ATTACHMENT 14

EMERGENCY RESPONSE PLAN TEMPLATE

Town of Manchester

Attachment 14: Emergency Response Plan (ERP)
Manchester Public Library Battery Energy Storage System (BESS)
Town of Manchester, Connecticut

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1. Introduction and Purpose

The Town of Manchester has developed this Emergency Response Plan (ERP) to establish procedures for responding to potential emergency conditions associated with the proposed Battery Energy Storage System (BESS) at the Manchester Public Library (MPL), located at 901 Main Street.

This ERP is intended to:

- Protect public safety, first responders, and property
- Provide clear response protocols for fire, electrical, and system fault conditions
- Support the Connecticut Siting Council's evaluation of safety and environmental impacts

This plan reflects:

- Manufacturer-provided safety systems and procedures
- Industry standards (NFPA 855, NFPA 68, UL 9540/9540A, IFC)
- Coordination with local emergency responders

This Emergency Response Plan is consistent with the Connecticut Siting Council's expectations and demonstrates that the proposed BESS can be constructed, operated, and maintained in a manner that does not result in substantial adverse environmental or public safety impacts, in accordance with CGS §16-50k.

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2. Project and System Description

The proposed BESS is part of a state-of-the-art, all-electric municipal facility designed to achieve Net Zero Energy and improve energy resilience.

The system includes:

- Eaton xStorage BESS (approx. 300 kW / ~1,119 kWh)
- CATL EnerOne lithium-ion battery cabinets (three units)
- Bidirectional inverter and control cabinet

- Integrated thermal management (liquid and air-cooling systems)
- Remote monitoring, alarm notification, and automatic shutdown controls

The system is installed outdoors within dedicated enclosures and integrated with the building electrical system and solar PV array to support peak shaving, load shifting, and backup power.

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3. Fire Protection and Safety Features

The MPL BESS incorporates a layered safety approach:

3.1 Prevention and Detection

- Battery Management System (BMS) with continuous monitoring
- Temperature, voltage, and fault detection
- Automatic shutdown outside normal operating conditions

3.2 Tested System Performance

- UL 9540A testing indicates:
    - No fire propagation between modules
    - No explosion or deflagration observed under test conditions

3.3 Passive Protection

- NFPA 855-compliant separation distances (or greater via relocation)
- NFPA 68-aligned deflagration venting
- Outdoor-rated enclosures

3.4 Active Systems

- External Warning Communication System (EWCS)
- Local fire alarm horn and strobe
- Remote monitoring and alarm notification

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4. Hazard Identification

The BESS presents the following primary hazards:

4.1 Electrical Hazards

- High voltage systems up to:

    - ~1500 VDC (battery system)
    - 480 VAC (inverter system)
- Stored energy remains present after disconnection

4.2 Fire and Thermal Hazards

- Lithium-ion battery thermal runaway potential
- Elevated temperatures during abnormal operating conditions

4.3 Chemical Hazards

- Potential release of flammable gases (see attached SDS)
- Potential formation of toxic byproducts (e.g., hydrogen fluoride under certain conditions)

4.4 Pressure / Deflagration Hazards

- Internal overpressure events are mitigated through:
    - Pressure relief doors
    - Deflagration vent panels designed to direct gases upward

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5. Emergency Detection and Notification

Emergency conditions are identified through:

- Automated system alarms (remote monitoring platform)
- Local visual/audible alarms (horn and strobe)
- Direct observation of smoke, fire, or abnormal conditions

Upon detection:

- Automatic notifications are sent to designated personnel
- The system initiates automatic shutdown and isolation

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6. Emergency Response Procedures

6.1 Initial Actions

1. Report Emergency
    A. Manchester Fire Department (Emergency): 911

B. Manchester Fire Department (Main): (860) 647-3266

C. Fire Marshal (AHJ): (860) 647-3267

2. Establish incident command
3. Secure the site and maintain safe standoff distances
4. Evacuate non-essential personnel

6.2 System Shutdown

If safe to do so:

- Activate Emergency Power Off (EPO)
- Open main AC disconnect

System response:

- Battery contactors open
- Inverter shuts down
- System isolates from grid

6.3 Fire Suppression Strategy

The BESS shall be treated as a Class B/C fire hazard.

Recommended approach:

- Use water for cooling and thermal runaway control
- Use dry chemical or CO_2 for surface-level flames
- Avoid penetrating enclosures or damaging battery modules

Continuous cooling is required until temperatures stabilize.

6.4 Gas Monitoring

- Monitor for flammable and toxic gases
- Maintain appropriate standoff distances
- Ensure responder safety using gas detection equipment

6.5 Personal Protective Equipment (PPE)

- Full structural firefighting gear
- Self-contained breathing apparatus (SCBA)

7. Site-Specific Design Considerations

The Town has implemented design features to further enhance safety and minimize impacts, including:

- Location of the BESS to increase separation (100+ feet from occupied structures)
- Inclusion of:
    - Protective bollards
    - Noise-mitigating enclosure or fencing

The final configuration is reflected in:

- Construction Documents (See attached plans)
- Hazard Mitigation Analysis (HMA)
- The noise assessment
- Final Petition materials

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8. Coordination with Emergency Responders

The Town will coordinate directly with the Manchester Fire Department prior to commissioning to:

- Provide this ERP and supporting documentation
- Conduct site walkthroughs
- Review system shutdown procedures and hazard conditions
- Offer training and coordination with manufacturer representatives as needed

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9. Inspection, Monitoring, and Maintenance

- 24/7 remote system monitoring
- Preventive maintenance per manufacturer requirements
- Annual review and update of ERP as necessary

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10. Post-Incident Protocol

Following any emergency event:

- The system shall remain offline until inspected by authorized personnel
- The site shall be secured and documented
- The ERP shall be reviewed and updated if necessary

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11. Code Compliance and Safety Framework

The MPL BESS safety strategy is consistent with:

- NFPA 855 – Energy Storage Systems
- NFPA 68 – Deflagration Venting
- UL 9540 / UL 9540A – System safety and fire testing
- IFC Section 104.11 – Performance-based design equivalency

This approach provides a comprehensive, layered safety framework addressing:

- Hazard prevention
- Detection and control
- Emergency response and mitigation

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12. Emergency Contacts

- Emergency: 911
- Manchester Fire Department: 911
- Town of Manchester (Facilities): (860) 645-5500
- Eaton Service: (800) 498-2678
- Electric Utility (Eversource): (800) 286-2000

Appendices

- **Site Plan and Electrical Drawings**
- **Aerosol suppression agent SDS**

SIGN LEGEND

STOP	VAN ACCESSIBLE	DO NOT ENTER	ACCESSIBLE PARKING		NOTE: ALL SIGNS SHALL BE IN ACCORDANCE WITH THE CTDOT SIGN CATALOG, OR AS SHOWN. *SIGN MOUNTED ON BREAKAWAY POST
31-0552* A	31-0662P 31-0448 B	31-1119 C	31-0662P D	E	

