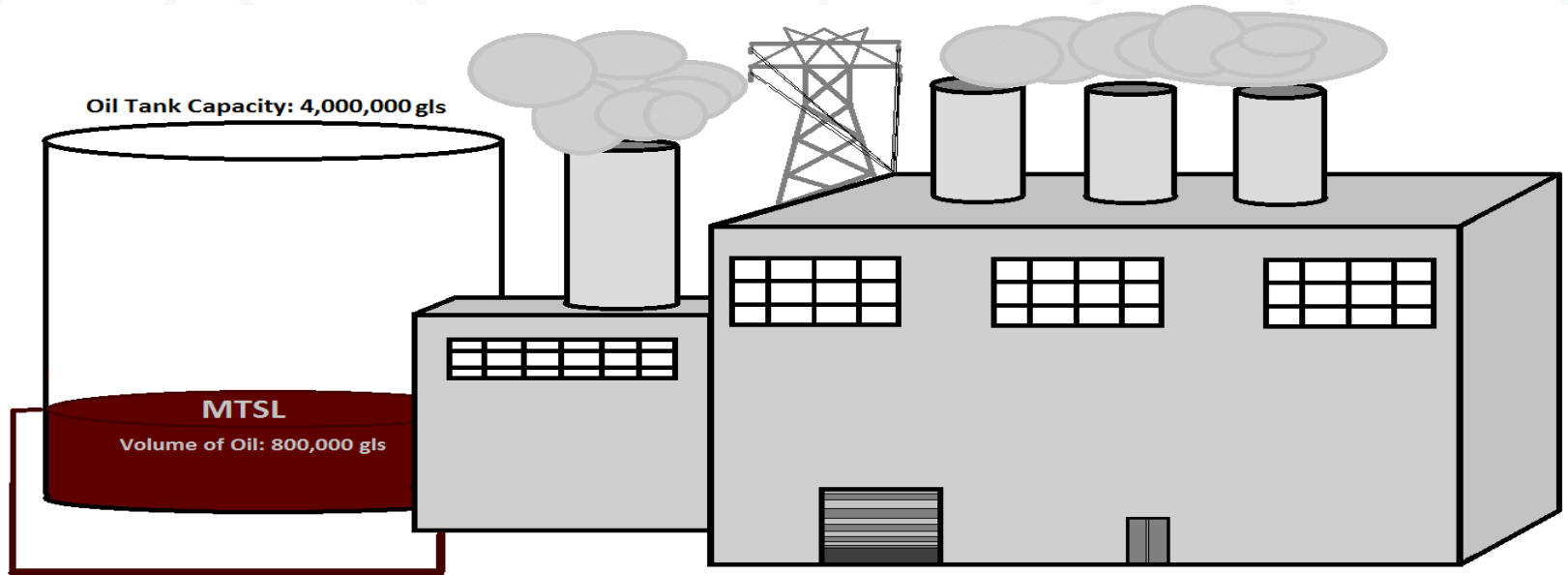


# Minimum Tank Suction Level. Shared Tank

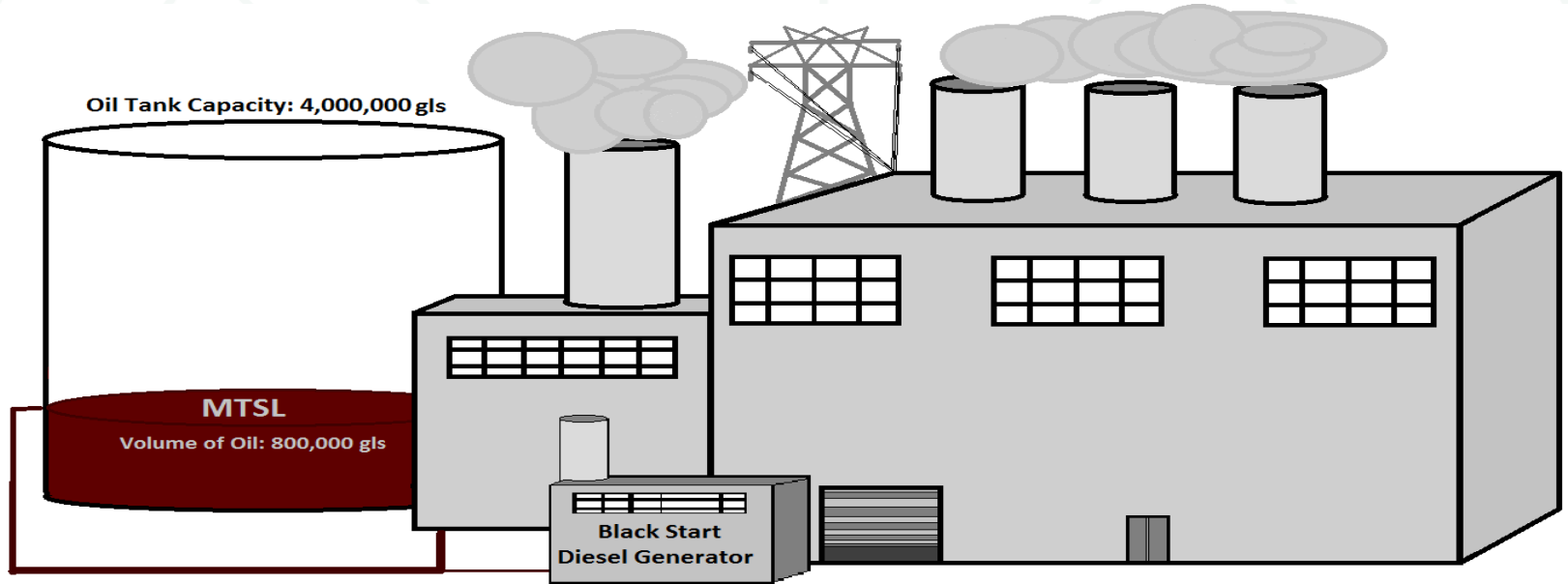
- **Many Black Start units use fuel tanks that are shared with generating units that participate in the PJM energy and capacity markets.**



