

Commissioning & Start-Up of a WTP Backup Power Facility

May 6, 2016

Erika Murphy, P.E. (OR)

JWC Project Manager





Genset Installation

August 27, 2015

Why is Backup Power Important?

- Power outages are everyday occurrences in the US
- Can take hours to weeks to months to restore power
- Short of an earthquake, power loss is the WTP's biggest vulnerability
- Expectation that drinking water will come online faster than power
- AWWA Best Management Practices recommend a backup power source for minimum 40% - 50% WTP capacity
- **CRITICAL FACILITY:** One of our missions as a water provider is reliability. This project is paramount in ensuring reliability.

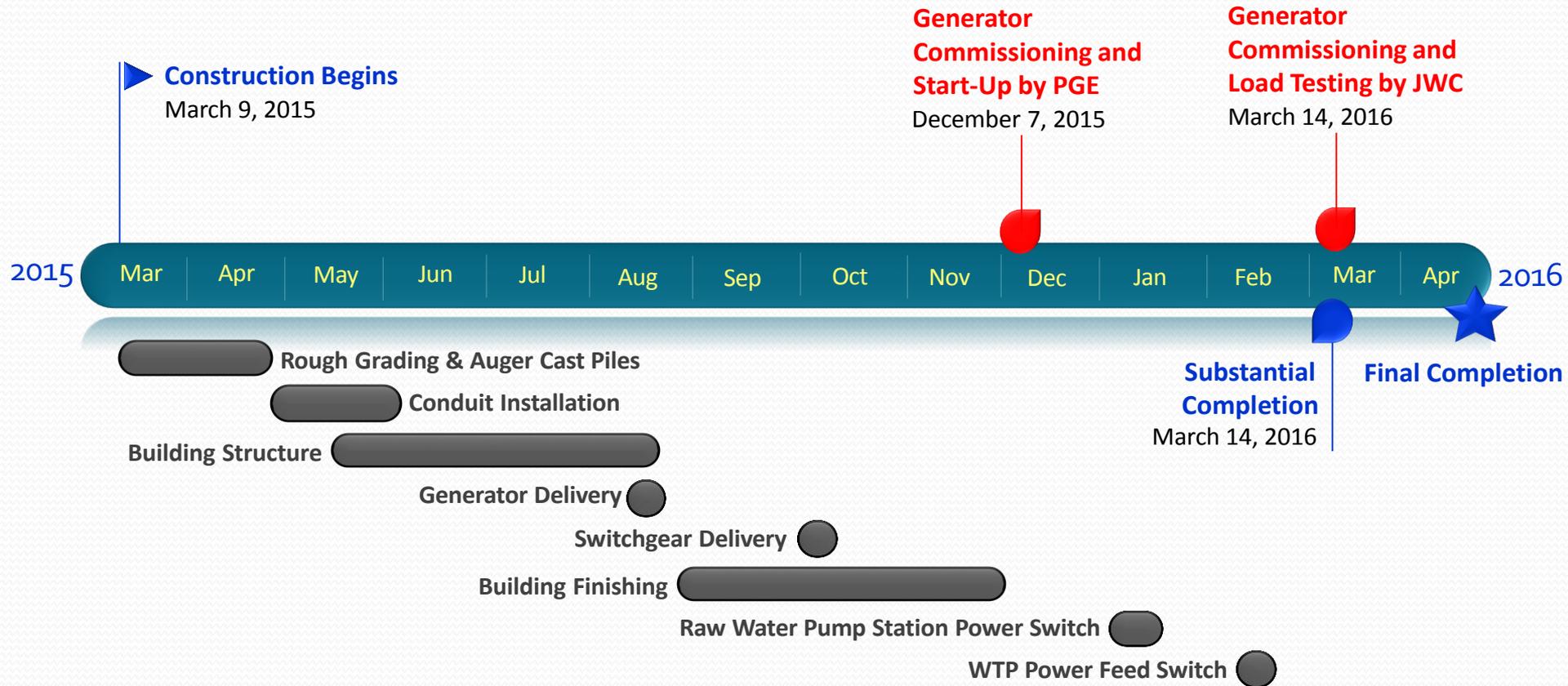
Partnership Opportunity

- Local power provider is Portland General Electric (PGE)
- Dispatchable Standby Generation (DSG)
- With 5MW of JWC power, the DSG program achieved 100MW of dispatchable standby power
- PGE provided funding incentives at completion of project for additional equipment (\$222,000) and aid in construction (\$1,117,850 for 5MW)
- PGE contract is for 10 years, with automatic 1-year renewals thereafter unless terminated

PGE DSG Benefits

- While under contract, PGE provides:
 - Monthly testing of the generators under load
 - Diesel fuel – testing and fill-ups
 - Preventative maintenance on generators and switchgear
 - Engine tune-ups and general wear repairs
 - Emissions DEQ permit modifications and renewals
 - 24/7 monitoring and assistance
- PGE may use the generators to offset peak loading (<50 hours/year)
- **Emergency operations by JWC always take priority**

Project Schedule



Total Project Costs

Approved Project Budget	\$ 6,000,000
PGE Aid in Construction	\$ 1,383,850
<u>PGE Accelerated Schedule Contribution</u>	<u>\$ 150,000</u>
Total Available Budget	\$ 7,533,850
Construction	\$ 6,191,740
Engineering	\$ 825,674*
<u>Initial Diesel Fuel Tank Fill</u>	<u>\$ 22,994</u>
Current Project Cost	\$ 7,040,408

*not final

Auger Cast Pile Installation



Conduit Duct Banks – Pile Supported



Duct bank E



Duct bank D



concrete in duct bank D



Fuel Tank Piping



South Elevation



View from the WTP



Generator and Muffler





Project Challenges



Project Challenges

What exactly is a non-segregated phase bus duct?

