

## **Appendices**

### **Operations and Maintenance Agreement**

**Between**

**US Virgin Islands Water and Power Authority**

**And**

**Wartsila Caribbean, Inc.**

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**APPENDIX 1**  
**FACILITY DESCRIPTION**

Appendix 1.A	Battery Limits
Appendix 1.B	Single Line Diagram with Interconnection Point
Appendix 1.C	Location of Project Site and Facility

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## APPENDIX 1.A

### BATTERY LIMITS

#### Wartsila 34LPG Power Station.

Battery limits of this contract is the Wartsila 20V34LPG Power Plant (21 MW and corresponding auxiliary equipment) operating on LPG as primary fuel.

The Wartsila 20V34LPG Power Plant provides power to the national grid through one (1) substation Step up transformer 13.8 kV / 34.5 kV and corresponding electrical equipment to operate this substation.



REND\_DBAE193172  
Power plant site.pdf

[Drawing to be updated with As Built once available]

The table below establishes the engine type(s), engine serial number, cylinder configuration, assumed Running Hours as of the Effective Date, and the Maximum Running Hour Limit.

The engine serial number is a unique number and is used to identify specific components for a particular engine.

The Wartsila 20V34LPG engines are expected to run an average of eight thousand (8,000) Running Hours per Year per engine during the Term of the Agreement.

The Running Hours as of the Effective Date indicate the starting point of the Work for the covered equipment.

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Covered Equipment Type	Covered Equipment Serial Number	Cylinder Configuration	Assumed Running Hours (ARH)
Wartsila 34LPG	PAAE327456	20V	0
Wartsila 34LPG	PAAE327457	20V	0
Wartsila 34LPG	PAAE327458	20V	0

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## APPENDIX 1.B

### SINGLE LINE DIAGRAM WITH INTERCONNECTION POINT

In this Appendix are included drawings with corresponding single line diagrams of the power plant and substation including Interconnection point between both.

#### MV schematic



Appendix  
1B\_REND\_DBAE199E

[Drawing to be updated with As Built once available]

#### LV schematic



Appendix  
1B\_DBAE199487\_LV.

[Drawing to be updated with As Built once available]

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## APPENDIX 1.C

### LOCATION OF PROJECT SITE AND FACILITY

In this Appendix is included drawing with corresponding lay-out of Project Site and the Facility.

[Drawings to be updated with As Built once available]



New Plant Layout w  
septic STT- REV.pdf



REND\_DBAE193172  
Power plant site.pdf



DBAE193170 Master  
layout plan.pdf

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## **APPENDIX 2**

### **PROCUREMENT DURING MOBILIZATION AND AUDIT PERIOD**

Appendix 2.A	Safety Parts and Exchange Spare Parts
Appendix 2.B	Tools and Equipment
Appendix 2.C	Office Equipment

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## APPENDIX 2.A

### SAFETY SPARE PARTS AND EXCHANGE SPARE PARTS

#### Safety Spare Parts.

Part number	Description	Quantity
100003	Antipolishing ring	1
100023	O-ring	2
100110	Cylinder liner	1
100113	O-ring	1
100142	Sealing set	1
100341	Thrust bearing kit	1
100342	Main bearing kit	2
111010	Connecting rod, lower part	1
111011	Connecting rod, upper part	1
111015	Shim	1
111016	Big end bearing kit	1
113001	Piston	1
113009	Securing ring	2
113010	Gudgeon pin	1
113012	Piston ring set	1
120013	Valve guide	1
120015	Sealing set for cylinder head replacement	2
120021	Seat ring for inlet valve	1
120022	Seat ring for outlet valve	1
120054	Sealing set for cylinder head overhaul	2





120095	Ignition coil	2
121001	Exhaust valve, complete	2
121007	Inlet valve, complete	2
123001	Starting valve	2
124002	Spark plug	20
124043	Sealing set	2
124044	Prechamber control valve	2
145001	Push rod	2
145018	Valve tappet	1
1561301	Short cartridge kit	3
156383	Spare part set	1
164025	Main gas admission valve	2
164089	Spare part set	1
181077	Service kit	1
182062	Sealing set	1
191051	Sealing set	1
200009	Screw	12
200011	Nut	12
200029	Gasket	2
200079	Bellows	1
200081	Bellows	1
200084	Screw	12
200085	Nut	12
200334	Positioner	1
200347	Sealing ring	2



202009	Bellows	2
202053	Screw	16
202148	Sealing ring	4
202149	Nut	16
202358	Screw	8
207986	Butterfly valve	1
471063	Filter cartridge	78
471126	Sealing set	1
473081	Sealing set	1
474043	Sealing set	1
476009	Sealing set	1
504103	Knock sensor	2
504128	Temperature sensor	2
5071072	Control unit CCM	1
5071289	Ignition module	1
516292	Control unit	1
516387	Engine safety module	1
516541	Pressure sensor	2
516963	Fuse 3,15A	8
800264	Sealing set for hydraulic tightening tool	2
CV519	IP-converter	1
PT201	Pressure sensor	1
PT241	Lube oil pressure, filter inlet	1
PT401	Pressure sensor	2
PT471	Pressure sensor	2



PT601	Pressure sensor	2
PT700	Pressure sensor	1
PT901	Pressure sensor	2
PT911	Pressure sensor	2
ST173	Speed pick-up	1
ST174	Speed pick-up	1
ST196P	Speed sensor	1
ST196S	Speed sensor	1
ST197P	Speed sensor	1
ST197S	Speed sensor	1
TE201	Temperature sensor	1
TE401	Temperature sensor, HT water, before engine	1
TE402	Temperature sensor	2
TE471	LT-water temp., before charge air cooler	2
TE600	Temperature sensor, charge air engine inlet	1
TE601	Temperature sensor	1



Exchange Spare Parts.

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
120001	Cylinder head complete	10
120075	Cylinder head	10
1561184	Nozzle	2
1561300	Short cartridge	2
181001	Lubricating oil pump	1
191001	HT-water pump	1
191002	LT-water pump	1
476001	Charge air cooler	1
124044	Prechamber control valve	20
124047	Prechamber valve, lower	20
1562001	Shroud Ring	2

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Auxiliary Equipment Safety Spare Parts.

System

3xAUX-Generator W32/W34 DCB- GS 658.5 SM50

Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
10021471	TRAILING TUBE (F70)	30
3584441	RUBBER BLOCK 8.5 SM50	30

System

3xAUX-NGA Charge air filter AAF 8- 110 + F5 (W20V32/34)

Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
03507030	ADHESIVE GASKET	1
10010780	DD PANEL 4' RIGHT	51
10010784	DD PANEL 4' LEFT	51
4601120	ELECTRIC MOTOR	1
70001540	ELECTRONIC TIMER	1
8039900246	FINE FILTER CHEVRONET 595X595X150	16
9110140	UPPER SHAFT SEAL	2
9110770	CHAIN LINK	200
9110780	JUNCTION LINK	4
9172100	COUPLING NUT	2

System

3xAUX-Charge air system & Exhaust gas system NHA Exhaust gas ventilation unit (W34)

Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
NHA003	BELLOWS	1
NHA004	RADIAL FAN MPT-290T WITH ELECTRIC MOTOR	1
NHA005	FLOW SWITCH	1

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**System****9xAUX-NHA Rupture disc NHA Rupture disc****Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
282030	GASKET DN1200	2
67111620003	RUPTURE DISC CV-S-I-LW-RI DN1200	1
WDAAA22168	SUPPORT RING DN1200	2

**System****3xAUX-ZBA Gas regulating unit / CGR W34SG Compact gas ramp (DBAE171890-)****Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
B00191	FILTER	2
B00192	SEALING SET	1
Q00030	SPARE PART SET	1
Q00032	SPARE PART SET	1
Q00048	SPARE PART SET	1
Q00049	SPARE PART SET	1
V00387	SERVICE KIT	1
V00388	GASKET	1
V00410	SPARE PART SET	2
V00414	SOLENOID	1
V00483	SERVICE KIT	1
V00564	LIMIT SWITCH	1
V00570	SOLENOID VALVE	1
V00626	GASKET SET	1
V00627	BALL	1
V00654	SOLENOID VALVE	1
V00755	PACKING RING	1
V00895	SEAT RING AND PLUG STEM ASSEMBLY	1
V00898	SPARE PART SET	1
ZAC006	THERMOMETER	1
ZAC052	PRESSURE TRANSMITTER	1

**System**

1xAUX-QAA Lube oil unloading pump unit, new 8,1 / 9,9 m3/h

Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
D00057	SPARE PART SET	1
D00301	SPARE PART SET	1
M00002	BALL BEARING	1
M00009	BALL BEARING	1

System

1xAUX-QAE Lube oil transfer pump unit, stationary 8,1 / 9,9 m3/h

Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
C60N2PD2UL	MCB C60N 2PD2 UL	1
D00057	SPARE PART SET	1
D00301	SPARE PART SET	1
F30001160	MCB C 60N 1PC2	1
F30001162	MCB C 60N 1PC4	1
F30002010	MOTOR PROTECT SWITCH GV2-ME14 6-10A	1
K20001079	CONTACTOR LC1-D 09F7	1
M00002	BALL BEARING	2
M00009	BALL BEARING	2
PR125251AR23EN	SELECTOR SWITCH 0-1-S PR125251AR23EN	1
XB4-BVG3	INDICATOR LIGHT GREEN XB4-BVG3	1
XB4-BVG4	INDICATOR LIGHT RED XB4-BVG4	1
XB4-BVG5	INDICATOR LIGHT YELLOW XB4-BVG5	1

System

3xAUX-QBF Oil mist separator QBF Oil mist separator Purevent single

Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
B00032	SERVICE KIT	1
B00035	ISOLATOR KIT	1

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B00036	FREQUENCY CONVERTER	1
B00037	O-RING	1

#### System

2x AUX-TSB Starting air bottle TSB Starting air bottle

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
2-211-177	SAFETY VALVE	1
4-211-178	MANOMETER 30 BAR	1

#### System

9x AUX-VCA Radiator FBLGS-1260-18-3A10-108DN80S6

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
9460065100	BEARING FOR FAN MOTOR (6310-C3)	3
9460065953	BEARING FOR FAN MOTOR (6308-C3)	3
9460153452	SAFETY SWITCH KUM 332U/EMC, U3, 2xM32	1
9460158740	MOTOR WU-DF180LUX-10 380-420/50Hz	1
9460158742	Axial Fan 1815- A4.3-1815-03-SML-D	1

#### System

3x AUX-VEA Expansion tank HT/ LT Expansion tank 600 L

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
VEA003	LEVEL SWITCH	1

#### System

1x AUX-VBA Maintenance water tank 6,0 m3 (9,0 m3/h)(CDX 120/12)

