Power Station B

Air Heater Scope Of Work

Unit 1-6

Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
Air Heater															
0	**General**														
0.04	Site establishment for GO					X									
0.08	Site de-establishment for GO					X									
0.09	Open all inspection and access doors (excluding main sliding door)		X	X	X	X									
0.10	Close hood doors, bearing compartment door and inspection doors including fitting of new packing		X	X	X	X									

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
1	Air Heater Inspection OP														
2	Air Heater Inspection IN														

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
3	Air Heater Inspection IR														

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
4	**Air Heater Inspection GO**														
4.01	a) Inspect stator face damage, levels, shaft and hood alignment b) Inspect seal frame, articulation joints and wear seals hot end and cold end c) Inspect all stainless steel expansion joints d) Inspect hood and hood doors hot end and cold end e) Inspect pins, springs and spring pin settings hot end and cold end f) Inspect drag links, center drive posts and nudging pins hot end and cold end g) Inspect thermal compensators (where fitted) h) Inspect collar seals by opening covers top and bottom including collar seal alignment and runouts i) Inspect pin rack and pinion j) Inspect motor drive and gearbox in situ k) Inspect sootblower system, cross bellows, center bellows with TIR, indexing paddle system and steam piping l) Inspect fire fighting system where fitted m) Inspect element packs visually in fitted position n) Inspect lubrication oil tunnel o) Inspect lubrication oil system p) Inspect transition ducting hot and cold end with spot thickness testing and visual q) Inspect all stay rods r) Inspect pack supports s) Inspect all erosion protection and report on consolidated list with erosion protection fitted and wear status t) Visually inspect the bearing compartment u) Visually inspect pinion shaft plumber block bearings					X									

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
5	**Stator - Twin Flow**														
5.01	Inspect complete stator after element packs have been removed for damage and wear including the lub tunnel casing. Submit detailed report					X									
5.02	Remove all stator element pack supports on the cold end					X									
5.03	Refit all stator element pack supports on the cold end					X									
5.12	Carry out stator radial and divisional plate window repairs by cutting out and rewelding 50.0m in total of 6mm thick plate when packs are removed					X									
5.16	Carry out stator radial and divisional plate window repairs by cutting out and rewelding 20.0m in total of 10mm thick plate when packs are removed					X									
5.17	Remove all radial plate U-Channel/flat bar strips hot end including primary section divisional plates					X									
5.18	Refit all radial plate flat bar strips hot end including primary section divisional plates					X									
5.23	Remove all radial plate U-Channel/flat bar strips cold end					X									
5.24	Refit all radial plate flat bar strips cold end					X									
5.33	Remove complete lub tunnel including pipe removal					X									
5.34	Refit complete lub tunnel including pipe re-installation					X									
6	**Element Packs**														
6.02	Remove 3 selected element packs top and intermediate/cold layer			X	X	X									
6.03	Split open packs, remove one plate pair re-assemble pack			X	X	X									
6.04	Refit 3 removed packs			X	X	X									
6.05	Mark plate pair and send for mass analysis			X	X	X									
6.06	Analyse plate mass loss and submit report on findings and record in database			X	X	X									
7	**Seal Frames - Twin Flow**														
7.01	Remove complete seal frame hot end					X									
7.02	Refit complete seal frame hot end					X									

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
8	**Stainless Steel Expansion Joints - Twin Flow**														
8.01	Remove complete set of stainless steel expansion joints hot end					X									
8.02	Refit complete set of stainless steel expansion joints hot end					X									
8.03	Remove complete set of stainless steel expansion joints cold end					X									
8.04	Refit complete set of stainless steel expansion joints cold end					X									
9	**Cast Iron Wear Seals - Twin Flow**														
9.01	Remove complete set of cast iron wear seals hot end					X									
9.02	Refit complete set of cast iron wear seals hot end					X									
9.03	Remove complete set of cast iron wear seals cold end					X									
9.04	Refit complete set of cast iron wear seals cold end					X									
10	**Spring Pins and Springs**														
10.01	Remove all the springs and pins hot end					X									
10.02	Refit all the springs and pins hot end					X									
10.09	Remove all the springs and pins cold end					X									
10.10	Refit all the springs and pins cold end					X									
10.21	Carry out complete air heater seal setting hot end				X	X									
10.22	Carry out complete air heater seal setting cold end				X	X									
11	**Articulation Joints**														
11.11	Remove erosion protection on four articulation joints hot end			X	X	X									
11.12	Refit new erosion protection on four articulation joints hot end			X	X	X									
12	**Center Post, Drag Links and Nudging pins**														
12.01	Service hot end center posts			X	X	X									
12.04	Service drag links hot end					X									
12.11	Service cold end center posts			X	X	X									
12.14	Service drag links cold end					X									
13	**Hoods - Twin Flow**														
13.01	Refurbish hood doors secondary and primary by carrying out minor repairs to hood doors, hinges and locking device			X	X	X									
13.04	Carry out thickness testing on all hot end hoods					X									
13.05	Carry out thickness testing on all cold end hoods					X									

