Duvha Power Station

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**														
0.01	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 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**														
1.01	Visually inspect the air heater for any damage and erosion		X												
2	**Air Heater Inspection IN**														
2.01	a) Visually inspect stator face damage b) Visually inspect seal frame, articulation joints and wear seals hot end and cold end c) Inspect stainless steel expansion joints hot end and cold end d) Inspect hood and hood doors hot end and cold end e) Visually inspect pins, springs and spring pins hot end and cold end f) Visually inspect drag links, center drive posts and nudging pins hot end and cold end g) Visually inspect thermal compensators (where fitted) h) Inspect collar seals i) Visually inspect pin rack and measure pinion wear j) Inspect motor drive and gearbox in situ k) Visually inspect sootblower system, cross bellows, center bellows, indexing paddle system, steam piping and erosion protection l) Inspect fire fighting system where fitted m) Inspect element packs visually in fitted position n) Visually inspect lubrication oil tunnel o) Inspect lubrication oil system p) Visually inspect transition ducting hot end and cold end q) Inspect all stay rods r) Inspect pack supports s) Inspect erosion protection t) Visually inspect the bearing compartment u) Inspect pinion shaft plumber block bearings			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
3	**Air Heater Inspection IR**														
3.01	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 and erosion protection 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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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
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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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
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									
5.04	Remove 50 off complete basket element pack supports				X										
5.05	Refit 50 off complete basket element pack supports				X										
5.06	Remove 10 off complete basket element pack supports			X											
5.07	Refit 10 off complete basket element pack supports			X											
5.08	Carry out stator radial and divisional plate window repairs by cutting out and rewelding 1.0m in total of 6mm thick plate when packs are removed														
5.09	Carry out stator radial and divisional plate window repairs by cutting out and rewelding 5.0m in total of 6mm thick plate when packs are removed			X											
5.10	Carry out stator radial and divisional plate window repairs by cutting out and rewelding 10.0m in total of 6mm thick plate when packs are removed														
5.11	Carry out stator radial and divisional plate window repairs by cutting out and rewelding 20.0m in total of 6mm thick plate when packs are removed				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									
5.13	Carry out stator radial and divisional plate window repairs by cutting out and rewelding 1.0m in total of 10mm thick plate when packs are removed														
5.14	Carry out stator radial and divisional plate window repairs by cutting out and rewelding 5.0m in total of 10mm thick plate when packs are removed			X											
5.15	Carry out stator radial and divisional plate window repairs by cutting out and rewelding 10.0m in total of 10mm 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									

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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
5.17	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									
5.19	Remove 24 off radial plate U-Channel/flat bar strips hot end				X										
5.20	Refit 24 off radial plate flat bar strips hot end				X										
5.21	Remove 12 off radial plate U-Channel/flat bar strips hot end			X											
5.22	Refit 12 off radial plate flat bar strips hot end			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									
5.25	Remove 24 off radial plate U-Channel/flat bar strips cold end														
5.26	Refit 24 off radial plate flat bar strips cold end														
5.27	Remove 12 off radial plate U-Channel/flat bar strips cold end														
5.28	Refit 12 off radial plate flat bar strips cold end														
5.29	Fit complete new stator periphery flange hot end to correct procedure (Only to be done in conjunction with radial plate flat bar to reinstate complete stator surface. Hub plate also needs to be considered)														
5.30	Fit complete new stator periphery flange cold end to correct procedure (Only to be done in conjunction with radial plate flat bar to reinstate complete stator surface. Hub plate also needs to be considered)														
5.31	Fit complete new stator hub plate on the hot end to correct procedure (Only to be done in conjunction with above radial plate flat bar replacement and stator periphery flange to reinstate complete stator surface)														
5.32	Fit complete new stator hub plate on the cold end to correct procedure (Only to be done in conjunction with above radial plate flat bar replacement and stator periphery flange to reinstate complete stator surface)														
5.33	Remove complete lub tunnel including pipe removal					X									
5.34	Refit complete lub tunnel including pipe re-installation					X									
6	**Element Packs**														

