ESTIMATED WEIGHT OF PIPING SYSTEMS - ITEM WISE - MATERIAL WISE (IN MT)

ITEM / MATERIAL	HMD		
	IBR	NIBR	TOTAL
PIPES			
AS (P91)	205	0	205
AS (P22)	35	0	35
CS	563	376	939
SS	0	53	53
SUB TOTAL	**803**	**429**	**1232**
FITTINGS			
AS (P91)	39	0	39
AS (P22)	2	0	2
CS	155	92	247
SS	0	10	10
SUB TOTAL	**196**	**102**	**298**
FLANGES			
AS (P91)	4	0	4
AS (P22)	0	0	0
CS	8	27	35
SS	0	4	4
SUB TOTAL	**12**	**31**	**43**
VALVES			
AS (P91)	36	0	36
AS (P22)	15	0	15
CS	214	124	338
SS	0	63	63
SUB TOTAL	**265**	**187**	**452**
OTHERS			
AS (P91)	4	0	4
AS (P22)	4	0	4
CS	4	9	13
SS	0	4	4
SUB TOTAL	**12**	**13**	**25**
TOTAL	**1288**	**762**	**2050**

ESTIMATED WEIGHT OF PIPING SYSTEMS - ITEM WISE - SYSTEM WISE (IN MT)

SYSTEM	IBR	HMD				
		AS (P91)	AS (P22)	CS	SS	TOTAL
ALL ITEMS						
MAIN STEAM	IBR	269	9	0	0	278
BOILER STARTUP STEAM	IBR	17	39	55	0	111
AUXILIARY STEAM	IBR	2	1	5	0	8
DEAERATOR PEGGING STEAM	IBR	1	5	30	0	36
EXTRACTION STEAM	IBR	0	0	276	0	276
BOILER FLASH TANK VENT TO DEAERATOR	IBR	0	0	21	0	21
BFP-SUCTION	IBR	0	0	67	0	67
FEED WATER	IBR	0	0	491	0	491
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR	0	0	5	0	5
SPRAY TO BSS PRDS	NIBR	0	0	0	5	5
CONDENSATE - CS	NIBR	0	0	72	0	72
CONDENSATE - SS	NIBR	0	0	0	129	129
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR	0	0	48	0	48
HP HEATE 5 & 6 DRAIN	NIBR	0	0	62	0	62
COOLING WATER	NIBR	0	0	123	0	123
AUX COOLING WATER	NIBR	0	0	111	0	111
CLOSED CIRCUIT COOLING WATER	NIBR	0	0	148	0	148
MISC - DRAINS	NIBR	0	0	39	0	39
MISC - VENTS	NIBR	0	0	6	0	6
INSTRUMENT AIR & PLANT AIR	NIBR	0	0	12	0	12
TOTAL		**289**	**54**	**1571**	**134**	**2048**
PIPES						
MAIN STEAM	IBR	194	3	0	0	197
BOILER STARTUP STEAM	IBR	10	28	36	0	74
AUXILIARY STEAM	IBR	1	1	5	0	7
DEAERATOR PEGGING STEAM	IBR	0	3	18	0	21
EXTRACTION STEAM	IBR	0	0	134	0	134
BOILER FLASH TANK VENT TO DEAERATOR	IBR	0	0	17	0	17
BFP-SUCTION	IBR	0	0	45	0	45
FEED WATER	IBR	0	0	310	0	310
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR	0	0	4	0	4
SPRAY TO BSS PRDS	NIBR	0	0	0	3	3
CONDENSATE - CS	NIBR	0	0	33	0	33
CONDENSATE - SS	NIBR	0	0	0	50	50
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR	0	0	34	0	34
HP HEATE 5 & 6 DRAIN	NIBR	0	0	38	0	38
COOLING WATER	NIBR	0	0	51	0	51
AUX COOLING WATER	NIBR	0	0	70	0	70
CLOSED CIRCUIT COOLING WATER	NIBR	0	0	104	0	104
MISC - DRAINS	NIBR	0	0	27	0	27
MISC - VENTS	NIBR	0	0	4	0	4
INSTRUMENT AIR & PLANT AIR	NIBR	0	0	8	0	8
SUB TOTAL		**205**	**35**	**938**	**53**	**1231**
FITTINGS						
MAIN STEAM	IBR	38	0	0	0	38

ESTIMATED WEIGHT OF PIPING SYSTEMS - ITEM WISE - SYSTEM WISE (IN MT)