MATERIALS LEGEND

- EXPANSION JOINT
- EXPANSION JOINT AT FROST WALL
- EXPANSION JOINT AT DEPRESSED SLAB
- CONTRACTION JOINT
- PAINTED ACCESSIBLE SYMBOL
- PAINTED CROSSWALK
- ACCESSIBLE RAMP TYPE A (4 C5.1)
- ACCESSIBLE RAMP TYPE B (3 C5.1)
- ACCESSIBLE RAMP TYPE C (4 C5.1)
- ACCESSIBLE RAMP TYPE D (2 C5.1)
- STAIR OR RAMP PROFILE
- TRAFFIC SIGN (SEE TRAFFIC SIGNAGE SCHEDULE) (13 C5.0)
- CC CONCRETE CURB (10 C5.0)
- FCC FLUSH INTEGRAL CONCRETE CURB (8 C5.0)
- ICC INTEGRAL CONCRETE CURB (9 C5.0)
- MCC MOUNTABLE CONCRETE CURB (12 C5.0)
- F1 FROST PAD (4 C5.0)
- F2 RECESSED FROST PAD (5 C5.0)
- B1 BITUMINOUS CONCRETE (LIGHT DUTY) (1 C5.0)
- B2 BITUMINOUS REPLACEMENT (HEAVY DUTY) (2 C5.0)
- C1 CONCRETE PAVEMENT (LIGHT DUTY) (3 C5.0)
- C2 CONCRETE PAVEMENT (HEAVY DUTY) (6 C5.0)
- P1 BRICK PAVERS (14 C5.0)
- S STONE MULCH (CRUSHED) (7 C5.0)
- WOOD FENCE (10 C5.1)
- EV DUAL ELECTRIC VEHICLE CHARGING STATION
- 26 PARKING STALL COUNT

MATERIALS NOTES

1. MATERIALS AND CONSTRUCTION PROCEDURES SHALL COMPLY WITH CT DOT FORM 818, TOWN OF MANCHESTER LAND USE REGULATIONS AND THE PROJECT MANUAL.
2. ALL LOCATIONS WHERE EXISTING CURBING, BITUMINOUS CONCRETE ROADWAY OR CONCRETE ROADWAY OR CONCRETE SIDEWALK ABUT NEW CONSTRUCTION, THE EDGE OF THE EXISTING CURB OR PAVEMENT SHALL BE SAW CUT TO PROVIDE A CLEAN, SMOOTH EDGE. TACK COAT EXPOSED EDGES OF EXISTING CONCRETE PRIOR TO PLACEMENT OF NEW BITUMINOUS CONCRETE PAVEMENT.
3. MANUFACTURED ITEMS SHALL BE INSTALLED, CONNECTED AND CLEANED ACCORDING TO THE MANUFACTURERS DIRECTIONS.
4. EXPANSION AND SCORE JOINTS FOR NEW CONCRETE WALKS SHALL BLEND TO MATCH EXISTING PATTERNS. CONTRACTOR TO ARRANGE TIMELY ON-SITE CONFERENCES WITH LANDSCAPE ARCHITECT TO APPROVE LAYOUT OF JOINT PATTERNS.
5. PROVIDE EXPANSION JOINTS FOR NEW CONCRETE PAVING AT ALL CURBS, TREE GRATES, BUILDING WALLS, SITE WALLS, STAIRS, LIGHT POLE BASES, MANHOLES, GRATES/VAULTS, EXISTING CONCRETE PAVING, STOP LIGHTS, FIRE HYDRANTS AND ALL OTHER FIXED MATERIALS. MAXIMUM DISTANCE BETWEEN EXPANSION JOINTS SHALL NOT EXCEED 20 FEET.
6. ALL DAMAGED OR BROKEN SECTIONS OF EXISTING STREET SIDEWALK AND CURBING WITHIN THE TOWN / CITY / SOVEREIGN NATION RIGHT OF WAY SHALL BE REPLACED.
7. ACCESSIBLE EV CHARGING SPACES MUST HAVE A SINGLE UNIT CHARGER TO NOT INTERFERE WITH ACCESSIBLE ROUTE. STANDARD EV CHARGING SPACES MAY SPLIT A DUAL CHARGER BETWEEN THE TWO SPACES

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NO.	DATE	DESCRIPTION
1	10-25-2024	P1 - BULLETIN #1
2	11-01-2024	P1 - BULLETIN #2
3	03-13-2025	PR-001 Revised
4	09-15-2025	E&S Plan Submission
5	09-19-2025	PR-23 - Carport/Rear Lot
6	11-24-2025	PR-24 - Utility Area

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MATERIALS PLAN

DATE: 09/23/2024
SCALE 1" = 20'-0"
PROJ. #: 70757.01
DRAWN: AMW
CHECKED: WGW

SHEET NO.
C2.0

SCALE: 1" = 20'

KEYNOTES - ELECTRICAL POWER	
Key Value	Keynote Text
EP1	PROVIDE 20A-1P, 120V POWER FEED TO FIRE/SMOKE DAMPER. REFER TO DETAIL 2/FA5.00 FOR ADDITIONAL INFORMATION.

1 ELECTRICAL POWER BASEMENT PLAN
1/8" = 1'-0"

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2	1/3/25	P2 - Bulletin #3
4	1/20/25	P2 - Bulletin #5
5	4/01/25	P2 - Bulletin #7
6	4/11/25	P2 - PR-004
7	4/18/25	P2 - PR-007 R1
24	12/24/2025	DG APPLICATION
26	01/13/2025	P2 - PR-024

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ELECTRICAL POWER BASEMENT FLOOR PLAN

DATE: 10/01/2024	SHEET NO.
SCALE 1/8" = 1'-0"	
PROJ. #:	
DRAWN: KCM	**EP1.00**
CHECKED: SJM	

ELECTRICAL RISER DIAGRAM KEY NOTES

E1	PROVIDE CONCRETE PAD AND GROUNDING SYSTEM FOR UTILITY TRANSFORMER, PER UTILITY COMPANY REQUIREMENTS. PROVIDE PER ELECTRICAL DETAILS.
E2	METER SOCKET SHALL BE 13 JAW INSTRUMENT RATED.
E3	CONCRETE HOUSEKEEPING PAD BY DIVISION 03 CONTRACTOR. COORDINATE ALL REQUIREMENTS WITH DIVISION 03 CONTRACTOR.
E4	PROVIDE CONTROL WIRING IN 1"C. PER MFR. REQUIREMENTS FROM ELEVATOR CONTROLLER TO MICRO-GRID CONTROLLER FOR STANDBY POWER SWITCH-OVER SIGNAL.
E5	LOCATE ON OPPOSITE SIDE OF BUS AS MAIN CIRCUIT BREAKER, PER NEC 690 REQUIREMENTS.
E6	PROVIDE C.T.-RATED UTILITY METER SOCKET PER UTILITY COMPANY REQUIRMENTS. LOCATION SHOWN ON PLANS. PROVIDE 1-1/2"C. WITH NYLON PULLSTRING FROM METER TO SWITCHBOARD C.T. CABINET. COORDINATE METER AND C.T. CABINET PRODUCT AND INSTALLATION REQUIREMENTS WITH UTILITY COMPANY PRIOR TO INSTALLATION.
E7	PROVIDE SIGNAGE AT THE SWITCHBOARD PER SPECIFICATIONS AND NEC FOR ARC FLASH AND FAULT CURRENT INDICATION. IN ADDITION, PROVIDE PERMANENT SIGNAGE INDICATING OTHER SOURCES OF POWER, WHERE APPLICABLE.
E8	PROVIDE THE IDENTIFIED DEVICE AS SUITABLE FOR REVERSE FEED. THIS DEVICE DOES NOT NEED TO BE MOTORIZED.
E9	THE IDENTIFIED DEVICE DOES NOT NEED TO BE MOTORIZED.
E10	PROVIDE A TRAPPED KEY INTERLOCK SYSTEM TO THE IDENTIFIED CIRCUIT BREAKER DEVICES. UTILIZE KIRK-KEY OR EQUIVALENT.
E11	PROVIDE INVERTER SYSTEMS, INC # ISI-3UFT-24,000-277/480-277/480-C(1)3P100AH-SB-SUS-BAC OR EQUAL. UNIT SHALL BE PROVIDED WITH BACNET CONNECTION CAPABILITY. STARTUP SERVICE AND SAME DAY TRAINING, 1 YEAR STANDARD PLUS 2 YEAR ELECTRONICS WARRANTY

