Camden Power Station

Air Heater Scope Of Work

Unit 1-8

Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ AH (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
Air Heater															
0	**General**														
0.01	Site establishment for OP		X												
0.02	Site establishment for IN			X											
0.03	Site establishment for IR				X										
0.04	Site establishment for GO					X									
0.05	Site de-establishment for OP		X												
0.06	Site de-establishment for IN			X											
0.07	Site de-establishment for IR				X										
0.08	Site de-establishment for GO					X									
0.09	Open inspection doors		X	X	X	X									
0.10	Close inspection doors		X	X	X	X									

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ AH (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
Air Heater															
1	**Air Heater Inspection OP**														
1.01	Visually inspect the air heater for any damage and erosion		X												
2	**Air Heater Inspection IN**														
2.01	a) Visually inspect air heater rotor for damage and erosion b) Visually inspect radial seals for damage and erosion c) Visually inspect axial seals for damage and wear d) Visually inspect circumferential seals for damage and wear e) Visually inspect sector plates for damage and erosion f) Visually inspect axial seal plates for damage and erosion g) Visually inspect hot end and cold end tyre for damage and erosion h) Visually inspect casing internally for damage and erosion i) Visually inspect drive system for oil leaks j) Visually inspect lubrication system for oil leaks. k) Visually inspect packs for damage, erosion and loose plates l) Visually inspect stay rods for damage and wear m) Visually inspect fire protection system for damage and erosion. n) Visually inspect the expansion joint covers for damage and wear. o) Visually inspect the hub seals for damage and wear p) Visually inspect the sootblower system for erosion, damage and movement. q) Visually inspect sealing actuators (eg sector plate) for damage and correct operation			X											

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Unit 1-8

Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ AH (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
Air Heater															
3	**Air Heater Inspection IR**														
3.01	a) Visually inspect air heater rotor for damage and erosion b) Visually inspect radial seals for damage and erosion c) Visually inspect axial seals for damage and wear d) Visually inspect circumferential seals for damage and wear e) Visually inspect sector plates for damage and erosion f) Visually inspect axial seal plates for damage and erosion g) Visually inspect hot end and cold end tyre for damage and erosion h) Visually inspect casing internally for damage and erosion i) Visually inspect drive system for oil leaks j) Visually inspect lubrication system for oil leaks. k) Visually inspect packs for damage, erosion and loose plates l) Visually inspect stay rods in ducting for damage and wear m) Visually inspect fire protection system for damage and erosion. n) Visually inspect the expansion joint covers for damage and wear. o) Visually inspect hub seals for damage and wear p) Visually inspect the sootblower system for erosion, damage and movement. q) Visually inspect sealing actuators (eg sector plate) for damage and correct operation				X										

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Unit 1-8

Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ AH (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
Air Heater															
4	**Air Heater Inspection GO**														
4.01	a) Visually inspect air heater rotor for damage and erosion b) Visually inspect radial seals for damage and erosion c) Visually inspect axial seals for damage and wear d) Visually inspect circumferential seals for damage and wear e) Visually inspect sector plates for damage and erosion f) Visually inspect axial seal plates for damage and erosion g) Visually inspect hot end and cold end tyre for damage and erosion h) Visually inspect casing internally for damage and erosion i) Visually inspect drive system for oil leaks j) Visually inspect lubrication system for oil leaks. k) Visually inspect packs for damage, erosion and loose plates l) Visually inspect stay rods in ducting for damage and wear m) Visually inspect fire protection system for damage and erosion. n) Visually inspect the expansion joint covers for damage and wear. o) Visually inspect hub seals for damage and wear p) Visually inspect the sootblower system for erosion, damage and movement. q) Visually inspect sealing actuators (eg sector plate) for damage and correct operation					X									