SYSTEM	IBR	HMD				
		AS (P91)	AS (P22)	CS	SS	TOTAL
BOILER STARTUP STEAM	IBR	1	1	9	0	11
AUXILIARY STEAM	IBR	0	0	0	0	0
DEAERATOR PEGGING STEAM	IBR	0	0	2	0	2
EXTRACTION STEAM	IBR	0	0	61	0	61
BOILER FLASH TANK VENT TO DEAERATOR	IBR	0	0	1	0	1
BFP-SUCTION	IBR	0	0	11	0	11
FEED WATER	IBR	0	0	72	0	72
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR	0	0	0	0	0
SPRAY TO BSS PRDS	NIBR	0	0	0	0	0
CONDENSATE - CS	NIBR	0	0	9	0	9
CONDENSATE - SS	NIBR	0	0	0	10	10
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR	0	0	5	0	5
HP HEATE 5 & 6 DRAIN	NIBR	0	0	10	0	10
COOLING WATER	NIBR	0	0	37	0	37
AUX COOLING WATER	NIBR	0	0	11	0	11
CLOSED CIRCUIT COOLING WATER	NIBR	0	0	13	0	13
MISC - DRAINS	NIBR	0	0	4	0	4
MISC - VENTS	NIBR	0	0	1	0	1
INSTRUMENT AIR & PLANT AIR	NIBR	0	0	1	0	1
SUB TOTAL		**39**	**1**	**247**	**10**	**297**
FLANGES						
MAIN STEAM	IBR	4	0	0	0	4
BOILER STARTUP STEAM	IBR	0	0	0	0	0
AUXILIARY STEAM	IBR	0	0	0	0	0
DEAERATOR PEGGING STEAM	IBR	0	0	0	0	0
EXTRACTION STEAM	IBR	0	0	3	0	3
BOILER FLASH TANK VENT TO DEAERATOR	IBR	0	0	0	0	0
BFP-SUCTION	IBR	0	0	4	0	4
FEED WATER	IBR	0	0	1	0	1
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR	0	0	0	0	0
SPRAY TO BSS PRDS	NIBR	0	0	0	0	0
CONDENSATE - CS	NIBR	0	0	5	0	5
CONDENSATE - SS	NIBR	0	0	0	4	4
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR	0	0	1	0	1
HP HEATE 5 & 6 DRAIN	NIBR	0	0	1	0	1
COOLING WATER	NIBR	0	0	0	0	0
AUX COOLING WATER	NIBR	0	0	10	0	10
CLOSED CIRCUIT COOLING WATER	NIBR	0	0	9	0	9
MISC - DRAINS	NIBR	0	0	1	0	1
MISC - VENTS	NIBR	0	0	0	0	0
INSTRUMENT AIR & PLANT AIR	NIBR	0	0	1	0	1
SUB TOTAL		**4**	**0**	**36**	**4**	**44**
VALVES						
MAIN STEAM	IBR	33	6	0	0	39
BOILER STARTUP STEAM	IBR	2	7	10	0	19
AUXILIARY STEAM	IBR	1	0	0	0	1

ESTIMATED WEIGHT OF PIPING SYSTEMS - ITEM WISE - SYSTEM WISE (IN MT)

SYSTEM	IBR	HMD				
		AS (P91)	AS (P22)	CS	SS	TOTAL
DEAERATOR PEGGING STEAM	IBR	1	1	9	0	11
EXTRACTION STEAM	IBR	0	0	78	0	78
BOILER FLASH TANK VENT TO DEAERATOR	IBR	0	0	3	0	3
BFP-SUCTION	IBR	0	0	7	0	7
FEED WATER	IBR	0	0	106	0	106
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR	0	0	1	0	1
SPRAY TO BSS PRDS	NIBR	0	0	0	2	2
CONDENSATE - CS	NIBR	0	0	25	0	25
CONDENSATE - SS	NIBR	0	0	0	61	61
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR	0	0	6	0	6
HP HEATE 5 & 6 DRAIN	NIBR	0	0	11	0	11
COOLING WATER	NIBR	0	0	35	0	35
AUX COOLING WATER	NIBR	0	0	20	0	20
CLOSED CIRCUIT COOLING WATER	NIBR	0	0	22	0	22
MISC - DRAINS	NIBR	0	0	1	0	1
MISC - VENTS	NIBR	0	0	1	0	1
INSTRUMENT AIR & PLANT AIR	NIBR	0	0	2	0	2
SUB TOTAL		**37**	**14**	**337**	**63**	**451**
OTHERS						
MAIN STEAM	IBR	0	0	0	0	0
BOILER STARTUP STEAM	IBR	4	3	0	0	7
AUXILIARY STEAM	IBR	0	0	0	0	0
DEAERATOR PEGGING STEAM	IBR	0	1	1	0	2
EXTRACTION STEAM	IBR	0	0	0	0	0
BOILER FLASH TANK VENT TO DEAERATOR	IBR	0	0	0	0	0
BFP-SUCTION	IBR	0	0	0	0	0
FEED WATER	IBR	0	0	2	0	2
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR	0	0	0	0	0
SPRAY TO BSS PRDS	NIBR	0	0	0	0	0
CONDENSATE - CS	NIBR	0	0	0	0	0
CONDENSATE - SS	NIBR	0	0	0	4	4
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR	0	0	2	0	2
HP HEATE 5 & 6 DRAIN	NIBR	0	0	2	0	2
COOLING WATER	NIBR	0	0	0	0	0
AUX COOLING WATER	NIBR	0	0	0	0	0
CLOSED CIRCUIT COOLING WATER	NIBR	0	0	0	0	0
MISC - DRAINS	NIBR	0	0	6	0	6
MISC - VENTS	NIBR	0	0	0	0	0
INSTRUMENT AIR & PLANT AIR	NIBR	0	0	0	0	0
SUB TOTAL		**4**	**4**	**13**	**4**	**25**