FEEDER LINE TYPES AND SYMBOLS LEGEND

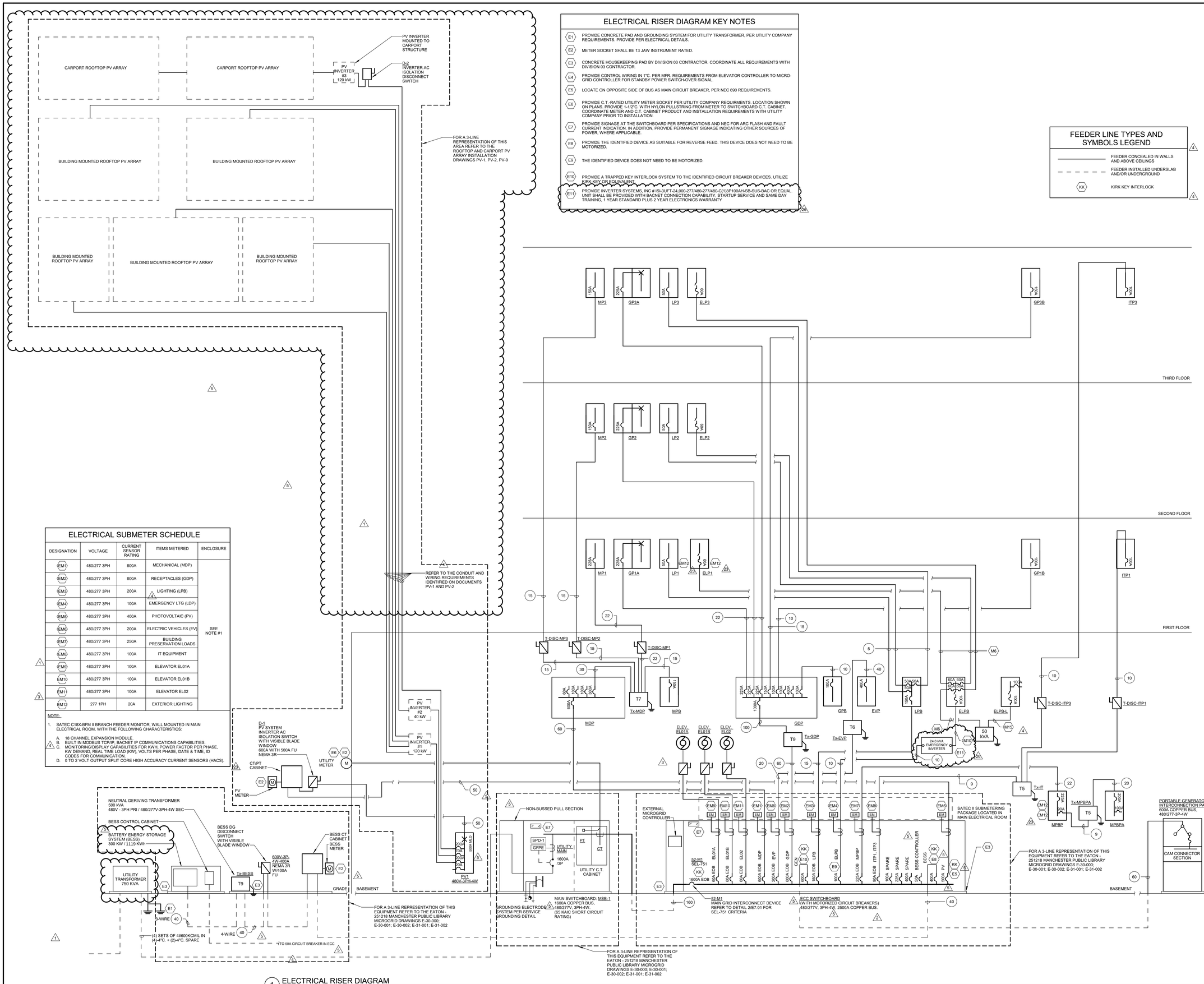
- FEEDER CONCEALED IN WALLS AND ABOVE CEILINGS
- FEEDER INSTALLED UNDERSLAB AND/OR UNDERGROUND
- KK — KIRK KEY INTERLOCK

ELECTRICAL SUBMETER SCHEDULE

DESIGNATION	VOLTAGE	CURRENT SENSOR RATING	ITEMS METERED	ENCLOSURE
EM1	480/277 3PH	800A	MECHANICAL (MDP)	SEE NOTE #1
EM2	480/277 3PH	800A	RECEPTACLES (GDP)	
EM3	480/277 3PH	200A	LIGHTING (LPB)	
EM4	480/277 3PH	100A	EMERGENCY LTG (LDP)	
EM5	480/277 3PH	400A	PHOTOVOLTAIC (PV)	
EM6	480/277 3PH	200A	ELECTRIC VEHICLES (EV)	
EM7	480/277 3PH	250A	BUILDING PRESERVATION LOADS	
EM8	480/277 3PH	100A	IT EQUIPMENT	
EM9	480/277 3PH	100A	ELEVATOR EL01A	
EM10	480/277 3PH	100A	ELEVATOR EL01B	
EM11	480/277 3PH	100A	ELEVATOR EL02	
EM12	277 1PH	20A	EXTERIOR LIGHTING	

NOTE:

1. SATEC C18X-8FM II BRANCH FEEDER MONITOR, WALL MOUNTED IN MAIN ELECTRICAL ROOM, WITH THE FOLLOWING CHARACTERISTICS:
   - A. 18 CHANNEL EXPANSION MODULE.
   - B. BUILT IN MODBUS TCP/IP, BACNET IP COMMUNICATIONS CAPABILITIES.
   - C. MONITORING/DISPLAY CAPABILITIES FOR KWH, POWER FACTOR PER PHASE, KW DEMAND, REAL TIME LOAD (KW), VOLTS PER PHASE, DATE & TIME, ID CODES FOR COMMUNICATION.
   - D. 0 TO 2 VOLT OUTPUT SPLIT CORE HIGH ACCURACY CURRENT SENSORS (HACS).



