## Scope of Work for Scheduled Outages on SGen-1000A

| | | | | |
|---|---|---|---|---|
| **1 Medium Inspection** | | | | |
| **2 Major Inspection** | | | | |
| Equipment (KKS) | Activity | | Medium | Major |
| **A) Outer Enclosure** | | | | |
| | **Visual inspections:** | | | |
| | Enclosure for water leaks | | **x** | **x** |
| | Ambient air filters (replace if required) | | **x** | **x** |
| | Inner lights | | **x** | **x** |
| | External foundation gaskets of enclosure's differential pressure duct | | **x** | **x** |
| | Foundation varnish | | **x** | **x** |
| | Foam gaskets between foundation and bedplate | | **x** | **x** |
| **B) Stator (MKA)** | | | | |
| | **Electrical tests:** | | | |
| | Measure insulation resistances of each phase of stator winding | | **x** | **x** |
| | Through bolt insulation resistance test, if accessible without additional disassembly of major components | | | **x** |
| | Resistance temperature detector or thermo couple insulation resistance test | | **x** | **x** |
| | Evaluate condition of insulation | | **x** | **x** |
| | | | | |
| | **Mechanical tests:** | | | |
| | Check foundation bolt gaps (if Generator is not grouted) | | **x** | **x** |
| | Check foundation bolt torque (if Generator is grouted and hard bolted to the foundation) | | **x** | **x** |
| | Fixator torque (if Generator is not grouted) | | **x** | **x** |
| | **Visual inspections:** | | | |
| | Stator core condition by robotic tool | | **x** | **x** |
| | Ventilation paths of core by robotic tool | | **x** | **x** |
| | Condition of fixators and grout | | **x** | **x** |
| | Thermocouple and resistance temperature detector (RTD)-cables and seals | | | **x** |
| | Bushings and adjacent component | | **x** | **x** |
| | P-Seal / Core seal condition | | **x** | **x** |

| **1 Medium Inspection**<br>**2 Major Inspection** | | | | |
|---|---|---|---|---|
| Equipment (KKS) | Activity | | Medium | Major |
| | Stator winding conditions | | **x** | **x** |
| | **Maintenance:** | | | |
| | Replacement of all dismantled gaskets | | **x** | **x** |
| | Check / replacement of O-rings/ gaskets (depending on design) | | | **x** |
| **C) Terminal bushing (MKA)** | | | | |
| | Replacement of all gaskets to casing, internal gaskets and O-Rings (depending on design) | | | **x** |
| | **Electrical test:** | | | **x** |
| | Inspect top & bottom surface of ISO-phase adapter plate (as far as possible) | | **x** | **x** |
| **D) Rotor (MKA)** | | | | |
| | **Electrical tests:** | | | |
| | Measure insulation resistance of rotor winding | | **x** | **x** |
| | RSO measurement | | **x** | **x** |
| | **Mechanical tests:** | | | |
| | NDE of rotor blades | | **x** | **x** |
| | **Visual inspections:** | | | |
| | Blower blades | | **x** | |
| | End winding area | | **x** | **x** |
| | Bearing journals | | **x** | **x** |
| | Shaft seal contact surface | | **x** | **x** |
| | Grounding brushes and shaft contact surface | | **x** | **x** |
| | Rotor wedges and retaining rings* | | **x** | **x** |
| | Rotor slot ventilation paths by robotic tool | | **x** | **x** |
| | Flex slots and rotor teeth at wedge-to-wedge gaps by robotic tool | | **x** | **x** |
| | Balance weights in pole by robotic tool | | **x** | **x** |
| | *NDE of the rotor retaining rings (e.g. by robotic tool) in addition to the visual inspection. | | | |
| | **Maintenance:** | | | |
| | Replacement of bolts and locking device for any rotating component removed | | **x** | **x** |
| **E) Cooler (MKA)** | | | | |
| | **Mechanical tests:** | | | |
| | Valves at vent pipes (function) | | **x** | **x** |
| | Valves at drain pipes (function) | | **x** | **x** |
| | Perform leakage / tightness test | | | **x** |
| | **Visual inspections:** | | | |