#### Safety spare parts



<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
EB251450008	IMPELLER	1

**System**

**2xAUX-DDA Oily water transfer pump unit DL-40**

**Safety spare parts**

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
D00279	SPARE PART SET	1

**System**

**3xAUX-Engine auxiliary panel ABB- auxiliary panel**

**Safety spare parts**

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
480380/110/24VAC	TRANSFORMER 400/110 300VA	2
6ES71534AA010XB0	INTERFACE IM 153-4 MODULE 6ES7153-4AA01-0XB0	1
6ES73211BP000AA0	DIGITAL INPUT 6ES7321-1BP00-0AA0	1
6ES73221BL000AA0	DIGITAL OUTPUT 6ES7 322-1BL00-0AA0	1
6ES73311KF020AB0	ANALOG OUTPUT 6ES7331-1KF02-0AB0	1
6ES73325HD010AB0	ANALOG OUTPUT MODULE 6ES7-332-5HD01-0AB0	1
AVK9020B	PANEL LIGHT AVK 9020B	1
C60N 1C0.5	MCB C60N 1C0.5	2
C60N 1C2	MCB C60N 1C2	2
C60N 1C4	MCB C60N 1C4	2
C60N 1P C1	MCB C60N 1C1	2
C60N2C2	MCB C60N 2C2	2
C60N2C4	MCB C60N 2C4	2
C60N3C1	MCB C60N 3C1	2
C60N3C10	MCB C60N 3C10	2
C60N3C16	MCB C60N 3C16	2
C60N3C4	MCB C60N 3C4	2
FLK14EZDR100KONF	CABLE FLK 14/EZ-DR/100/KONFEK	1
FPF12KU115BE-110	FAN AND FILTER UNIT FPF12KU115BE-110	1
FPF12KUG	OUTLET FILTER FPF12KUG	1

GV2ME08	MOTOR PROTECTION SWITCH GV2 ME08 (2.5-4A)	1
GV2ME14	MOTOR PROTECTION SWITCH GV2 ME14 (6-10A)	1
GV2ME16	MOTOR PROTECTION SWITCH GV2 ME16 (9-14A)	1
GV2ME20	MOTOR PROTECTION SWITCH GV2 ME20 (13-18A)	1
GV3P65(48-65A)	MOTOR PROTECTION SWITCH GV3 P65 (48-65A)	1
GVAE20	AUXILIARY CONTACT GV AE20	1
LADN20	AUXILIARY CONTACT LAD N20	1
LADN22	AUXILIARY CONTACT LAD N22	1
LC1D09F7	CONTACTOR LC1 D09F7 110VAC	1
LC1D18BD	CONTACTOR LC1 D18BD 24VDC	1
LC1D18F7	CONTACTOR LC1 D18F7 110VAC	1
LC1D65F7	CONTACTOR LC1 D65F7 110VAC	1
NES13DB24SA	SAFETY RELAY NES13DB24SA 24VDC	1
OF 26924	AUXILIARY CONTACT SD 26924	4
PF390300075	HAND CONTROL PF390300075	1
PLCRSC24DC21	AUX. RELAY + BASE PLC-RSC-24 DC/21	10
RXZE2S114M	CONNECTION BASE RXZE2S114M	3
WDU4	TERMINAL WDU 4	30
WSI 6 LD	FUSE TERMINAL BLOCKS WSI 6 LD FUSE 100MA	10
WSI6LD24VDCFUSE1	FUSE TERMINAL BLOCKS WSI 6 LD FUSE 1A	10
ZB5-AK1313WHITE	LIGHT SWITCH HANDLE ZB5-AK1313 WHITE	1
ZB5-AW0B13	BODY/ CONTACT BLOCK WITH LED ZB5-AW0B13	1
ZBE-101	CONTACT BLOCK ZBE-101	1

### System

6xAUX-MV- switchgear MV- switchgear (ABB Unigear)

### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
6ED1052	PROGR. LOGIC CONTROLLER (PLC) 6ED1052-1FB00-0AB5	1
6ED1055	EXPANSION MODULE 6ED1055-1FB00-0BA1	2
700-M220A1	AUXILIARY RELAY 700-M220A1 110 VAC	10
700DC-M220Z11	AUXILIARY RELAY 700DC-M220Z 110 VDC	10
800EP-F3	PUSH BUTTON 800EP-F4, GREEN	3
800EP-F4	PUSH BUTTON 800EP-F4, RED	3
800EP-F6	PUSH BUTTON 800EP-F6, BLUE	3
FB96A;2500	AMPERE-METER FB96	2
FB96A;500	AMPERE-METER FB96	2
FB96V	VOLTMETER FB96	1
HD4170632GEN	SF6 CIRCUIT BREAKER HD4 17.06.32 (GEN)	1

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HD4170632STA	SF6 CIRCUIT BREAKER HD4 17.06.32 (STA)	1
HD4172532OUT	SF6 CIRCUIT BREAKER HD4 17.25.32 (OUT)	1
HD4CHARG110VDC	CHARGING MOTOR 110VDC FOR HD4 BREAKER	1
HD4CLOS110VDC	CLOSING COIL 110VDC FOR HD4 BREAKER	5
HD4TRIP110VDC	TRIPPING COIL 110VDC FOR HD4 BREAKER	1
HD4UNDE110VDC	UNDER VOLTAGE COIL 110VDC FOR HD4 BREAKER	1
KOKM 06J2	SUMMARY CURRENT TRANSFORMER KOKM 06J2	3
PAVC161	AUXILIARY RELAY SOCKET PAVC 161	10
S201-Z4	MCB S201-Z4	3
S202-C6	MCB S202-C6	3
S203-Z4	MCB S203-Z4	3
S2CH6R	AUXILIARY CONTACT S2C-H6R	5
TJC 5	VOLTAGE TRANSFORMER TJC5	3
TPU 50.13;150	CURRENT TRANSFORMER TPU 50.13	1
TPU 50.13;500	CURRENT TRANSFORMER TPU 50.13	1
TPU 54.33;1250	CURRENT TRANSFORMER TPU 54.33	1
TPU 56.33;2500	CURRENT TRANSFORMER TPU 56.33	1
VAMP1353X7AAA	VOLTAGE AND FREQUENCY RELAY VAMP 135- 3X7AAA	1
VAMP1403A7AAA	OVER CURRENT RELAY VAMP 140-3A7AAA	1

#### System

1xAUX-LV-switchgear LV-switchgear (Elkamo)

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
100AGG00	FUSE 100A GG00	3
125AGG00	FUSE 125A GG00	3
160AGG1	FUSE 160A GG1	3
200AGG1	FUSE 200A GG1	3
20AGG00	FUSE 20A GG00	3
250AGG1	FUSE 250A GG I	3
3*125A	SWITCH FUSE FUSERBLOCK 3*125A	1
3*250A	SWITCH FUSE FUSERBLOCK 3*250A	1
50AGG00	FUSE 50A GG00	3
63AGG00	FUSE 63A GG00	3
80AGG00	FUSE 80A GG00	3
BQ96	V- METER BQ-96; 0-500V	1
BQ96020005A	A- METER BQ-96 0- 2000/5A	3
C60N1PC10	MCB C 60N 1PC10	2
C60N1PC16	MCB C 60N 1PC16	2

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C60N1PC20	MCB C 60N 1PC20	2
C60N2PC6	MCB C 60N 2PC6	2
C60N3PC10	MCB C60N 3P C10	2
C60N3PC16	MCB C60N 3P C16	2
CAD32V7	AUXILIARY RELAY CAD-32V7 400VAC	1
FPF15KPR230B	FILTER FAN FPF 15KR230B (R)-110	2
GV2ME08	MOTOR PROTECTION SWITCH GV2 ME08 (2.5-4A)	1
GV2P16	MCB GV2-P16; 9-14A	1
GVAD0110	AUX CONTACT GV-AD0110	1
K1D80207Z	CONTROL SWITCH K1D80207Z; A-0-1<-START	1
K1F027MC	SELECTOR SWITCH K1F027MC	1
KBC1B	CONTROL SWITCH KBC-1B+K1D-024M	1
LA7D1020	AUXILIARY DEVICE LA7D 1020	1
LADN31	AUX. CONTACT LA-DN31	1
LADR2	DELAY UNIT LAD-R2 0,1-30 S	1
LC1D18F7	CONTACTOR LC1 D18F7 110VAC	1
LC1D65F7	CONTACTOR LC1 D65F7 110VAC	1
LR2D1321	THERMAL RELAY LR2-D 1321	1
LR2D3357	THERMAL RELAY LR2-D 3357	1
LRD3359	THERMAL RELAY LR-D3359	1
MCH110VDC	SPRING MOTOR MCH 110VDC	1
MN110VDC	UNDERVOLTAGE RELEASE MN 110VDC	1
MX110VACDC	SHUT RELEASE MX 110VDC	1
NS80HMA80	CIRCUIT BREAKER NS80H-MA80	1
RAC45230V	SECTION HEATER RAC-45 230V	2
RUN31A21F7	AUXILIARY RELAY RUN31A21F7+RUZ1A 110VAC	2
RUN31A21FDRUZ1A	AUXILIARY RELAY RUN31A21FD+RUZ1A 110VDC	1
SD	AUXILIARY CONTACT SD	2
SDE	ALARM CONTACT SDE	1
SEL22D130VGREEN	PILOT LIGHT GREEN SEL-22D-130V	1
SEL22D130VRED	PILOT LIGHT RED SEL-22D-130V	1
XF54499	CLOSING RELEASE XF- 110 VDC	1
ZB5AA331	PUSH BUTTON ZB5-AA331	1
ZB5AA432	PUSH BUTTON ZB5-AA432	1
ZB5AZ101	BODY ZB5-AZ101	2

#### System

3xAUX-Neutral point cubicle Neutral point cubicle

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
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CURRENT TRANSFORMER

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**System**

3xAUX-Radiator panel Radiator panel

**Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
MS325-12.5+HK11	CIRCUIT BREAKER MS325-12.5+HK11	2
OA1G10	AUXILIARY CONTACT	2
S201-C4	MCB S201-C4	2
S2CH6R	AUXILIARY CONTACT S2C-H6R	2
SK3110	THERMOSTAT SK 3110	1
SK311650120W	HEATER SK3116; 50/120W	1
SK3322107	FILTER FAN SK 3322.107	1
SK3322207	OUTLET FILTER SK 3322.207	1

**System**

3xAUX-Frequency converter NXS01055A5H (Radiator)

**Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
FAN KIT NXS	MAIN FAN KIT NXS SERIES	1
NXS01055A5H	FREQUENCY CONVERTER	1

**System**

3xAUX-Frequency converter NXS00315A2H (Freq. conv. for roof)

**Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
FAN KIT NXS	MAIN FAN KIT NXS SERIES	1
NXS00315A2H	FREQUENCY CONVERTER	1



