



Airbus Operations Ltd
Environment Team
Chester Road
Broughton
Chester
CH4 0DR

Our reference: **EA/EPR/08/2013**

1st August 2013

Elizabeth Voice
Regulatory Officer
Natural Resources Wales
Chester Road
Buckley
CH7 3AJ

Re: De-Commissioning of Hawker and New combustion plant list

Dear Beth,

Following your recent visit to the site I can now formally confirm that the Hawker Surface Treatment Facility, Effluent plant, Autoclaves and Grit Blast have now been decommissioned and removed from site.

The following emission points are no longer applicable to the environment permit:

TE2	Effluent Plant discharge point (DCWW have revoked the consent)
A73 to A78	Autoclaves
A86 to A89	Grit Blast
A85	Effluent Plant and Treatment line

The Hawker Paintshop for the facility is still in place but not operational.

Also enclosed, is a copy of a new combustion plant inventory with the autoclaves removed and a report explaining the operation of the new A321 ovens.

The combustion inventory also includes details of the plant that has been added for the new Facilities Management Building (building 53) and Waste Management Compound (building 193).

Should you have any further questions please do not hesitate to contact me.

Yours sincerely,

Claire Powell
Environment Manager
Airbus Operations, Broughton

Tel: 01244 523496

	INITIALS	DATE
OK FOR PUBLIC REGISTER	☒	28/8/13
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AIRBUS Operations Ltd

A321 VACUUM FORMING OVENS

OVERVIEW



Introduction

The purpose of this document is to provide an overview of the operating criteria and environmental benefits of the installation of two vacuum forming ovens used in the heat treatment of A321 wing panels. The document will also include technical information regarding the oven construction and use of the oven.

Part of the manufacturing process for A321 wings, involves the heat treatment of the aluminium wing panels and reinforcing components, in a large process oven in order to alter the material properties of those panels. The existing oven - which is over 15 years old and consequently requires regular maintenance - has insufficient capacity to meet the projected increases in demand rate. Its replacement, whilst driven primarily by the need to meet future production requirements, enables us to reduce the environmental impact of each wing-set by realising improvements in software control strategies and burner efficiency that have been achieved since the existing oven was installed.

The Ovens

Each of the ovens is comprised of the following:-

- Fully insulated oven enclosure supplied in 4 sections;
- Motorized vertical lift doors at each end;
- 4 indirect gas fired heat exchangers;
- 8 belt driven air re-circulation fans;
- Air distribution ducts;
- Air inlet and air extract cooling fans;
- Inlet air cooling coil with packaged water chiller unit;
- Duplex vacuum pump with 12 plug in vacuum ports;
- 24 component thermocouple sockets;
- Access ladder and maintenance platform;
- Tooling trolley guide rails;
- Control panel housing all necessary temperature, vacuum and cooling control instrumentation and switch gear;
- Programmable Logic Controller (PLC) ;
- Duty and Backup PC based oven control system utilising supervisory control and data acquisition (SCADA) software.

Specifications

Oven Rating

Heating	200 kW (700,000 btu/h)
Re-circulating fans	8 @ 7.5 kW, 2.5" w.g.
Inlet Cooling fan	7.5 kW, 4" w.g.
Extract Cooling fan	7.5 kW, 2.5" w.g.
Vacuum pump	4.5 kW
Chiller	10 kW
Heat exchanger efficiency*	78 - 80%
Stack temperature*	280°C
Stack velocity*	4 m/s. (with a 150mm diameter exhaust flue)
Stack volume*	0.036 Nm ³ /s (0.071 Am ³ /s)
Maximum load weight:	5500 kg
Typical Cycle time	24 hrs
Maximum air temperature.	180°C ± 3°C
Maximum product temperature	150°C ± 3°C

* At 150°C operating temperature and with the modulating gas and air burner

Emissions at full burn

Oxygen	4%
CO	100 ppm
Nox	100 ppm

Services

- 400/415 Vac @ 50 Hz, 3phase /N; 180A
- Natural gas at 20mbar minimum
- Mains water supply

