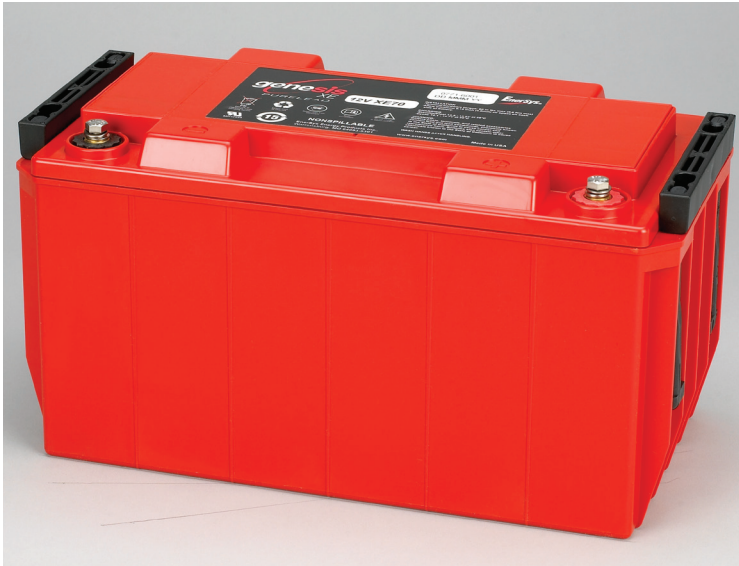


Nova Electric (Technology Dynamics Inc.)

Large-Capacity DC Battery System & Integrated Power Plan

CURTISS - WRIGHT

Nuclear Power Products and Services



About

One of the primary “lessons learned” from the accident at Fukushima was the significance of the challenges presented by the loss of safety-related systems following the occurrence of a beyond-design-basis external event (BDBEE). The U.S. nuclear industry is applying post-Fukushima solutions by implementing FLEX strategies to provide AC and DC power to critical equipment in the case of extended loss of AC power. In support of the NRC’s order EA-13-109 regarding Hardened Containment Vent Systems (HCVS), Curtiss-Wright Nuclear has developed an Integrated Power Plan (IPP) that provides a seismically qualified power source that is plug-and-play.

Curtiss-Wright Nuclear has partnered with NOVA Electric (Technology Dynamics Inc.) to provide a turn-key IPP that is custom designed to the site specific analysis of post event power needs. The IPP contains the batteries, the charger and various distribution panel breakers to feed any load configuration. The system can also accommodate any monitoring and alarm features, as well as self-exercising circuitry to maintain optimum battery plate health.



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Large-Capacity DC Battery System & Integrated Power Plan



Galaxy Cabinet



Battery Cells



Battery Charger



Jupiter 22B

The Benefits

The IPP system is designed to easily fit into the site BDBEE strategy. The IPP is permanently installed and is maintained in a ready status to connect to critical components when needed. This design provides:

- Large capacity but small spatial footprint to minimize use of existing valuable real estate at the site
- Any voltage level (24 VDC, 125 VDC, 250 VDC) or AC with inverter
- Custom designed to site equipment load requirements
- Various battery technologies to satisfy site specific design parameters, including:
 - VRLA – High Purity Valve Regulated Lead Acid
 - LiFePO4 – Lithium Iron Phosphate
 - Nickel Cadmium
- Extreme temperature ranges (-40°C to 80°C, -40°F to 176°F) to survive post event environments
- No additional ventilation required for hydrogen outgassing
- Multiple Accessories (breaker distribution panel, instrumentation, self-monitoring battery health indications) to customize the IPP to fit into each site's Emergency Response, Maintenance and Testing Procedures
- BDBEE Seismic Qualification by Curtiss-Wright Nuclear to operate before, during, and after the event

The Batteries

VRLA High Purity

- -40°C to 80°C (-40°F to 176°F) with metal jacket
- 300+ full depth of discharge cycles
- High rate charge and discharge
- 2 year shelf life at 25°C (77°F)
- Superior deep discharge

LiFePO4 Lithium Iron Phosphate

- 1/3 the weight of conventional lead acid packs
- Better voltage regulation – battery terminal voltage remains relatively constant during high rate discharge
- Runs better at elevated temperature, offering 10% more capacity, due to higher lithium ionic conductivity
- Cycle life up to 2,000 cycles
- 4x higher energy density than lead-acid battery
- Includes Battery Management System (BMS)
- Large overcharge tolerance and safer performance

Nickel Cadmium

- Short charge time
- High load current

The Chargers

- High efficiency
- Rugged construction
- AC Input 100-132/180-264 VAC
- Built-in DC fan for cooling
- OV, OL, OT protection
- Parallel operation
- 3 phase input

The Accessories

- Float/equalize pushbuttons (momentary) with indicators
- 0-100 Hour Equalize Timer, manual start, and auto reset
- Float voltage potentiometer on front panel
- Equalize voltage potentiometer on front panel
- DC Output Voltmeter/Ammeter (Analog)
 - Option available to incorporate into QualTech NP HCVS Control Panel
- DC Ground Detect Meter: LED and Switch
- Positive/negative to ground alarm indicator: LED and alarm function relay contacts
- AC overvoltage/undervoltage: LED and alarm function relay contacts
- DC overvoltage/undervoltage: LED and alarm function relay contacts
- Over temperature: LED and alarm function relay contacts
- AC available: LED
- Common trouble (summary) alarm relay contacts

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