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BEHIND THE METER SAFETY

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Objective

Demonstrate that safety is a value in behind the meter storage.

Outline

Key points:

- Equipment safety through testing
- Installations per codes
- Safety practices during installation

Benefits:

- Energy storage will be safe for the people who work on it and the for the community that will use it.

Next steps:

- Development of additional safety standards
- Monitoring and communicating safety standards

Battery Safety/Certifications

Cell level safety tests

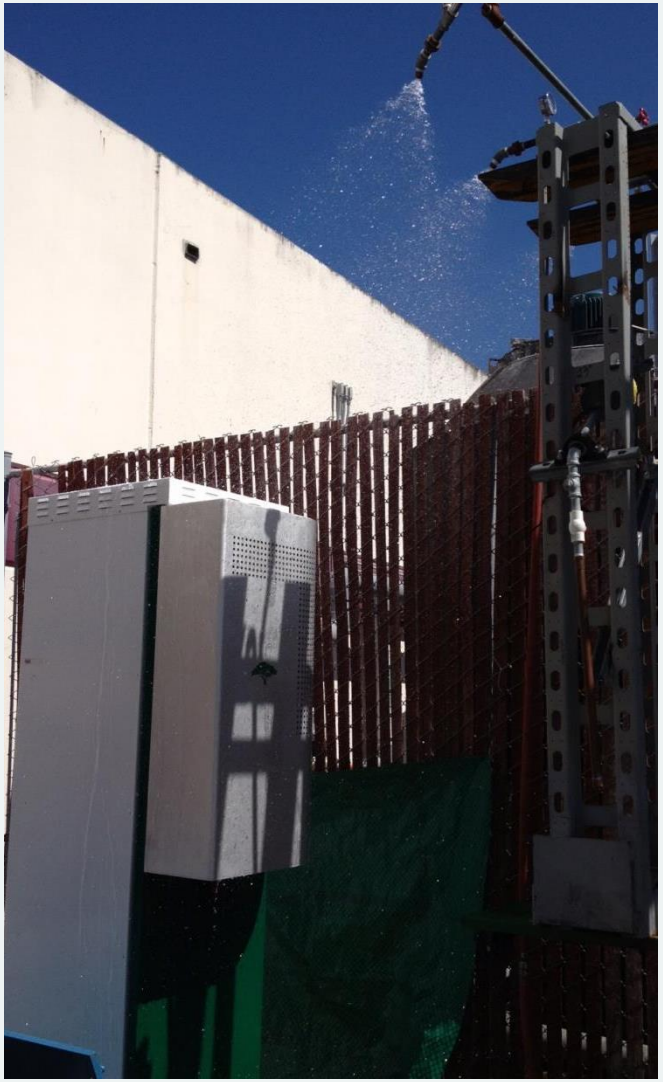
- Mechanical tests
  - Crush
  - Mechanical shock
  - Impact
  - Drop
  - Damp heat/steady state
  - Random vibration
- Thermal
  - Thermal Stability
  - Thermal shock in air
- Electrical Abuse
  - Over charge
  - Over discharge
  - External Short Circuit

Cell/System Level Certifications

- UL 1642
  Cell Safety
- UL 1973
  Trays, switchgears
- UN DOT38.3
  Shipping of lithium ion batteries