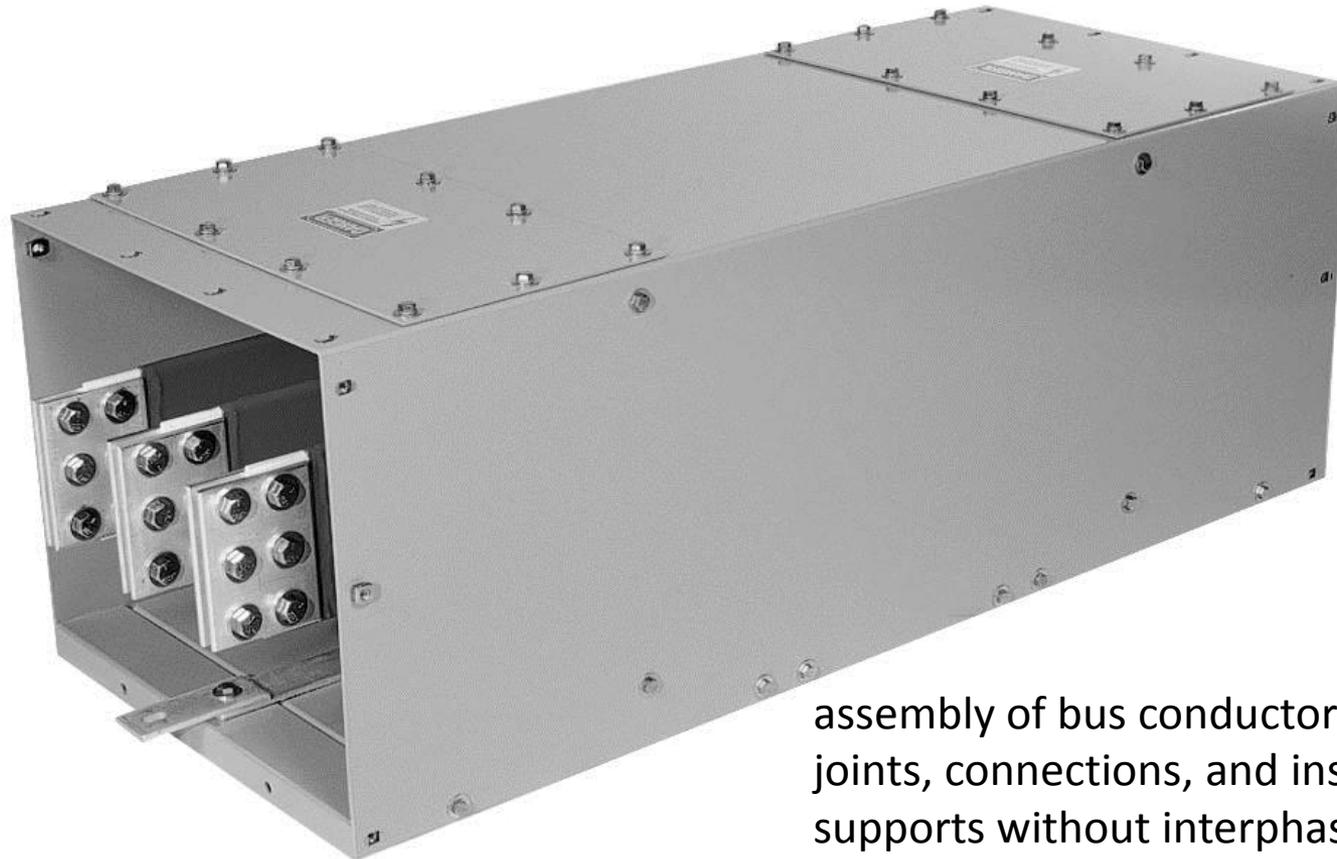
Project Challenges

What exactly is a non-segregated phase bus duct?



Project Challenges

What exactly is a non-segregated phase bus duct?



