DEF Urea System Specification

The DEF Urea System includes storage tanks, pumps, controls, and accessories to supply DEF Urea to the generator SCR system. The system shall be supplied by a single vendor with over 5 years experience in DEF Urea for generators. Submittals shall include equipment physical drawings, flow diagrams, control panel electrical schematics, field wiring requirements, BMS / Scada interface, and calculations demonstrating pressure, flow, and temperature performance for the application. System shall be as provided by Earthsafe Systems or approved equal.

Storage Tanks. DEF Urea storage tanks shall be rectangular 304 stainless steel construction. Model UT100 Tanks shall be double wall construction including the top surface for thermal protection. Where additional thermal protection is required, it shall be installed with the double wall to assure exterior durability of the tank. Tanks shall be rated for 2.5 PSI operating pressure and 5 PSI field test pressure. Tanks shall include opening for fill, vent, inspection, gauging, level sensor, level transmitter, leak sensor, SCR supply, SCR return, and 1 spare.

Remote Fill Station. Where shown on drawings the DEF Urea system shall include a remote fill station for bulk truck DEF Urea delivery. The Model UM40 fill station shall be a 24 x 24 x 12 stainless steel cabinet with lockable door. The cabinet shall be capable of wall surface mounting, recessed mounting, or floor stand. The fill connection shall be a 2 IN cam and groove type fitting with cap, manual ball valve, and check valve all with stainless steel construction. The fill station shall have an internally mounted control panel with operator interface for tank high level audible and visual, and a tank percent full digital display. Sensors shall be provided for tank high levels 90 and 95 percent and analog level, for the fill control panel, if inputs are not available from a master panel.

Duplex Pumps and Flow Control. Where a DEF Urea Circulation loop is required for buffer tank operation and multiple points of use, then the storage tank shall include a UM20 duplex transfer pump set and return flow back-pressure regulating valve. The pumps shall be rated at minimum 5 GPM 25 PSI or as required for adequate SCR supply. The pumps shall be stainless steel construction with TEFC single phase motors. Pumps and motors shall be rated for continuous duty. The back pressure regulator shall be stainless steel construction adjustable to from 5 to 25 PSI or as required for the application. The system shall include pump motor control and overload protection. The pump control shall be capable of alternating mode with generator run input signal, or continuous lead lag operation with weekly alternation.

Day Tank and Buffer Tank Level Control. Where the SCR dosing system includes a buffer tank with integral level control, the DEF Urea system shall include an inlet control panel to meet the buffer tank inlet pressure and flow requirements with over-pressure protection. Where a local day tank is required adjacent to the SCR dosing, the UMS50 day tank shall be rectangular stainless steel construction per the main storage tank. The day tank shall include sensors for level control as 95% high level, 90% refill stop, 70% refill start, and 25% low level. The day tank control shall include high and low level signals for the generator SCR controls.

DEF Temperature Control. Storage tanks shall be maintained between 20-85 Degrees F, where tanks are located outside or in unheated spaces. Heating equipment shall be circulation or immersion type heaters. Cooling systems shall be circulation type with split heat exchanger. Tanks shall be monitored
with temperature transmitters to provide on-off control and high – low temperature monitoring. Heating and Cooling calculations shall be provided to assure performance for ambient conditions.

**DEF Piping Systems.** DEF piping systems shall be 304 stainless steel pipe with welded connections, HDPE piping with fusion welded connections, or flexible thermoplastic piping specifically designed for DEF application. Piping exposed aboveground shall be insulated, and where required it shall be heat traced with self-regulating electric heating cable. Threaded fitting shall be allowed at tanks, special valves, and equipment using a sealing joint compound rated for DEF Urea application.

**Control Panel.** The DEF Urea system shall include a master control panel for integration of all system elements and integration to SCADA, BMS, SCR, and Generator control systems. The UC9 control panel shall include bulk tank level monitoring, point level sensors, leak sensors, pump control, temperature control, flow and pressure monitoring. The control panel shall be UL 508 listed, 120-230 VAC. Output contacts shall be provided for and coordinated with all interfacing systems as required for the application. The control panel shall include a MODBUS and BACnet interfaces for SCADA / BMS system.

**Startup, Commissioning, and Training:** System supplier shall provide procedures and checklists for system installation, testing, and startup. Where required system supplier shall have personnel at the project site for startup, commissioning, and owner training.