

The Rocksavage Way! A truly pragmatic solution



GT B EV Combustor Failure May 2022
AOG 2023 Conference Charlotte EPRI

Agenda

01

Introduction

02

**GT B Forced Outage Timeline
& Trip event**

03

Initial Findings

04

Parts & Resource

05

Re-build Highlights

06

All about timing

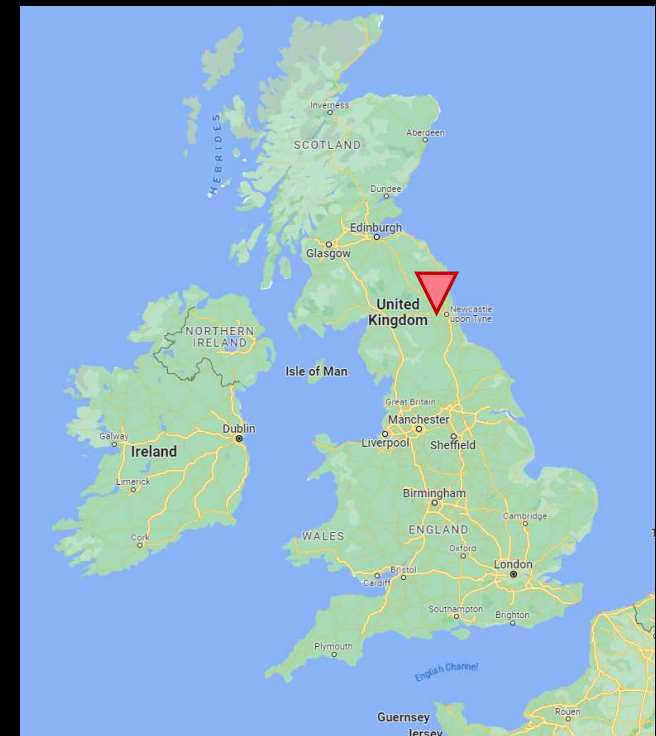
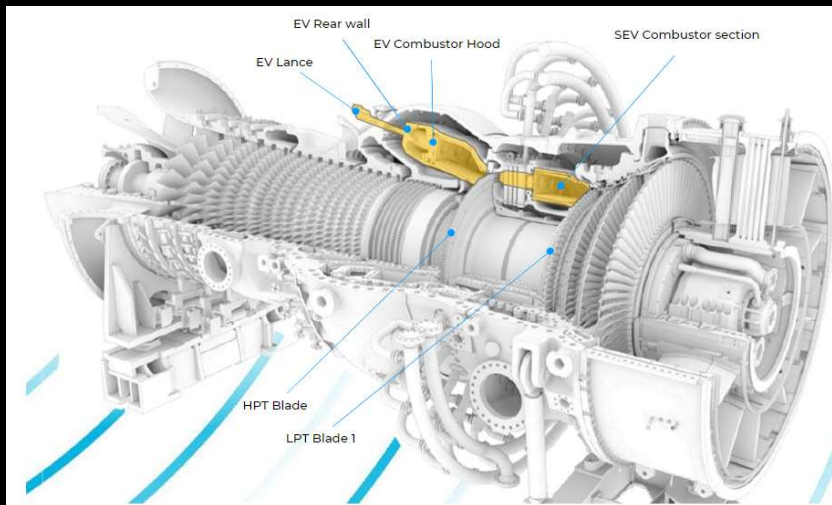


01. Introduction

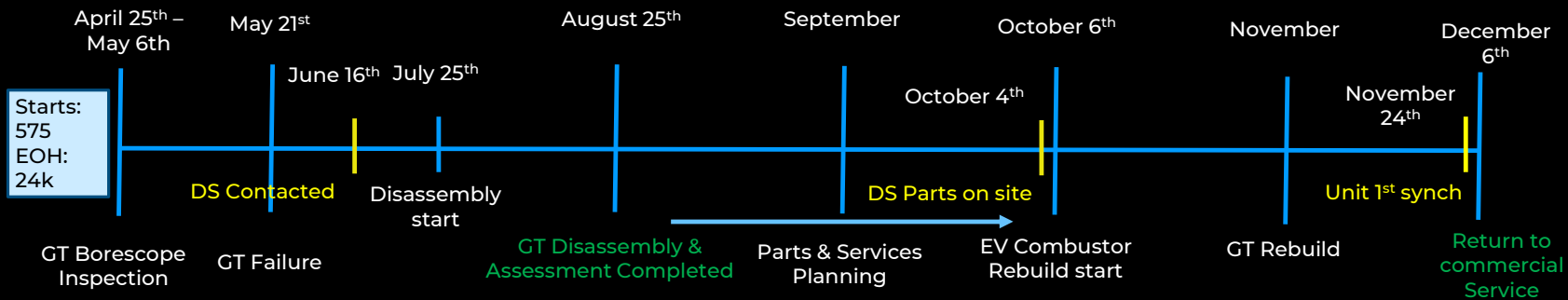


Rocksavage Power Plant :