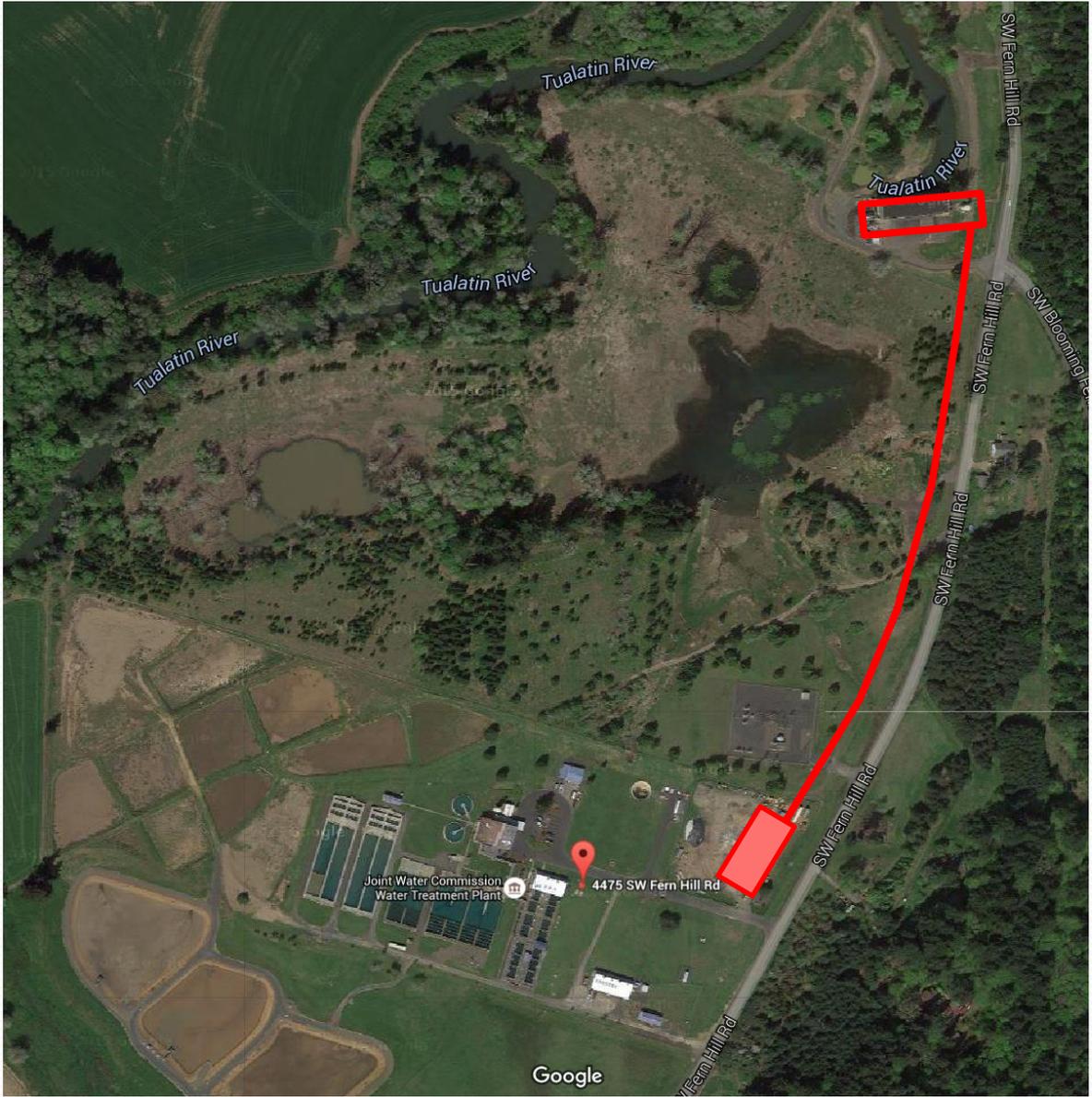
assembly of bus conductors with joints, connections, and insulating supports without interphase barriers