# Minimum Tank Suction Level. Before Black Start



# Minimum Tank Suction Level. Shared Tank





# Minimum Tank Suction Level. Shared Tank

- **Black Start MTSL = Black Start Tank Ratio × MTSL**
  - **Where:**
  - **Black Start Tank Ratio =  $\frac{\text{Unit Fuel Burn Rate} \times \text{Minimum Run Hours}}{\text{Tank Capacity} - \text{MTSL}}$**
  - **(Share of usable fuel capacity.)**



# Minimum Tank Suction Level. Shared Tank

- **Example:**

- **Tank Capacity: 4,000,000 gals**

- **MTSL: 800,000 gals**

- **Unit Fuel Burn Rate: 12,000 gals per hour**

- **Minimum Run Hours: 16 hours**

- **Total Black Start Fuel Burn: 192,000 gals**

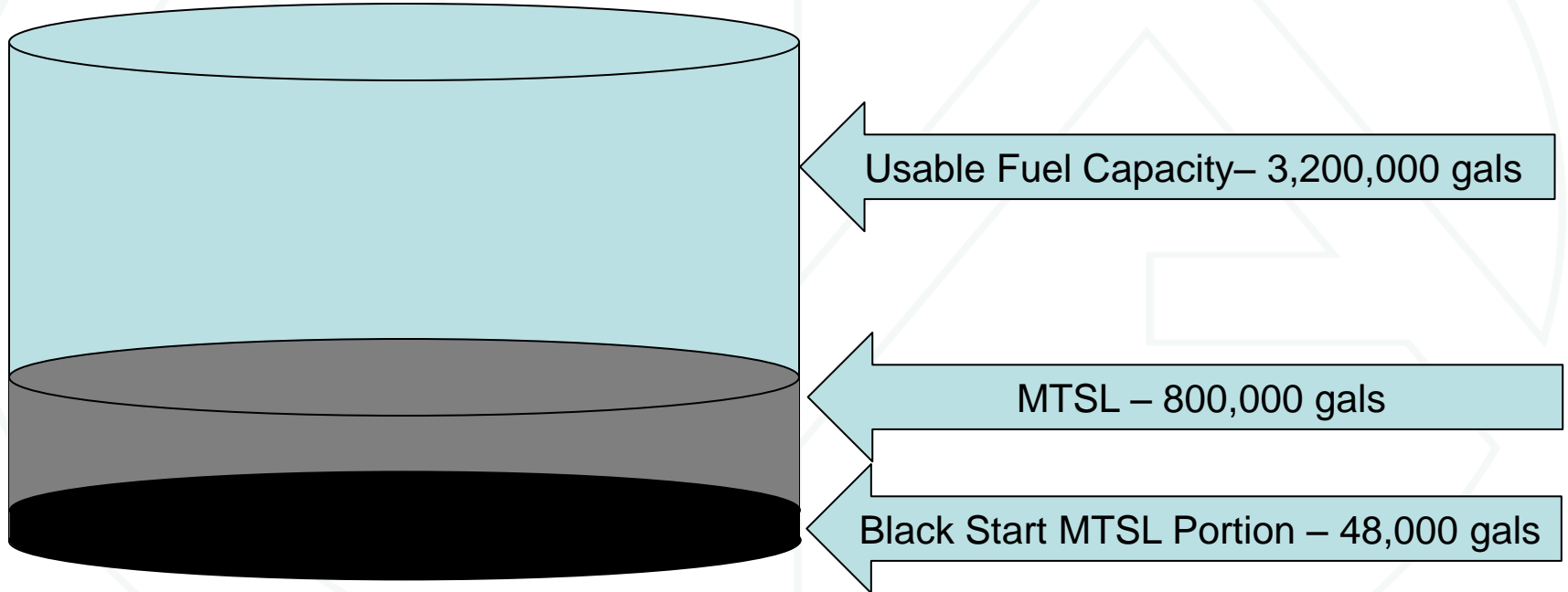
- **Black Start Tank Ratio** =  $\frac{12,000 \frac{\text{gals}}{\text{hr}} \times 16 \text{ hrs}}{4,000,000 \text{ gals} - 800,000 \text{ gals}} = 6.0 \%$

- **Black Start MTSL** = 6.0% x 800,000 gals = 48,000 gals



# Minimum Tank Suction Level

- **Tank Capacity: 4,000,000 gals**



# PJM Method vs. IMM Method

- **PJM's method would allow recovery of carrying cost on 800,000 gals of fuel.**
- **The IMM's method would allow recovery of carrying costs on 48,000 gals of fuel.**
- **The actual incremental amount of MTSL that results from the addition of black start capability is zero.**
  - **When black start capability is added at a generating unit, the oil tank size remains the same and the MTSL remains the same.**



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