ESTIMATED NO OF WELDS - SYSTEM WISE - MATL WISE

SYSTEM	IBR	HMD				
		AS (P91)	AS (P22)	CS	SS	TOTAL
MAIN STEAM	IBR	574	590	0	0	1164
BOILER STARTUP STEAM	IBR	44	129	290	0	463
AUXILIARY STEAM	IBR	61	188	356	0	605
DEAERATOR PEGGING STEAM	IBR	22	170	675	0	867
EXTRACTION STEAM	IBR	0	0	3067	0	3067
BOILER FLASH TANK VENT TO DEAERATOR	IBR	0	0	432	0	432
BFP-SUCTION	IBR	0	0	952	0	952
FEED WATER	IBR	0	0	2303	0	2303
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR	0	0	278	0	278
SPRAY TO BSS PRDS	NIBR	0	0	0	386	386
CONDENSATE - CS	NIBR	0	0	768	0	768
CONDENSATE - SS	NIBR	0	0	0	966	966
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR	0	0	580	0	580
HP HEATE 5 & 6 DRAIN	NIBR	0	0	677	0	677
COOLING WATER	NIBR	0	0	278	0	278
AUX COOLING WATER	NIBR	0	0	348	0	348
CLOSED CIRCUIT COOLING WATER	NIBR	0	0	1837	0	1837
MISC - DRAINS	NIBR	0	0	1080	0	1080
MISC - VENTS	NIBR	0	0	146	0	146
INSTRUMENT AIR & PLANT AIR	NIBR	0	0	217	0	217
TOTAL		**701**	**1077**	**14284**	**1352**	**17414**

ESTIMATED NO OF WELDS - SIZE WISE - MATL WISE

SIZE	HMD				
	AS (P91)	AS (P22)	CS	SS	TOTAL
IBR					
0.75	0	240	1191	0	1431
1	0	399	2026	0	2425
1.5	4	223	35	0	262
2	229	17	290	0	536
2.5	0	0	0	0	0
3	16	44	293	0	353
4	71	21	467	0	559
5	0	0	0	0	0
6	0	57	254	0	311
8	28	30	761	0	819
10	50	26	590	0	666
12	54	0	372	0	426
14	0	0	891	0	891
16	149	4	200	0	353
18	0	0	174	0	174
20	100	0	101	0	201
24	0	4	179	0	183
28	0	0	9	0	9
30	0	0	136	0	136
32	0	12	22	0	34
36	0	0	0	0	0
40	0	0	0	0	0
44	0	0	66	0	66
TOTAL	**701**	**1077**	**8057**	**0**	**9835**
NIBR					
0.75	0	0	16	17	33
1	0	0	212	24	236
1.5	0	0	0	243	243
2	0	0	1343	131	1474
2.5	0	0	6	0	6
3	0	0	223	75	298
4	0	0	1274	42	1316
5	0	0	6	0	6
6	0	0	1345	186	1531
8	0	0	323	0	323
10	0	0	632	70	702
12	0	0	39	35	74
14	0	0	33	495	528
16	0	0	267	4	271
18	0	0	55	0	55