Project Challenges







Conduit Trench

Easements - Multiple Property Owners





Project Challenges

Permitting



Fuel Considerations

How much fuel is the right amount?

Fuel Considerations

- After a large seismic event, fuel will be hard to get
 - Roads will be out
 - Everyone will need fuel for utility repairs
- Maintaining fuel quality
 - Diesel fuel degrades over time
 - Biological growth and moisture create issues
- Our solution?
 - 48 hours of fuel
 - Monthly fuel testing
 - Fuel polishing system

15,000 Gallon Fuel Tank



Commissioning Party

- Joint Water Commission
- WTP Operators/Electricians
- JWC SCADA Technician
- Peterson Caterpillar
- R&W Engineering
- CurrenTechnologies
- Carollo Engineers
- 2KG Contractors
- Design Electric
- PGE DSG
- PGE Distribution
- Taurus Power & Controls

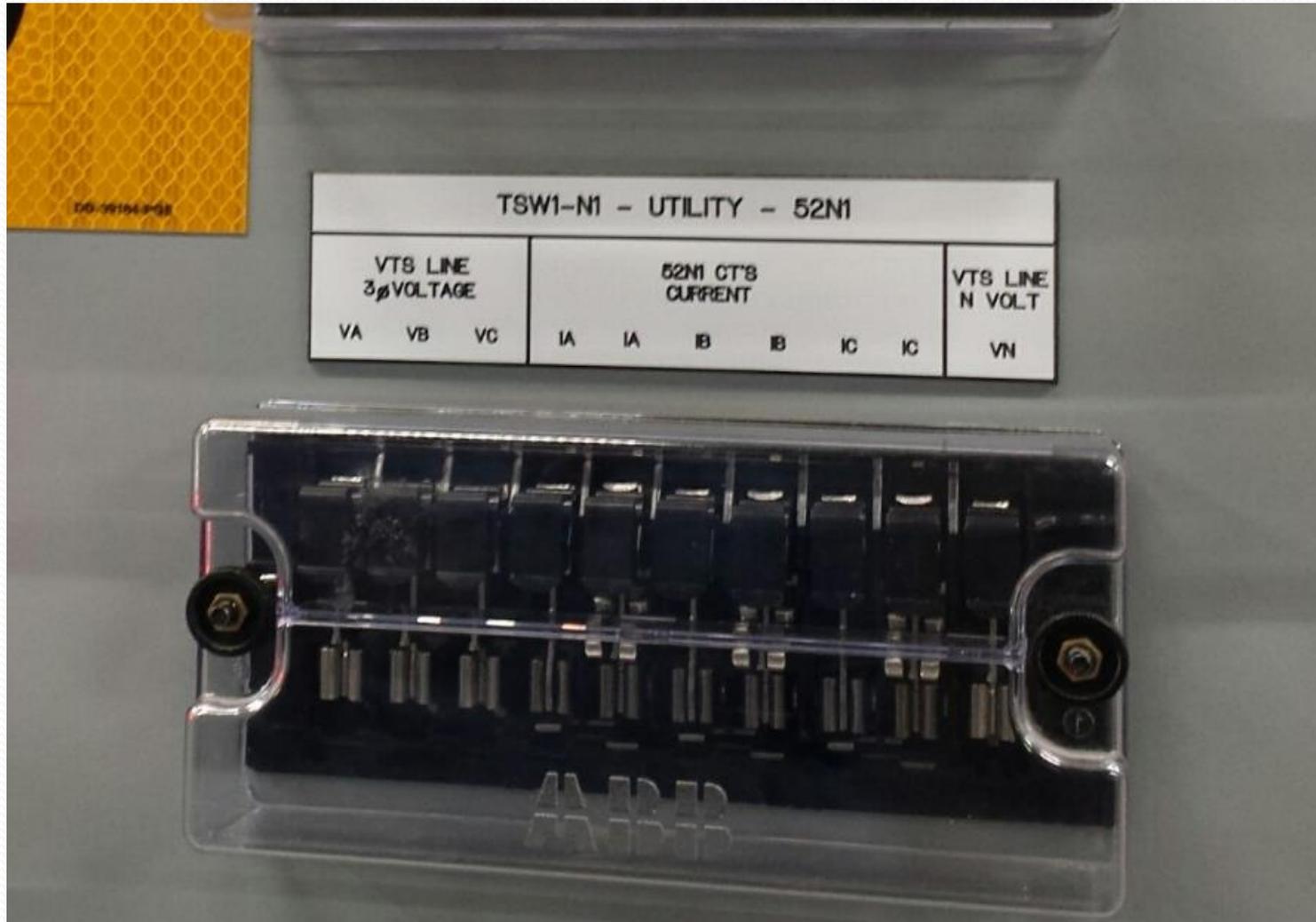
Commissioning Party

- Joint Water Commission
- **WTP Operators/Electricians**
- JWC SCADA Technician
- Peterson Caterpillar
- R&W Engineering
- CurrenTechnologies
- Carollo Engineers
- 2KG Contractors
- Design Electric
- PGE DSG
- PGE Distribution
- Taurus Power & Controls