Dimensions

Oven Chamber (Internal)			External
Length:	12.00m		12.40m
Width	:	3.40m (between side ducts)	3.75m
Height	:	2.20m	4.10m (5.23m inc. doors)

Principle of Operation

Each oven is arranged into 4 convection zones with re-circulated air being heated by means of indirect gas fired heat exchangers. The fans and heaters are located to the top of the oven with the re-circulated air being blown into ducts and along the side walls of the oven. The air is vented into the oven through adjustable louvers on the side ducts and returns to the heat exchangers through plenum chambers in the oven roof. Access to the oven is via a manually operated motorised vertical lift door at each end of the oven.

The component panels are mounted on dedicated tooling jigs which are fitted with 24 thermocouples (18 fixed and 6 roaming) to enable continuous monitoring of component & tooling temperature throughout the heating cycle.

The cycle itself consists of a number of ramp and dwell phases which increase temperature in 20°C increments up to a final set point of 147°C, the final dwell period being followed by a fan assisted cooling to a pre-set safe temperature of 40°C. Precise information about the requisite heating cycle recipe information for each component is obtained by the control software from the site data system with which it continuously interfaces enabling the number of ramp phase increments to be varied as required.

The zone arrangement is designed to take into account of variations in mass (and therefore heat dissipation characteristics) along the full length of the jig mounted component. The 12 thermocouples on the jigs provide real-time data about component temperature to the control software which then adjusts the speed of the recirculating fans in each zone to equalise heating rate as the set point is approached. This method ensures optimum energy efficiency throughout the heating process and helps to achieve a uniform and efficient heating rate across the tooling.

The air temperature in each zone of the oven is controlled via a PID loop taking its process variable from the average of four oven control thermocouples in each zone. A separate over temperature alarm unit for each zone is provided to give ultimate over temperature protection and shut down the oven in the event of an over temperature alarm.

During the cooling phase the heaters and fans switch off and the oven and component are cooled by introducing air from outside through an air inlet fan and extracting warm air to atmosphere. To speed up cooling the inlet air is passed over a cooling coil which is fed with a continuous supply of chilled water from a packaged chiller unit located at the rear of the oven. The air inlet temperature is monitored and controlled by control valves on the cooling coil. The inlet and extract fans and chiller unit switch off automatically when the cooling temperature has been reached.

Under normal operating conditions the oven is fully automatic, however for the purposes of testing, commissioning and fault finding the oven can be run fully in manual mode with each device capable of being run independently providing safety interlocks are activated. Manual operation does not allow any safety interlock to be overridden.

Oven Construction

The oven is supplied in four sections which bolt together through internal steel flanges. The walls of each section are comprised of double skinned steel panels, in-filled with 100 mm of high density mineral wool insulation with a thermal conductivity of 0.035 W/mK. Ceramic fibre tape is used to seal between the panels to continue integrity of insulation. Fitted to the top of the oven are the fully insulated heater boxes incorporating the heat exchangers and air re-circulation fans. The floor of the oven is further insulated and reinforced with structural steel.

Fixed oven control thermocouples are fitted to the side walls of the oven (4 per zone). Thermocouple connector panels are provided at the front and back of the oven for connecting the tooling thermocouples.

Access to the oven is via a fully insulated, counterbalanced, motorised vertical lift door at each end of the oven. The door and weight are fitted inside a structural steel frame which bolts to the front of the oven. Each door is fitted with high temperature seals, open/close limit switches and electromagnetic operated safety latch activated when the door is in the raised position.

Gas Heaters

The gas heaters and air re-circulation fans are fitted to fully insulated heater boxes on the top of the oven (one heat exchanger and two fans per zone).

Each heater consists of a fully packaged indirect gas fired heat exchanger with modulating control gas burner and automatic ignition/flame monitoring. The outer casing of the heater unit is manufactured from mild steel and is of a double skinned, thermally insulated construction. Combustion gases are vented to atmosphere through an insulated exhaust duct.

