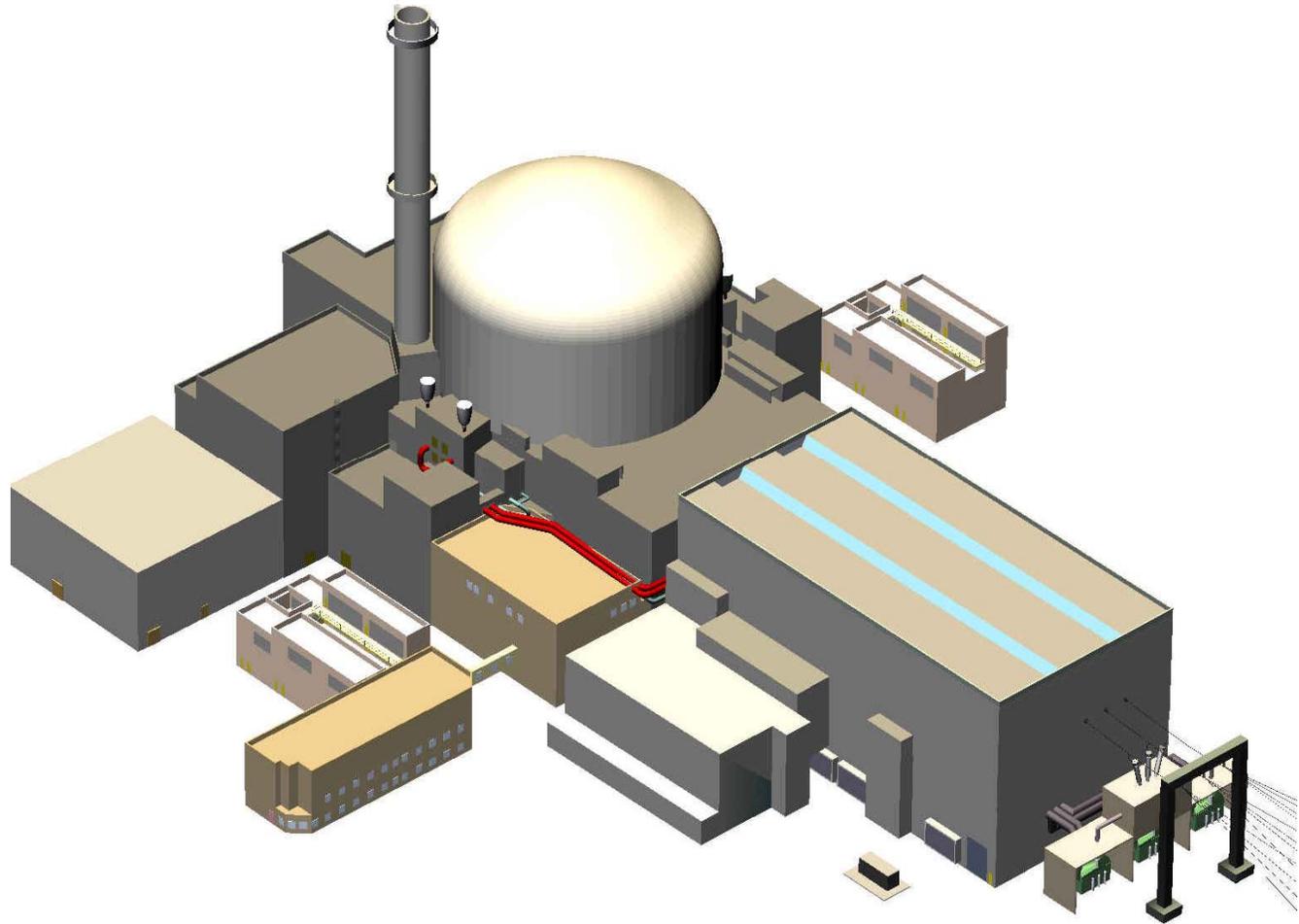