1 ELECTRICAL RISER DIAGRAM
NTS

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5	4/01/25	P2 - Bulletin #7
23	10/10/2025	P2 - PR-023
26	01/13/2025	P2 - PR-024
27	01/15/2025	P2 - PR-026

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ELECTRICAL RISER DIAGRAMS AND SCHEDULES

DATE: 10/01/2024
SCALE 1/8" = 1'-0"
PROJ. #:
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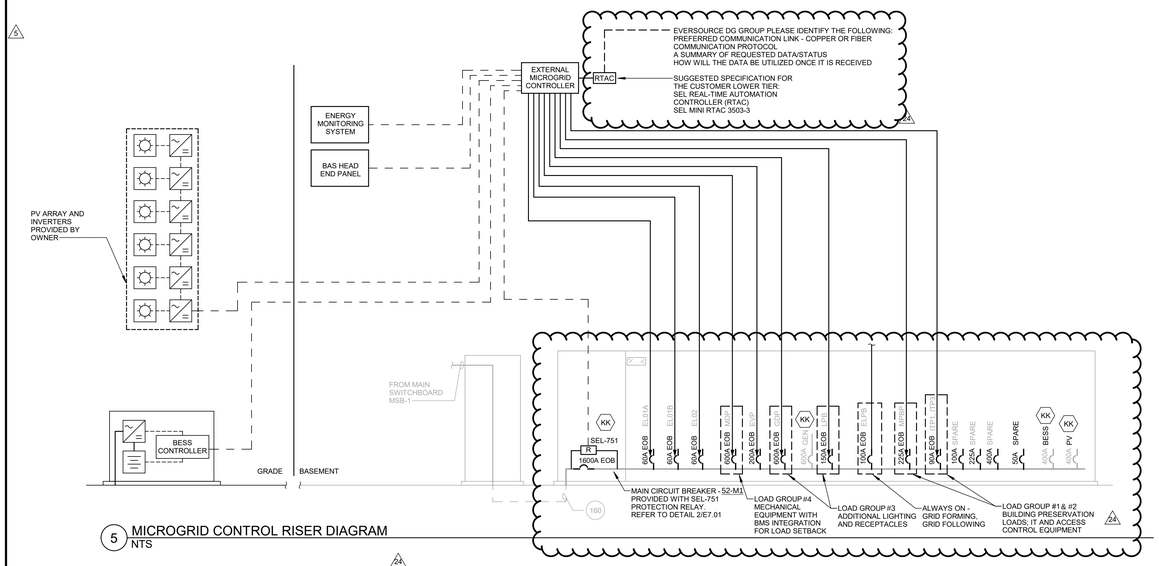
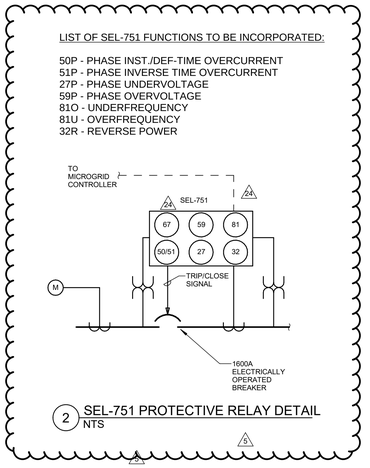
CHECKED: SJM

SHEET NO.

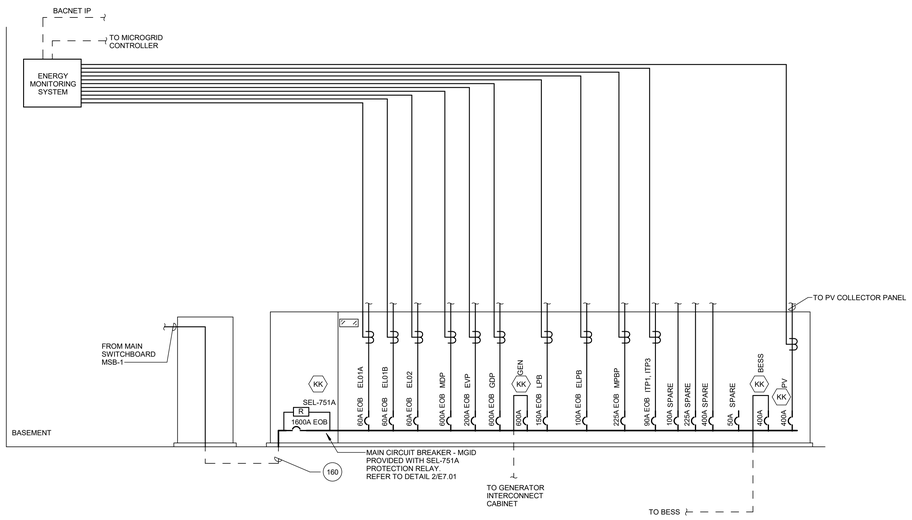
E7.00



5 MICROGRID CONTROL RISER DIAGRAM
NTS



2 SEL-751 PROTECTIVE RELAY DETAIL
NTS



6 ENERGY MONITORING SYSTEM RISER DIAGRAM
NTS

ELECTRICAL SUBMETER SCHEDULE

DESIGNATION	VOLTAGE	CURRENT SENSOR RATING	ITEMS METERED	ENCLOSURE
EM1	480/277 3PH	800A	MECHANICAL (MDP)	SEE NOTE #1
EM2	480/277 3PH	800A	RECEPTACLES (GDP)	
EM3	480/277 3PH	200A	LIGHTING (LPB)	
EM4	480/277 3PH	100A	EMERGENCY LTG (LDP)	
EM5	480/277 3PH	400A	PHOTOVOLTAIC (PV)	
EM6	480/277 3PH	200A	ELECTRIC VEHICLES (EV)	
EM7	480/277 3PH	250A	BUILDING PRESERVATION LOADS	
EM8	480/277 3PH	100A	IT EQUIPMENT	
EM9	480/277 3PH	100A	ELEVATOR EL01A	
EM10	480/277 3PH	100A	ELEVATOR EL01B	
EM11	480/277 3PH	100A	ELEVATOR EL02	

NOTE:

1. SATEC C18X-BFM II BRANCH FEEDER MONITOR, WALL MOUNTED IN MAIN ELECTRICAL ROOM, WITH THE FOLLOWING CHARACTERISTICS:
   A. 18 CHANNEL EXPANSION MODULE.
   B. BUILT IN MODBUS TCP/IP, BACNET IP COMMUNICATIONS CAPABILITIES.
   C. MONITORING/DISPLAY CAPABILITIES FOR KWH, POWER FACTOR PER PHASE, KW DEMAND, REAL TIME LOAD (KW), VOLTS PER PHASE, DATE & TIME. ID CODES FOR COMMUNICATION.
   D. 0 TO 2 VOLT OUTPUT SPLIT CORE HIGH ACCURACY CURRENT SENSORS (HACS).