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Air Heater Scope Of Work

Unit 1-8

Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ AH (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
Air Heater															
5	**Radial Seals**														
5.01	Remove the complete set of radial seals on the hot end					X									
5.02	Refit the complete set of radial seals on the hot end.					X									
5.03	Remove the complete set of radial seals on the cold end					X									
5.04	Refit the complete set of radial seals on the cold end.					X									
5.05	Remove one radial seal segment per radial plate hot end			X	X										
5.06	Refit one radial seal segment per radial plate hot end			X	X										
5.07	Remove radial seal make up piece on each radial plate hot end			X	X										
5.08	Refit radial seal make up piece on each radial plate hot end			X	X										
5.09	Remove one radial seal segment per radial plate cold end			X	X										
5.10	Refit one radial seal segment per radial plate cold end			X	X										
5.11	Remove radial seal make up piece on each radial plate cold end			X	X										
5.12	Refit radial seal make up piece on each radial plate cold end			X	X										
6	**Hub Seals**														
6.01	Remove the hub seals hot end					X									
6.02	Refit the hub seals hot end					X									
6.03	Remove the hub seals cold end					X									
6.04	Refit the hub seals cold end					X									
7	**Axial Seals**														
7.01	Remove all the axial seals					X									
7.02	Refit all the axial seals					X									
7.03	Remove 4 axial seals			X	X										
7.04	Refit 4 axial seals.			X	X										
7.05	Remove all the axial seal holding strips														
7.06	Refit all the axial seal holding strips														
7.07	Remove 8 off the axial seal holding strips					X									
7.08	Refit 8 off the axial seal holding strips					X									
8	**Circumferential Seals**														

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Unit 1-8

Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ AH (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
Air Heater															
8.01	Remove all the circumferential seals on the hot end gas side					X									
8.02	Refit all the circumferential seals on the hot end gas side including setting to correct seal settings					X									
8.03	Remove all the circumferential seals on the hot end air side														
8.04	Refit all the circumferential seals on the hot end air side including setting to correct seal settings														
8.05	Remove all the circumferential seals on the cold end gas side					X									
8.06	Refit all the circumferential seals on the cold end gas side including setting to correct seal settings					X									
8.07	Remove all the circumferential seals on the cold end air side														
8.08	Refit all the circumferential seals on the cold end air side including setting to correct seal settings														
8.09	Remove 8 sections off the circumferential seals			X	X										
8.10	Refit 8 sections off the circumferential seals including setting to correct seal settings			X	X										
8.11	Adjust complete hot end circumferential seals to correct settings			X	X	X									
8.12	Adjust complete cold end circumferential seals to correct settings			X	X	X									
9	**Sector Plates**														
9.01	Remove hot end sector plate and lower to ground level					X									
9.02	Refit hot end sector plate including lifting to air heater level from ground level					X									
9.03	Remove cold end sector plate and lower to ground level														
9.04	Refit cold end sector plate including lifting to air heater level from ground level														
10	**Rotor**														
10.01	Remove complete rotor hot end tyre														
10.02	Refit complete hot end rotor tyre														
10.03	Remove complete rotor cold end tyre														
10.04	Refit complete cold end rotor tyre														
10.05	Remove all rotor element pack support strips														
10.06	Refit all rotor element pack support strips														