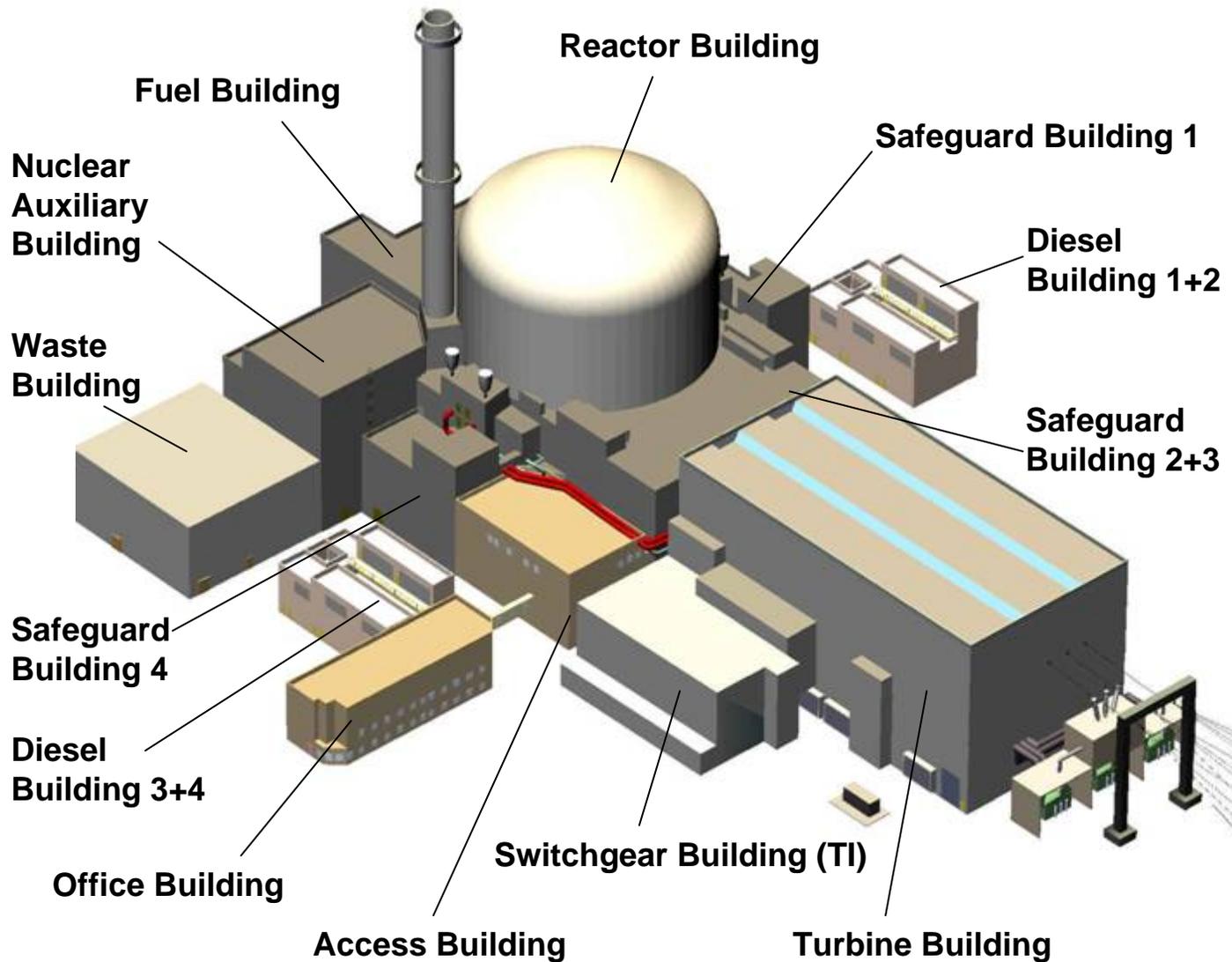