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
14	**Thermal Compensators**														
14.03	Remove 4 thermal compensator rods				X	X									
14.04	Refit 4 thermal compensator rods				X	X									
14.11	Remove all thermal compensator erosion protection plates					X									
14.12	Refit all thermal compensator erosion protection plates					X									
14.15	Repair erosion damage on all thermal compensator boxes					X									
14.18	Carry out minor repairs to all thermal compensator bell crank systems					X									
16	**Collar Seals - Spring Boxes Twin Flow Primary Air Section**														
16.01	Open all collar seal spring boxes hot end, inspect and report			X	X	X									
16.02	Refit new springs and stop washers on spring boxes hot end					X									
16.03	Close up spring boxes hot end			X	X	X									
16.08	Remove erosion protection on all spring boxes hot end					X									
16.09	Refit new erosion protection on all spring boxes hot end					X									
16.10	Remove all collar seal cast iron wear seals hot end					X									
16.11	Refit all collar seal cast iron wear seals hot end including seal gap setting					X									
16.14	Close up collar seal housing hot end			X	X	X									
16.15	Remove rubbing ring hot end					X									
16.16	Refit rubbing ring hot end					X									
16.19	Open all collar seal spring boxes cold end, inspect and report			X	X	X									
16.20	Refit new springs and stop washers on spring boxes cold end					X									
16.21	Close up spring boxes cold end			X	X	X									
16.26	Remove erosion protection on all spring boxes cold end					X									
16.27	Refit new erosion protection on all spring boxes cold end					X									
16.28	Remove all collar seal cast iron wear seals cold end					X									
16.29	Refit all collar seal cast iron wear seals cold end including seal gap setting					X									
16.32	Close up collar seal housing cold end			X	X	X									

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Unit 1-6

Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
16.33	Remove rubbing ring cold end					X									
16.34	Refit rubbing ring cold end					X									
17	**Collar Seals - Spring Boxes Twin Flow Secondary Air Section**														
17.01	Open all collar seal spring boxes hot end, inspect and report			X	X	X									
17.02	Refit new springs and stop washers on spring boxes hot end					X									
17.03	Close up spring boxes hot end			X	X	X									
17.08	Remove erosion protection on all spring boxes hot end					X									
17.09	Refit new erosion protection on all spring boxes hot end					X									
17.10	Remove all collar seal cast iron wear seals hot end					X									
17.11	Refit all collar seal cast iron wear seals hot end including seal gap setting					X									
17.14	Close up collar seal housing hot end			X	X	X									
17.15	Remove rubbing ring hot end					X									
17.16	Refit rubbing ring hot end					X									
17.19	Open all collar seal spring boxes cold end, inspect and report			X	X	X									
17.20	Refit new springs and stop washers on spring boxes cold end					X									
17.21	Close up spring boxes cold end			X	X	X									
17.26	Remove erosion protection on all spring boxes cold end					X									
17.27	Refit new erosion protection on all spring boxes cold end					X									
17.28	Remove all collar seal cast iron wear seals cold end					X									
17.29	Refit all collar seal cast iron wear seals cold end including seal gap setting					X									
17.32	Close up collar seal housing cold end			X	X	X									
17.33	Remove rubbing ring cold end					X									
17.34	Refit rubbing ring cold end					X									
18	**High Pressure Washing - Elements**														
18.01	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					X									
19	**Drive System**														
19.01	Remove drive motor					X									

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
19.02	Refit drive motor					X									
19.03	Remove coupling guard and inspect guard			X	X	X									
19.04	Clean coupling and inspect coupling			X	X	X									
19.05	Re-grease and close up coupling			X	X	X									
19.06	Carry out minor repairs to coupling guard and refit guard			X	X	X									
19.13	Remove gearbox oil and refill gearbox with new oil through filtration unit			X	X	X									
19.17	Remove the complete gearbox and lower to gearbox to ground level					X									
19.18	Refit the complete gearbox including lifting the gearbox up to the air heater level from ground level					X									
19.21	Remove drive pinion				X	X									
19.23	Refit drive pinion					X									
19.24	Align drive pinion height					X									
19.25	Align drive pinion penetration					X									
20	**Pin Rack**														
20.01	Remove complete pin rack					X									
20.02	Refit complete pin rack to correct alignment					X									
20.06	Remove 4.0m erosion protection strips on pin rack stiffener pipes			X	X	X									
20.07	Refit 4.0m erosion protection strips on pin rack stiffener pipes			X	X	X									
20.09	Weld repair 10 off pin rack holding strips				X	X									
20.16	Remove 10 meters of pin rack stiffener pipes				X	X									
20.17	Refit 10 meters of pin rack stiffener pipes including erosion protection				X	X									
21	**Main Bearings - Oil**														
21.01	Inspect for oil leaks in bearing compartment			X	X	X									
21.02	Clean out bearing compartment and all drip trays			X	X	X									
21.03	NDT inspect bearing support gussets			X	X	X									
21.04	Inspect lub piping balance lines and ensure they are open			X	X	X									
21.05	Inspect hub and stator radial plate welds inside bearing compartment					X									
21.06	Thickness test hub plate hot end and cold end and report				X	X									
21.07	Inspect labyrinth seals			X	X	X									
21.08	Open and inspect guide bearing				X	X									
21.09	Open and inspect support bearing				X	X									
21.10	Remove guide bearing					X									
21.11	Refit guide bearing					X									