SEQUENCE OF OPERATION

THE MICROGRID CONTROL SYSTEM SHALL HAVE THE FOLLOWING MODES OF OPERATION:

- **GRID FOLLOWING MODE**: WITH THE ELECTRIC UTILITY AVAILABLE BESS, AND PV ENERGY SOURCES SHALL BE AVAILABLE AND SNYCHRONIZED WITH THE UTILITY GRID SUPPLY. THE GRID FOLLOWING MODE SHALL BE UTILIZED FOR ALL ACTIVE DISPATCHES THAT WILL BE COORDINATED WITH EVERSOURCE ENERGY
- **GRID FORMING MODE**: ELECTRIC UTILITY GRID IS NOT AVAILABLE. ALSO REFERRED TO AS ISLANDING MODE. THE MICROGRID CONTROL SYSTEM (MCS) SHALL DISCONNECT FROM THE GRID BY OPENING THE MGID AND SHALL MANAGE THE AVAILABLE DER RESOURCES TO SUPPORT BUILDING LOADS ONLY.
- **STANDBY MODE**: DURING AN EXTENDED LOSS OF UTILITY GRID POWER SUPPLY (SIX TO EIGHT HOURS OR MORE) MANUAL SYSTEM INTERVENTION BY THE BESS OPERATOR CAN BE INITIATED TO POWER THE BUILDING FROM A TEMPORARY GENERATOR. THE MCS SHALL SHUT DOWN SYSTEMS AND A TEMPORARY GENERATOR SHALL BE MANUALLY INTERCONNECTED WITH THE BUILDING ELECTRICAL POWER SYSTEM. A KEY INTERLOCK SYSTEM (KIRK KEY) SHALL BE UTILIZED TO ENSURE THE ECC IS DISCONNECTED FROM THE GRID AND THE DER'S ARE DISCONNECTED FROM THE ECC. THE TEMPORARY GENERATOR SHALL NOT PARALLEL WITH ANY OTHER POWER SOURCE.
- **COMPLETE SYSTEM SHUT DOWN**: ALL MICROGRID ACTIVITY AND POWER DISTRIBUTION SEQUENCES SHALL BE DE-ENERGIZED AND DISABLED.

GRID FOLLOWING MODE

- IN GRID-FOLLOWING MODE THE ELECTRIC UTILITY (EVERSOURCE) SHALL BE THE ANCHOR RESOURCE. THE BUILDING ELECTRICAL LOADS SHALL BE ENERGIZED FROM MAIN SWITCHBOARD (MSB-1) AND THE DESIGNATED MAIN GRID INTERCONNECTING DEVICE (MGID) SHALL BE CLOSED IN THIS MODE. A BATTERY ENERGY STORAGE SYSTEM (BESS) PROVIDED UNDER THIS DIVISION AND A PHOTOVOLTAIC (PV) SOLAR GENERATION ARRAY PROVIDED BY THE OWNER SHALL BE UTILIZED AS DISTRIBUTED ENERGY RESOURCE (DER) ELEMENTS MANAGED BY THE MICROGRID CONTROL SYSTEM (MCS).
- THE MCS SHALL BE PROGRAMMED TO OPTIMIZE THE DER RESOURCES TO PROMOTE ELECTRIC RESILIENCY, DEMAND CHARGE REDUCTION, ENERGY OPTIMIZATION AND NET ZERO MANAGEMENT ADVANTAGES.
- THE MCS SHALL BE PROGRAMMED TO COORDINATE ALL DISCHARGE EVENT REQUESTS SUBMITTED TO THE OWNER BY EVERSOURCE ENERGY. THE EVENTS SHALL CONSIST OF (40) 3 HOUR DISCHARGE CYCLES THAT SHALL SHED THE MAXIMUM AMOUNT OF BUILDING ELECTRICAL LOAD POSSIBLE OVER THE 3 HOUR PERIOD WHILE PRESERVING A MINIMUM OF 100 KWH FOR BUILDING LIFE SAFETY SYSTEM OPERATIONS.
- GRID FOLLOWING MODE SHALL CONFORM TO UL-1741 AND IEEE 1547.
- ACTIVE DISPATCH EVENTS COORDINATED WITH EVERSOURCE ENERGY SHALL BE MANAGED PER THE FOLLOWING CRITERIA:
  1. EVENT WINDOWS AND FREQUENCY: 30-60 REQUESTS FOR ACTIVE DISPATCH FROM JUNE THROUGH SEPTEMBER AND UP TO 5 REQUESTS FROM NOVEMBER THROUGH MARCH. THE ACTIVE DISPATCH EVENT WILL BE A MAXIMUM OF 3 HOURS BETWEEN THE HOURS OF 12 PM TO 9 PM.
  2. DISCHARGE: BESS OPERATORS WILL BE PROVIDED WITH THE REQUESTED DISCHARGE LEVEL FOR THE EVENT. ACTUAL PERFORMANCE WILL BE VERIFIED BASED ON DATA CAPTURED BY THE CUSTOMER'S OPERATOR AND REPORTED BACK TO THE DERMS.
- DURING THE GRID FOLLOWING MODE OF OPERATION IT IS ANTICIPATED THAT THE PV AND BESS DER'S WILL HAVE OUTPUT CURTAILED TO A MAXIMUM OF 300 KW ABOVE THE MEASURED OPERATING BUILDING LOAD.

GRID FORMING MODE (ISLANDING)