ESTIMATED NO OF WELDS - SIZE WISE - MATL WISE

SIZE	HMD				
	AS (P91)	AS (P22)	CS	SS	TOTAL
20	0	0	190	30	220
24	0	0	10	0	10
28	0	0	22	0	22
30	0	0	13	0	13
32	0	0	0	0	0
36	0	0	211	0	211
40	0	0	7	0	7
44	0	0	0	0	0
TOTAL	**0**	**0**	**6227**	**1352**	**7579**
TOTAL IBR + NIBR					
0.75	0	240	1207	17	1464
1	0	399	2238	24	2661
1.5	4	223	35	243	505
2	229	17	1633	131	2010
2.5	0	0	6	0	6
3	16	44	516	75	651
4	71	21	1741	42	1875
5	0	0	6	0	6
6	0	57	1599	186	1842
8	28	30	1084	0	1142
10	50	26	1222	70	1368
12	54	0	411	35	500
14	0	0	924	495	1419
16	149	4	467	4	624
18	0	0	229	0	229
20	100	0	291	30	421
24	0	4	189	0	193
28	0	0	31	0	31
30	0	0	149	0	149
32	0	12	22	0	34
36	0	0	211	0	211
40	0	0	7	0	7
44	0	0	66	0	66
TOTAL	**701**	**1077**	**14284**	**1352**	**17414**

ESTIMATED INCH DIA - SYSTEM WISE - MATL WISE

SYSTEM	IBR	HMD				
		AS (P91)	AS (P22)	CS	SS	TOTAL
MAIN STEAM	IBR	5870	972	0	0	6842
BOILER STARTUP STEAM	IBR	428	833	3521	0	4782
AUXILIARY STEAM	IBR	182	306	841	0	1329
DEAERATOR PEGGING STEAM	IBR	72	460	3251	0	3783
EXTRACTION STEAM	IBR	0	0	27061	0	27061
BOILER FLASH TANK VENT TO DEAERATOR	IBR	0	0	1965	0	1965
BFP-SUCTION	IBR	0	0	8017	0	8017
FEED WATER	IBR	0	0	13491	0	13491
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR	0	0	473	0	473
SPRAY TO BSS PRDS	NIBR	0	0	0	800	800
CONDENSATE - CS	NIBR	0	0	6629	0	6629
CONDENSATE - SS	NIBR	0	0	0	10088	10088
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR	0	0	3771	0	3771
HP HEATE 5 & 6 DRAIN	NIBR	0	0	4120	0	4120
COOLING WATER	NIBR	0	0	7578	0	7578
AUX COOLING WATER	NIBR	0	0	6032	0	6032
CLOSED CIRCUIT COOLING WATER	NIBR	0	0	10135	0	10135
MISC - DRAINS	NIBR	0	0	3560	0	3560
MISC - VENTS	NIBR	0	0	830	0	830
INSTRUMENT AIR & PLANT AIR	NIBR	0	0	900	0	900
TOTAL		**6552**	**2571**	**102175**	**10888**	**122186**

ESTIMATED INCH DIA - SIZE WISE - MATL WISE
PE&SD SCOPE OF ENGINEERING

PIPE NPS	HMD				
	AS (P91)	AS (P22)	CS	SS	TOTAL
TOTAL IBR + NIBR					
0.75	0	193	934	13	1140
1	0	399	2238	24	2661
1.5	6	343	53	366	768
2	458	34	3266	262	4020
2.5	0	0	16	0	16
3	48	132	1548	225	1953
4	284	84	6964	168	7500
5	0	0	30	0	30
6	0	342	9594	1116	11052
8	224	240	8672	0	9136
10	500	260	12220	700	13680
12	648	0	4932	420	6000
14	0	0	12936	6930	19866
16	2384	64	7472	64	9984
18	0	0	4122	0	4122
20	2000	0	5820	600	8420
24	0	96	4536	0	4632
28	0	0	868	0	868
30	0	0	4470	0	4470
32	0	384	704	0	1088
36	0	0	7596	0	7596
40	0	0	280	0	280
44	0	0	2904	0	2904
TOTAL	**6552**	**2571**	**102175**	**10888**	**122186**
IBR					
0.75	0	193	922	0	1115
1	0	399	2026	0	2425
1.5	6	343	53	0	402
2	458	34	580	0	1072
2.5	0	0	0	0	0
3	48	132	879	0	1059
4	284	84	1868	0	2236
5	0	0	0	0	0
6	0	342	1524	0	1866
8	224	240	6088	0	6552
10	500	260	5900	0	6660
12	648	0	4464	0	5112
14	0	0	12474	0	12474
16	2384	64	3200	0	5648