Brief Discussion of U.S. EPR Electrical Distribution Systems



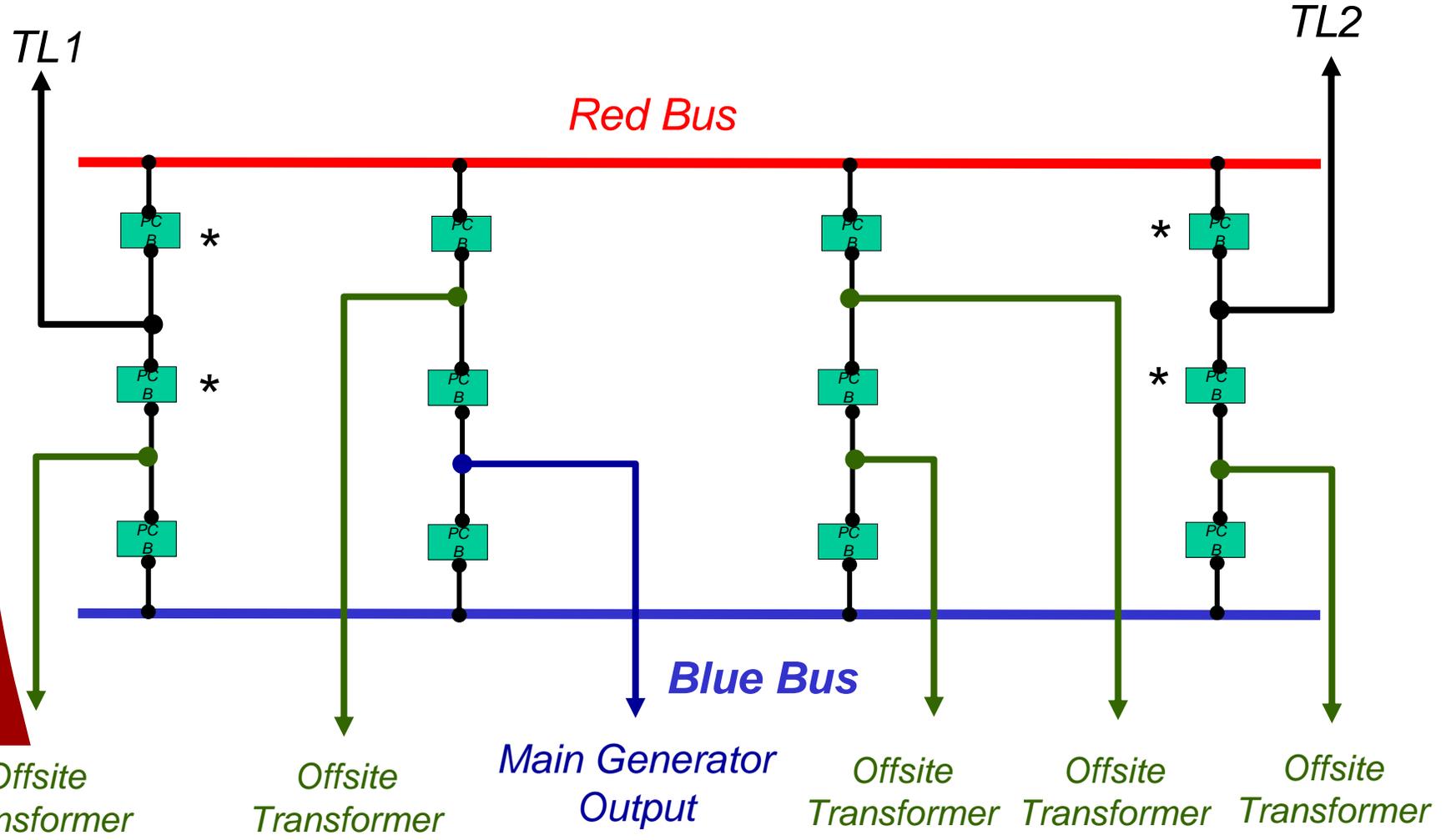
Brian Gardes
Electrical Engineer
New Plant Engineering