Air Re-Circulation Fans

Each air re-circulation fan consists of an indirect IET2* motor driven centrifugal impeller mounted to an insulated plug. Air is drawn through the heat exchanger into the impeller and is discharged into ducts on the side walls of the oven. The air vents into the oven chamber through horizontal, adjustable louvers arranged along the full length and height of the oven. Inverters are provided to control the air re-circulation fan speed during the heating cycle. 7

*Note: this classification is broadly equivalent to the old EFF1 efficiency rating

Cooling

During the 3-hour controlled cooling phase, air is drawn through ducting from outside using a high volume backward laminar fan. Before being discharged into the oven air is drawn over a finned tubed cooling coil which is fed with a constant supply of chilled water from a fully packaged chiller unit. Valves are used to divert the cooling media away from the coil to regulate the air inlet temperature.

The chiller unit is fitted with an internal tank and pump and rejected heat is extracted by a centrifugal fan ducted to the roof. The chiller unit is located adjacent to the oven at the rear and all pipework to and from the cooling coil is in 304 stainless steel.

Warm air is extracted from the oven through a second high volume backward laminar fan, air

is ducted to outside.

Motorised dampers are fitted to low level inlet dampers to allow factory air to be drawn into the oven to assist with cooling; the dampers are closed during the heating cycle.

Summary

Below is a summary of some of the advantages / improvements of the new ovens over the existing process:-

- Higher efficiency heat exchanger
- Increased production capacity
- High density insulation, external surfaces < 40 deg C
- Adjustable recirculation air flow
- Improved burner technology, modulating control on burner
- Heat exchanger fully enclosed (no exposed pipes requiring lagging and guarding)
- Individual zone control (not necessary to introduce cool air during the heating cycle to provide zoning as on the existing oven)
- VSD on recirculation fans to reduce power consumption during dwell phase
- High efficiency recirculation fan motors
- Vacuum pump reservoir provided, reduces pump usage
- Chiller located near oven reducing pipework run and thus losses from pipework
- Improved control by staged ramping reducing the temperature differential across the part during ramp to temperature.