ESTIMATED INCH DIA - SIZE WISE - MATL WISE
PE&SD SCOPE OF ENGINEERING

PIPE NPS	HMD				
	AS (P91)	AS (P22)	CS	SS	TOTAL
18	0	0	3132	0	3132
20	2000	0	2020	0	4020
24	0	96	4296	0	4392
28	0	0	252	0	252
30	0	0	4080	0	4080
32	0	384	704	0	1088
36	0	0	0	0	0
40	0	0	0	0	0
44	0	0	2904	0	2904
SUM	**6552**	**2571**	**57366**	**0**	**66489**
NIBR					
0.75	0	0	12	13	25
1	0	0	212	24	236
1.5	0	0	0	366	366
2	0	0	2686	262	2948
2.5	0	0	16	0	16
3	0	0	669	225	894
4	0	0	5096	168	5264
5	0	0	30	0	30
6	0	0	8070	1116	9186
8	0	0	2584	0	2584
10	0	0	6320	700	7020
12	0	0	468	420	888
14	0	0	462	6930	7392
16	0	0	4272	64	4336
18	0	0	990	0	990
20	0	0	3800	600	4400
24	0	0	240	0	240
28	0	0	616	0	616
30	0	0	390	0	390
32	0	0	0	0	0
36	0	0	7596	0	7596
40	0	0	280	0	280
44	0	0	0	0	0
SUM	**0**	**0**	**44809**	**10888**	**55697**

PIPE THICKNESSES -MATL WISE - SYSTEM WISE

SYSTEM	NPS	0.75	1	1.5	2	2.5	3	4	5	6	8	10	12	14	16	18	20	24	28	30	32	36	40	44
	NB	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	1100
	OD	26.7	33.4	48.3	60.3	73	88.9	114.3	141.3	168.3	219.1	273	323.8	355.6	406.4	457	508	610	711	762	813	914	1016	1118
AS (P91)																								
MAIN STEAM	IBR				5.54			11.13			18.26		25.4		30.96		38.1							
BOILER STARTUP STEAM	IBR							11.13				21.44												
AUXILIARY STEAM	IBR				5.54			11.13																
DEAERATOR PEGGING STEAM	IBR						7.62	11.13																
EXTRACTION STEAM	IBR																							
BOILER FLASH TANK VENT TO DEAERATOR	IBR																							
BFP-SUCTION	IBR																							
FEED WATER	IBR																							
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR																							
SPRAY TO BSS PRDS	NIBR																							
CONDENSATE - CS	NIBR																							
CONDENSATE - SS	NIBR																							
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR																							
HP HEATE 5 & 6 DRAIN	NIBR																							
COOLING WATER	NIBR																							
AUX COOLING WATER	NIBR																							
CLOSED CIRCUIT COOLING WATER	NIBR																							
MISC - DRAINS	NIBR																							
MISC - VENTS	NIBR																							
INSTRUMENT AIR & PLANT AIR	NIBR																							
AS (P22)																								
MAIN STEAM	IBR		6.35	10.15	11.07					7.11														
BOILER STARTUP STEAM	IBR		6.35	10.15							8.18										22.23			
AUXILIARY STEAM	IBR		4.55				5.49	6.02																
DEAERATOR PEGGING STEAM	IBR		4.55					6.02		7.11		9.27												
EXTRACTION STEAM	IBR																							
BOILER FLASH TANK VENT TO DEAERATOR	IBR																							
BFP-SUCTION	IBR																							
FEED WATER	IBR																							
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR																							
SPRAY TO BSS PRDS	NIBR																							
CONDENSATE - CS	NIBR																							
CONDENSATE - SS	NIBR																							
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR																							
HP HEATE 5 & 6 DRAIN	NIBR																							
COOLING WATER	NIBR																							
AUX COOLING WATER	NIBR																							
CLOSED CIRCUIT COOLING WATER	NIBR																							
MISC - DRAINS	NIBR																							
MISC - VENTS	NIBR																							
INSTRUMENT AIR & PLANT AIR	NIBR																							
CS																								
MAIN STEAM	IBR																							
BOILER STARTUP STEAM	IBR		4.55								6.35	6.35	9.53			9.53		9.53	9.53					
AUXILIARY STEAM	IBR		4.55	5.08		5.16	5.49																	
DEAERATOR PEGGING STEAM	IBR	3.91	4.55		3.91		5.49	6.02			6.35	9.27	9.53											
EXTRACTION STEAM	IBR	3.91	4.55							7.11	8.18	9.27	9.53	7.92	9.53	9.53	9.53	9.53		9.53				12.7
BOILER FLASH TANK VENT TO DEAERATOR	IBR		4.55					6.02		7.11														
BFP-SUCTION	IBR	3.91	4.55		3.91						8.18	9.27	9.53	7.92	9.53									