**System****3xAUX-Frequency converter NXS00385A5H (Gen. outlet fan)****Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
FAN KIT NXS	MAIN FAN KIT NXS SERIES	1
NXS00385A5H	FREQUENCY CONVERTER	1

**System****3xAUX-DC- system MPS 24V****Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
18060150	SHUNT 150A/60MV	1
52500211	AUXILIARY CONTACT 07350	2
DX2C12510KA	MCB DX-2C125 10KA	2
DX2C166KA	MCB DX-2C16 6KA	2
DX2C206KA	MCB DX-2C20 6KA	2
DX2C326KA	MCB DX-2C32 6KA	2
DX2C506KA	MCB DX-2C50 6KA	2
DX2C66KA	MCB DX-2C6 6A	2
MPK318D24V	SYSTEM ADAPTER MPK 318D/24V	1
MPK320DRCU24V	CONTROL UNIT MPK-320D RCU/24V	1
MPK34724V	FUSE ADAPTER MPK 347/24V	1
MSR2440	RECTIFIER MSR24/40	1

**System****2xAUX-DC- system EIPS 110V****Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
18060150	SHUNT 150A/60MV	1
52500211	AUXILIARY CONTACT 07350	2
94M037	LED MODULE 94M037	1
94M096D	DIGITAL SUPERVISOR 94M096D	1



94M102B	FUSE CONTROL UNIT 94M102	1
BEB10	EARTH BALANCING UNIT BEB-10	1
DX1C166KA	MCB DX-1C16 6KA	2
DX2C166KA	MCB DX-2C16 6KA	2
DX2C206KA	MCB DX-2C20 6KA	2
DX2C636KA	MCB DX-2C63 6KA	2
DX2C66KA	MCB DX-2C6 6A	2
ELM10	EARTH LEAKAGE MONITOR ELM-10	1
IPS1800110V	RECTIFIER IPS 1800 110V	1

#### System

**3xAUX-Generator AMG 1120**

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
9893305	OPERATIONAL SPARE PART PACKAGE	1

#### System

**1xAUX-QLC Lube oil transfer pump unit, mobile 8,1 / 9,9 m3/h**

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
D00057	SPARE PART SET	1
D00301	SPARE PART SET	1
M00003	BALL BEARING	1
M00004	BALL BEARING	2
M00015	BALL BEARING	1

#### System

**1xAUX-ZAA Gas pressure reduction unit ZAA Gas pressure reduction unit**

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
0136630	GASKET FOR FA-12-AP 80 FILTER	2

*unf*

2200093	KIT FOR PS/79	1
2200469	KIT FOR OS/80X-APA-D	1
2200836	KIT FOR BM5/40	1
4009825	FILTER CARTRIDGE FA-12-AP 80	2

**System**

**3xAUX-NHC Turbo washing unit NHC Turbo washing unit (gas engine)**

**Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
V00721	SOLENOID VALVE	1

**System**

**3xAUX-VDA W32/34 W32/34 Preheating unit EL (60Hz)**

**Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
D00445	Sealing kit	1
D00446	Impeller	1
VDA007	SAFETY VALVE	1

**System**

**3xAUX-MOD W34 EAM W34SG EAM 1-C v.2.2 (1 preheater) 60Hz**

**Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
B00055	FILTER ELEMENT G5XP4-D	1
V00082	SPARE PART SET ARI FIG	1
V00083	GASKET ARI FIG	1

**System**

**1xAUX-Atlas Copco GA 15-125 AP**





**Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
2901086601	Filter kit	1
3001500651	Service Kit for dryer	1

**System**

**1xAUX-TSA Starting air compressor unit - double (E-E) XA150 E-E**

**Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
XA150-CR	XA150 MAKERS RECOM SPARES	1

**System**

**1xAUX-DDC Sludge transfer pump unit 1,8 m3/h**

**Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
BORNE10	ROTOR PUMP EL 164	1
BORNE22	STATOR PUMP EL 164	1

**System**

**3xAUX-CEMS - Suomi analytics Ultramat 23 - Continuous gas analysis**

**Safety spare parts**

<b><u>Part number</u></b>	<b><u>Description</u></b>	<b><u>Quantity</u></b>
100587	O-ring for sample cell	1

**System**

**3xAUX-HVAC Ventilation unit 12 m<sup>3</sup>/s (Leimec)**

**Safety spare parts**



<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
SPWES00000205	PRESSURE SWITCH	1
SPWES00000210	PRESSURE GUAGE	1
SPWES00000315	BAG FILTER SET	1
SPWES00000400	SAFETY SWITCH	2

#### System

3xAUX-HVAC Ventilation unit 18 m<sup>3</sup>/s

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
KUA340	SAFETY SWITCH KUA 340	1
VAIRBAG00002	AIRBAG 287*592*330/3 G4	3
VAIRBAG00003	AIRBAG FILTER 592*592*330/6 G4	15
WEG160L	FAN MOTOR WEG160L	1

#### System

2xAUX-CFA- Common control panel Common control panel ABB

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
200700900BMR1	FOOT FOR LIGHT MOD. 200700900, BMR1	1
210501900SLL	LIGHT MODULE YELLOW 210501900, SLL	1
210502900SLL	LIGHT MODULE RED 210502900, SLL	1
210506900SLL	LIGHT MODULE GREEN 210506900, SLL	1
6ES73172AJ100AB0	CPU 317-2DP	1
6ES73211BL000AA0	DIGITAL INPUT MODULE S7-300; 6ES7-321-1BL00-0AA0	1
6ES73221BL000AA0	DIGITAL OUTPUT 6ES7 322-1BL00-0AA0	1
6ES73311KF010AB0	ANALOG INPUT MODULE 6ES7-331-1KF01-0AB0	1
6ES73325HD010AB0	ANALOG OUTPUT MODULE 6ES7-332-5HD01-0AB0	1
6ES73650BA010AA0	INTERFACE MODULE SIMATIC S7-300	1
6ES79538LL110AA0	MEMORY CARD 6ES7 953-8LL11-0AA0	1
6ES79720BA500XA0	BUS CONNECTOR 6ES7 972-0BA50-0XA0	1
6ES79720BB500XA0	BUS CONNECTOR 6ES7 972-0BB50-0XA0	1
6GK73431EX200XE0	COMMUNICATIONS PROCESSOR CP 343-1	1

890010905	LIGHT BULB 890010905, GL24, Ba15d 30V 5W	3
BE9690ACTI	ACTIVE POWER METER BE-96 90°	1
BE9690AMPE	A- METER BE-96 90°	1
BE9690FREQ	FREQUENCY METER BE-96 90°	1
BE9690POWE	POWER FACTOR METER BE-96 90°	1
BE9690REAC	REACTIVE POWER METER BE-96 90°	1
BE9690VOLT	VOLTAGE METER BE-96 90°	1
C3A30X115VAC	AC-AUXILIARY RELAY C3A30-X115VAC	10
C3A30X24VDC	DC- AUXILIARY RELAY C3A30-X24VDC	20
C60OF	ALARM CONTACT C60 OF	6
FAS-115DG	AUTO-SYNCHRONIZER FAS-115DG	1
FLK14EZDR100	CABLE FLK14/EZ-DR/100/KONFEK	1
FLK14EZDR200	CABLE FLK14/EZ-DR/200/KONFEK	1
FLK50EZDR150	CABLE FLK 50/EZ-DR/ 150/KONFEK	1
FLK50EZDR200	CABLE FLK 50/EZ-DR/ 200/KONFEK	1
FLKM14PAS300	FRONT CONNECTOR FLKM 14-PA-S300	2
FLKM50PAS300	FRONT CONNECTOR FLKM 50-PA-S300	2
FQ1207	DOUBLE VOLTMETER FQ 1207	1
FQD96	DOUBLE FREQUENCY METER FQD96	1
K1D024MKBC1B	CONTROL SWITCH K1D024M+KBC1B	1
KLH24VDC	SIGNAL HORN KLH; AUX: 24VDC	1
MULTI9C60N1C4	MCB MULTI9 C60N 1C4	6
PI25124VDC	POSITION INDICATOR PI25-1 / 24VDC	1
PI25224VDC	POSITION INDICATOR PI25-2 / 24VDC	2
PLCRSC24DC21	AUX. RELAY + BASE PLC-RSC-24 DC/21	10
PLCV8FLK14IOUT	TERMINAL BLOCK PLC-V8/FLK14/IOUT	2
S3-S	CONNECTION BASE S3-S	20
SQZE96	SYNCHRONOSCOPE WITH CHECK SYNC RELAY	1
UM45FLK50	TERMINAL BLOCK UM 45-FLK50/32IM/PLC	1
VAMP2105D7BAA	GENERATOR PROT. RELAY VAMP 210-5D7BAA; AUX:24VDC	1
VAMP2605C7BAA	POWER MONITORING UNIT VAMP 260-5C7BAA	1
VAMP2655D7BAA	GENERATOR DIFF. RELAY VAMP 265-5D7BAA; AUX:24VDC	1
WDU4	TERMINAL WDU 4	50
WSI6100MA	FUSE TERMINAL BLOCKS WSI 6 LD 24VDC; FUSE: 100MA	10
WSI624	FUSE TERMINAL BLOCKS WSI 6 LD 24VDC; FUSE: 1A	10
WTL61	TERMINAL BLOCKS WTL 6/1	10
XPSAR24VDC	SAFETY RELAY XPS-AR; AUX V: 24VDC	1
ZB5AA1ZB5AZ101	PUSH BUTTON ZB5-AA1+ZB5-AZ101	1
ZB5AA3AZB5Z101	PUSH BUTTON ZB5-AA3+ZB5-AZ101	1
ZB5AD2ZB5AZ103	CONTROL SWITCH + HANDLE; ZB5-AD2+ZB5-AZ103	1
ZB5AD3ZB5AZ103	CONTROL SWITCH + HANDLE; ZB5-AD3+ZB5-AZ103	1
ZB5AD3ZB5AZ1034X	CONTROL SWITCH ZB5-AD3+ZB5-AZ103+ 4 x ZBE-101	1
ZB5AD5ZB5AZ103	CONTROL SWITCH ZB5-AD5+ZB5-AZ103	3

ZB5AK1413ZB5AW	CONTROL SWITCH ZB5-AK1413+ZB5-AW0B13	1
ZB5AL8434	PUSH BUTTON ZB5-AL8434+ZB5-AZ103	2
ZB5AW313;	LIGHT PUSH-BUTTON ZB5-AW313+ZB5-AW0B11	3
ZB5AW313AW	LIGHT PUSH-BUTTON ZB5-AW313+ZB5-AW0B12	3
ZB5AW343	LIGHT PUSH BUTTON ZB5-AW343+ZB5-AW0B41	1
ZB5AW353	LIGHT PUSH-BUTTON ZB5-AW353+ZB5-AW0B51	1
ZB5AZ101	BODY ZB5-AZ101	3
ZB5AZ103	BODY ZB5-AZ103	3
ZB5AZ104ZB5BS54	EMERGENCY STOP PUSH BUTTON ZB5-AZ104+ZB5-AS54	1
ZBE-101	CONTACT BLOCK ZBE-101	3