A41	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint	Replacement for A4 & A5 (HWB04 & HWB05)
A42	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint	Replacement for A4 & A5 (HWB04 & HWB05)
A35a	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint	Replacement for A4 & A5 (HWB04 & HWB05)
A36a	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint	Replacement for A4 & A5 (HWB04 & HWB05)
A37a	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint	Replacement for A4 & A5 (HWB04 & HWB05)
A38a	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint	Replacement for A4 & A5 (HWB04 & HWB05)
A39a	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint	Replacement for A4 & A5 (HWB04 & HWB05)
A40a	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint	Replacement for A4 & A5 (HWB04 & HWB05)
A41a	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint	Replacement for A4 & A5 (HWB04 & HWB05)
A42a	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint	Replacement for A4 & A5 (HWB04 & HWB05)
A218	Powrmatic Unit Heater WXX75	Surgery Entrance	0.075	Gas	1	Surgery Entrance	Replacement for A4 & A5 (HWB04 & HWB05)
A219	Heater	Building 13 (r/s)	0.075	Gas	149	Stringer	Replacement for A99 (WAH31)
A220	Powrmatic Unit Heater	Building 15	0.075	Gas	15	Stringer	Replacement of CHG 06
A221	Powrmatic Unit Heater	Building 15	0.075	Gas	15	Stringer	Addition
A222	Powrmatic Unit Heater	SMC Mayfran (Tankroom)	0.075	Gas	15	Stringer	Addition
A223	WAH36	Building 140 (-600 Receiving)	0.299	Gas	140	Building 140 (-600 Receiving)	Moved from Demo box2
A224	Powrmatic WAH	Building 1 (adjacent to SA J16&18)	0.293	Gas	1	Building 1 (adjacent to SA J16&18)	Addition
A225	Powrmatic WAH	Building 1 (adjacent to SA bottom skin ASPA)	0.293	Gas	1	Building 1 (adjacent to SA bottom skin ASPA)	Addition
A226	Powrmatic WAH	Building 1 (adjacent to -600 LVER pit)	0.293	Gas	1	Building 1 (adjacent to -600 LVER pit)	Addition
A227	CHB25	MH5	0.023	Gas	10	Building 10	Addition
A228	GWHL2	Andrews	0.57	Gas	88	Hanger 88	Addition
A229	HVB16	Wellman Robby	0.0065	Gas	88	Hanger 89	Addition
A230	PM07	Powrmatic	0.0065	Gas	149	Stringer Treatment 149 annex	Addition
A231	PM08	Powrmatic	0.0065	Gas	149	Stringer Treatment 149 annex	Addition
A232	PM09	Powrmatic	0.054	Gas	64	OSS front Extension	Addition
A233	PM10	Powrmatic	0.054	Gas	64	OSS front Extension	Addition
A234	PM11	Powrmatic	0.054	Gas	64	OSS front Extension	Addition
A235	PM12	Powrmatic	0.054	Gas	64	OSS front Extension	Addition
A236	WAH25	Babcock Wanson	0.0484	Gas	145	OSS front Extension	Addition
A237	WAH16	Babcock Wanson	0.0484	Gas	145	Building 145 - 600 Store	Misused from original permit
A238	WAH27	Babcock Wanson	0.0484	Gas	145	Building 145 - 600 Store	Misused from original permit
A239	WAH28	Babcock Wanson	0.0484	Gas	145	Building 145 - 600 Store	Misused from original permit
A240	WAH29	Babcock Wanson	0.0484	Gas	145	Building 145 - 600 Store	Misused from original permit
A241	WAH30	Babcock Wanson	0.0484	Gas	145	Building 145 - 600 Store	Misused from original permit
A242	WAH37	Babcock Wanson	0.075	Gas	141	Site 5 Dispatch Shed	Addition
A243		Powrmatic	0.075	Gas	79	Hanger 79	Addition
A244		Powrmatic	0.075	Gas	79	Hanger 79	Replacement for Oil Fired WAH 15 & WAH 16
A245		Powrmatic	0.075	Gas	79	Hanger 79	
A246		Powrmatic	0.075	Gas	79	Hanger 79	
A247		Remzor	0.525	Gas	89	Hanger 89	
A248		Linton Services/Riello	0.1	Oil	1	Building 1	Addition
A249		Broag Remida Quinta Pro 115	0.1	Gas	23	Building 23 M. Hfc Block	Addition
A250		Broag Remida Quinta Pro 115	0.0183	Gas	23	Building 23 Main Office Block	Replaced CHB 15
A251		Broag Avanta 185	0.044	Gas	193	Waste Management Facility	Replaced CHB 15
A252		AO Smith Hot Water Heater	0.0195	Gas	193	Waste Management Facility	Addition
A253		Ambirad Linear Heater	0.0195	Gas	193	Waste Management Facility	Addition
A254		Ambirad Linear Heater	0.0909	Gas	53	Facilities Management	Addition
A255		Ideal Evomax 80 Condensing Boiler	0.36	Gas	37	A321 Oven	4 burners per oven
A256		Ideal Evomax 80 Condensing Boiler	0.36	Gas	37	A321 Oven	Addition
A257		ISS Oven	0.36	Gas	37	A321 Oven	Addition
A258		ISS Oven	0.36	Gas	37	A321 Oven	Addition