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Air Heater Scope Of Work

Unit 1-8

Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ AH (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
Air Heater															
10.07	Remove 50 off complete basket element pack support strips			X	X										
10.08	Refit 50 off complete basket element pack support strips			X	X										
10.09	Inspect complete rotor after element packs have been removed for damage and wear. Submit detailed report					X									
10.10	Carry out rotor radial and annular plate window repairs by cutting out and rewelding 0.5m in total of 6mm thick plate when packs are removed			X											
10.11	Carry out rotor radial and annular plate window repairs by cutting out and rewelding 1.0m in total of 6mm thick plate when packs are removed														
10.12	Carry out rotor radial and annular plate window repairs by cutting out and rewelding 5.0m in total of 6mm thick plate when packs are removed				X										
10.13	Carry out rotor radial and annular plate window repairs by cutting out and rewelding 20.0m in total of 6mm thick plate when packs are removed					X									
10.14	Carry out rotor radial and annular plate window repairs by cutting out and rewelding 0.5m in total of 10mm thick plate when packs are removed			X											
10.15	Carry out rotor radial and annular plate window repairs by cutting out and rewelding 1.0m in total of 10mm thick plate when packs are removed														
10.16	Carry out rotor radial and annular plate window repairs by cutting out and rewelding 5.0m in total of 10mm thick plate when packs are removed				X										
10.17	Carry out rotor radial and annular plate window repairs by cutting out and rewelding 20.0m in total of 10mm thick plate when packs are removed					X									
11	**Element Packs**														
11.01	Remove 3 element packs and take one plate pair out of each element pack for mass loss analysis. Mark elements with steel tags. Submit mass loss report for air heater packs erosion monitoring. Refit the 3 element packs			X	X	X									
11.02	Remove all element pack cover strips on the hot end on 4 sides on each basket					X									

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Unit 1-8

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Air Heater															
11.03	Refit all element pack cover strips on the hot end on 4 sides on each basket					X									
11.04	Remove 50 off element pack cover strips on the hot end on 4 sides on each basket			X	X										
11.05	Refit 50 off element pack cover strips on the hot end on 4 sides on each basket			X	X										
12	**High Pressure Washing - Elements**														
12.01	Carry out complete air heater water washing with high pressure system from the cold end of the air heater for a duration of 72 hours including all equipment required														
12.02	Carry out complete air heater water washing with high pressure system from the cold end of the air heater for a duration of 96 hours including all equipment required														
12.03	Carry out complete air heater water washing with high pressure system from the cold end of the air heater for a duration of 120 hours including all equipment required														
13	**Drive System and Bearings**														
13.01	Remove drive motor					X									
13.02	Refit drive motor					X									
13.03	Remove coupling guard and inspect guard			X	X	X									
13.04	Clean coupling and inspect coupling			X	X	X									
13.05	Re-grease and close up coupling			X	X	X									
13.06	Carry out minor repairs to coupling guard and refit guard			X	X	X									
13.07	Remove motor coupling half					X									
13.08	Refit motor coupling half					X									
13.09	Remove gearbox coupling half					X									
13.10	Refit gearbox coupling half					X									
13.11	Remove gearbox labyrinth seal					X									
13.12	Refit gearbox labyrinth seal					X									
13.13	Remove gearbox oil and refill gearbox with new oil through filtration unit			X	X	X									
13.14	Remove the gearbox output shaft seal				X										
13.15	Refit the gearbox output shaft seal				X										
13.16	Align motor and gearbox					X									
13.17	Remove the complete gearbox and lower to gearbox to ground level					X									

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Air Heater															
13.18	Refit the complete gearbox including lifting the gearbox up to the air heater level from ground level					X									
13.19	Inspect the guide bearing			X	X										
13.20	Inspect the support bearing			X	X										
13.21	Remove the guide bearing														
13.22	Refit the guide bearing														
13.23	Remove the support bearing 12 yearly					X									
13.24	Refit the support bearing 12 yearly					X									
14	**Lubrication System**														
14.01	Remove and refit pump motor					X									
14.02	Remove and refit pump					X									
14.03	Remove and refit pressure regulating valve														
14.04	Remove and refit needle valve														
14.05	Remove and refit filters														
14.06	Remove and refill oil														
14.07	Remove and refit duplex filter unit														
14.08	Remove and refit flexible hoses to bearings					X									
14.09	Open, drain, clean and inspect tank for rust and damage. Inspect all oil pipework for leaks and repair where required. Inspect suction strainer/foot valve (Where fitted). Fit new gaskets and close tank. Refill tank via filtration unit.			X	X	X									
14.10	Microblast clean tank inside, clean tank and re-coat inside of tank with special coating														
14.11	Remove lubrication oil filters and clean/replace filters as required. Service filter change over handles and repair oil leaks on piping and filter unit.			X	X	X									
14.12	Inspect lubrication oil pumps and piping for leaks and repair leaks where required.			X	X	X									
14.13	Remove lubrication oil pumps and inspect couplings and bell housing/guards for damage. Repair any damage and replace coupling or bell housing if required. Refit pumps			X	X	X									
14.14	Send pumps away for overhaul					X									
14.15	Disconnect and remove oil coolers. Open water boxes and inspect coolers for damage and wear. Replace gaskets/O-rings where required. Clean coolers. Close coolers and refit coolers.			X	X										