Commissioning and Load Testing



Commissioning and Load Testing



And everything went perfect



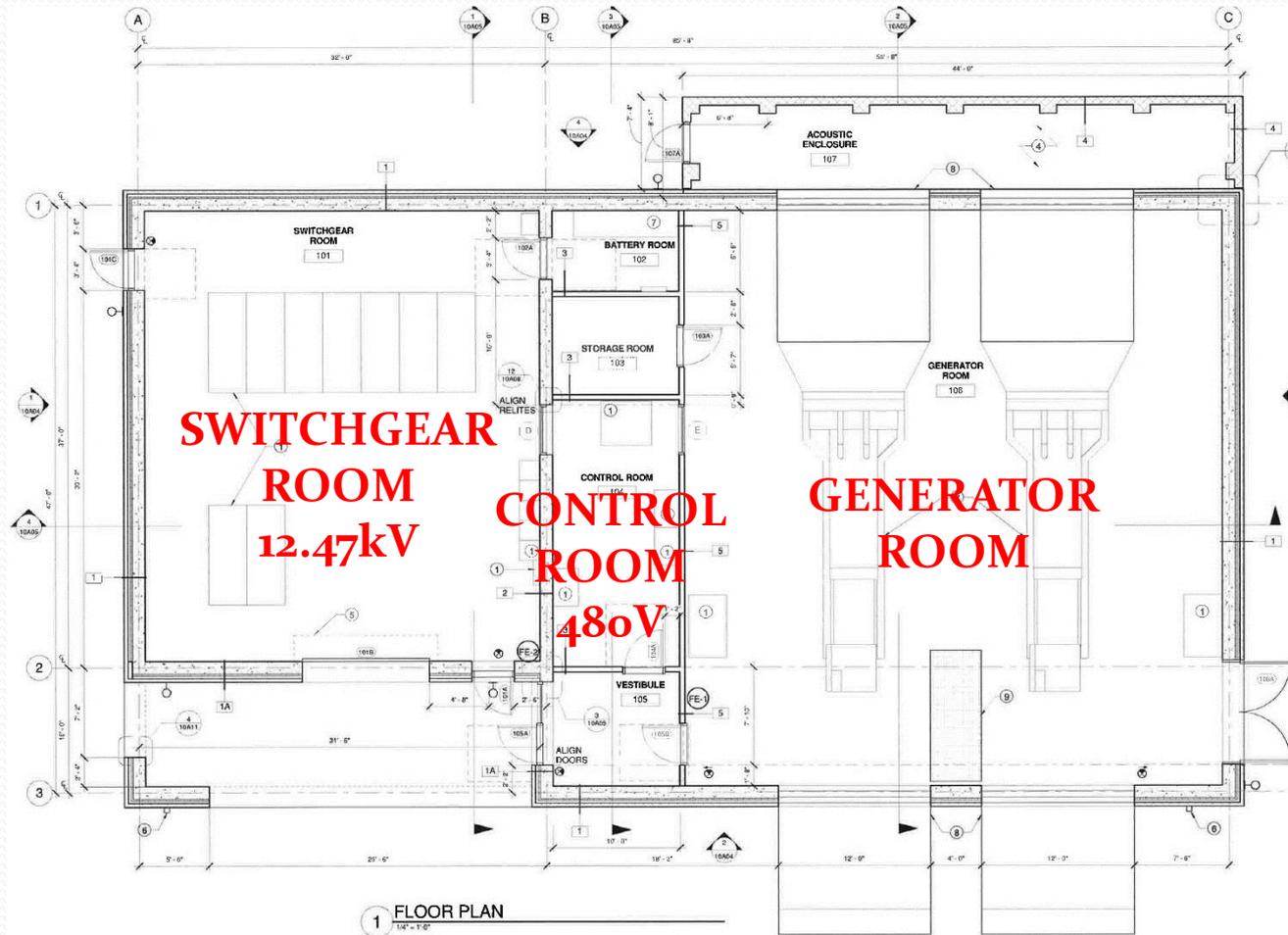
Commissioning and Load Testing



Safety in Design



Safety in Design



Murphy's Law

March 2016

SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19

Murphy's Law

March 2016

SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	FAILED TEST	8	9	10	11
12						
13	14	15	16	17	18	19