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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
6.01	Remove 3 selected element packs top and intermediate/cold layer			X	X	X									
6.02	Split open packs, remove one plate pair re-assemble pack			X	X	X									
6.03	Refit 3 removed packs			X	X	X									
6.04	Mark plate pair and send for mass analysis			X	X	X									
6.05	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									
7.03	Remove compete seal frame cold end														
7.04	Refit complete seal frame cold end														
7.05	Remove hub section seal frame hot end														
7.06	Refit hub section seal frame hot end														
7.07	Remove hub section seal frame cold end														
7.08	Refit hub section seal frame cold end														
7.09	Remove one leading edge section of seal frame hot end			X											
7.10	Refit one leading edge section of seal frame hot end			X											
7.11	Remove two leading edge section of seal frame hot end				X										
7.12	Refit two leading edge section of seal frame hot end				X										
7.13	Remove one primary section periphery seal frame hot end			X	X										
7.14	Refit one primary section periphery seal frame hot end			X	X										
7.15	Remove one primary section periphery seal frame cold end														
7.16	Refit one primary section periphery seal frame cold end														
7.17	Remove one leading edge section of seal frame cold end														
7.18	Refit one leading edge section of seal frame cold end														
7.19	Remove one periphery section of seal frame hot end			X											
7.20	Refit one periphery section of seal frame hot end			X											
7.21	Remove two periphery section of seal frame hot end				X										
7.22	Refit two periphery section of seal frame hot end				X										
7.23	Remove one periphery section of seal frame cold end														
7.24	Refit one periphery section of seal frame cold end														

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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									
8.05	Remove hubs section stainless steel expansion joints hot end														
8.06	Refit hub section stainless steel expansion joints hot end														
8.07	Remove hubs section stainless steel expansion joints cold end														
8.08	Refit hub section stainless steel expansion joints cold end														
8.09	Remove one complete leading edge or trailing edge section stainless steel expansion joints hot end			X	X										
8.10	Refit one complete leading edge or trailing edge section stainless steel expansion joints hot end			X	X										
8.11	Remove one complete leading edge or trailing edge section stainless steel expansion joints cold end														
8.12	Refit one complete leading edge or trailing edge section stainless steel expansion joints cold end														
8.13	Remove one periphery section of stainless steel expansion joints hot end			X											
8.14	Refit one periphery section of stainless steel expansion joints hot end			X											
8.15	Remove one primary hood periphery section of stainless steel expansion joints hot end			X											
8.16	Refit one primary hood periphery section of stainless steel expansion joints hot end			X											
8.17	Remove one primary hood periphery section of stainless steel expansion joints cold end														
8.18	Refit one primary hood periphery section of stainless steel expansion joints cold end														
8.19	Remove one periphery section of stainless steel expansion joints cold end														

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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
8.20	Refit one periphery section of stainless steel expansion joints cold end														
8.21	Remove one section of stainless steel expansion joint hot end														
8.22	Refit one section of stainless steel expansion joint hot end														
8.23	Remove one section of stainless steel expansion joint cold end														
8.24	Refit one section of stainless steel expansion joint cold end														
8.25	Remove four sections of stainless steel expansion joint hot end			X	X										
8.26	Refit four sections of stainless steel expansion joint hot end			X	X										
8.27	Remove four sections of stainless steel expansion joint cold end			X	X										
8.28	Refit four sections of stainless steel expansion joint cold end			X	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									
9.05	Remove hub section cast iron wear seals hot end														
9.06	Refit hub section cast iron wear seals hot end														
9.07	Remove hub section cast iron wear seals cold end														
9.08	Refit hub section cast iron wear seals cold end														
9.09	Remove one complete leading edge section cast iron wear seals hot end			X	X										
9.10	Refit one complete leading edge section cast iron wear seals hot end			X	X										
9.11	Remove one complete leading edge section cast iron wear seals cold end				X										
9.12	Refit one complete leading edge section cast iron wear seals cold end				X										
9.13	Remove one complete periphery section cast iron wear seals including both corner seals and one radial arm seal each side hot end			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
9.14	Refit one complete periphery section cast iron wear seals including both corner seals and one radial arm seal each side and ensure blend in is correct hot end			X	X										
9.15	Remove one complete periphery section cast iron wear seals including both corner seals and one radial arm seal each side cold end														
9.16	Refit one complete periphery section cast iron wear seals including both corner seals and one radial arm seal each side and blend in is correct cold end														
9.17	Remove one cast iron wear seal hot end														
9.18	Refit one cast iron wear seal hot end														
9.19	Remove one cast iron wear seal cold end														
9.20	Refit one cast iron wear seal cold end														
9.21	Remove five cast iron wear seals hot end														
9.22	Refit five cast iron wear seals hot end														
9.23	Remove five cast iron wear seals cold end														
9.24	Refit five cast iron wear seals cold end														
9.25	Remove complete primary section periphery seals both sides hot end			X	X										
9.26	Refit complete primary section periphery seals both sides hot end			X	X										
9.27	Remove complete primary section periphery seals one side only hot end														
9.28	Refit complete primary section periphery seals one side only hot end														
9.29	Remove primary section corner periphery seals one side only hot end														
9.30	Refit primary section corner periphery seals one side only hot end														
9.31	Remove complete primary section periphery seals both sides cold end														
9.32	Refit complete primary section periphery seals both sides cold end														
9.33	Remove complete primary section periphery seals one side only cold end														
9.34	Refit complete primary section periphery seals one side only cold end														
9.35	Remove primary section corner periphery seals one side only cold end														
9.36	Refit primary section corner periphery seals one side only cold end														