### System

3xAUX-CFC- Generating set control panel Generating set control panel VEO

### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
140ACO02000	ANALOG OUTPUT 140 ACO 020 00; 4 CHANNELS, 24VDC	1
140CPS52400	POWER SUPPLY 140 CPS 524 00	1
140CPU65150	CPU 140 CPU 651 50	1
140CRP93100	RIO HEAD MODULE 140 CRP 931 00	1
140DDI35300	DIGITAL INPUT 140 DDI 353 00	2
140DDO35300	DIGITAL OUTPUT 140 DDO 353 00	1
140NOE77101	ETHERNET CARD 140 NOE 771 01	1
140XTS00200	TERMINAL STRIP 140 XTS 002 00	1
1SNA631025R1400	DIGITAL INPUT MODULE BOM-16-B; 1SNA631025R1400	2
BE913800/110	VOLTAGE METER BE96; 13800/110V; 0-20KV	1
BE96	RPM- METER BE96; 4-20MA, 0-1000 RPM, 0-30000 RPM	1
BE9642005105	POWER FACTOR METER BE96; 4-20MA= 0,5-1-0,5CAP-IND	1
BE96420MA4016	REACTIVE POWER METER BE96; 4-20MA= -4-0-16 MVAR	1
BE96420MA=0-20	ACTIVE POWER METER BE96; 4-20MA = 0-20MW	1
BE9655-65HZ110	FREQUENCY METER BE96; 110V; 55-65HZ	1
BE96;1000/5A	CURRENT METER BE96; 1000/5A, 1000/2000A	1
E27240V60W	BULB E27; 240V 60W	1
GARDOMAX60W	PANEL LIGHT GARDOMAX; MAX 60W	1
P22061049219M1	SWITCH P220-61049-219M1; ENG., TURBO A, TURBO B	1
P22061312219M1	SWITCH P220-61312-219M1; 0, L1-L2, L2-L3, L3-L1	1
PT3P7615115VAC	AC-AUXILIARY RELAY PT 3P7615 115 VAC	1
PT5D7110110VDC	DC-AUXILIARY RELAY PT 5D7110 110 VDC	7
QUINTPS1AC24DC5	DC POWER SUPPLY QUINT-PS/1AC/24DC/5	1
S201-C1	MCB S201-C1	2

*ms*

S202-C 2	MCB S 202-C 2	2
S202-C4	MCB S202-C4	2
S2C-H6R	AUXILIARY CONTACT S 2C-H6R	2
S506100RB100MA	TUBE FUSE S506-100-R-B; 100MA, 5X20MM	10
SK311650120W	HEATER SK3116; 50/120W	1
VAMP2105A7AHC	GENERATOR PROTECTION RELAY VAMP 210-5A7AHC	1
VAMP2605C7AHC	PMU VAMP 260-5C7AHC	1
VAMP2655A7AHC	GENERATOR DIFFERENTIAL RELAY VAMP 265-5A7AHC AUX	1
WDU4	TERMINAL WDU 4	50
WTL 6/1 EN STB	TERMINAL WTL 6/1/ EN STB	20
XRFE16124	DIGITAL RELAY OUTPUT MODULE XRFE16124	1
ZB5AS844REDZB5	EMERGENCY STOP BUTTON ZB5-AS844; ZB5-AZ104; ZHS	1

#### System

1xAUX-Station auxiliary transformer Station auxiliary transformer KTPU

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
DGPT2	DGPT2 PROTECTION DEVICE	1
DT3150	LV-BUSHING DT3150	1
NLTD 24B 250	HV BUSHING NLTD 24B 250	1
YRFA2	PRESSURE RELIEF DEVICE YRFA2	1

#### System

3xAUX-Frequency converters NXC03005A2H (Ventilation auxiliary side)

#### Safety spare parts

<u>Part number</u>	<u>Description</u>	<u>Quantity</u>
60PP01080	MAIN FAN KIT NXS SERIES	1
60SVB00761	CONTROL BOARD	1
NXC03005A2H	FREQUENCY CONVERTER	1

APPENDIX 2.B  
TOOLS AND EQUIPMENT

[Enter list of tools under Mobilization]

Currently under Mobilization no workshop tooling provided by Wartsila.

A handwritten signature or mark, possibly initials, located in the bottom right corner of the page.

APPENDIX 2.C  
OFFICE EQUIPMENT

[Enter list of office equipment supplied under Mobilization.]

Currently under Mobilization, no office equipment provided by Wartsila. Expected that USVIWAPA furnishes the offices at the W34LPG power station

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## APPENDIX 3

### PERFORMANCE FIGURES AND GUARANTEES

#### 1. ANNUAL AVAILABILITY

##### 1.1.1 Annual Availability Guarantee for each Wartsila Generator Set

Starting from the initial performance testing, the Operator guarantees an Annual Availability for each of the Wartsila Generator Sets of the Power Station of ninety six percent (96%) in the Operating Year; provided, that in any Operating Year in which the 16,000 Engine Running Hour overhaul occurs for one or more Wartsila Generator Sets, the guaranteed Annual Availability for that engine is ninety four percent (94%). When calculating the Annual Availability target for the Facility, it shall be calculated as set forth below in Section 1.1.3, taking into account the number of Wartsila Generator Sets subject to such overhaul. The Annual Availability shall be calculated in accordance with the formula set forth in Section 1.1.2 below. Notwithstanding anything else herein, the Annual Availability Guarantee shall be ninety two percent (92%) in the first sixty (60) Days following COD. All calculations made for any Operating Year which is less than a full calendar year shall be made on a pro-rata basis.

##### 1.1.2 Annual Availability Formula

The Annual Availability ("**AA**") shall be calculated according to the IEEE 762-2006 standard and expressed as a percentage (%) for each Wartsila Generator Set:

##### 1.1.3 Calculation of Annual Availability

The Annual Availability for each of the Wartsila Generator Set is calculated based on the IEEE 762-2006 standard for each Wartsila Generator Set separately.



## Annual Availability Guarantee Calculation (IEEE 762-2006 standard)

	Year 1	Year 2	Year 3
Annual Guarantee	96.00%	94%	96%

When a 16000 hour Overhaul occurs, the impact on Annual Guarantee per Wartsila Generator Set is 94%, the above Annual Guarantee in Year 2 is that all engines have the 16000 hour Overhaul in Year 2.

Example of Year 1, no overhauls

Year	Total Number hours	Actual Available Hours	Target Available Hours	GS Availability Target	Actual GS Availability	Facility Availability (AF)	Facility Target
1							
GS1	8760	8490	8410	96.00%	96.92%		
GS2	8760	8490	8410	96.00%	96.92%		
GS3	8760	8490	8410	96.00%	96.92%	96.92%	96.00%

Example with year with Overhaul.

Year	Total Number hours	Actual Available Hours	Target Available Hours	GS Availability Target	Actual GS Availability	Facility Availability (AF)	Facility Target	Note
2								
GS1	8760	8200	8234	94.00%	93.61%			16000 hour Ov
GS2	8760	8300	8234	94.00%	94.75%	95.13%	94.67%	16000 hour Ov
GS3	8760	8500	8410	96.00%	97.03%			12000 hour Ov

## 2. HEAT RATE GUARANTEE

Starting from the initial performance testing, the Operating Partner guarantees that the Heat Rate measured running on LPG based on the measurement of the heat rate per one engine measured during the annual test, at the reference conditions (site conditions) as stipulated in Appendix 4 and operated at condition as stipulated in Table 1, and expressed in Btu/kWh as stipulated in Table 2 is not higher than indicated in Table 2 value.

If the Heat Rate measured in the initial Heat Rate Test is below the value indicated in Table 2, based on the conditions of Table 1, the Heat Rate values in Table 2 will be replaced by the Heat

*mt*

Rate values measured in the initial Heat Rate Test, and the Heat Rate Guarantee shall be based on Heat Rate measured in the initial Heat Rate Test plus an aging factor of 1.5 %.

Table 1. Conditions at 100 % load and 0.8 power factor

<u>Objective</u>	<u>Value</u>	<u>Units</u>	<u>Target</u>
Electrical Power Output, W20V34LPG	7027	kWe	Generator terminals or as tested in Construction Contract performance test

Table 2. Guaranteed Performance Values at 0.8 power factor

<u>Objective</u>	<u>Value</u>	<u>Units</u>	<u>Target</u>
Heat rate, W20V34LPG	8282	Btu / kWh, at LHV	Generator terminals

Table 3. Correction factor for guaranteed Heat Rate value

<u>Objective</u>	<u>Value</u>	<u>Units</u>	<u>Valid for electrical outputs at generator terminals (kWe)</u>
Correction factor for heat rate, W20V34LPG	0.048	kJ / kWh	5950 - 7027

If the Electrical Power Output stipulated in Table 1 can't be reached during the performance tests, the Heat Rate guarantee value in Table 2 is increased by the value unit stipulated in Table 3 per reduced Electrical Power Output measured per kW. This is valid for Electrical Power Outputs

stipulated in Table 3.

Example: Electrical Power Output during performance tests 6,000 kW on W20V34LPG->  
Guaranteed heat rate:  $8282 + (0.048 \times (7027 - 6000)) = 8331.3 \text{ Btu/kWh}$

### 3. **Lube Oil Consumption Guarantee**

The Wartsila 34SG LPG Generator sets shall not exceed the average gross Lube Oil Consumption in a year shall not exceed 0.50 g/kWh generated at the generator terminals.

### 4. **ELECTRICAL CAPACITY GUARANTEE**

For the Wartsila 34SG LPG Generator Sets, the Electrical Capacity Guarantee shall equal the value measured in the Construction Contract performance test.

### 5. **EMISSION GUARANTEE**

For the Wartsila 34SG LPG Generator Sets, the emissions will not exceed the emissions limitations set forth in the Emissions Statement below and the Stack Emissions Test conducted under the Construction Contract as documented in the Performance Test Certificate, whichever is higher.

**CONFIDENTIAL Emission statement**

Wärtsilä	Emission guarantees for USV	Doc ID: 00AE03J595
		Revision: g
Author:	Hanna Strandberg	Status: Finalised
Finalised by:	Leik Uude / 21.02.2017	Pages: 1 (4)
Organisation:	- General Energy Solutions	
Project:	- Project information	

This document provides flue gas emissions, i.e. maximum average values for emissions measured over a period of minimum 60 minutes. The emissions are based on the site conditions, gas composition and measurement methods specified in this document.