Equipment Testing

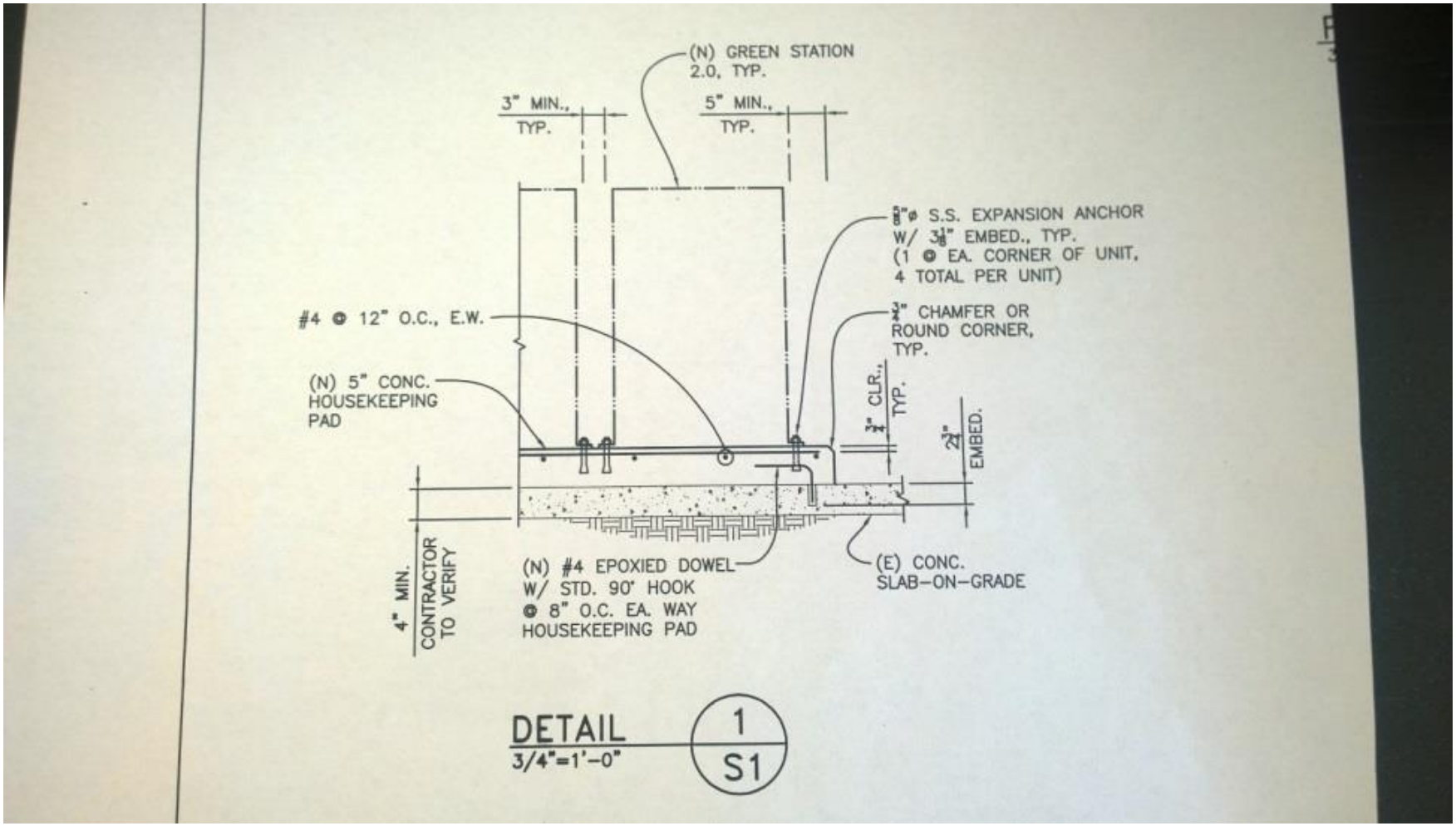
- Vibration
- Humidity
- Temperature



Installation Considerations

- Drawings are done by registered professional engineer
  - National Electrical Code/California Electrical Code
    - Feeder sizing
    - Grounding
      - Storage Batteries
    - Interconnected Electric Power Production Source
  - CPUC guidelines
    - Rule 2
    - Rule 21
    - SGIP
  - California Building Codes-Seismic Design Factors
    - Risk Category
    - Site Class
    - Seismic Design Category