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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
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									
10.03	Remove hub springs and spring pins hot end														
10.04	Refit hub springs and spring pins hot end														
10.05	Remove one secondary hood periphery side corner spring and pin hot end														
10.06	Refit one secondary hood periphery side corner spring and pin hot end														
10.07	Remove one radial arm leading or trailing edge section spring and pin hot end														
10.08	Refit one radial arm leading or trailing edge section spring and pin hot end														
10.09	Remove all the springs and pins cold end					X									
10.10	Refit all the springs and pins cold end					X									
10.11	Remove hub springs and spring pins cold end														
10.12	Refit hub springs and spring pins cold end														
10.13	Remove one secondary hood periphery side corner spring and pin cold end														
10.14	Refit one secondary hood periphery side corner spring and pin cold end														
10.15	Remove one radial arm leading or trailing edge section spring and pin cold end														
10.16	Refit one radial arm leading or trailing edge section spring and pin cold end														
10.17	Remove one complete spring pin assembly hot end														
10.18	Re-align and refit one complete spring pin assembly hot end														
10.19	Remove one complete spring pin assembly cold end														
10.20	Re-align and refit one complete spring pin assembly cold end														
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									
10.23	Carry out trim adjustment of air heater seal setting nut gaps and shoe gaps complete hot end				X										
10.24	Carry out trim adjustment of air heater seal setting nut gaps and shoe gaps complete cold end				X										
10.25	Carry out trim adjustment of air heater seal setting nut gaps and shoe gaps periphery springs only 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
10.26	Carry out trim adjustment of air heater seal setting nut gaps and shoe gaps periphery springs only cold end			X											
11	**Articulation Joints**														
11.01	Remove one bolt in type articulation joint hot end														
11.02	Refit one bolt in type articulation joint complete with protection covers hot end														
11.03	Remove four bolt in type articulation joint hot end			X	X										
11.04	Refit four bolt in type articulation joint complete with protection covers hot end			X	X										
11.05	Remove one bolt in type articulation joint cold end														
11.06	Refit one bolt in type articulation joint complete with protection covers cold end														
11.07	Remove four bolt in type articulation joint cold end														
11.08	Refit four bolt in type articulation joint complete with protection covers cold end														
11.09	Remove erosion protection on one articulation joint hot end														
11.10	Refit new erosion protection on one articulation joint hot end														
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									
11.13	Remove erosion protection on one articulation joint cold end														
11.14	Refit new erosion protection on one articulation joint cold end														
11.15	Remove erosion protection on four articulation joints cold end														
11.16	Refit new erosion protection on four articulation joints cold end														
11.17	Remove one weld in type articulation joint hot end														
11.18	Refit one weld in type articulation joint complete with protection covers hot end														
11.19	Remove four weld in type articulation joint hot end														
11.20	Refit four weld in type articulation joint complete with protection covers hot end														
11.21	Remove one weld in type articulation joint cold end														
11.22	Refit one weld in type articulation joint complete with protection covers cold end														
11.23	Remove four weld in type articulation joint cold end														