PIPE THICKNESSES -MATL WISE - SYSTEM WISE

SYSTEM	NPS	0.75	1	1.5	2	2.5	3	4	5	6	8	10	12	14	16	18	20	24	28	30	32	36	40	44
	NB	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	1100
	OD	26.7	33.4	48.3	60.3	73	88.9	114.3	141.3	168.3	219.1	273	323.8	355.6	406.4	457	508	610	711	762	813	914	1016	1118
FEED WATER	IBR	3.91	4.55					13.49				28		38		50								
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR		4.55		8.74																			
SPRAY TO BSS PRDS	NIBR																							
CONDENSATE - CS	NIBR				3.91			6.02		7.11	6.35	6.35	6.35	11.13	6.35		6.35							
CONDENSATE - SS	NIBR																							
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR							6.02		7.11	6.35	6.35												
HP HEATE 5 & 6 DRAIN	NIBR							6.02		7.11	8.18	9.27										12.7		
COOLING WATER	NIBR						4.8	5.4		5.4												10		
AUX COOLING WATER	NIBR												6	6	6		6							
CLOSED CIRCUIT COOLING WATER	NIBR				4.5		4.8	5.4		5.4	8.18	6		6		6	6	8	8	8			10	
MISC - DRAINS	NIBR				3.91					7.11		6.35	6.35											
MISC - VENTS	NIBR							6.02		7.11		6.35												
INSTRUMENT AIR & PLANT AIR	NIBR				4.5		4.8	5.4	5.4	5.4	6													
SS																								
MAIN STEAM	IBR																							
BOILER STARTUP STEAM	IBR																							
AUXILIARY STEAM	IBR																							
DEAERATOR PEGGING STEAM	IBR																							
EXTRACTION STEAM	IBR																							
BOILER FLASH TANK VENT TO DEAERATOR	IBR																							
BFP-SUCTION	IBR																							
FEED WATER	IBR																							
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR																							
SPRAY TO BSS PRDS	NIBR			3.68	3.91		3.05	3.05																
CONDENSATE - CS	NIBR																							
CONDENSATE - SS	NIBR				3.91					3.4		4.19	4.57	4.78			5.54							
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR																							
HP HEATE 5 & 6 DRAIN	NIBR																							
COOLING WATER	NIBR																							
AUX COOLING WATER	NIBR																							
CLOSED CIRCUIT COOLING WATER	NIBR																							
MISC - DRAINS	NIBR																							
MISC - VENTS	NIBR																							
INSTRUMENT AIR & PLANT AIR	NIBR																							

SIGN. AND DATE | REF. DRG. NO. | A4 FORMAT

INVENTORY NO

REVISION REASON:				REVISION REASON:			
REV.	DATE	ALTERED	CHECKED	REV.	DATE	ALTERED	CHECKED

GEN. DIM. LIMITS , FITS , & TOLERANCES AS PER P.S :- HY0230261

CONSULTANT:	BECHTEL FREDERICK, MARYLAND, U.S.A
PROJECT:	STG PACKAGE (4 X 93.1 MW STGs), CCPP HAZIRA MANUFACTURING DIVISION (HMD) STG PACKAGE (3 X 90.3 MW STGs), CCPP DAHEJ MANUFACTURING DIVISION (DMD)
CUSTOMER:	RELIANCE INDUSTRIES LIMITED COAL BASED CAPTIVE POWER PLANT (CCPP)
RIL DRG. NUMBER DAHEJ:	10091-G69-DAT000-BHB-0001
RIL DRG. NUMBER HAZIRA:	10090-G69-HAT000-BHB-0001

BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

	NAME	SIGN.	DATE	NO.OF VAR.
DRN.	KD	---	04.03.14	-N.A-
CHD.	KG	---	04.03.14	
APPD.	PSB		04.03.14	

DEPT.	UNTOL. DIMS. GR.		SCALE	WEIGHT (KG)	REF. TO ASSY. DRG.	ITEM NO.	NO.OF ITEMS
PE&SD CODE 450	¢/M/f		-NTS-	-N.A-	-N.A-	-N.A-	-N.A-

TITLE :
Painting and Coating Schedule (STG BOP)