Murphy's Law

March 2016

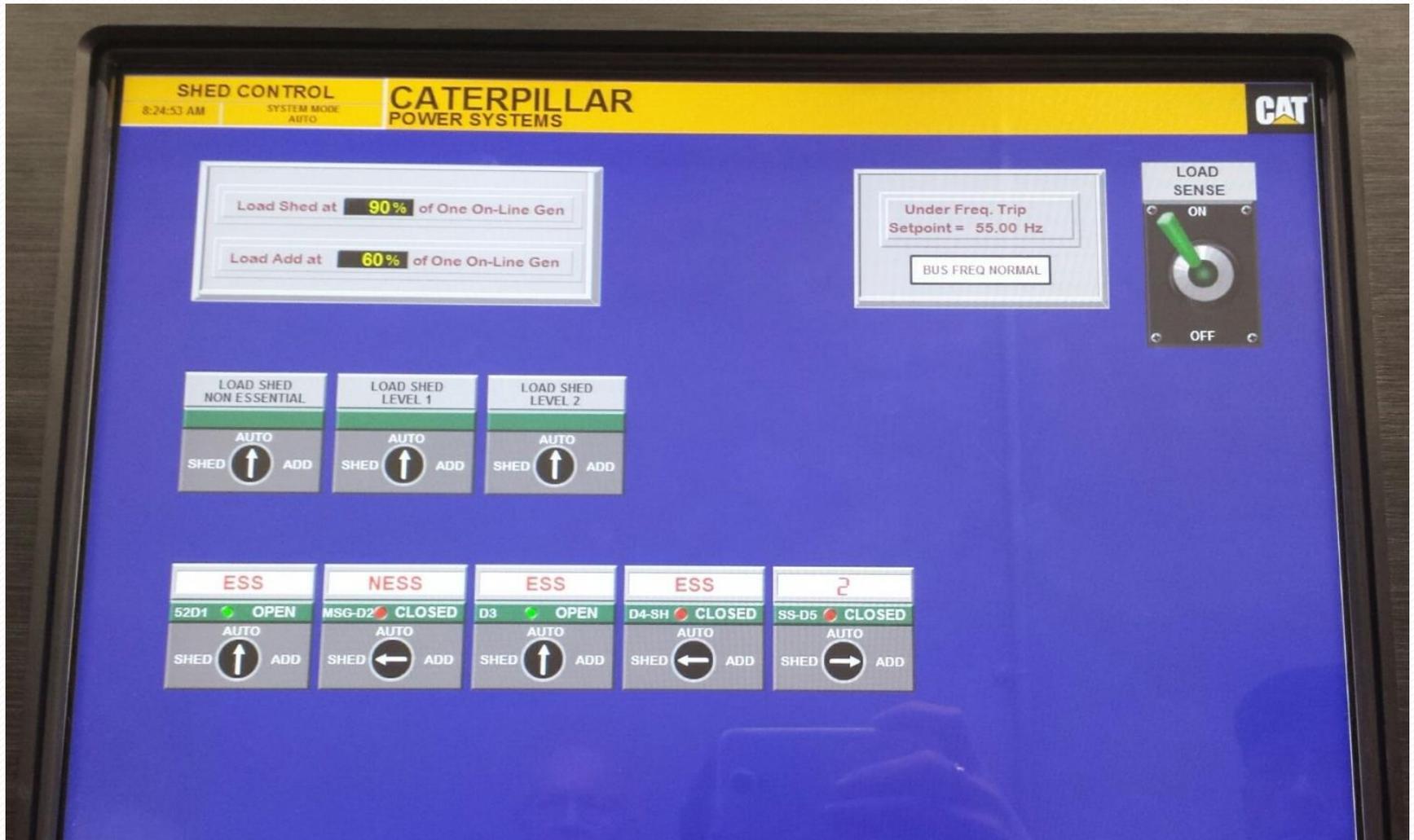
SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	FAILED TEST	8	9	10	11
12						
13	NEXT SCHEDULED TEST	14	15	16	17	18
						19

Murphy's Law

March 2016

SUN	MON	TUE	WED	THU	FRI	SAT
		1	2	3	4	5
6	7	FAILED TEST	8	9	10	11
WIND STORM 13	NEXT SCHEDULED TEST 14	15	16	17	18	19

Commissioning and Load Testing



Commissioning and Load Testing



Success!