- IN GRID-FORMING MODE THE BESS SHALL BE THE ANCHOR RESOURCE. UPON LOSS OF THE ELECTRIC UTILITY SUPPLY GRID THE MCS SHALL OPEN THE MGID TO DISCONNECT THE ELECTRICAL POWER SYSTEM (EPS) FROM THE UTILITY SUPPLY.
- THE 1600A MGID ELECTRICALLY OPERATED BREAKER (EOB) OR CONTACTOR DEVICE SHALL BE OPENED BY THE SEL-751 RELAY UPON LOSS OF ALL THREE PHASES OF POWER AS MEASURED BY THE RELAY. THE MCS SHALL BE MONITORING THE MGID SEL-751 RELAY AND THE ENERGY MONITORING SYSTEM VIA SEPARATE BACNET COMMUNICATION LINKS.
- THE MCS CONTROLLER SHALL SIGNAL THE BESS CONTROLLER TO OPERATE IN A STAND-ALONE MODE AS THE ANCHOR RESOURCE. THE BESS SHALL PROVIDE A STABLE VOLTAGE TO THE MAIN BUS OF THE ENERGY CONTROL CENTER (ECC). THE MCS SHALL SHED ALL NON-CRITICAL LOADS VIA THE EOB'S OF THE ECC CONTROL SCHEME. AT THIS TIME THE ONLY LOAD THAT SHALL BE CONNECTED DIRECTLY TO THE ENERGIZED BUS OF THE ECC SHALL BE THE LIFE SAFETY BRANCH (ELPB) IN CONFORMANCE WITH NEC ARTICLE 700.12.
- THE PV CONTROLLER SHALL SENSE THE VOLTAGE SOURCE PROVIDED BY THE BESS AND MCS AND SHALL OVERRIDE THE UL-1741 GRID LOSS SHUTOFF PROTOCOL AND SUPPLY POWER AS A DER TO THE ECC BUS.
- THE MCS SHALL UTILIZE INFORMATION PROVIDED BY THE BESS CONTROLLER TO IDENTIFY THE CHARGE STATE OF THE BESS BATTERIES. PROGRAMMING PARAMETERS SHALL BE IN PLACE TO LIMIT THE DISCHARGE OF THE BATTERIES DOWN TO A MINIMUM OF 10% OF FULL BATTERY CAPACITY, OR 100 KWH WHICHEVER IS HIGHER. THIS MINIMUM RESERVE CHARGE SHALL PROVIDE POWER TO OPERATE THE EMERGENCY LIGHTING POWER BRANCH (ELPB) THAT SERVES LIFE SAFETY LIGHTING AND FIRE ALARM SAFETY SYSTEMS WITHIN THE BUILDING FOR MINIMUM RUNTIME OF 90 MINUTES. THIS SHALL EQUATE TO APPROXIMATELY 15 KW / 100 KWH TO OPERATE SYSTEMS FOR 6 HOURS AT FULL LOAD.
- THE MCS SHALL UTILIZE INFORMATION PROVIDED BY THE BESS CONTROLLER TO MANAGE THE BUILDING PRESERVATION LOADS (MPBP BRANCH) CONSISTING OF HEAT PUMP EQUIPMENT, GEOTHERMAL PUMPS, DOA EQUIPMENT NECESSARY TO MAINTAIN BUILDING TEMPERATURE ABOVE FREEZING. THE MCS SHALL INTERFACE WITH THE BUILDING AUTOMATION SYSTEM (BAS) TO INITIATE CONTROL STEPS AND A PROPER LOAD STEPPING SEQUENCE OF PUMPS AND FANS TO MINIMIZE INRUSH. BUILDING PRESERVATION LOADS SHALL ALSO INCLUDE AUTOMATIC DOOR OPERATORS AND OTHER MISCELLANEOUS LOADS. THIS SHALL EQUATE TO APPROXIMATELY 180 KW / 360 KWH TO OPERATE SYSTEMS FOR 2 HOURS AT FULL LOAD.
- THE MCS SHALL UTILIZE INFORMATION PROVIDED BY THE BESS CONTROLLER TO MANAGE POWER BRANCH SUPPORTING DATA IT RACKS, DATA COMMUNICATION SERVICE ENTRANCE EQUIPMENT, NETWORK SWITCH EQUIPMENT, ALL NECESSARY TO OPERATE THE CORE CRITICAL BUILDING SYSTEMS SUCH AS ACCESS CONTROL, PAGING, SECURITY DEVICES / CAMERAS. THIS SHALL EQUATE TO APPROXIMATELY 5 KW / 50 KWH TO OPERATE SYSTEMS FOR 10 HOURS AT FULL LOAD.
- PROGRAM PARAMETERS SHALL BE CREATED FOR MANAGING NON-CRITICAL LOADS INTO AN OPERATIONAL SEQUENCE PROVIDED THERE IS BATTERY CAPACITY TO SUPPORT EXTENDED RUNTIME. KEY POINTS OF THE CONTROL SEQUENCE SHALL BE AS FOLLOWS:
  1. UPON ENTERING ISLANDING THE FOLLOWING BRANCHES WILL BE DISCONNECTED AND NOT ALLOWED TO OPERATE:
     1. EL01A – ELEVATOR (OFF)
     2. EL01B – ELEVATOR (OFF)
     3. EL02 – ELEVATOR (OFF)
     4. EVP – ELECTRIC VEHICLE CHARGING (OFF)
  2. UPON ENTERING ISLANDING MODE THE ELPD EMERGENCY LIGHTING BRANCH WILL BE ON.
  3. UPON ENTERING ISLANDING MODE THE FOLLOWING LOAD GROUPS WILL BE ALLOWED TO OPERATE:
     1. LOAD GROUP #1: ITP1/ITP3 – IT, SECURITY AND PAGING EQUIPMENT.
     2. LOAD GROUP #2: MPBP – BUILDING PRESERVATION SYSTEMS.
     3. LOAD GROUP #3: LPB, GDP – LIGHTING AND GENERAL RECEPTACLE LOADS.
     4. LOAD GROUP #4: MDP – MECHANICAL EQUIPMENT RUNNING IN A SETBACK PROFILE TO MINIMIZE DEMAND. MCS SHALL PROVIDE A LOAD SHEDDING SIGNAL TO THE BUILDING MANAGEMENT SYSTEM.
  4. UPON EXECUTING ISLANDING MODE THE FOLLOWING LOAD GROUPS WILL BE ALLOWED TO OPERATE BASED ON THE BESS SOC (STATE OF CHARGE) AT THE TIME:
     1. BESS OPERATING WITH 100% TO 80% SOC ELPD AND LOAD GROUPS #1, #2, #3, #4.
     2. BESS OPERATING WITH 79% TO 60% SOC ELPD AND LOAD GROUPS #1, #2, #3.
     3. BESS OPERATING WITH 59% TO 40% SOC ELPD AND LOAD GROUPS #1, #2.
     4. BESS OPERATING WITH 39% TO 20% SOC ELPD AND LOAD GROUP #1.
     5. BESS OPERATING WITH 19% SOC SHALL OPERATE ELPD ONLY.
  5. PV POWER GENERATION SHALL BE MANAGED TO ENSURE THAT PV PRODUCTION SHALL NEVER BE HIGHER THAN THE OPERATING BUILDING LOAD. THE PV SYSTEM SHALL NOT UNDER ANY CIRCUMSTANCES BE ALLOWED TO ATTEMPT AN EXPORT OF POWER DURING ISLANDING MODE. TO ENSURE THIS THE PV INVERTER OUTPUT SHALL BE CURTAILED IN INCREMENTS PER THE FOLLOWING SEQUENCE:
     1. WHEN THERE IS 340 KW OR HIGHER OF OPERATING BUILDING LOAD THE PV SYSTEM SHALL OPERATE WITH 280 KW OF OUTPUT (MAXIMUM).
     2. WHEN THERE IS 300 KW OF OPERATING BUILDING LOAD THE PV SYSTEM SHALL OPERATE WITH NO MORE THAN 260 KW OF OUTPUT.
     3. WHEN THERE IS 260 KW OF OPERATING BUILDING LOAD THE PV SYSTEM SHALL OPERATE WITH NO MORE THAN 220 KW OF OUTPUT.
     4. WHEN THERE IS 220 KW OF OPERATING BUILDING LOAD THE PV SYSTEM SHALL OPERATE WITH NO MORE THAN 180 KW OF OUTPUT.
     5. WHEN THERE IS 180 KW OF OPERATING BUILDING LOAD THE PV SYSTEM SHALL OPERATE WITH NO MORE THAN 140 KW OF OUTPUT.
     6. WHEN THERE IS 140 KW OF OPERATING BUILDING LOAD THE PV SYSTEM SHALL OPERATE WITH NO MORE THAN 100 KW OF OUTPUT.
     7. WHEN THERE IS 100 KW OF OPERATING BUILDING LOAD THE PV SYSTEM SHALL OPERATE WITH NO MORE THAN 60 KW OF OUTPUT.
     8. WHEN THERE IS 60 KW OF OPERATING BUILDING LOAD THE PV SYSTEM SHALL OPERATE WITH NO MORE THAN 20 KW OF OUTPUT.

STANDBY MODE (UTILITY GRID AND DER RESOURCES DISCONNECTED FROM THE ECC)

- IN STANDBY MODE THE GRID, BESS AND PV WILL ALL BE DISCONNECTED FROM THE ELECTRICAL POWER SYSTEM (EPS) AND A TEMPORARY PORTABLE GENERATOR PLUGGED IN THROUGH THE REMOTE GENERATOR DOCKING STATION SHALL BE THE ANCHOR RESOURCE. THE MODE SHALL BE SET UP TO INITIATE MANUALLY THROUGH THE MANIPULATION OF KEY INTERLOCK STATIONS INSTALLED ON THE MAIN, BESS AND PV DEVICES WITH A FOURTH STATION ON THE GENERATOR INTERCONNECT DEVICE (GID) LOCATED IN THE ESP SWITCHBOARD.