| | | | | |
|---|---|---|---|---|
| **1 Medium Inspection** | | | | |
| **2 Major Inspection** | | | | |
| Equipment (KKS) | Activity | | Medium | Major |
| | Condition of coolers and water boxes acc. to contamination and corrosion | | **x** | **x** |
| | Condition and function of temperature measuring devices | | **x** | **x** |
| | Condition and function of pressure measuring devices | | **x** | **x** |
| | Cooling water inlet and outlet pipes | | **x** | **x** |
| | Mounting of all coolers | | **x** | **x** |
| | Cooler tubes surface for damages | | **x** | **x** |
| | **Maintenance:** | | | |
| | Replacement of O-Rings and header gaskets | | | **x** |
| **F) Bearings (as far as possible and depending on design) (MKD)** | | | | |
| | **Electrical tests:** | | | |
| | Bearing insulation | | **x** | **x** |
| | Function of bearing temperature measuring device | | **x** | **x** |
| | **Mechanical tests:** | | | |
| | Bearing surfaces and babbitt bonding | | **x** | **x** |
| | Bearing clearances | | **x** | **x** |
| | Seating of bearing sleeves on bearing saddles | | | **x** |
| | Clearance of labyrinth rings and seal strips | | **x** | **x** |
| | Function of lift oil components | | **x** | **x** |
| | Functional check of actual shaft lift | | **x** | **x** |
| | **Visual inspections:** | | | |
| | Lift oil grooves | | **x** | **x** |
| | Condition of bearing temperature measuring device | | **x** | **x** |
| | Condition of lift oil hoses | | | |
| | Condition of wiring and connections | | **x** | **x** |
| | Labyrinth rings | | **x** | **x** |
| | **Maintenance:** | | | |
| | Replacement of lift oil hoses | | **x** | **x** |
| **G) Slip Rings (MKC) (if implemented)** | | | | |
| | **Electrical tests:** | | | |
| | Insulation resistance of slip rings | | **x** | **x** |
| | Measure insulation resistance of collector stationary rigging | | **x** | **x** |
| | **Mechanical tests:** | | | |
| | Performance of brush carrier and carbon brushes | | **x** | **x** |
| | Check brush holder alignment and radial clearances | | **x** | **x** |
| | **Visual inspections:** | | | |
| | Condition and performance of measuring devices | | **x** | **x** |
| | Condition of brush carrier and carbon brushes | | **x** | **x** |
| | Condition of slip rings / insulation | | **x** | **x** |

| | | | | |
|---|---|---|---|---|
| **1 Medium Inspection** | | | | |
| **2 Major Inspection** | | | | |
| Equipment (KKS) | Activity | | Medium | Major |
| | Blower and assembly hardware | | | x |
| | Collector exhaust housing | | x | x |
| | Labyrinth rings | | | x |
| | **Maintenance:** | | | |
| | Replacement of air filter | | | x |
| **G) Integral Brushless Exciter (MKC) (if implemented)** | | | | |
| | **Electrical tests:** | | | |
| Diode Wheel | | | | |
| | Diode forward / reverse resistance | | x | x |
| | Diode wheel to heat sink insulation resistance | | | x |
| Main exciter rotor | | | | |
| | Ground detection ring insulation resistance (as far as possible) | | x | x |
| Main exciter stator | | | | |
| | AC impedance & pole balance test | | x | x |
| | Winding insulation resistance | | x | x |
| | **Visual inspections:** | | | |
| | Labyrinth rings | | | x |
| | Exciter and diode wheel condition | | x | x |
| | **Maintenance:** | | | |
| | Replacement of filter | | | x |
| **H) Generator Supervisory Equipment (MKA)** | | | | |
| | Condition and performance of temperature gauges and alarms | | x | x |
| | Replacement of gaskets at temperature measuring points | | | x |
| | Condition and performance of liquid level alarm switches | | x | x |
| | (Pedestal) vibration device functional test | | x | x |

| 1 Medium Inspection | | | | |
|---|---|---|---|---|
| **2 Major Inspection** | | | | |
| Equipment (KKS) | Activity | | 2 Medium | 3 Major |
| **Re-commissioning** | | | | |
| Cold Re-commissioning | | | | |
| | Check for cleanness (inside and outside generator) | | x | x |
| | Plausibility check of generator temperature measuring device | | x | x |
| Hot Re-commissioning | | | | |
| | Check the connection of lube oil and lift oil pipes to generator | | x | x |
| Optimization | | | | |
| | Measure shaft voltage and shaft current if generator is on load | | x | x |
| | Final adjustment of all systems on load | | x | x |
| | Check all operating values local and in I&C | | x | x |
| | Record of operating values (different load) | | x | x |