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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
11.24	Refit four weld in type articulation joint complete with protection covers cold end														
12	**Center Post, Drag Links and Nudging pins**														
12.01	Service hot end center posts			X	X	X									
12.02	Remove one drag link hot end														
12.03	Refit one drag link hot end														
12.04	Service drag links hot end					X									
12.05	Remove one nudging pin hot end														
12.06	Reset one nudging pin hot end														
12.07	Refit one nudging pin hot end														
12.08	Remove two nudging pins hot end														
12.09	Refit two nudging pins hot end														
12.10	Reset/Reposition one nudging pin hot end														
12.11	Service cold end center posts			X	X	X									
12.12	Remove one drag link cold end														
12.13	Refit one drag link cold end														
12.14	Service drag links cold end					X									
12.15	Remove one nudging pin cold end														
12.16	Reset one nudging pin cold end														
12.17	Refit one nudging pin cold end														
12.18	Remove two nudging pins cold end														
12.19	Refit two nudging pins cold end														
12.20	Reset/Reposition one nudging pin cold end														
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									
13.02	Remove complete hood door														
13.03	Refit complete new hood door														
13.04	Carry out thickness testing on all hot end hoods					X									
13.05	Carry out thickness testing on all cold end hoods					X									
13.06	Carry out minor welding repair on hood turning vanes			X											
13.07	Carry out minor welding repair on hood stiffener pipes			X											
13.08	Remove 1 complete hood turning vane														
13.09	Refit 1 complete hood turning vane														
13.10	Remove 4 off complete hood turning vanes														
13.11	Refit 4 off complete hood turning vanes														
13.12	Remove 1 meter of hood pipe stiffeners														
13.13	Refit 1 meter of hood pipe stiffeners														
13.14	Remove 5 meters of hood pipe stiffeners														
13.15	Refit 5 meters of hood pipe stiffeners														

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13.16	Remove 10 meters of hood pipe stiffeners														
13.17	Refit 10 meters of hood pipe stiffeners														
13.18	Carry out window repairs of 1.0m in total of 6mm thick hood plate by cutting out and re-welding with new material.			X											
13.19	Carry out window repairs of 5.0m in total of 6mm thick hood plate by cutting out and re-welding with new material				X										
13.20	Weld repair hood leading edge frame surface 1.0m			X											
13.21	Weld repair hood leading edge frame surface 4.0m				X										
13.22	Weld repair hood periphery frame surface 1.0m			X											
13.23	Weld repair hood periphery frame surface 4.0m				X										
14	**Thermal Compensators**														
14.01	Remove one thermal compensator rod			X											
14.02	Refit one thermal compensator rod			X											
14.03	Remove 4 thermal compensator rods				X	X									
14.04	Refit 4 thermal compensator rods				X	X									
14.05	Remove all thermal compensator rods														
14.06	Refit all thermal compensator rods														
14.07	Remove one thermal compensator erosion protection plates			X											
14.08	Refit one thermal compensator erosion protection plates			X											
14.09	Remove 4 thermal compensator erosion protection plates				X										
14.10	Refit 4 thermal compensator erosion protection plates				X										
14.11	Remove all thermal compensator erosion protection plates					X									
14.12	Refit all thermal compensator erosion protection plates					X									
14.13	Repair erosion damage on one thermal compensator box			X											
14.14	Repair erosion damage on 4 thermal compensator boxes				X										
14.15	Repair erosion damage on all thermal compensator boxes					X									
14.16	Carry out minor repairs to one thermal compensator bell crank system			X											
14.17	Carry out minor repairs to 4 thermal compensator bell crank systems				X										

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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									
16.04	Remove erosion protection on four spring boxes hot end			X											
16.05	Refit new erosion protection on four spring boxes hot end			X											
16.06	Remove erosion protection on ten spring boxes hot end				X										
16.07	Refit new erosion protection on ten spring boxes hot end				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									
16.12	Remove four collar seal cast iron wear seals hot end				X										
16.13	Refit four collar seal cast iron wear seals hot end including setting gap				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									
16.17	Realign rubbing ring hot end														
16.18	Re-align collar seal housing run out to specification hot end														
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									
16.22	Remove erosion protection on four spring boxes cold end			X											
16.23	Refit new erosion protection on four spring boxes cold 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
16.24	Remove erosion protection on ten spring boxes cold end				X										
16.25	Refit new erosion protection on ten spring boxes cold end				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									
16.30	Remove four collar seal cast iron wear seals cold end				X										
16.31	Refit four collar seal cast iron wear seals cold end including setting gap				X										
16.32	Close up collar seal housing cold end			X	X	X									
16.33	Remove rubbing ring cold end					X									
16.34	Refit rubbing ring cold end					X									
16.35	Realign rubbing ring cold end														
16.36	Re-align collar seal housing run out to specification cold end														
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									
17.04	Remove erosion protection on four spring boxes hot end			X											
17.05	Refit new erosion protection on four spring boxes hot end			X											
17.06	Remove erosion protection on ten spring boxes hot end				X										
17.07	Refit new erosion protection on ten spring boxes hot end				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									