**Engine:** Wärtsilä® 20V34LPG, 720 rpm (constant speed)

**Site conditions:**

Altitude	up to 100 m above sea level
Ambient temperature	20-35 °C
Humidity ratio	6-25 g water/kg dry air

**Gas composition:**

The emissions are valid within the limits of the gas composition given in the table below which also represents the maximum and minimum limits for LPG fuel characteristics for the Wärtsilä W34LPG engine. It is understood that variations in the gas composition inside this specification will occur and are permitted; however sudden extreme changes in gas temperature, pressure or composition are not allowed.

Property	Unit	Limit
Methane (CH <sub>4</sub> ) + Ethane (C <sub>2</sub> H <sub>6</sub> ) + Propane (C <sub>3</sub> H <sub>8</sub> ) content, min.	% v/v	97.0
Propane (C <sub>3</sub> H <sub>8</sub> ) content, min.	% v/v	99.0
Butanes and heavier alkanes, max.	% v/v	3.0
Pentanes and heavier alkanes, max.	% v/v	1.0
Total alkanes, max.	% v/v	2.0
C4+ alkenes, max.	% v/v	0.5
Hydrogen sulphide (H <sub>2</sub> S) content, max.	% v/v	0.05
Total sulphur, max S	mg/kg	5.0
Water and hydrocarbon condensate bef. engine		Not allowed

## APPENDIX 4

### PERFORMANCE TEST GUIDELINES

(Draft) Test Procedures

Temp:ature	Charge air cooler inlet thermodynamic temperature	Charge air cooler outlet	K	± 1 K
fuel	Gas consumed	Ac gas flow meter	kg/h	± 1 %
LHV	Lower heating value	Ac gas flow meter	kJ/m <sup>3</sup>	± 0.2 %
HIV	Higher heating value	Ac gas flow meter	kJ/m <sup>3</sup>	± 0.2 %
E	Electrical Energy	PMU / EHU <sup>1</sup>	kWh	± 0.5 %
t	Time	N/A	s	± 0.1 %

<sup>1</sup> ISO 1540 recommends equipments with these accuracies, however actual tolerances of measuring equipment used during the test(s), shall be used for calculating Electrical Power and Heat Rate as per section 4.6 and 5.1 respectively.

<sup>2</sup> Gas flow to be expressed at same reference conditions as the LHV. The reference conditions are described in Contract Exhibit 5 – Performance Guarantees.

<sup>3</sup> This is the point of measurement as per agreement between the Contractor and Owner (Alternator terminals).

The Energy is measured using a PMU (Power Monitoring Measuring Unit). The Power is calculated from the Energy for each test period.

$$P = E / t$$

$$\text{Where } E_g = E_e$$

$$C_{e1} = E_e - E_a \text{ and } F_{H1} = F_{H2} - E_a$$

#### 4 Gross Electrical Capacity Test

##### 4.1 General

The Gross Electrical Capacity Test is performed concurrently with the Heat Rate Test, during a 4 (four) hour period.

The engines involved in the test shall run for 2 (two) hours at full load prior to the start of the test in order to achieve stable conditions in all engine components and external systems.

Because there can be major variations in the ambient conditions during the full test period, it is important to split the test period into shorter hourly test periods. These hourly test periods are then used to calculate the average of the full test. Please note that under no circumstances should an average of the ambient conditions prevailing over the full test period be used for the adjustment calculations.

For accuracy of the test it is important that all measurement readings are taken simultaneously.

The required measurements are done on an hourly basis and the readings recorded on a form. The period can differ somewhat from one hour without affecting the accuracy of the test. The electrical capacity is calculated from the produced electrical energy during each test period. The actual electrical capacity produced and actual gas consumed is naturally the sum of all the hourly test periods.

The guaranteed Electrical Capacity and Heat Rate for each hourly test period is adjusted for the ambient conditions prevailing and measured at the start of each hourly test period.

The final guaranteed Capacity and Heat Rate during the full test is the average of the adjusted Capacity and the corresponding heat rates, which are calculated separately for each hourly test period.

(Signature)

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## **APPENDIX 5**

Appendix 5.A	LPG Specification
Appendix 5.B	Lube Oil Specification
Appendix 5.C	Cooling Water Treatment
Appendix 5.D	Air Quality

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## APPENDIX 5.A LPG SPECIFICATION FOR FACILITY

The LPG characteristic for the Wartsila 34LPG Generator Sets of the Facility must meet the below specifications.

		© Wärtsilä Finland Oy Finland		FUEL CHARACTERISTICS		
This doc is the property of Wärtsilä Finland Oy and shall neither be copied, shown or communicated to a third party without the consent of the owner						
Subtitle	Product	Made	30.10.2013	Page	Document No	Rev
Performance Manual	Wärtsilä 34LPG-A	Appd.	1 (2)		DAAF090429	-
Revised date:	Changed by:	Approved by:	D-message No.: 241227			

### Maximum limits for gas fuel characteristics

The Wärtsilä 34LPG-A engine is designed and developed for continuous operation on liquefied petroleum gas (LPG), without reduction in the rated output, on gas qualities according to the following specification:

Property	Unit	Limit
Propane (C <sub>3</sub> H <sub>8</sub> ) content, min.	% v/v	97,0
Butane (C <sub>4</sub> H <sub>10</sub> ) + heavier alkanes content, max.	% v/v	3,0
Total alkenes content, max.	% v/v	2,0
Hydrogen sulphide (H <sub>2</sub> S) content, max.	% v/v	0,05
Hydrogen (H <sub>2</sub> ) content, max. <sup>1)</sup>	% v/v	Not allowed
Water and hydrocarbon condensates before the engine, max. <sup>2)</sup>	% v/v	Not allowed
Copper strip corrosion, max.	Rating	No. 1
Ammonia content, max.	mg/ m <sup>3</sup> N	25
Chlorine + Fluorine content, max.	mg/ m <sup>3</sup> N	50
Particles or solids content in engine inlet, max. <sup>3)</sup>	mg/ m <sup>3</sup> N	50
Particles or solids size in engine inlet, max. <sup>3)</sup>	µm	5
Gas inlet temperature	°C	0 - 60

**NOTE 1.** If there is hydrogen in the gas, the use of gas has to be considered case by case. W34 Product Management&Engineering is to be contacted for further evaluation.

**NOTE 2.** Dew point of liquefied petroleum gas (LPG) is below the minimum operating temperature and pressure.

**NOTE 3.** Content of gas in engine inlet.



## APPENDIX 5.B LUBE OIL CHARACTERISTIC FOR FACILITY

The lube oil characteristics for the Wartsila 34LPG Generator Sets of the Facility must meet the below specifications.



### DATA & SPECIFICATIONS

Wärtsilä 4-stroke  
Technical Services

**WS02N003**  
Issue 5, 15 September 2017

#### Lubricating oils for WÄRTSILÄ® 34LPG, 34SG and 50SG engines

Information to Operators and Owners of installations  
concerned

##### For your information

**Engines concerned**  
WÄRTSILÄ® 34LPG, 34SG and 50SG  
engines.

**Reference**  
02 Fuel, lubricating oil, cooling water

**Introduction**  
A new revision of "Requirements and oil  
quality" has been released.

**Validity / Issue**  
Until further notice. Replacing issue 4  
dated 07 December 2015.



Wärtsilä Finland Oy Services  
P.O. Box 252 (Tartuajantie 2)  
FIN-05101 Vaasa, Finland

Switchboard Tel: +358 10 700 0000

*ant*



## APPENDIX 5.C COOLING WATER ADDITIVE SPECIFICATION FOR FACILITY

The cooling water additive specifications for the W34LPG Generator Sets of the Facility must meet the below specifications.



### INSTRUCTIONS

Wärtsilä 4-stroke  
Technical Services

**4619Q002**  
Issue 9, 07 March 2018

#### Cooling water treatment and analysing

Information to Operators and Owners of installations  
concerned

#### For your information

Engines concerned  
This bulletin is valid for following engine  
types:

- GMT210, GMT230, GMT300, GMT320,  
GMT420, GMT550
- Isuzu F10, F20, F30
- Sulzer Z40, Z440, Z440S, Z450S
- Wichmann AX, 20
- Wärtsilä Vasa 22ABC 22HF, 22MD, 222S
- Wärtsilä Vasa 32, 32LN
- Wärtsilä Neuhab 25, 25DF
- Wärtsilä 15
- Wärtsilä 20, 20DF
- Wärtsilä 200, 220SG
- Wärtsilä 250G, 255G
- Wärtsilä 26
- Wärtsilä 31, 31DF, 31SG
- Wärtsilä 32, 32DF, 32GD, 32LNGD
- Wärtsilä 34DF, 34LPG, 34SG
- Wärtsilä 30, 30A, 30B
- Wärtsilä 46, 46DF, 46GD, 46F
- Wärtsilä 50, 50DF, 50SG
- Wärtsilä 64

Reference  
Cooling water system

Introduction  
Correct cooling water treatment and  
follow-up of the cooling water condition  
are of utmost importance for keeping the  
cooling water systems of the engines in  
good condition.

Validity / Issue  
Until further notice. Replacing issue 8  
dated 26 January 2018. This issue  
replaces following bulletins:

- 9183M141GB / NO
- 9199000700E
- I-ALL.0003 GB

#### Note

- Updates in issue 9
- Engine types concerned updated.
  - Content revised.

Wärtsilä Finland Oy Services  
P.O. Box 252 (Tähtisaari 2)  
FIN-05101 Vaasa, Finland

Switchboard Tel. +358 10 709 0000

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## **APPENDIX 5.D**

### **AIR QUALITY SPECIFICATION**

The combustion air entering the engine shall always be filtrated trough an air filter having the minimum filtrating class corresponding to F5 (EN779:2002). In applications where the engine is delivered with marine filters this is also the minimum requirement for air filters used in the process ventilation system. The filtration class F5 is corresponding to an efficiency rate of 70% for 5µm particles.

For plant applications where the outside dust levels can reach concentrations above 1-hour TSP of 1 mg/Nm<sup>3</sup>, the filtration system is to be done in two steps, one pre-filter system with higher dust handling capacities and a secondary filtration system.

The highest allowable concentration of harmful components in the engine intake air after filtration is:

- Sulphur Dioxide (SO<sub>2</sub>): 1.25 mg/Nm<sup>3</sup> or 0.43 vol-ppm
- Hydrogen Sulphide (H<sub>2</sub>S): 375 µg/Nm<sup>3</sup> or 0.25 vol-ppm
- Chlorides (Cl<sup>-</sup>): 1.5 mg/Nm<sup>3</sup> or 1.16 mass-ppm
- Ammonia (NH<sub>3</sub>): 94 µ/Nm<sup>3</sup> or 0.125 vol-ppm

Note! Nm<sup>3</sup> given at 0°C and 1013 mbar.