EA reference	Airbus Reference	Combustion	Input (mw)	Fuel	Building Number	Location	Drawing number	Comments
A122	CHB01	CHB01	0.039	Gas	58	Sports and Social	PPC 01 and PPC 04	
A123	CHB07	CHB07	0.075	Gas	42	Surgery	PPC 01 and PPC 04	
A124	CHB08	CHB08	0.06	Oil	74	Pavilion	PPC 01 and PPC 04	
A125	CHB09	CHB09	0.0282	Gas	46	Whitehouse	PPC 01 and PPC 04	
A126	CHB10	CHB10	0.0282	Gas	46	Whitehouse	PPC 01 and PPC 04	Removed
A127	CHB13	CHB13	0.0185	Gas	58	Canteen	PPC 01 and PPC 04	Removed
A128	CHB14	CHB14	0.0185	Gas	58	Canteen	PPC 01 and PPC 04	Removed
A129	CHB15	CHB15	0.3528	Gas	1	Entrance to main factory	PPC 01 and PPC 04	
A130	CHB16	CHB16	0.0185	Gas	1	Single Aisle	PPC 01 and PPC 04	
A131	CHB17	CHB17	0.045	Gas	28	Steve Watson Centre	PPC 01 and PPC 04	
A131	DH01	DH01	0.06	Gas	1	Over door heater/ goods receiving area	PPC 01 and PPC 04	
A132	GWH01	GWH01	0.019	Gas	23	Main office block	PPC 01 and PPC 04	Removed
A133	GWH02	GWH02	0.019	Gas	1	OED	PPC 01 and PPC 04	
A134	GWH03	GWH03	0.08	Gas	141	Site 5	PPC 01 and PPC 04	
A135	GWH04	GWH04	0.05	Gas	64	OSS	PPC 01 and PPC 04	
A136	GWH05	GWH05	0.1048	Gas	1	Main factory	PPC 01 and PPC 04	
A137	GWH06	GWH06	0.014	Gas	23	Main offices	PPC 01 and PPC 04	
A138	GWH07	GWH07	0.076	Gas	91	Hawker	PPC 01 and PPC 04	
A139	GWH08	GWH08	0.076	Gas	91	Hawker	PPC 01 and PPC 04	
A140	GWH 11	GWH11	0.076	Gas	144	dash 600 offices	PPC 01 and PPC 04	
A141	CHB 14	CHB 14	0.063	Gas	141	Site 5		
A14	CHB 19	CHB 19	0.1375	Gas	141	Site 5		
A15	HWB02	CHB20	0.1375	Gas	141	Site 5		
A4					448	Single-aisle-paint-shop		Replaced
A5					448	Single-aisle-paint-shop		Replaced
A6	38	HWB06	2	Oil and Gas	91	Hawker H91	PPC 01 and PPC 04	
A7	26	HWB07	2	Oil and Gas	91	Hawker H91	PPC 01 and PPC 04	
A23	56	HWB17	1	Oil and Gas	91	Hawker H91	PPC01 and PPC 04	Commissioned to support H89 (Renumbered from HWB7A)
A44	HWB08				84	A340 support centre and H75		Replaced by A350 H75
A145	HWB09	HWB09	0.4	OIL	59	Customer Support	PPC 01 and PPC 04	
A8	21	HWB10	0.75	Gas	64	OSS	PPC 01 and PPC 04	
A9	22	HWB11	0.75	Gas	64	OSS	PPC 01 and PPC 04	
A10	23	HWB12	1.758	Gas	134	LCM-treatments	PPC 01 and PPC 04	
A10	23	HWB13	1.758	Gas	134	LCM-treatments	PPC 01 and PPC 04	
A12	24	HWB14	0.6	Gas	134	LCM-treatments	PPC 01 and PPC 04	
A12	24	HWB15	0.6	Gas	134	LCM-treatments	PPC 01 and PPC 04	
A146	PM01	PM01	0.4	Gas	1	Main factory	PPC 01 and PPC 04	
A147	PM02	PM02	0.4	Gas	1	Main factory	PPC 01 and PPC 04	
A148	PM03	PM03	0.4	Gas	1	Main factory	PPC 01 and PPC 04	
A149	PM04	PM04	0.4	Gas	1	Main factory	PPC 01 and PPC 04	
A150	PM05	PM05	0.4	Gas	58	Canteen	PPC 01 and PPC 04	
A151	PM06	PM06	0.4	Gas	58	Canteen	PPC 01 and PPC 04	
A183	WAH12	WAH12	0.38	Gas	1	Main factory	PPC 01 and PPC 04	
A152	WAH13	WAH13	0.38	Gas	1	Main factory	PPC 01 and PPC 04	
A153	WAH14	WAH14	0.045	Gas	1	Main factory	PPC 01 and PPC 04	
A154	WAH15	WAH15	0.045	Gas	1	Main factory	PPC 01 and PPC 04	
A155	WAH16	WAH16	1.1	Gas	141	Hangar 99	PPC 01 and PPC 04	Removed
A156	WAH17	WAH17	1.1	Gas	141	Hangar 99	PPC 01 and PPC 04	Removed
