

SITE VISIT REPORT



Date: 11/03/2022

Site Name/Ref: Gorsen, HL1080

Engineer: R Sotgiu

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Reason for visit:

1. To carry out annual maintenance service

On-Site works / Observations:

1. On the day of the visit, the turbine was running at 3.3kW, flow level in the intake was 133mm and the head pressure was 11.2Bar.
2. All configuration parameters were noted
3. The annual maintenance service was carried out

Remedial works:

Annual Maintenance Service:

Turbine cumulative generation was 350,886kWh (last service was 296,249kWh, last year 197,634kWh, year before 141,841kWh) Three phase
Gross Head with turbine off 11.4Bar

General condition of turbine house

- The turbine house was clean.
- The house was dry. Outside the temperature was about 10 degrees above zero.
- No wet patches on the floor.
- No condensation was present
- Noise level was 88.5dB

Runner and arbor inspection (runner is 22x1.5 original spoons with no banding ring):

The polycarb window was removed for visual inspection of runner and arbor;

- Wear on spoons – all good, no wear, leading edge of spoons was sharp as expected.
- Dents – none
- Visible cracks – none
- Distortion – no
- Smooth spinning of runner – yes
- Condition of banding ring – no ring
- Bearing play – none
- 8 off Cap-head bolts – all tight
- Central hex bolt – tight

- General condition of arbor – very good with no wear and little deposition of peat.
- Grub screws on arbor – good, tight, no corrosion
- Gap between arbor and bottom of the case – same gap as day of commissioning, so no movement of arbor

Spear Valve 1 (to the right as facing the front of the turbine) & fastening:

- Through the window check general condition of spear and cone – good, no scrapes on the front of the spear indication good filtration of intake box. Also very little deposition of peat indication of good clean water

Cycle the valve to FULL OPEN and record Current draw – 440-720 normal

- Is it steady/ increasing/ with any obvious current spikes – steady
- Does the motor sound healthy – Yes
- Record the STALL INHIBIT time – 60ms normal

Cycle the valve FULL SHUT and record current draw – 420-680 normal

- Is it steady/ increasing/ with any obvious current spike – steady
- Does the motor sound healthy – Yes but making a slight noise
- Record the STALL INHIBIT time – 40ms normal

Disconnect Motor and bearing retaining plate

- Unscrew leadscrew and visually inspect – very good condition with hardly any sign of wear and grease still golden colour.
- Thread type M14x1.5 in Ally Bronze on SV4)
- Manually move the spear fully back and shine a light through the cone to inspect – good, no signs of debris stuck in the valve
- Clean, re-grease and reassemble – done
- Check brass guides for alignment/bending – none
- Test valve again and compare current draw – same
- Check and tighten M10/M12 locknuts on valve and plate (do not torque nylock nuts) – all tight, no sign of movement
- Check bolts on valve flange and torque if required – All good
- Check gasket/o-ring for leaks – good, no leaks
- Check manifold branch and saddle electrofusion fitting – good.

Windows Inspection:

- General condition – good, little peat deposition indicating clean water
- Cracks or chips – The window has been replaced with a new one
- Visibility through windows – good. Cleaned with strong solvent
- Check screws for tightness. – done

Lights

Check if it works – yes

Generator

- General condition – good, no flaking paint, no signs of paint bubbling, some rust. There's a buzzing noise from the top of the case, difficult to tell if it's the fan cover vibrating or the top bearing is starting to show signs of wear.
- Check temperature level (when running) – 22.5deg, ok.
- Check vibration level (when running) – low, as commissioned
- Check nylock bolts for tightness/movement – all good

- Re-grease both bearings – not applicable (sealed bearings)

Control Unit:

- General condition – good
- Check for visual signs of cables overheating/discoloration or burn smell – none
- Check for visual signs of overheating/discoloration on motherboard – none
- Check for visual signs of any damage to capacitors – none
- Check for tightness of all connections – good, all tight
- Check battery volts – ok

Main Inlet Gate Valve:

- Check for smooth operation closing – good, it closed tight with no leakage
- Check for smooth operation opening – good, opens fine with no abnormal signs

Tail Race Components:

- Visual inspection, all seems fine, no obstructions at outlet and no damage to report

Recommendations:

1. The valve leadscrew was found in good condition and no replacement was required.
2. Tiny steps was set to OFF, this has been changed back to ON and configs have been restored to last year's settings.
3. There's a buzzing noise from the top of the case, difficult to tell if it's the fan cover vibrating or the top bearing is starting to show signs of wear. Please monitor over this year and report to Hydrolite if it starts to sound worse.
4. Hydrolite carried out a light inspection of the control units; It is recommended to book a full system inspection of the units by SCS Ltd engineers, to measure the capacitors, test batteries, replace worn relays and failed indicators.
5. The next mechanical annual general service should be booked around Mar 2023.

Configuration Settings as per date of visit:

Parameter	Value	Last Value
Starting Head	160	155
Head Aim	130 from 80	130
Head Step	10	10
Start Open Jog	25% from 12%	25%
Sync Max Jog	0.2%	1%
Standard Jog	1%	1%

Sync pause	15000	20000
Full Open Time	15 from 35	15
Act Open Pause	10000	5000
Actuator Stall	2000	2000
Stall Inhibit	80	80
Min Power	300	300
Restart Time	10	60
Max Gen Power	16.5	16
Software version	5.2.71 Jul 2020	5.2.71 08 Jul 2020