Measurements are to be performed during a 24 hour period and the highest 1 hour average is to be compared with the above mentioned boundary values. Weather conditions, such as wind speed, wind direction, ambient temperature and air humidity may vary considerably during one year. Therefore, a one day measurement may not reflect the most critical situation.

A detailed investigation concerning the filtration has to be done in installations, where the air includes components that are known to be caustic, corrosive or toxic.



## APPENDIX 6

### INDEXES AND FORMULAS

#### 1. Fixed Fee

The Fixed Fee is escalated yearly at each anniversary of the Execution Date ("**Adjustment Date**"), using the formula below:

$$AFF_x = AFF_{x-1} * (USCPI_x / USCPI_{x-1})$$

**Where:**

$AFF_x$  = shall mean the escalated Fixed Fee for the year commencing on the Adjustment Date.

$AFF_{x-1}$  = shall mean the escalated Fixed Fee in effect immediately prior to the escalation.

$USCPI_x$  = shall mean the USCPI corresponding to the Adjustment Date.

$USCPI_{x-1}$  = shall mean the USCPI corresponding to the previous Adjustment Date.

#### 2. Variable Fee for the Wartsila 34LPG Generator Set

The Variable Fees is escalated yearly at each anniversary of the Execution Date ("**Adjustment Date**"), using the formula below:



$$AVF_x = AVF_{x-1} * (60\% * (EPPI_x / EPPI_{x-1}) + 40\% * (USCPI_x / USCPI_{x-1}))$$

**Where:**

$AVF_x$  = shall mean the escalated Variable Fee for the year commencing on the Adjustment Date.

$AVF_{x-1}$  = shall mean the Variable Fee in effect immediately prior to the escalation.

$EPPI_x$  = shall mean the EPPI corresponding to the Adjustment Date.

$EPPI_{x-1}$  = shall mean the EPPI corresponding to the previous Adjustment Date.

$USCPI_x$  = shall mean the USCPI corresponding to the Adjustment Date.

$USCPI_{x-1}$  = shall mean the USCPI corresponding to the previous Adjustment Date.

### 3. Overhaul Fee for the Wartsila 34LPG Generator Set

The Variable Fees is escalated yearly at each anniversary of the Execution Date ("**Adjustment Date**"), using the formula below:

$$AVF_x = AVF_{x-1} * (XX * (EPPI_x / EPPI_{x-1}) + YY * (USCPI_x / USCPI_{x-1}))$$

**Where:**



$AVF_x$  = shall mean the escalated Variable Fee for the year commencing on the Adjustment Date.

$AVF_{x-1}$  = shall mean the Variable Fee in effect immediately prior to the escalation.

$EPPI_x$  = shall mean the EPPI corresponding to the Adjustment Date.

$EPPI_{x-1}$  = shall mean the EPPI corresponding to the previous Adjustment Date.

$USCPI_x$  = shall mean the USCPI corresponding to the Adjustment Date.

$USCPI_{x-1}$  = shall mean the USCPI corresponding to the previous Adjustment Date.

XX = the applicable percentage multiplier for the EPPI indicated in the table below

YY = the applicable percentage multiplier for the USCPI in the table below

Engine Overhaul	XX	YY
12,000 hour	64%	36%
16,000 hour	54%	46%
24,000 hour	72%	28%

**APPENDIX 7**  
**FORM OF ANNUAL OPERATING PLAN**

**1. GENERAL & ADMINISTRATION**

**1.1. Status of the Power Plant**

[Make a reference to the applicable agreement and summarize the status in general.]

**1.2. Subcontractors**

[List and describe functions that are planned to be subcontracted.]

**1.3. Reporting**

[List reports and describe content and distribution of e.g. daily and monthly reports generated in accordance with the Agreement.]

**1.4. Communication**

[Create a communication plan including contact persons and describing how communication is taken care of on different occasions (e.g. meetings, handling of legal notices, contacting authorities concerning safety and environmental issues.)]

**2. OPERATIONAL TARGETS AND PERFORMANCE**

[List and describe guaranteed performance parameters including applicable bonuses and penalties.]

**3. SAFETY AND ENVIRONMENTAL ISSUES**

**3.1. Safety**

[Describe applicable OH&S (Occupational Health and Safety) guidelines and responsibilities (including personnel and equipment).]



### 3.2. Environmental

[Describe applicable EMS (Environmental Management System) guidelines and responsibilities.]

## 4. CHANGE ORDERS

### 4.1. Facility Improvements

[List and describe available product upgrades that could improve the process or utilization and in majority would need to be planned into Owner's budget.]

## 5. ANNUAL DISPATCH PLAN (based on Owner's input)

[Bar graph(s) and list(s)]

[Fuel(s) and Lube Oil estimated consumption]

## 6. ANNUAL MAINTENANCE SCHEDULE

[List, according to annual maintenance schedule, all major equipment that will undergo scheduled maintenance during the Year. Accordingly describe parts availability and purchase requirement(s).]

## 7. ANNUAL TRAINING PROGRAM

[List annual training program for the personnel, target dates of training, etc.]

## 8. OTHER RELEVANT ACTIVITIES

[List and describe all other important milestones to achieve during the Year.]

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**APPENDIX 8  
FORM OF TERMINATION/EXPIRY CERTIFICATE**

The Parties acknowledge and certify that:

- (i) The Agreement has expired/has been terminated with effect from [●].
- (ii) They have fulfilled all their obligations under the Agreement, except for the obligations set forth in this Certificate.
- (iii) The obligations still to be fulfilled under the Agreement are the following: Operating Partner [●], Owner [●].
- (iv) Except as set forth in (iii) above the Parties release each other from any further claims, demands or liabilities with respect to their obligations under the Agreement.
- (v) future service and spare part requirements will be handled by the following office,  
  
[insert name of the Party entity]  
[insert name of contact person/title]  
[insert telephone number]  
[insert facsimile]  
[insert e-mail]

The Parties have caused this Termination/Expiry Certificate to be executed by their duly authorized representatives as of [●].

**On behalf of Owner:**

**On behalf Operating Partner:**

**By:**

**By:**

**Title:**

**Title:**

*mt*



**APPENDIX 9**  
**FORM OF PERFORMANCE TEST CERTIFICATE**

The Performance Test has been satisfactorily completed in accordance with the Agreement.

The measured results during the Electrical Capacity and Heat Rate Test are as follows:

[•]

The Parties acknowledge that based upon the above results [the Operating Partner is liable to pay Performance Liquidated Damages in the following amounts [•]. The Performance Liquidated Damages shall be paid in accordance with Section 8.1.2 and 8.1.4.

For: **Operating Partner**

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date

For **Owner**

By: \_\_\_\_\_

Title: \_\_\_\_\_

Date:

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**APPENDIX 10**  
**PRELIMINARY ORGANIZATION CHART**



Appendix  
10\_Preliminary Orga

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**APPENDIX 11**  
**OWNER'S SAFETY POLICY**

A handwritten signature in black ink, located in the bottom right corner of the page. The signature is stylized and appears to be a single word or a short phrase.



H-AQA Texas, LLC  
 1157 Katy Freeway  
 Suite 100  
 Houston, TX 77059  
 USA  
 Phone: 1 281 258 2300  
 www.h-aqa.com

**Virgin Island Water and Power Authority**  
**Occupational Health and Safety Policy**  
**Incident Reporting and Investigation**

**INCIDENT-** An incident is an unplanned, undesired event that can or has the potential to adversely affect the completion of a task.

Document Number:			WAPA OHS-SM-PP-001		
Rev.	Revision Date	Revision Description	Prepared	Checked	Approved
1	June 26, 21015	Issue for Comments	B. Pasion 7/7/15 SMT (Sany)	X. Yang 7/7/15	X. Yang 7/7/15

*ant*



WAPA, LLC  
1500 Caywood Blvd.  
Suite 200  
Hawkins, TX 75842  
USA  
Phone: +1 (281) 254-2300  
[www.wapa.com](http://www.wapa.com)

## Virgin Island Water and Power Authority

### Occupational Health and Safety Policy

#### Personal Protective Equipment

Document Number:		WAPA-OHS-SM-PP-002			
Rev.	Revision Date	Revision Description	Prepared	Checked	Approved
4	June 23, 21015	Issue for Comments	B. Nelson 7/7/15 got 10/15	X. Yang 7/7/15	X. Yang 7/7/15

WPA



by-ACIA Texas, LLC  
1500 Citywest Blvd.  
Suite 200  
Houston, TX 77042  
USA  
Phone: +1 281 256 2310  
[www.acia.com](http://www.acia.com)

## Virgin Island Water and Power Authority

### Occupational Health and Safety Policy

#### Welding Cutting and Hot Work

Document Number:			WAPA-OHS-SM-PP-007		
Rev.	Revision Date	Revision Description	Prepared	Checked	Approved
A	August 12, 2015	Issue for Comments	B. Poston	X. Yang	X. Yang

This document is confidential and is intended for the sole use of the person or company to whom it is addressed and no liability of any nature whatsoever shall be assumed to any other party in respect of its contents.

ast



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1990 Citywest Blvd.  
Suite 200  
Houston, TX 77042  
USA  
Phone: +1 281 218 2360  
[www.p-ata.com](http://www.p-ata.com)

## Virgin Island Water and Power Authority

### Occupational Health and Safety Policy

#### Lockout / Tagout

Document Number:			WAPA-OHS-SM-PP-008		
Rev.	Revision Date	Revision Description	Prepared	Checked	Approved
A	August 12, 2015	Issue for Comments	B. Poston	X. Yang	X. Yang

*mt*





**Virgin Island Water and Power Authority**

**Occupational Health and Safety Policy**

**Change Management Process (ChAMP)**

**WAPA-OHS-SM-PP-017**

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This document is intended for the sole use of the person or company to whom it is addressed, and no liability of any nature whatsoever shall be assumed to any other party in respect of its contents.

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## APPENDIX 12

### TRAINING COURSE SPECIFICATIONS

Customized Engine Practical, W34LPG and W32LG



## Course Specification

Wärtsilä Services  
Reference: F1302

Date: 28.12.2016

Document No: PR40273/EAA

Course specification  
Page: 1(2)

### Engine W34SG Practical

#### 1. Target group

This training course is aimed for marine and power plant personnel at the operational and management levels.

#### 2. Prerequisites

The trainees should have a basic knowledge and operational experience of large medium speed engines. Theoretical education on internal combustion engines is preferred.

#### 3. Objective

The participants will be able to carry out scheduled maintenance and they are familiar of all engine related special tools, measuring equipment and basic engine adjustments.

#### 4. Location

Wärtsilä Training Centre with suitable equipment.

#### 5. Duration

Five (5) working days.

#### 6. Content

- Introduction and preparation of hands-on activities
- Preventive maintenance
- Maintenance operations, practical training

A handwritten signature in blue ink, consisting of a stylized 'W' followed by a flourish.