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Air Heater															
14.16	Disconnect and remove oil coolers. Send coolers for inspection and pressure testing off site. Refit coolers.					X									
14.17	Flush lubrication system by bypassing bearings and using mobile filtration unit.			X	X	X									
14.18	Commission lubrication system by setting pressures and/or flow rates			X	X	X									

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Air Heater															
15	**Ducting**														
15.01	Carry out window repairs of 0.5m in total of 6mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.														
15.02	Carry out window repairs of 1.0m in total of 6mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.			X											
15.03	Carry out window repairs of 5.0m in total of 6mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.				X										
15.04	Carry out window repairs of 0.5m in total of 8mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.			X		X									
15.05	Carry out window repairs of 1.0m in total of 8mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.				X										
15.06	Carry out window repairs of 5.0m in total of 8mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.					X									
15.07	Carry out window repairs of 0.5m in total of 10mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.			X											
15.08	Carry out window repairs of 1.0m in total of 10mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.				X										
15.09	Carry out window repairs of 5.0m in total of 10mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.					X									
15.10	Remove 1.0m erosion protection strips on support stays			X											

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Air Heater															
15.11	Refit 1.0m erosion protection strips on support stays			X											
15.12	Remove 2.0m erosion protection strips on support stays				X	X									
15.13	Refit 2.0m erosion protection strips on support stays				X	X									
15.14	Remove 2 meters of support stays piping			X											
15.15	Refit 2 meters of support stays piping including erosion protection			X											
15.16	Remove 10 meters of support stays piping				X	X									
15.17	Refit 10 meters of support stays piping including erosion protection				X	X									
16	**Transition Ducting**														
16.01	Carry out window repairs of 0.5m in total of 6mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.			X											
16.02	Carry out window repairs of 1.0m in total of 6mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.				X										
16.03	Carry out window repairs of 5.0m in total of 6mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.					X									
16.04	Carry out window repairs of 0.5m in total of 8mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.			X											
16.05	Carry out window repairs of 1.0m in total of 8mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.				X										
16.06	Carry out window repairs of 5.0m in total of 8mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.					X									

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Air Heater															
16.07	Carry out window repairs of 0.5m in total of 10mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.			X											
16.08	Carry out window repairs of 1.0m in total of 10mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.				X										
16.09	Carry out window repairs of 5.0m in total of 10mm thick ducting plate by cutting out and rewelding with new material. Excluding removal of cladding and insulation if required.					X									
17	**Sootblower System - Stationary Pipes**														
17.01	Inspect all the sootblower nozzles dimensionally and for erosion on the inside			X	X	X									
17.02	Inspect the sootblower pipe for damage and erosion			X	X	X									
17.03	Inspect the sootblower pipe erosion protection plates			X	X	X									
17.04	Inspect sootblower reciprocating system			X	X	X									
17.05	Remove complete sootblower pipe					X									
17.06	Refit complete sootblower pipe					X									
17.07	Remove worn sootblower erosion protection plates			X	X	X									
17.08	Refit new sootblower erosion protection plates			X	X	X									
17.09	Remove orifice plates and inspect			X	X	X									
17.10	Refit orifice plates			X	X	X									
19	**Commissioning**														
19.01	Test run air heater and ensure heaters runs freely			X	X	X									

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