A14	43	WAH18	1.1	Gas	141	Site 5	PPC 01 and PPC 04	
A99	WAH34	WAH34		Gas	4	Surgery entrance	Shown on PPC 01 and table 2.3.6	Removed & Replaced byPowmatic Unit Heater WAX75 A218
A100	WAH32	WAH32	0.448	Gas	141	Site 5	Shown on PPC 01 and table 2.3.6	
A155	WW01	WW01	0.086	Gas	58	Canteen	PPC 01 and PPC 04	
A156	WW02	WW02	0.086	Gas	58	Canteen	PPC 01 and PPC 04	
A157	CHG05	CHG05		Gas	83	Stringer Annex	PPC 01 and PPC 04	Removed
A22					89			Removed
A101	WAH33	WAH33	0.176	Gas	1	PAC Receiving	New Plant installed since permit issued	Individual Flue
A102	WAH34	WAH34	0.19	Oil	79	H79	New Plant installed since permit issued	Individual Flue
A103					79			Removed
A104	2 units	2 units	0.15	Gas	153	Firestation	New Plant installed since permit issued	Individual Flue
A105	Burner 1	Burner 1	0.36	Gas	91	Hangar 91 Paintshops	Missed from original permit	Individual Flue
A106	Burner 2	Burner 2	0.36	Gas	91	Hangar 91 Paintshops	Missed from original permit	Individual Flue
A107	Burner 3	Burner 3	0.36	Gas	91	Hangar 91 Paintshops	Missed from original permit	Individual Flue
A108	Burner 4	Burner 4	0.36	Gas	91	Hangar 91 Paintshops	Missed from original permit	Individual Flue
A109	Burner 5	Burner 5	0.36	Gas	91	Hangar 91 Paintshops	Missed from original permit	Individual Flue
A110	Burner 6	Burner 6	0.36	Gas	91	Hangar 91 Paintshops	Missed from original permit	Individual Flue
	Burner 1	Burner 1	0.18	Gas	37	Blinks	Missed from original permit	Individual Flue
	Burner 2	Burner 2	0.18	Gas	37	Blinks	Missed from original permit	Individual Flue
	Burner 3	Burner 3	0.18	Gas	37	Blinks	Missed from original permit	Individual Flue
	Burner 4	Burner 4	0.18	Gas	37	Blinks	Missed from original permit	Individual Flue
	Burner 5	Burner 5	0.65	Gas	37	Blinks	Missed from original permit	Individual Flue
	Burner 1	Burner 1	0.6	Gas	141	Site 5- Booth 1	Missed from original permit	Individual Flue
A112	Burner 2	Burner 2	1.2	Gas	141	Site 5- Booth 1	Missed from original permit	Individual Flue
A113	Burner 1	Burner 1	0.6	Gas	141	Site 5- Booth 2	Missed from original permit	Individual Flue
A114	Burner 2	Burner 2	1.2	Gas	141	Site 5- Booth 2	Missed from original permit	Individual Flue
A115	Burner 1	Burner 1	0.8	Gas	141	Site 5 prep booth 1	Missed from original permit	Individual Flue
A116	Burner 2	Burner 2	0.8	Gas	141	Site 5 prep booth 2	Missed from original permit	Individual Flue
A117	dash 600 paintshop	dash 600 paintshop	0.32	Gas	141	dash 600 paintshop	Missed from original permit	Individual Flue
A118	dash 600 paintshop	dash 600 paintshop	0.81	Gas	134	dash 600 paintshop	Missed from original permit	Individual Flue
A119	dash 600 paintshop	dash 600 paintshop	0.81	Gas	134	dash 600 paintshop	Missed from original permit	Individual Flue
A120	dash 600 paintshop	dash 600 paintshop	0.81	Gas	134	dash 600 paintshop	Missed from original permit	Individual Flue
A121	dash 600 paintshop	dash 600 paintshop	0.35	Gas	149	Stringers paintshop	Missed from original permit	Individual Flue
A158								Duplicate of A134