# Power Plant W34SG Operation and Maintenance at site

## 1. Target group

This training course is aimed for power plant personnel at the operational and management levels.

## 2. Prerequisites

The trainees should have a basic knowledge and operational experience of medium speed engine power plant. Theoretical education on internal combustion engines is preferred.

## 3. Objective

The participants will understand the design, operation and basic maintenance of the engine power plant.

## 4. Location

At the customer's power plant in question.

## 5. Duration

Ten (10) working days.

## 6. Content

- Auxiliary systems
- Auxiliary systems operation instructions
- Design and function of engine and systems
- Evaluation of engine operating data
- Engine control, instrumentation and automation systems
- Engine start, stop and operation
- Fuel, lubricating oil and cooling water system requirements
- Installation documentation, Power plants
- Maintenance operations, practical training
- Plant general arrangement
- Plant operation routines
- Reading flow diagrams





## Course Specification

Wartsila Services  
Reference: FI302

Date: 22.12.2015

Document No. POW0056/EAA

Course specification  
Page: 1(2)

### Power Plant (Gas) Electrification at site

#### 1. Target group

This training course is aimed for power plant personnel at the operational and management levels.

#### 2. Prerequisites

The trainees should have a basic knowledge and operational experience diesel power plant electrical design. Theoretical education on electrical engineering is preferred.

#### 3. Objective

The participants will understand the working principles and operational function of each electrical system in the power plant thus enabling them to operate the plant in a safe and effective way.

#### 4. Location

At customer's power plant in question.

#### 5. Duration

Five (5) working days.

#### 6. Content

- Electrification
- Operation Modes
- Engine control, instrumentation and automation systems
- Alternator
- Automatic Voltage Regulator
- Control and Monitoring System
- Operator Station Program
- MV / LV Switchgear
- DC System, Local Control Panels
- Protection Relays

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## Power Plant Management

### 1. Target group

This training course is aimed for power plant Senior or Middle Management.

### 2. Prerequisites

The trainees should preferably have a BSc or MSc education in engineering, (mechanical or electrical), or marine engineer together with operational experience of the diesel engines in different applications, or similar.

### 3. Objective

The participants will understand the planning for operation and maintenance routines as well as the basic design of engine power plant. This training also emphasises certain economic aspects and reporting related to plant operation and maintenance.

### 4. Location

Wärtsilä Training Centre in question.

### 5. Duration

Five (5) working days.

### 6. Content

- Plant general arrangements
  - Plant performance monitoring
  - Plant coding system
  - Plant general arrangement
  - Plant operation routines
  - Management reporting
- Fuel, lubricating oil and cooling water requirements and treatments
- Plant management activities
  - Economical engine operation
  - Principles of preventive maintenance
  - Reliability centred maintenance
  - Condition Based Maintenance (CBM)
  - Operation and maintenance planning
  - Power plant logistics and forecasting
- Auxiliary systems



## APPENDIX 13. FORM OF OPERATOR PARENT COMPANY GUARANTEE

### PARENT COMPANY GUARANTY

This Guaranty (the "Guaranty") is executed as of [REDACTED], 2019, by WÄRTSILÄ CORPORATION, a company organized and existing under the laws of Finland, with principal offices at John Stenbergin rantaa 2, P.O.Box 196, 00531 Helsinki, Finland ("Guarantor"), in favor of US VIRGIN ISLANDS WATER AND POWER AUTHORITY, an autonomous governmental instrumentality incorporated under the laws of the United States Virgin Islands, with its principal place of business in 9720 Estate Thomas, St. Thomas, Virgin Islands 00801 (the "Owner").

WHEREAS, in connection with the Operations and Maintenance Agreement (the "Agreement") dated as of [day] [month], 2019, by and between Owner and Wärtsilä Caribbean, Inc. ("Operator"), a company organized under the laws of Puerto Rico and a wholly-owned subsidiary of Guarantor, Owner has required Operator to furnish to Owner, a guaranty of performance of all of Operator's obligations under the Agreement and;

WHEREAS, Guarantor, by virtue of its ownership of Operator, will benefit from Operator's performance of its obligations under the Agreement;

NOW, THEREFORE in consideration of the premises set forth herein and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, Guarantor covenants and agrees as follows:

#### 1. Guaranty

Subject to the last sentence of Section 2(a), Guarantor hereby guarantees to Owner the full and punctual payment and performance by Operator of any and all obligations whatsoever to be performed, by Operator under the Agreement in all respects in accordance with the terms of the Agreement to the extent not so performed by Operator. This Guaranty is in no way conditioned upon any requirement that Owner first attempt to enforce any of the guaranteed obligations against Operator. In the event of a default in performance of any guaranteed obligation by Operator, Guarantor, subject to Guarantor's rights under Section 2 hereof, shall promptly perform or cause to be performed such guaranteed obligation upon receipt of written notice of such default and demand for performance from Owner.

Notwithstanding anything else, Guarantor's liability shall in no case exceed the maximum liability of Operator under the Agreement. In no event shall the Guarantor be liable for special, incidental, consequential, exemplary, indirect or punitive damages or loss of profit.

#### 2. Obligations Unconditional

(a) Except as set forth in the last sentence of this paragraph (a), the obligations of Guarantor under Section 1 hereof are absolute and unconditional, irrespective of the insolvency, bankruptcy, reorganization, dissolution or liquidation of Operator or any change in ownership of Operator or any assignment by Operator to any of its Affiliates or other parties. Any provision herein to the contrary notwithstanding, Guarantor expressly reserves to itself all rights, setoffs, counterclaims and other defenses which Operator is or may be entitled to under the Agreement.



- (b) Without limiting the foregoing, Guarantor hereby consents to:
- (i) the waiver by Owner of the payment, performance or observance of any of the covenants, terms or agreements of Operator set forth in the Agreement;
  - (ii) the modification, postponement or extension of time for payment of any amounts due or of the time for performance of any of the covenants, terms or agreements of Operator set forth in the Agreement;

3. Guaranty Reinstatement

Subject to the last sentence of Section 2 (a), the obligations of Guarantor hereunder shall be automatically reinstated if and to the extent that for any reason any performance by or on behalf of Operator in respect of the guaranteed obligations is rescinded or must be otherwise repaid or restored to Operator by any holder of any of the guaranteed obligations, whether as a result of any proceedings in bankruptcy or reorganization or otherwise.

4. Subordination

So long as any guaranteed obligation remains unsatisfied, any claims of Guarantor resulting from the performance of any of the guaranteed obligations hereunder (whether or not demanded by Owner) against Operator shall be subordinate to any claims of Owner against Operator, and in the event any consideration is received by Guarantor in respect of any such subordinated claim, it shall be subject to recovery by Owner whether in insolvency proceedings or otherwise. In any insolvency proceedings of any nature (including bankruptcy), Owner shall be entitled to enforce said subordinated claims, to collect assets distributed on account thereof, to vote such claims, and to otherwise take any such action therein that Guarantor might otherwise take.

5. Remedies

In the event Guarantor fails to pay or perform any of its obligations hereunder, including the failure to make payment when due, Owner may avail itself of all available remedies, in law or equity, to enforce its rights hereunder.

6. Demand by Owner

Owner shall have the right, in its sole judgment and discretion, from time to time, but subject to the terms of this Guaranty, including Section 1 and Section 2 hereof, to make demand for performance and to proceed against Guarantor for the performance of any guaranteed obligation owed to Owner pursuant to this Guaranty, or to proceed from time to time against Guarantor for the performance of any and all such guaranteed obligations, as Owner may determine.

7. Successors and Assigns

The guaranty hereunder is a continuing guaranty and shall apply to all guaranteed obligations whenever arising and shall inure to the benefit of the successors or assigns of Owner and be binding upon Guarantor and its successors and assigns, provided, however, that neither Guarantor nor Owner may make an assignment or other transfer of this Guaranty or any interest herein by operation of law or otherwise unless it has obtained a prior written consent of the other party to this Guaranty for such assignment or other transfer. Guarantor hereby irrevocably consents to the assignment of this Guaranty by Owner coincident with any assignment of the Agreement by Owner permitted thereunder.

8. Notices



All notices to Guarantor required to be served under this Guaranty shall be in a written form and shall be served by commercial overnight delivery services or by registered mail and shall be addressed as follows:

Wärtsilä Corporation  
John Stenbergin rantaa 2  
FIN-00530 Helsinki, Finland  
ATTN: Group General Counsel

or at such other address as Guarantor may from time to time designate in writing to Owner. All notices required to be served under this Guaranty will be effective when received by the addressee.

9. No Waiver Amendments

No amendment of this Guaranty shall be effective unless the same shall be in writing and signed by Guarantor and Owner. No waiver of any provision of this Guaranty shall be effective unless signed by Owner.

10. Governing Law

This Guaranty shall be governed by, and construed in accordance with, the laws of Finland.

11. Termination

Subject to Section 3 hereof, this Guaranty, and the obligations of Guarantor hereunder, shall terminate after full performance of all of the guaranteed obligations and the expiration of any period during which the guaranteed obligations are capable of being revived, whichever is later, and in any case latest on \_\_\_\_\_.

IN WITNESS WHEREOF, Guarantor has caused this Guaranty to be duly executed as of the day and year first above written.

For and on behalf of  
WÄRTSILÄ CORPORATION

\_\_\_\_\_

\_\_\_\_\_





## APPENDIX 14. INSURANCES

### OPERATOR INSURANCE REQUIREMENTS.

#### **Liability and Workers Compensation Insurance Requirements**

During Operation, Operator is to carry the liability and workers' compensation insurances set out below. Subcontractors are to carry the same coverages but required limits may be amended at the discretion of the Contractor for subcontractors to reflect the size of their contracts, subject to a minimum limit of \$1,000,000 each for Commercial General Liability, Automobile Liability and Employers Liability. After receipt of evidence of insurance for any subcontractor, WAPA reserves the right to require limits up to those required for the Contractor.

Once operations have begun, Contractor and/or its general contractor shall have in place and at all times maintain the below liability and workers' compensation insurances.

Coverage Type	Minimum Limit		Maximum Deductible or Retentions	
Commercial General Liability	\$2,000,000*	Combined single limit per occurrence and in the aggregate where applicable	\$250,000	Per occurrence
Automobile Liability	\$2,000,000*	Combined single limit per accident	\$250,000	Per accident
Employers Liability	\$2,000,000*	Each accident for bodily injury by accident Each employee and policy limit for bodily injury by disease	\$100,000	Each accident or employee (for disease)
Workers Compensation	Statutory requirements	Per occurrence	N.A.	N.A.
Professional Liability	\$2,000,000*	Per occurrence and in the aggregate	\$250,000	Per occurrence

Combination of primary and excess or umbrella liability policies. Any combination of primary and excess limits is acceptable if the total equals or exceeds the specified amount.