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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
17.11	Refit all collar seal cast iron wear seals hot end including seal gap setting					X									
17.12	Remove four collar seal cast iron wear seals hot end				X										
17.13	Refit four collar seal cast iron wear seals hot end including setting gap				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									
17.17	Realign rubbing ring hot end														
17.18	Re-align collar seal housing run out to specification hot end														
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									
17.22	Remove erosion protection on four spring boxes cold end			X											
17.23	Refit new erosion protection on four spring boxes cold end			X											
17.24	Remove erosion protection on ten spring boxes cold end				X										
17.25	Refit new erosion protection on ten spring boxes cold end				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									
17.30	Remove four collar seal cast iron wear seals cold end				X										
17.31	Refit four collar seal cast iron wear seals cold end including setting gap				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									
17.35	Realign rubbing ring cold end														
17.36	Re-align collar seal housing run out to specification cold end														
18	**High Pressure Washing - Elements**														

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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
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														
18.02	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														
18.03	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														
19	**Drive System**														
19.01	Remove drive motor					X									
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									
19.07	Remove motor coupling half														
19.08	Refit motor coupling half														
19.09	Remove gearbox coupling half														
19.10	Refit gearbox coupling half														
19.11	Remove gearbox labyrinth seal														
19.12	Refit gearbox labyrinth seal														
19.13	Remove gearbox oil and refill gearbox with new oil through filtration unit			X	X	X									
19.14	Remove the gearbox output shaft seal														
19.15	Refit the gearbox output shaft seal														
19.16	Align motor and gearbox														
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									
19.19	Remove the felt seal on the bottom bearing cover plate														
19.20	Refit the felt seal on the bottom bearing cover plate														
19.21	Remove drive pinion				X	X									
19.22	Turn and refit drive pinion				X										
19.23	Refit drive pinion					X									
19.24	Align drive pinion height					X									

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Duvha Power Station

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
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									
20.03	Turn over and refit complete pin rack to correct alignment														
20.04	Remove 1.0m erosion protection strips on pin rack stiffener pipes														
20.05	Refit 1.0m erosion protection strips on pin rack stiffener pipes														
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									
20.08	Weld repair 2 off pin rack holding strips			X											
20.09	Weld repair 10 off pin rack holding strips				X	X									
20.10	Remove 2 off pin rack holding strips														
20.11	Refit 2 off pin rack holding strips														
20.12	Remove 10 off pin rack holding strips														
20.13	Refit 10 off pin rack holding strips														
20.14	Remove 2 meters of pin rack stiffener pipes			X											
20.15	Refit 2 meters of pin rack stiffener pipes including erosion protection			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									
21.12	Remove support bearing					X									

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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
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**														
22.01	Remove and refit pump motor														
22.02	Remove and refit pump														
22.03	Remove and refit pressure regulating valve														
22.04	Remove and refit needle valve														
22.05	Remove and refit filters														
22.06	Remove and refill oil														
22.07	Remove and refit duplex filter unit														
22.08	Remove and refit flexible hoses to bearings														
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									
22.10	Microblast clean tank inside, clean tank and re-coat inside of tank with special coating														
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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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
23	**Ducting Hot End**														
23.01	Carry out window repairs of 1.0m in total of 6mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
23.02	Carry out window repairs of 5.0m 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											
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									
23.04	Carry out window repairs of 1.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
23.05	Carry out window repairs of 5.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
23.06	Carry out window repairs of 10.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
23.07	Carry out window repairs of 1.0m in total of 10mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
23.08	Carry out window repairs of 5.0m in total of 10mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
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.														
24	**Ducting Cold End**														