KEY INTERLOCK IMPLEMENTATION SCENARIOS SHALL BE AS FOLLOWS:

1. GRID AVAILABLE, MICROGRID IN GRID FOLLOWING MODE:
   - 52-M1 MCB (MGID) OF ECC – CLOSED
   - GEN INTERCONNECT CB – OPEN
   - BESS INTERCONNECT CB – CLOSED
   - PV INTERCONNECT CB - CLOSED
2. GRID NOT AVAILABLE, MICROGRID IN GRID FORMING MODE
   - 52-M1 MCB (MGID) OF ECC – OPEN
   - GEN INTERCONNECT CB – OPEN
   - BESS INTERCONNECT CB – CLOSED
   - PV INTERCONNECT CB - CLOSED
3. GRID NOT AVAILABLE, BATTERY CHARGE DEPLETED, OWNER WANTS TO BACK UP THE BUILDING WITH A PORTABLE GENERATOR THROUGH THE INTERCONNECT CABINET. MICROGRID CONTROL MODE SHALL INITIATE ALL DOWNSTREAM DEVICES GO TO CLOSED POSITION TO ENABLE ENERGIZING EVERYTHING IN THE BUILDING:
   - 52-M1 MCB (MGID) OF ECC – OPEN
   - GEN INTERCONNECT CB – CLOSED
   - BESS INTERCONNECT CB – OPEN
   - PV INTERCONNECT CB - OPEN

THE SYSTEM IS NOT INTENDING TO INTERCONNECT THE UTILITY GRID OR DER'S IN PARALLEL WITH THE PORTABLE TEMPORARY GENERATOR.

CONTROL SEQUENCE TO ENSURE BESS DOES NOT CHARGE FROM THE UTILITY GRID

- THE MCS/BESS SYSTEM SHALL CHARGE THE BATTERY SYSTEM ONLY WHEN THERE IS SUFFICIENT PV PRODUCTION BEING MEASURED THAT WILL OFFSET THE SELECTED CHARGE RATE.
- THE MCS/BESS SYSTEM HAS A VARIABLE CHARGE RATE THAT CAN BE APPLIED THROUGH PROGRAMMING AS FOLLOWS:
  1. IF THERE IS NO PV PRODUCTION THE BESS SHALL NOT CHARGE FROM THE GRID.
  2. IF THERE IS PARTIAL PV PRODUCTION THE FOLLOWING CHARGE RATES SHALL APPLY:
     1. WHEN THERE IS 50 KW OF PV PRODUCTION AVAILABLE THE BESS SYSTEM SHALL CHARGE NO HIGHER THAN 40 KW.
     2. WHEN THERE IS 100 KW OF PV PRODUCTION AVAILABLE THE BESS SYSTEM SHALL CHARGE NO HIGHER THAN 90 KW.
     3. WHEN THERE IS 150 KW OF PV PRODUCTION AVAILABLE THE BESS SYSTEM SHALL CHARGE NO HIGHER THAN 140 KW.
     4. WHEN THERE IS 200 KW OF PV PRODUCTION AVAILABLE THE BESS SYSTEM SHALL CHARGE NO HIGHER THAN 190 KW.
     5. WHEN THERE IS 250 KW OF PV PRODUCTION AVAILABLE THE BESS SYSTEM SHALL CHARGE NO HIGHER THAN 240 KW.
     6. WHEN THERE IS 280 KW OF PV PRODUCTION (MAXIMUM NAMEPLATE RATING) AVAILABLE THE BESS SYSTEM SHALL CHARGE NO HIGHER THAN 270 KW.

9 ELECTRICAL MICROGRID SEQUENCE OF OPERATION
NTS

FRIAR
architecture
interior design
master planning
21 Talcott Notch Road
Farmington, CT 06032
friar.com
860.678.1291

PROFESSIONAL SEAL

HBM
ARCHITECTURE
INTERIOR DESIGN
HBM Architects, LLC
1382 W. Ninth Street, Suite 300
Cleveland, Ohio 44113
PH: 216.241.1100
CONSULTANT

CES
Consulting Engineering Services, Inc.
811 Middle Street
Middletown CT 06457
860.632.1682
ceseng.com
CES #2023626.00

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REVISIONS

NO.	DATE	DESCRIPTION
1	12/20/24	P2 - Bulletin #2
2	1/3/25	P2 - Bulletin #3
4	1/20/25	P2 - Bulletin #5
5	4/01/25	P2 - Bulletin #7
24	12/24/2025	DG APPLICATION

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ELECTRICAL RISER DIAGRAMS AND SCHEDULES - BESS

DATE: 10/01/2024
SCALE As indicated
PROJ. #:
DRAWN: KCM
CHECKED: SJM

SHEET NO.

E7.01

Stat-X® Aerosol Fire Suppression

Fireaway

Safety Data Sheet according to Regulation (EC) No. 1907/2006 & Amendment 987/2008 (REACH) & HazCom 2012

5852 Baker Road
Minnetonka, MN
55345
USA

SDSR# FU015A
DATE: 04/23

SECTION 1: Identification of the Substance/Mixture and of the Company/undertaking Product Identifier

Stat-X® Condensed Aerosol Generators - Models 30 to 2500.

Details of the supplier of the safety data sheet:
Fireaway Inc., 5852 Baker Road, Minnetonka, MN, 55345, USA
Telephone +1 (952) 935-9745, Fax +1 (952) 935-9757
Email address of the competent person: info@statx.com

For information only, call 1-952-935-9745.
For emergencies, call
INFOTRAC
USA & CANADA: +1-800-535-5053
INTERNATIONAL: +1-352-323-3500 (collect)

Only Representative Contact:
Blue Frog Scientific Limited, Quantum House,
91 George Street, Edinburgh, EH2 3ES
+44 (0) 131 523 1412

SECTION 2: Hazards Identification

Possible exposure to aerosol suppression agent if generator is activated. May cause temporary, mild irritation of mucous membranes if inhaled. US EPA listed under US EPA SNAP List for use as a total flooding fire suppression agent in normally occupied spaces.

2.1 Classification

OSHA Regulatory Status

All 3 chemicals listed below are not stored as raw loose powder but homogenously blended and pressed into a single solid aerosol forming compound pellet. Exposure to raw dust from the pellet is very limited which may contain any of the 3 chemicals listed in Section 3.

Potassium nitrate: Oxidizer solid

Dicyandiamide: Not a hazardous substance or mixture

Phenolic resin: This chemical is considered hazardous under 29 CFR 1910.1200 (Hazard Communication)

2.2 Label Elements

Signal Word

WARNING

Hazard pictogram(s)

Hazard statement(s)

H272	Oxidizer	Oxidizer, Category 3
H315	Causes skin irritation	Skin Damage/Irritation, Category 2
H319	Causes eye irritation	Eye Damage/Irritation, Category 2B
H335	May cause respiratory irritation	Specific Target Organ Toxicity (Single Exposure), Category 3 (Respiratory Tract irritation)

Precautionary statement(s) Prevention

P210	Keep away from heat/sparks/open flames/hot surfaces – No smoking
P220	Keep/store away from clothing/organic material/combustible materials
P261	Avoid breathing dust/fumes
P264	Wash face, hands and any exposed skin thoroughly after handling
P272	Contaminated clothing should not be allowed out of the workplace unless well rinsed with water
P280	Wear protective gloves/protective clothing/eye protection/face protection

Precautionary statement(s) Response

P303	IF ON SKIN	Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.
P305	IF IN EYES	Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rising. If eye irritation persists: Get medical advice/attention.
P306	IF ON CLOTHING	Dispose of contaminated clothing and gloves after use in accordance with applicable laws and good industrial hygiene practices.