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
21.12	Remove support bearing					X									
21.13	Refit support bearing					X									
21.14	Close guide bearing					X									
21.15	Close support bearing					X									
21.16	Close up bearing compartment			X	X	X									
22	**Lubrication System - Two Electrical Pumps**														
22.09	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									
22.11	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									
22.12	Inspect lubrication oil pumps for leaks and repair leaks where required.			X	X	X									
22.13	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									
22.14	Send pumps away for overhaul					X									
22.15	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	X									
22.16	Disconnect and remove oil coolers. Send coolers for inspection and pressure testing off site. Refit coolers.					X									
22.17	Flush lubrication system by bypassing bearings and using mobile filtration unit.					X									
22.18	Commission lubrication system by setting pressures and/or flow rates			X	X	X									

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
23	**Ducting Hot End**														
23.03	Carry out window repairs of 10.0m in total of 6mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.				X	X									
23.09	Carry out window repairs of 10.0m in total of 10mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.					X									
24	**Ducting Cold End**														
24.03	Carry out window repairs of 10.0m in total of 6mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.				X	X									
25	**Transition Ducting Hot End**														
25.03	Carry out window repairs of 10.0m in total of 6mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.					X									
25.09	Carry out window repairs of 10.0m in total of 10mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.					X									
26	**Transition Ducting Cold End**														
26.03	Carry out window repairs of 10.0m in total of 6mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.					X									
27	**Walkways**														
27.04	Remove 4.0m^2 of walkway grating					X									
27.05	Refit 4.0m^2 of walkway grating					X									
28	**Sootblower System - Reciprocating Pipe**														
28.01	Inspect the sootblower pipe erosion protection plates			X	X	X									
28.02	Inspect sootblower reciprocating system including links, bearing box and bushes			X	X	X									
28.03	Inspect the sootblower piping for damage, erosion and holes complete from AH casing entry to sootblower device			X	X	X									

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Item No	Description	Spares and Consumables Required	OP	IN	IR	GO	Dur/ Htr (Hrs)	Dur/ Unit (Hrs)	SE	A	W	S/S	L	Price/ Htr	Price/ Unit
28.04	Inspect sootblower cross bellows for damage, erosion, holes and alignment			X	X	X									
28.05	Refurbish the sootblower pipe penetration system through the air duct walls					X									
28.06	Refurbish the sootblower actuating paddle mechanism			X	X	X									
28.07	Carry out correct setup and stroking for sootblower actuating paddle			X	X	X									
28.12	Refit complete sootblower pipe including alignment					X									
28.15	Remove 5m of sootblower erosion protection plate				X	X									
28.16	Refit 5m of sootblower erosion protection plate				X	X									
28.19	Remove the Sootblower U-Bend and inspect for damage and erosion			X	X	X									
28.20	Refit Sootblower U-Bend including alignment			X	X	X									
28.21	Remove one sootblower cross compensator			X	X	X									
28.22	Refit one sootblower cross compensator including correct alignment			X	X	X									
28.23	Remove sootblower center compensator			X	X	X									
28.24	Inspect center compensator including sliding faces for damage and erosion			X	X	X									
28.26	Refit sootblower center compensator			X	X	X									
29	**Fire Protection System - Twin Flow**														
29.03	Remove 5 fire protection system spray nozzles only excluding piping				X	X									
29.04	Refit 5 fire protection system spray nozzles				X	X									
29.17	Remove 10m of fire protection system erosion protection					X									
29.18	Refit 10m of fire protection system erosion protection					X									
29.19	Remove fire protection system center manifold when center sootblower compensator is removed			X	X	X									
29.20	Inspect fire protection system center manifold internally			X	X	X									
29.22	Refit fire protection system center manifold (Turn manifold if required)			X	X	X									
29.25	Check primary side to secondary side bursting discs					X									
29.28	Test fire protection system manually during air heater washing (Including removal and replacement of bursting discs)					X									
30	**Commissioning**														

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30.01	Start lub system and test run air heater and ensure heaters run freely			X	X	X									
30.02	Engineering to witness, record and analyse online seal settings at first full load operation.			X	X	X									

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