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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
24.01	Carry out window repairs of 1.0m in total of 6mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
24.02	Carry out window repairs of 5.0m 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											
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									
24.04	Carry out window repairs of 1.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
24.05	Carry out window repairs of 5.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
24.06	Carry out window repairs of 10.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
24.07	Carry out window repairs of 1.0m in total of 10mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
24.08	Carry out window repairs of 5.0m in total of 10mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
24.09	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.														
25	**Transition Ducting Hot End**														
25.01	Carry out window repairs of 1.0m in total of 6mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														

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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
25.02	Carry out window repairs of 5.0m 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										
25.03	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									
25.04	Carry out window repairs of 1.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
25.05	Carry out window repairs of 5.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
25.06	Carry out window repairs of 10.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
25.07	Carry out window repairs of 1.0m in total of 10mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
25.08	Carry out window repairs of 5.0m in total of 10mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
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.														
26	**Transition Ducting Cold End**														
26.01	Carry out window repairs of 1.0m in total of 6mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
26.02	Carry out window repairs of 5.0m 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										

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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
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									
26.04	Carry out window repairs of 1.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
26.05	Carry out window repairs of 5.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
26.06	Carry out window repairs of 10.0m in total of 8mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
26.07	Carry out window repairs of 1.0m in total of 10mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
26.08	Carry out window repairs of 5.0m in total of 10mm thick ducting plate by cutting out and re-welding with new material. Excluding removal of cladding and insulation if required.														
26.09	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.														
27	**Walkways**														
27.01	Carry out minor repairs on walkways			X	X										
27.02	Remove 1.0m^2 of walkway grating				X										
27.03	Refit 1.0m^2 of walkway grating				X										
27.04	Remove 4.0m^2 of walkway grating					X									
27.05	Refit 4.0m^2 of walkway grating					X									
27.06	Remove 1m of walkway grating support structure														
27.07	Refit 1m of walkway grating support structure														
27.08	Remove 4m of walkway grating support structure														
27.09	Refit 4m of walkway grating support structure														
27.10	Remove 10m of walkway grating support structure														
27.11	Refit 10m of walkway grating support structure														
28	**Sootblower System - Reciprocating Pipe**														

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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
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									
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									
28.08	Loosen sootblower reciprocating device														
28.09	Remove sootblower reciprocating device														
28.10	Refit sootblower reciprocating device														
28.11	Remove complete sootblower pipe														
28.12	Refit complete sootblower pipe including alignment					X									
28.13	Remove 1m of sootblower erosion protection plate			X											
28.14	Refit 1m of sootblower erosion protection plate			X											
28.15	Remove 5m of sootblower erosion protection plate				X	X									
28.16	Refit 5m of sootblower erosion protection plate				X	X									
28.17	Remove 10m of sootblower erosion protection plate														
28.18	Refit 10m of sootblower erosion protection plate														
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									
28.25	Align sootblower center compensator correctly														
28.26	Refit sootblower center compensator			X	X	X									
29	**Fire Protection System - Twin Flow**														
29.01	Remove 1 fire protection system spray nozzle only excluding piping			X											
29.02	Refit 1 fire protection system spray nozzle			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
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									
29.05	Remove 10 fire protection system spray nozzles only excluding piping														
29.06	Refit 10 fire protection system spray nozzles														
29.07	Remove 1m of fire protection system piping including erosion protection														
29.08	Refit 1m of fire protection system piping excluding erosion protection														
29.09	Remove 5m of fire protection system piping including erosion protection														
29.10	Refit 5m of fire protection system piping excluding erosion protection														
29.11	Remove 10m of fire protection system piping including erosion protection														
29.12	Refit 10m of fire protection system piping excluding erosion protection														
29.13	Remove 1m of fire protection system erosion protection			X											
29.14	Refit 1m of fire protection system erosion protection			X											
29.15	Remove 5m of fire protection system erosion protection				X										
29.16	Refit 5m of fire protection system erosion protection				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									
29.21	Adjust and setup fire protection system center manifold control rods														
29.22	Refit fire protection system center manifold (Turn manifold if required)			X	X	X									
29.23	Remove 1 fire protection system compensator bellow														
29.24	Refit 1 fire protection system compensator bellow														
29.25	Check primary side to secondary side bursting discs					X									
29.26	Remove 1 bursting disc														

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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
29.27	Refit 1 bursting disc														
29.28	Test fire protection system manually during air heater washing (Including removal and replacement of bursting discs)					X									
30	**Commissioning**														
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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