CARD CODE -N.A-

BHEL DRAWING NO.
PEMC-04398

REV. 00

SHT. No 01 | NO. OF SHT. 07

PAINTING & COATING SCHEDULE FOR RIL- DMD

Sl.No.	Equipment/ Surface	Units involved	Area/ Location	Arrangement (Indoor / Outdoor)	Temp.	Surface Prepatation	Primer or 1st Coat Name of paint /DFT	2nd Coat Name of paint /DFT	3rd Coat Name of paint /DFT	Total DFT	Colour	Remarks
1	**STEAM TURBINE**											
a	Outer Casing	PESD	TG HALL	Indoor	113 deg.F	Blasting SA2 1/2	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	75	Aluminium RAL 9006	
b	Exhaust Hood	PESD	TG HALL	Indoor	113 deg.F	Blasting SA2 1/2	Inorganic Zinc Silicate/50	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	100	Aluminium RAL 9006	
c	Steam Pipes & Brackets (Interconnecting Pipes & Piping on casing)	PESD	TG HALL	Indoor	113 deg.F	Pickling/ Mechanical Cleaning	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	75	Aluminium RAL 9006	
d	Steam Gland Body Cover	PESD	TG HALL	Indoor	113 deg.F	Blasting SA2 1/2	Inorganic Zinc Silicate / 50	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	100	Aluminium RAL 9006	
e	Governing Actuators	PESD	TG HALL	Indoor	113 deg.F	Solvent Cleaning/Mech. Cleaning	Epoxy Zinc Rich	High Build MIO Epoxy / 100			As per supplier standard	
f	Governing: HPSU	PESD	TG HALL	Indoor	113 deg.F	Solvent Cleaning/Mech. Cleaning	Epoxy Zinc Rich / 50	High Build MIO Epoxy / 100			As per supplier standard	
g	Bearing Pedestals, Bed Plates,	PESD	TG HALL	Indoor	113 deg.F	Blasting SA2 1/2	Epoxy Zinc Rich / 50	High Build MIO Epoxy / 100	Aliphatic Urethane / 50	200	Grey White RAL 9002	
2	**ST GENERATOR**											
a	Generator Enclosure	EM	TG HALL	INDOOR	Ambient	Shot Blasting SA 2 1/2	Epoxy Zinc Rich/75	2 Coats of Epoxy high build/100	2 coats of Epoxy Polyurethane/75	250	Light Grey shade no 631 of IS 5	
b	Generator air duct	EM	TG HALL	INDOOR	Ambient	Shot Blasting SA 2 1/2	Epoxy Zinc Rich/75	2 Coats of Epoxy high build/100	2 coats of Epoxy Polyurethane/75	250	Light Grey shade no 631 of IS 5	
c	Generator stator frame	EM	TG HALL	INDOOR	Ambient	Shot Blasting SA 2 1/2	Epoxy Zinc Rich/75	2 Coats of Epoxy high build/100	2 coats of Epoxy Polyurethane/75	250	Light Grey shade no 631 of IS 5	
d	Generator bearings	EM	TG HALL	INDOOR	Ambient	Shot Blasting SA 2 1/2	Epoxy Zinc Rich/75	2 Coats of Epoxy high build/100	2 coats of Epoxy Polyurethane/75	250	Light Grey shade no 631 of IS 5	
e	Exciter stator frame	EM	TG HALL	INDOOR	Ambient	Shot Blasting SA 2 1/2	Epoxy Zinc Rich/75	2 Coats of Epoxy high build/100	2 coats of Epoxy Polyurethane/75	250	Light Grey shade no 631 of IS 5	
3	**BOILER FEED PUMP**	HPEP-HYD.	TG Hall	Indoor	Room Temp.	Surface of equipment shall be made free from rust ,mill scales,grease,oil,dirt,etc and made fit to receive one coatof primer.	Inorganic Zinc Silicate Primer	Heat Resistant Air Drying Silicon Aluminum	Heat Resistant Air Drying Silicon Aluminum	50	Aluminium of IS: 5	1. One coat of rust penetrative,hard film yellow to be applied on all exposed machined surfaces. 2.Grease IS:958 shall be applied liberally on all exposed threded portions
4	**SURFACE CONDENSER**	HPEP-HYD.		Indoor	≤ 199.4 deg. F	SP 10	Epoxy Zinc Rich/100-150	Finishing paint at site Polyurethane/80-120	-	180-270	Red/Grey	
5	**HP HEATER**	HPEP-HYD.		Indoor	≥ 428 Deg. F	SP 10	Inorganic Zinc/80-120	Silicone Aluminium/80	-	160-200	Aluminium	
6	**LP HEATER**	HPEP-HYD.		Indoor	≥ 428 Deg. F	SP 10	Inorganic Zinc/80-120	Silicone Aluminium/80	-	160-200	Aluminium	