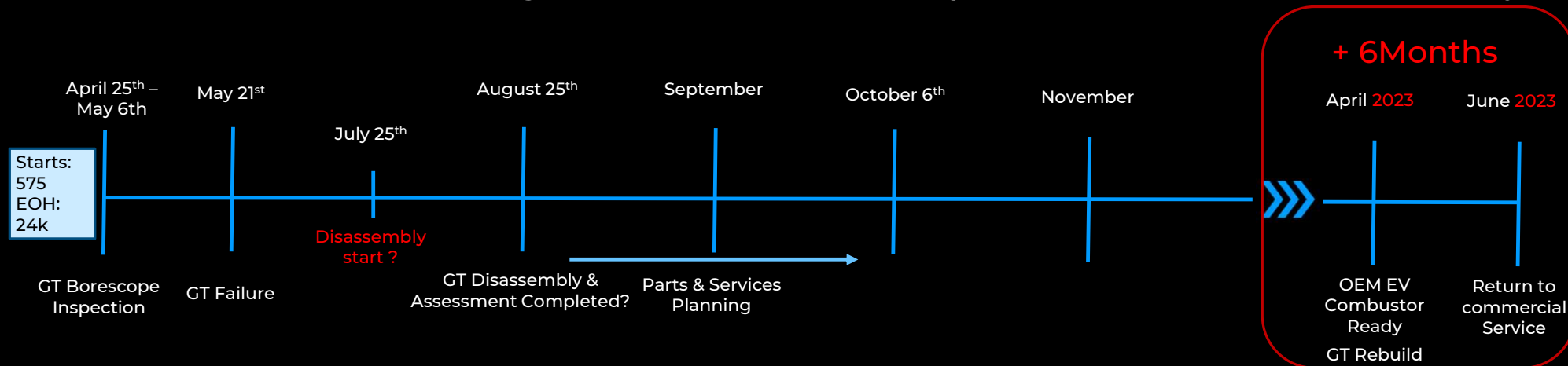
- InterGen Own & Operate 3 x CCGT and 1 x OCGT in UK, HQ in Edinburgh Scotland.
- 2+1 CCGT 800MW Fired on Natural Gas
- Fully merchant plant with NCF 20-40%
- North west of England 10miles East of Liverpool
- GT26 A/B Version, Base model, 24kEOH C-cycle
- Commercial Operation 1998
- No Service agreement in place with the OEM.



02. GT B Forced Outage Timeline



- Available for Winter 2022/23 High market values.
- Proactive response to issue, progressing all options to repair maintained a positive and collaborative relationship with the insurance and loss adjusters.
- Invaluable contacts made throughout the owners and independent Power Generation industry



02. GT Trip Event



Full plant operating to commercial position from 07:00 (21/05/22) and due to de-load at 23:00 (21/05/22) with a plant desynchronization at 23:22 Saturday 21st May 2022.

Timeline

22:36 - Alarms generated for EV burnershell protection

22:37 - PLS based on EV burner **T419B_850CEL** >MAX2

22:37 - Temp increase alarms for EV burner shell **T419A**

22:40 - TAT 1 Hi Val alarm >MAX2 PLS. **CT416** reading 1120°C

Attempt to Ack PLS however only cleared 3 mins later when temperature turned. GT load below 100MW.

22:43 - PLS ack but TAT1 Hi VAL >MAX2 alarm active again as turbine attempted to load.

22:45 - More EV burnershell alarms but relating to 419, 420A+B. Alarm text suggests that temps are now increasing to 850°C.

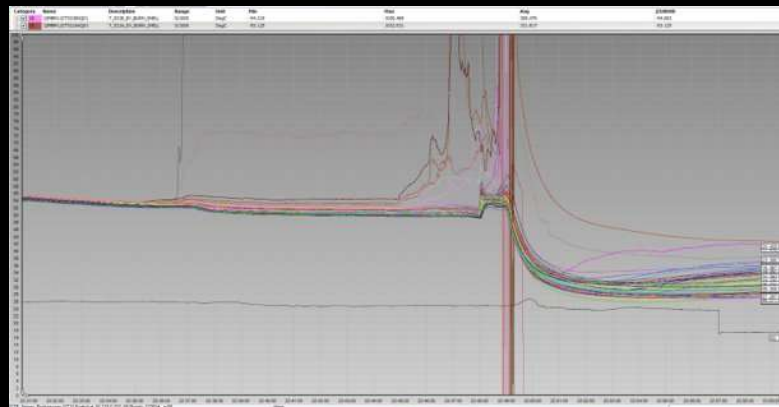
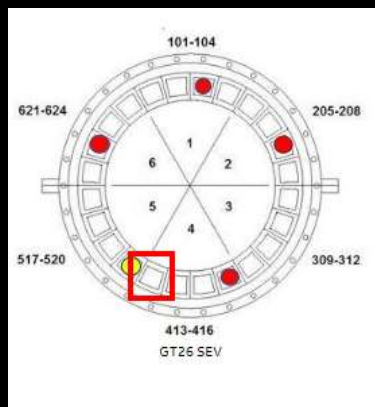
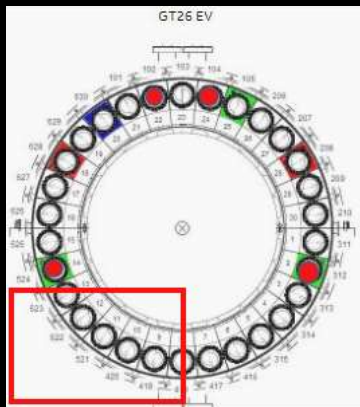
22:47 - EV burnershell alarm for T521.