Precautionary statement(s) Storage

P411	Store at temperatures not exceeding 65°C/149°F

Precautionary statement(s) Disposal

P501	Dispose of contents/container to an approved waste disposal plant

2.3 Hazards Not Otherwise Classified (HNOC)

Not applicable.

SECTION 3: Composition/Information on Ingredients

Hazardous components: Does not contain dangerous materials as defined by ordinance on hazardous materials.

Components – Chemical (Hazardous Components ≥ 1%)	**CAS#**	**Weight %**	**COMMENTS:**
Potassium Nitrate ECHA Registration no. 01-2119488224-35-0066	7757-79-1	75.0	Components are blended and pressed into a highly stable, molded form. Molded composition is contained within a sealed double-walled stainless steel housing – no environmental exposure. Upon generator unit activation these chemical elements are not discharged from the unit but are fully consumed by an internal chemical reaction.
DCDA (Cyanoguanidine) ECHA Registration no. 01-2119474914-28-0020	461-58-5	16.5	
Organic Resin	9003-35-4	8.5	
Appearance & Odor:			Beige to white in color. No odor.
Auto-Ignition Temperature:			300^0 C
Solubility in Water:			Slightly Soluble

SECTION 4: First aid measures

Contact Method:	Procedure:
Inhalation	Remove to fresh air
Eye Contact	Flush with water
Skin Contact	Wash with soap and water.
Ingestion	Not a likely route of exposure.
Seek medical attention for further treatment, observation, and support if necessary.	

SECTION 5: Firefighting Measures

In the event of a fire, evacuate the area and inform emergency services. Ignition of Stat-X produces a fire-suppression aerosol. Water may be used as an additional suppression agent.

SECTION 6: Accidental Release Measures

If these devices are spilled they can be safely recovered by hand and should be inspected for damage prior to repacking. Suspect or damaged articles should be labeled and consigned for correct destruction.

SECTION 7: Handling and Storage

Store in temperate conditions. Avoid shock, electric currents, static discharge, excessive heat and extended periods of storage at temperatures greater than 65°C.

SECTION 8: Exposure Controls/Personal Protection

Respiratory Protection	Ventilate area completely after discharge. Do not enter area prior to complete venting of enclosure. Use filter mask as necessary during clean-up.
Hand Protection	Wear gloves if handling generators prior to cooling.
Eye Protection	Safety glasses are advisable.
Skin Protection	N/A

SECTION 9: Physical and Chemical Properties

Appearance:	Stainless Steel Cylinder up to 270 mm in length

SECTION 10: Stability and Reactivity

These devices are extremely stable below 125°C. They are packaged to protect the articles from electrical power and shock. As with any stored products, stored packaging should be protected from fire and high temperatures.

SECTION 11: Toxicological Information

Toxic by-products of combustion are extremely low. Main by-products are listed below with 15-minute TWA values for a maximum 100g/m^3 concentration in a hermetically sealed volume.

Gas	15 minute Time Weighted Average in parts per million
NO_2	1.08
NO	0.97
CO	84.20

SECTION 12: Ecological Information

These devices are sealed and present no ecological hazards. The aerosol produced upon ignition has very low global warming potential and an ozone depletion potential = 0.

SECTION 13: Disposal Considerations

Comply with all local, state, and federal/international regulations.

SECTION 14: Transport Information

Hazard pictogram(s)

UN Number: 0432	Authorized Modes of Transport: Motor Vehicle, Rail, Cargo Vessel, Cargo and Passenger Air
UN Classification: Class 1.4S Articles Pyrotechnic for Technical Purposes	Shipping Limitations: Cargo Aircraft: Max single packaging – 100 kg. Passenger Aircraft: Max single packaging – 25 kg.

SECTION 15: Regulatory Information

Safety, health and environmental regulations/legislation specific for the substance or mixture
EU regulations

Phenolic Resin:

Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex I, as amended:
Not listed.
Regulation (EC) No. 1005/2009 on substances that deplete the ozone layer, Annex II, as amended:
Not listed.
Regulation (EC) No. 850/2004 On persistent organic pollutants, Annex I as amended:
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 1 as amended:
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 2 as amended:
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex I, part 3 as Amended:
Not listed.
Regulation (EC) No. 689/2008 concerning the export and import of dangerous chemicals, Annex V as amended
Not listed.
Regulation (EC) No. 166/2006 Annex II Pollutant Release and Transfer Registry, as amended
Not listed.
Regulation (EC) No. 1907/2006, REACH Article 59(1) Candidate List as currently published by ECHA
Not listed.

Authorizations

Regulation (EC) No. 143/2011 Annex XIV Substances Subject to Authorization:
Not listed.
Regulation (EC) No. 1907/2006, REACH Annex XIV Substances subject to authorization, as amended:
FORMALDEHYDE (CAS 50-00-0):

Restrictions on use

Regulation (EC) No. 1907/2006, REACH Annex XVII Substances subject to restriction on marketing and use as amended
FORMALDEHYDE (CAS 50-00-0)
Directive 2004/37/EC: on the protection of workers from the risks related to exposure to carcinogens and mutagens at work, as amended:
FORMALDEHYDE (CAS 50-00-0)
Directive 92/85/EEC: on the safety and health of pregnant workers and workers who have recently given birth or are breastfeeding, as amended:
FORMALDEHYDE (CAS 50-00-0)

Other EU regulations

Directive 2012/18/EU on major accident hazards involving dangerous substances:
FORMALDEHYDE (CAS 50-00-0)
Directive 98/24/EC on the protection of the health and safety of workers from the risks related to chemical agents at work, as amended:
FORMALDEHYDE (CAS 50-00-0)
Directive 94/33/EC on the protection of young people at work, as amended
FORMALDEHYDE (CAS 50-00-0)

Other regulations

The product is classified and labelled in accordance with EC directives or respective national laws.

National regulations

This preparation is not classified as dangerous according to European Union legislation. Young people under 18 years old are not allowed to work with this product according to EU Directive 94/33/EC on the protection of young people at work. Follow national regulation for work with chemical agents.

U.S. INFORMATION

Potassium Nitrate:
TSCA 8(b) inventory: Potassium Nitrate
CALIFORNIA PROPOSITION 65: Potassium Nitrate (CAS 7757-79-1) is not listed.
Clean Water Act (CWA): No product found

Phenolic Resin:
CALIFORNIA PROPOSITION 65: Formaldehyde (CAS 50-00-0) is listed.
Clean Water Act (CWA): Hazardous substance

SECTION 16: Other Information

Comply with manufacturer's installation and maintenance procedures.

Disclaimer: The information contained herein is accurate to the best knowledge and belief of Fireaway Inc., and is intended to describe the product for health, safety, and environmental requirements only. It is not intended and should not be construed as a warranty. Consult Fireaway for further information.