A159	CHG08	CHG08	0.135	Gas	10	Building 10	New Plant installed since permit issued	Individual Flue
A160	CHG09	CHG09	0.135	Gas	10	Building 10	New Plant installed since permit issued	Individual Flue
A161	Combat 03	Combat 03	0.135	Gas	13	Stringer Annex	New Plant installed since permit issued	Individual Flue
A162	Combat 04	Combat 04	0.135	Gas	13	Stringer Annex	New Plant installed since permit issued	Individual Flue
A163	CHG05	CHG05	0.27	Gas	15	Stringer Machining	New Plant installed since permit issued	Individual Flue
A164	Combat 06	Combat 06	0.095	Gas	15	Stringer Machining	New Plant installed since permit issued	Individual Flue
A165	Combat 07	Combat 07	0.095	Gas	15	Stringer Machining	New Plant installed since permit issued	Individual Flue
A166	Combat 08	Combat 08	0.135	Gas	15	Stringer Machining	New Plant installed since permit issued	Individual Flue
A167	CHG10	CHG10	0.135	Gas	15	Stringer Machining	New Plant installed since permit issued	Individual Flue
A168	CHG11	CHG11	0.135	Gas	145	-600Receiving Building	New Plant installed since permit issued	Individual Flue
A169	Combat 11	Combat 11	0.135	Gas	145	-600Receiving Building	New Plant installed since permit issued	Individual Flue
A170	Combat 12	Combat 12	0.135	Gas	31	A350 Demo box	New Plant installed since permit issued	Individual Flue
A171	Combat 13	Combat 13	0.135	Gas	31	A350 Demo box	New Plant installed since permit issued	Individual Flue
A172	CHG13	CHG13	0.135	Gas	145	-600Receiving Building	New Plant installed since permit issued	Individual Flue
A173	Combat 15	Combat 15	0.135	Gas	31	A350 Demo box	New Plant installed since permit issued	Individual Flue
A174	Combat 16	Combat 16	0.135	Gas	31	A350 Demo box	New Plant installed since permit issued	Individual Flue
A75-A78	Hangar 99 autoclave	Hangar 99 autoclave		Gas	89	Hauler		Removed with decommissioning of Hawker was 1.6MW
A61-A72		A380 Autoclave	5.4	Gas	151	LCM		
A175		New Single Aisle Boiler House	4.2	Gas	161	Single Aisle		STTS
A176		New Single Aisle Boiler House	4.2	Gas	161	Single Aisle		STTS
A103	WAH35	Site 5 Despatch	0.448		141	Site 5		Relocated from A103
A215		A350 H75	0.465		75	H75		Replacement for A144 (HWB08)
A201		A350 Biomass Boiler	1.2	Biomass	165	A350		Addition
A201	A350	A350	1.3	Gas	165	A350		Addition
A201	A350	A350	1.3	Gas	165	A350		Addition
A201	A350	A350	1.3	Gas	165	A350		Addition
A216	GWH		0.19	Gas	165	A350		Addition
A217	GWH		0.19	Gas	165	A350		Addition
A35	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint		Replacement for A4 & A5 (HWB04 & HWB05)
A36	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint		Replacement for A4 & A5 (HWB04 & HWB05)
A37	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint		Replacement for A4 & A5 (HWB04 & HWB05)
A38	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint		Replacement for A4 & A5 (HWB04 & HWB05)
A39	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint		Replacement for A4 & A5 (HWB04 & HWB05)
A40	AHP	Single Aisle Int Paint	0.22	Gas	128	Single Aisle Int Paint		Replacement for A4 & A5 (HWB04 & HWB05)