22:47 - Sequence off command given.

22:48 - Alarm active for LPL BV fail to close

22:48 - 12MBH40CT900 T COOL AIR BFR DISC PLST active. Unit trip.

11 minutes from the first alarm to the GT sequence off command.



03. Initial Findings



EV Combustion Chamber



EV Lance Trumpet



EV Hood rear wall



EV Burners (9 o'clock to 6 o'clock) viewed from the combustion chamber

04. Parts & Resource



Challenges:

- GT26 A/B Version, only 7 Running units left in the world, InterGen own 4 of those. Very limited A/B Version EV Combustor spares held by the OEM.
- To replace the EV Combustor Structural component with new from the OEM was a 46 week lead time.
- OEM Resources stretched due to customer service agreements commitments (UK Outage season).

Solutions:

- Engage with Independent Power Generation Owners, GT consultants & service companies.
- Contact the Engineering teams of the other GT26 A/B owners and operators. Dock Sud Argentina.
- Work with the OEM to explore resource options beyond the European teams (US GT24 Team).
- Use contacts within the OEM team to secure, assess and purchase used parts (EV HRW).



05. Re-Build Highlights



[Rocksavage Newsletter - Outage 2022 going the extra mile on Vimeo](#)



DS EV CC Arrives on site



New from old!



Blades Replaced – HPT, LPT 1, LPT2



Used OEM Rear Wall works in Switzerland

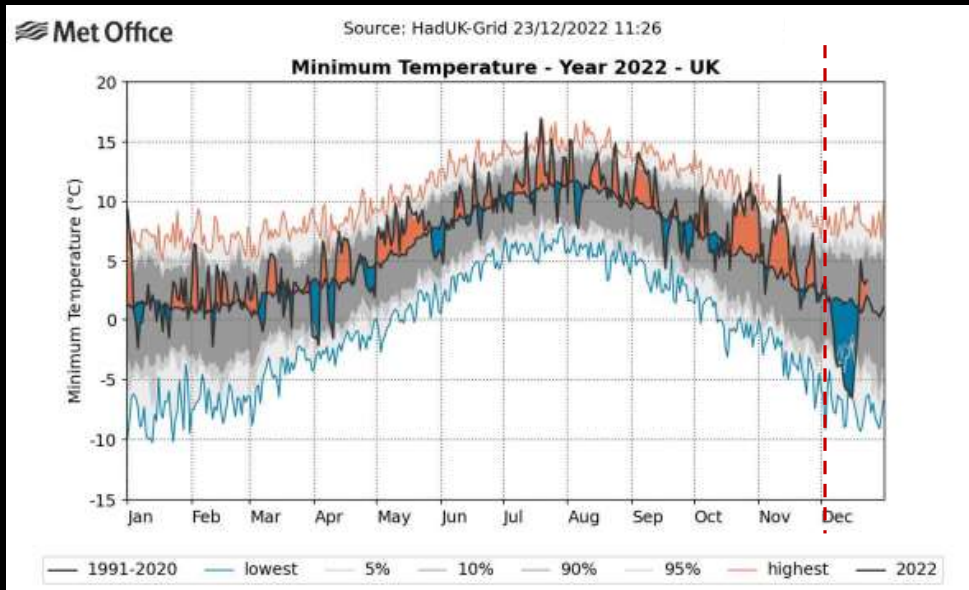


GT Rotor replacement



Pre-assembly of Combustor section completed

06. All about timing!



Met Office

Prolonged spell of low temperatures, December 2022

The UK experienced a prolonged spell of low temperatures accompanied by snowfalls from 8 to 18 December 2022 as an Arctic Maritime airmass brought hard frosts, with daytime temperatures struggling to rise above freezing and accompanied by widespread lying snow (although generally not deep). Daily minimum temperatures fell widely to between -5°C and -10°C across the UK on several nights – with hard frosts even in cities and coastal areas, and some locations below -10°C. On 12 December Braemar recorded a daily maximum temperature of -9.3°C, the UK's lowest maximum (excluding mountain stations) since December 2010. This was one of the most significant spells of low winter temperatures to affect the UK since the exceptional December of 2010.

- GT B Commercially available on 6th December 22 following 3 days of hot commissioning.
- Coldest temperatures of 2022 with extremely tight power margins.
- **12 Days** of uninterrupted baseload operation, allowing for Unit to be traded in the balancing market.
- GT B Running conditions are good, with confidence of running through to the 2024 Major Inspection.

Questions?