Liability Insurance Terms and Conditions		
a.	Occurrence Basis	The primary General Liability policy and any Excess or Umbrella Liability policy that provides additional limits over the primary General Liability policy shall be "occurrence-based" policies. The Professional Liability will be a Claims-made policy.

*mt*

OWNER INSURANCE REQUIREMENTS

A.	Property Insurance Requirements				
WAPA shall provide property insurance for the Facility. Property insurance shall be on an “all risk” basis, including coverage for boiler and machinery (machinery breakdown) perils to the extent those perils are present. The property insurance must be in place prior to commencement of the Work and must remain in place through testing and acceptance of the Work by WAPA.					
1.	Builder’s Risk Property Insurance				
	Coverage Type	Minimum Limit		Maximum Deductible or Retentions	
	Earth Movement including Earthquake, Volcanic Activity, and Subsidence.	Replacement Value of Insurable Real and Personal Property	Annual Aggregate	5% of Replacement Value	Per Occurrence
	Hurricane/ Windstorm		Annual Aggregate	5% of Replacement Value	Per Occurrence
	Flood including Tsunamis		Annual Aggregate	5% of Replacement Value	Per Occurrence
	Debris Removal	20% of Replacement Value	Per occurrence	Included	
	Ordinance or Law	10% of Replacement Value	Per occurrence	Included	
	Expediting Expense	20% of Replacement Value	Per occurrence	Included	
	All Other Perils (including boiler and machinery perils where applicable)	Replacement Value of Insurable Real and Personal Property	Per occurrence	\$1,000,000	Per Occurrence
B.	Requirements Applicable to All Property Insurance Policies				
1.	Additional Insured and Loss Payee	Contractor must be named as an additional insured and a loss payee to the extent of Contractor’s insurable interest.			
2.	Waiver of Subrogation	Each property policy must contain a standard waiver of subrogation clause waiving the insurance company’s right of subrogation against any insured party.			

## APPENDIX 15. LIQUIDATED DAMAGE CALCULATION

For the calculation of Liquidated Damages, the file is a “live” file that is updated on a quarterly bases and reported on a biannual bases. The attached excel file is an example of the document at the signing of this Agreement, including applicable formulas for calculating liquidated damages throughout the term of the Agreement.



Wartsila Set 1 O&M  
Evaluation.xlsx

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## APPENDIX 16. WARTSILA CARIBBEAN REGISTRATION

Business Entity No. FP0101424



Government of  
The United States Virgin Islands

-O-

Office of the Lieutenant Governor  
Division of Corporations & Trademarks

### CERTIFICATE OF AUTHORITY

To Whom These Presents Shall Come:

I, the undersigned Lieutenant Governor the United States Virgin Islands, do hereby certify that **WARTSILA CARIBBEAN, INC.** a **Foreign Profit Corporation**, has filed a(n) **Qualification Documents** in the Office of the Lieutenant Governor the requisite documents pursuant to the Virgin Islands Code, and the Rules and Regulations of this Office and may therefore proceed to carry on its business in the United States Virgin Islands as witnessed by my seal below.

**Registration Date:** December 19, 2018



Witness my hand and the seal of the Government of  
the United States Virgin Islands, on this 19th day  
of December, 2018.

A handwritten signature in blue ink, appearing to read "Osbert E. Potter".

Osbert E. Potter  
Lieutenant Governor  
United States Virgin Islands

Handwritten initials in blue ink, possibly "MP".



THE GOVERNMENT OF THE VIRGIN ISLANDS  
DEPARTMENT OF LICENSING AND CONSUMER AFFAIRS

**BUSINESS LICENSE**

**KNOW ALL BY THIS PRESENT**

That, in accordance with the applicable provisions of Title 3 Chapter 16 and Title 27 V.I.C. relating to the licensing of businesses and occupations, and compliance having been made with the provisions of 10 V.I.C. Sec. 41 relating to the Civil Rights Act of the Virgin Islands, the following license is hereby granted:

Licensee: <b>WARTSILA CARIBBEAN, INC.</b>	
Trade Name: <b>WARTSILA CARIBBEAN, INC.</b>	
Mailing Address	Physical Address
<b>ROAD 007 KM 0.6, STREET A LOT PARQUE INDUSTRIAL PARK, JULIO N CAROLINA 00967</b>	<b>72 KRONPRINDSENS GADE WATERFRONT CENTER SUITE A CHARLOTTE AMALIE ST. JOHN VI 00802</b>
Business No: <b>45053</b>	License No: <b>3-45053-1L</b>
<b>Types of License(s)</b> Engine Repair, Except Automotive Consultant - Equipment Maintenance Repair & Maint of Misc. Items	

As provided by law, the authorized licensing authority shall have the power to revoke or suspend any License issued hereunder, upon finding, after notice and adequate hearing, that such revocation or suspension is in the public interest; provided, that any persons aggrieved by any such decision of this office shall be entitled to a review of the same by the Territorial Court upon appeal made within (30) days from the date of the decision; provided, further, that all decisions of this office hereunder shall be final except upon specific findings by the Court that the same was arrived at by fraud or illegal means.

**2019**

If a renewal is desired, the holder is responsible for making application for same without any notice from this office. It is the responsibility of the Licensee to notify the Department in writing within (30) days, when a license is to be cancelled or placed in inactive status. Failure to do so will result in the assessment of penalties as authorized by law.

Valid from **05/01/2019 until 05/31/2020**  
Printed on **05/10/2019**  
Issued at **St. John, V.I.**  
Fee **\$85.00**

*Richard S. Sargolista*

Commissioner Nominee, Department of Licensing and Consumer Affairs

**THIS LICENSE MUST BE PROMINENTLY DISPLAYED AT PLACE OF BUSINESS**

## **APPENDIX 17. WAPA STANDARD TERMS AND CONDITIONS**

**BUSINESS LICENSE:** The Contractor must comply with all Virgin Islands' business licensing laws in connection with its business operation(s). Contractor shall further ensure that all subcontractors hired in connection with the performance of this contract comply with all Virgin Islands business license requirements. All necessary and applicable license(s) for Contractor and its subcontractor(s) shall be obtained by the Contractor and copies presented to the Contracting Officer concurrent with its execution of the Contract. Failure by Contractor to present business license(s) for itself and its subcontractors at the time of execution of the contract by the Contractor may, at the sole option of the Authority, be grounds to rescind the Contract award.

### **DRUG AND ALCOHOL TESTING FOR CONTRACTOR EMPLOYEES:**

The use of drugs, alcohol, and unauthorized substances are prohibited on all the Virgin Islands Water and Power Authority's (hereinafter the "Authority" or "WAPA") business locations, power generating, transmission and distribution, and potable water facilities, workplaces, worksites, and parking areas (hereinafter "Premises").

- Drugs are any drug or controlled substance which is not legally obtainable under both local and/or federal law, including but not limited to marijuana, opiates, PCP (phencyclidine), cocaine, heroin, amphetamines, barbiturates, benzodiazepines, narcotics, hallucinogens, inhalants, designer drugs, and/or any substances and/or paraphernalia that are prohibited by federal or local law.
- Unauthorized substances are over-the-counter or prescription drugs that are used, possessed, purchased, transferred, dispensed, or distributed in the manner outlined below:
  - a. prescription drugs that are not prescribed and/or prescribed on an invalid prescription;
  - b. prescription drugs that are prescribed at non-therapeutic levels or used in a manner or quantity other than as set forth in the prescription;
  - c. over-the-counter drugs in a manner or quantity other than set forth in the directions; or
  - d. over-the-counter or prescription drugs in a manner that contradicts the direction or instructions for use.
- Alcohol is a colorless volatile flammable liquid that is produced by the natural fermentation of sugars and is the intoxicating constituent of wine, beer, spirits, and other drinks.

**Contractor (and its subcontractors or agents) shall have in place during the performance of the work a Drug, Alcohol, and Unauthorized Substance Testing Policy for their respective employees, which policy shall include reasonable suspicion and post-accident testing.**

The Authority reserves the right to notify the Contractor if the Authority suspects that the Contractor's employee, agent or subcontractor employee performing work on the Authority's Premises may be under

the influence. If notified, the Contactor shall immediately assess the employee and invoke reasonable suspicion or post-accident testing, if testing is determined to be warranted per the Contractor's Policy. The Contractor shall provide the Authority with a written report advising of the results of its investigation into the Authority's complaint and the status of the employee involved in the investigation. Any Contractor employee, or employee of a subcontractor, or agent of the Contractor that fails a drug, alcohol, or unauthorized substance test shall not be allowed to return to the Authority's Premises until the Contractor provides written verification to the Authority that the employee has passed a subsequent test and is appropriately fit for duty. Provided however, the Authority may require the removal from the jobsite any employee of a Contractor or subcontractor or agent if in the judgment of the Contracting Officer such removal is necessary to protect the interest of the Authority.

A copy of the Contractor, Subcontractor or Agent's Drug, Alcohol, and Unauthorized Substance Policy must be presented upon contract execution.

**GROSS RECEIPT TAXES:** Title 33, Section 44 of the Virgin Islands Code, as amended, requires that the Authority, when making a payment under this Contract, to deduct and withhold from such payments, gross receipts taxes as required by the Virgin Islands law at 33 VIC Section 43(a) for each payment for Work performed in the Virgin Islands.

Notwithstanding any other provisions of this contract to the contrary, it is agreed between the Parties that that for the purposes of complying with Title 33, Section 44 of the Virgin Islands Code, the Authority shall withhold and forward to the V.I. Bureau of Internal Revenue such amounts as required by 33 VIC Section 43(a) or any amendments thereto. Despite the requirements under Title 33, Section 44, the Contractor agrees that calculation and payment of gross receipts taxes shall be the sole responsibility of the Contractor. The Authority shall not be responsible in any manner for any miscalculation, or change in law or additional assessments that may affect the amount due herein. In the unlikely event any overpayment is made to the V.I. Bureau of Internal Revenue, the Contractor shall seek repayment from V.I. Bureau of Internal Revenue and not the Authority. Upon written request of the Contractor directed to the Authority's Comptroller, the Authority agrees to provide Contractor with documentation confirming that gross receipts withheld under this agreement were paid to the V.I. Bureau of Internal Revenue in accordance with the provisions herein.

In the event the contract is amended and the consideration herein increases or decreases, the appropriate amount of Gross Receipt Taxes to reflect the increase or decrease in the consideration will be adjusted.

**INSURANCE:** The Contractor shall, at its expense, before any Work is commenced, cause to be issued and maintained throughout the duration of the Term, insurance as described in Appendix 14 of the Agreement. A copy of the insurance certificate must be presented to the Authority's Contracting Officer upon execution of the contract.

A handwritten signature in black ink, located in the bottom right corner of the page. The signature is stylized and appears to be a single name.