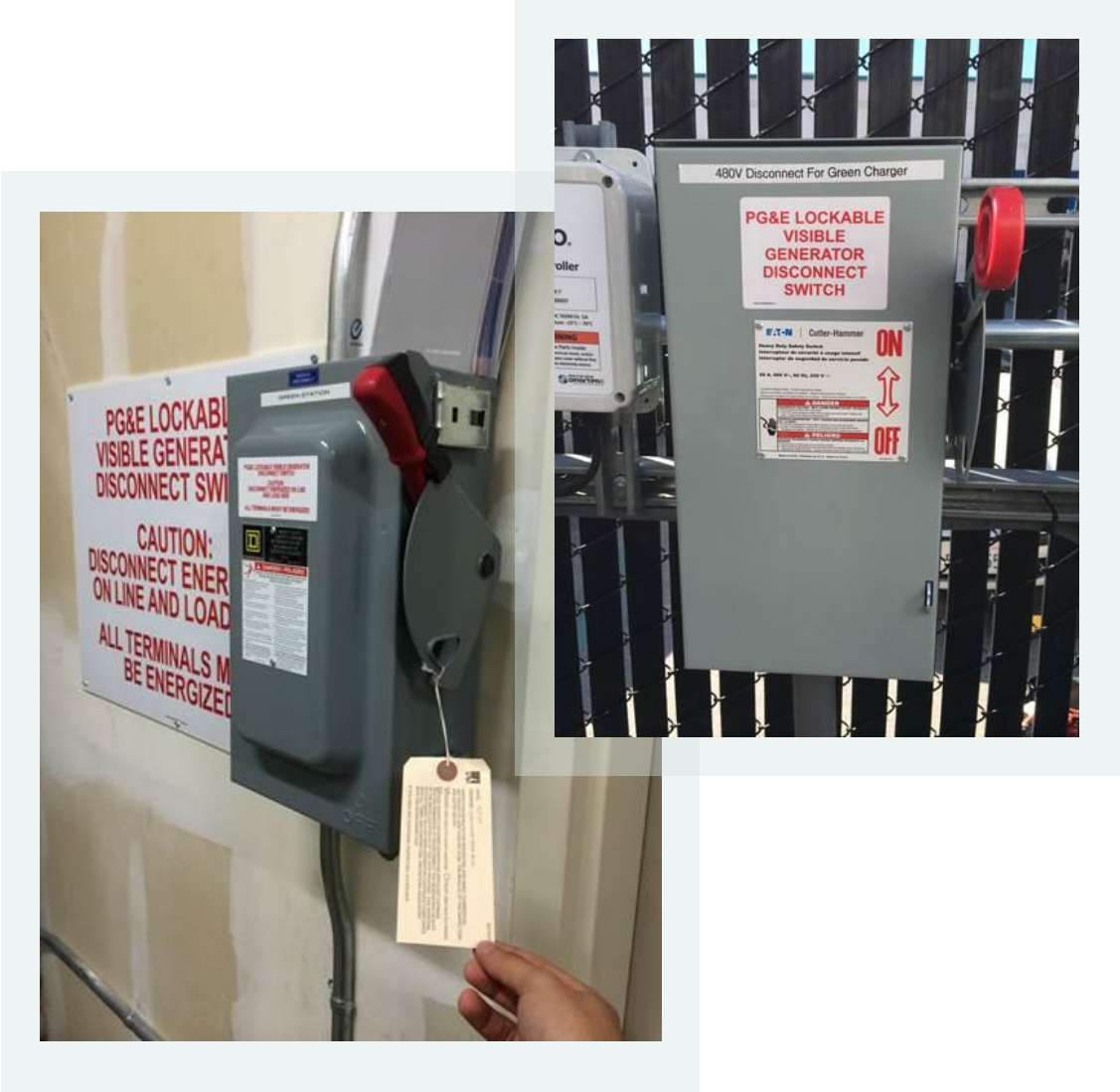
Seismic Details



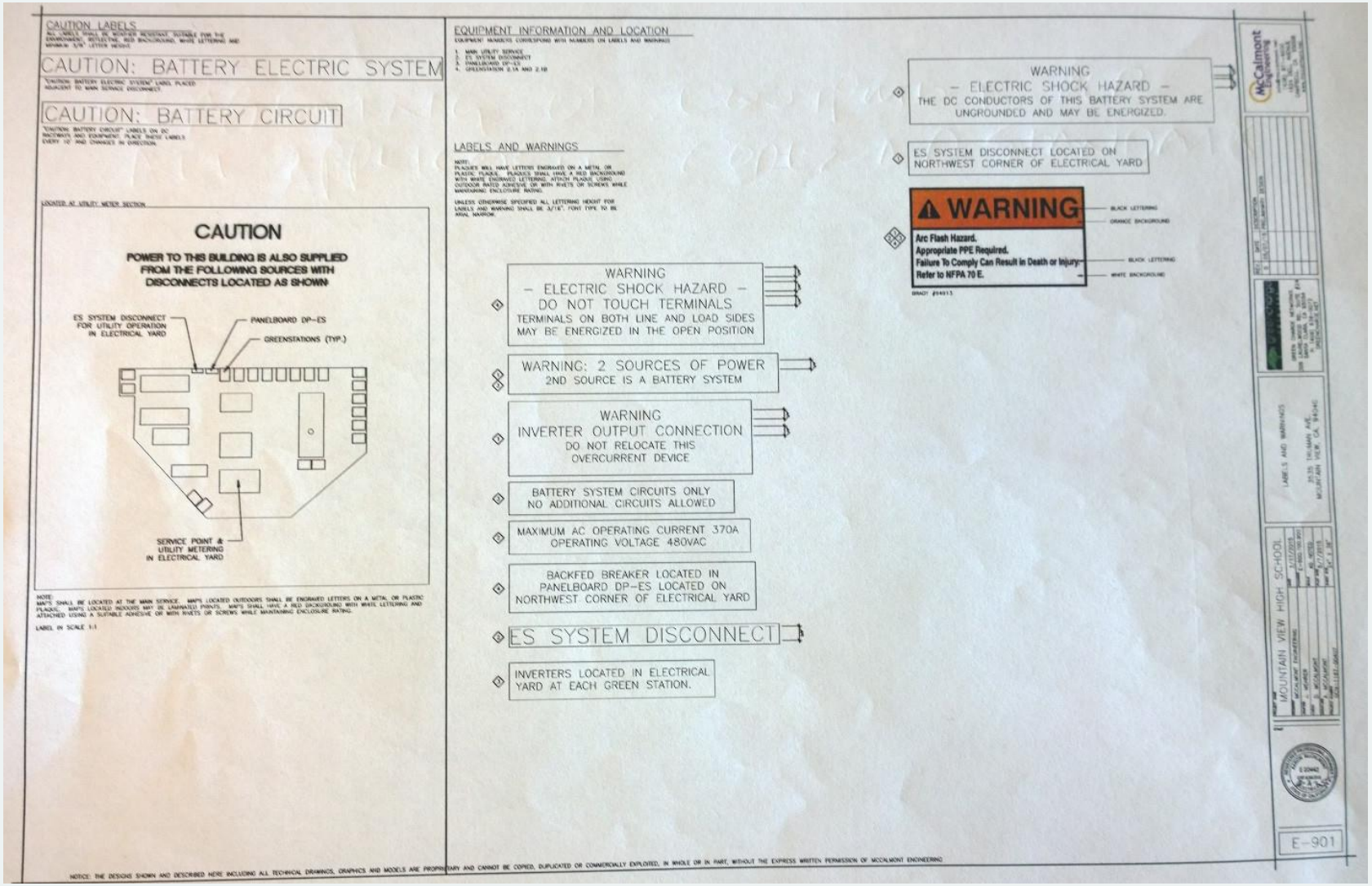
- Seismic Engineering Detail

Labeling

- Labeling of equipment per all applicable codes and standards



Labeling


CAUTION LABELS
CAUTION: BATTERY ELECTRIC SYSTEM
CAUTION: BATTERY CIRCUIT
CAUTION
POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN
ES SYSTEM DISCONNECT FOR UTILITY OPERATION IN ELECTRICAL YARD
PANELBOARD DP-ES
GREENSTATIONS (TYP.)
SERVICE POINT & UTILITY METERING IN ELECTRICAL YARD
EQUIPMENT INFORMATION AND LOCATION
LABELS AND WARNINGS
WARNING
– ELECTRIC SHOCK HAZARD –
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
WARNING: 2 SOURCES OF POWER
2ND SOURCE IS A BATTERY SYSTEM
WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT DEVICE
BATTERY SYSTEM CIRCUITS ONLY
NO ADDITIONAL CIRCUITS ALLOWED
MAXIMUM AC OPERATING CURRENT 370A
OPERATING VOLTAGE 480VAC
BACKFED BREAKER LOCATED IN PANELBOARD DP-ES LOCATED ON NORTHWEST CORNER OF ELECTRICAL YARD
ES SYSTEM DISCONNECT
INVERTERS LOCATED IN ELECTRICAL YARD AT EACH GREEN STATION.
WARNING
– ELECTRIC SHOCK HAZARD –
THE DC CONDUCTORS OF THIS BATTERY SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.
ES SYSTEM DISCONNECT LOCATED ON NORTHWEST CORNER OF ELECTRICAL YARD
WARNING
Arc Flash Hazard.
Appropriate PPE Required.
Failure To Comply Can Result in Death or Injury.
Refer to NFPA 70 E.
BLACK LETTERING
ORANGE BACKGROUND
BLACK LETTERING
WHITE BACKGROUND
McCalmont Engineering
MOUNTAIN VIEW HIGH SCHOOL
E-901

Safety practices

- Use of trained and qualified people to perform installations and maintenance
  - Have injury and illness prevention program
  - Defined lock out/tag out procedure
  - Arc flash PPE Category per NFPA 70E Annex F
  - CAL OHSA requirements
    - Access
    - Branch Circuits
    - Excavation and trenching
    - Crane and rigging
    - Ladder safety
    - Power tools
- Continuous Monitoring
- Yearly Operations and Maintenance Program

Communication Strategy

- Establish relevant metrics
- Establish safety standards website
- Subscribe for updates
- Create chat forum for ongoing dialog
- Establish social media sites for ongoing updates
- Quarterly conference calls

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