General Plant Layout



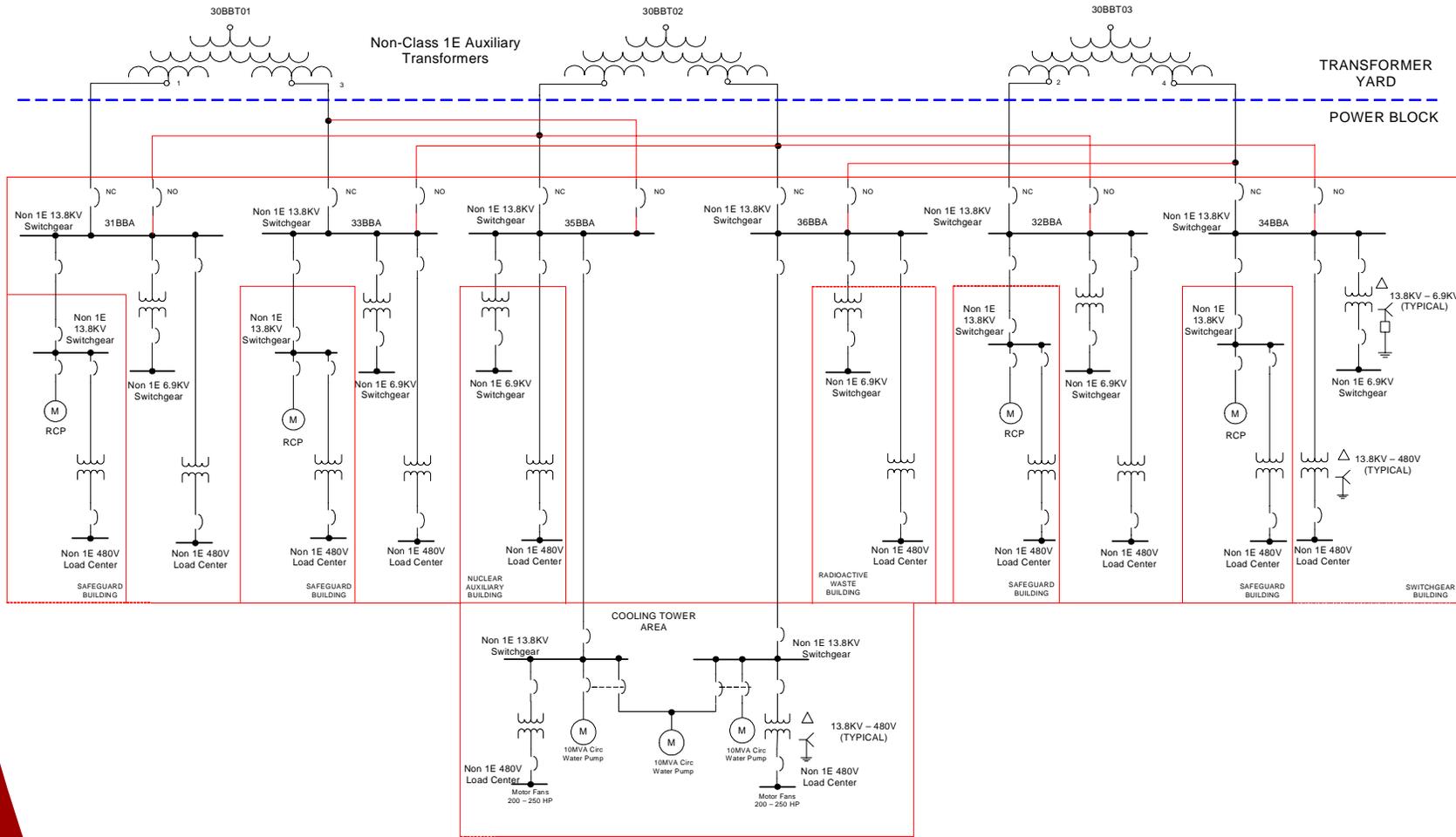
Typical U.S. Switchyard Configuration

Breaker and 1/2 Scheme

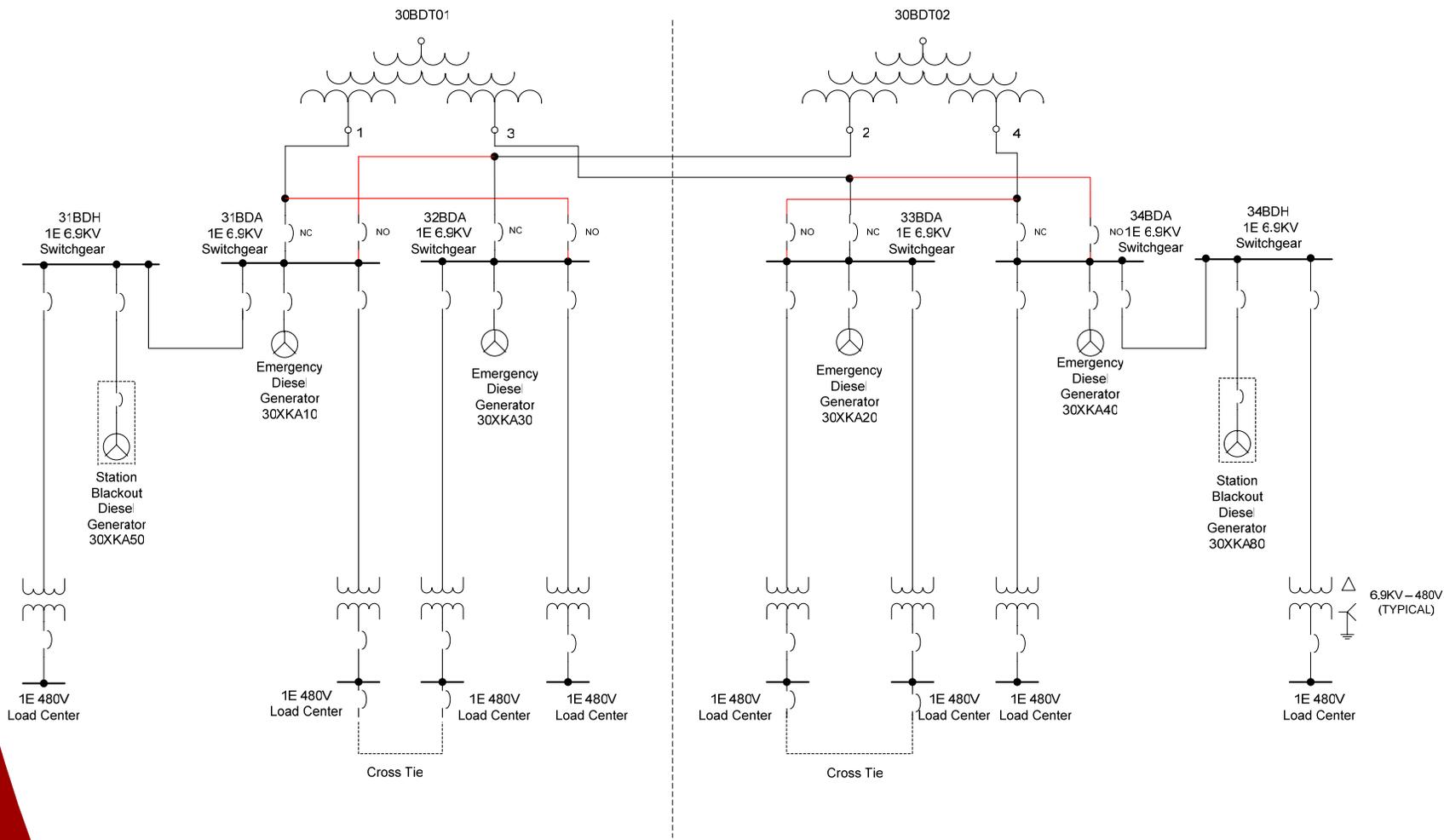


* TL breakers open for House Load Operation

NPSS System Offsite Power



EPSS Offsite Power



Electrical Power Features

- ◆ **Safety-Related Emergency Power**
 - **Number of Emergency Power Trains = Four, 100% capacity units (one per Safeguards division)**
 - **Type of Power Sources – Two off-site sources with no intervening non safety related buses, Emergency Diesel Generator (EDG), Uninterruptible Power Supplies (UPS)**
 - **Capacity of EDG - ~ 9800 KW per EDG**
 - **Physical Separation**
 - **Electrical Separation within Safeguards Buildings**
 - **Two EDG Buildings located on opposite sides of Reactor Building**
 - **Each diesel generator is separated within EDG building**

Electrical Power Features

- ◆ **Alternate AC Source(s)**
 - **Number of Alternate AC Source(s) = Two, 100% capacity units (Divisions 1 and 4)**
 - **Type of Power Source – Diesel Generator**
 - **Capacity of Power Source - ~ 3700 KW**
 - **Alternate AC Features**
 - **Meets SBO Rule (10 CFR 50.63), SECY-90-016 and SECY 93-087**
 - **Diversity from EDGs**
 - **Diverse manufacturers**
 - **Diverse diesel generator design (size differences)**
 - **Diverse fuel sources**
 - **No sharing of auxiliaries (e.g., cooling water, HVAC)**

Electrical Power Features

◆ Unit Output Design

- Power Output – 2000 MVA/ ~1600 MW to the grid
- Frequency – 60 Hz
- Minimum Grid Voltage - 345 kV for standard EPR design
- Maximum Load Rejection Capability = 100% Grid Load
- Reactive Load Capability – Meets FERC Requirements for Large Generators (0.9 PF supplying VARs and 0.95 PF accepting VARs)
- Under-frequency Operation – Meets evolving NERC Requirements for Northeast Power Coordinating Council
- Switchyard Design – Site Dependent

From Conception To Fabrication

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