7	**DEAERATOR**	HPEP-HYD.		Outdoor	≥ 428 Deg. F	SP 10	Inorganic Zinc/80-120	Silicone Aluminium/80	-	160-200	Aluminium	
8	**SJAE**	HPEP-HYD.		Indoor	≥ 428 Deg. F	SP 10	Inorganic Zinc/80-120	Silicone Aluminium/80	-	160-200	Aluminium	
9	**GENERATOR AIR COOLER**	HPEP-HYD.		Indoor	< 392 Deg. F	SP 10	Epoxy based zinc rich/100-150	Polyurethane/80-120		180-270	Grey	
10	**GLAND STEAM CONDENSER**	HPEP-HYD.		Indoor	≥ 428 Deg. F	SP 10	Inorganic Zinc/80-120	Silicone Aluminium/80	-	160-200	Aluminium	
11	**LUBE OIL CONSOLE**	PESD										
a	Lube Oil Tank (C.S.) (Outer)	PESD	TG HALL (6-7,12-13, A-A2/ 25-26,31-32)	Indoor	113 Deg. F	Blasting SA2½	Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
b	Lube Oil Tank (C.S.) (Inside)	PESD		Indoor	113 Deg. F		Temperature Rust Preventive coating, Category 'E'/ 40	Temperature Rust Preventive Rust Base 394 / 40	Temperature Rust Preventive Rust Base 394 / 40	120	--	
c	Duplex Filter (Outer)	PESD		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
d	Oil Seperator	PESD		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
e	Lube Oil Pump (LOP, AOP & EOP)	PESD		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
f	Vapour Exraction Fan	PESD		Indoor	113 Deg. F	Solvent Cleaning or Mechanical Cleaning	Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
g	Oil Purification Unit (Not a console part)	PESD		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
h	Jacking Oil Pump (Not a console part)	PESD		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
i	Gov Oil Accumulator (Not a console part)	PESD		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
j	Acoustic Enclosure for Turbine (Not a console part)	PESD		Indoor	113 Deg. F	Blasting SA2½ / mechanical cleaning	Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
k	Overhead Oil Tank (Not a console part) # Painting is not required on inner side of Tank.	PESD	TG HALL B-C Bay	Outdoor	122 Deg. F	Blasting SA2½	Epoxy Zinc Rich/75	High Build MIO Epoxy for SS / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
12	**PIPING & VALVES**											
a	Valves -BHEL Trichy											
a.1	Safety valves - BHEK Trichy	HPBP-TRICHY			400/600 Deg. F	SSPC-SP3	HR ALUMINUM GR.II UP TO 400deg.C/GR. I UP TO 600deg.C - DFT = 20microns	HR ALUMINUM GR.II UP TO 400deg.C/GR. I UP TO 600deg.C - DFT = 20microns	NIL	40 MICRONS		
a.2	Silencers - BHEL Trichy	HPBP-TRICHY			>400 Deg. F	SSPC-SP3	HR ALUMINUM GR. I UP TO DFT = 20microns	HR ALUMINUM GR. I UP TO DFT = 20microns	NIL	40 MICRONS		
b	Valves - BHEL Bhopal											
a.1	For External Unmachined Surface	BHEL- Bhopal	CW/ACW/CCW Water system	-	149 Deg. F	Shot Blast	Chemical Resistant Epoxy (Zinc Chromate/Zinc Phosphate) primer	Chemical Resistant Epoxy Finish paint (Colour-Grey)		(Total DFT - Primer +Finish Paint = 150 microns)		
b.2	For Direct Water passage & Water immersed surfaces	BHEL- Bhopal		-	149 Deg. F	Shot Blast	Chemical Resistant Epoxy (Zinc Chromate/Zinc Phosphate) primer	Coal Tar Pitch Epoxy Paint (Colour-Black)		(Total DFT - Primer +Finish Paint = 175 microns)		
b.3	For mated machined surface	BHEL- Bhopal		-	149 Deg. F	Shot Blast	-	Liberal Coat of Temporary Rust Preventive coat to get jet black finish				
c	Expansion bellows -BHEL Bhopal	BHEL- Bhopal	Flanges	-	149 Deg. F	Sand/Shot Blasted	Chemical Resistant Chlorinated Rubber based Primer paint	Chemical Resistant Chlorinated Rubber based Finishing paint				
d	IBR piping input - Piping centre				60 deg.C and Above	SSPC-SP3/Power Tool Cleaning	2 coats of Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	-----	-----	Total DFT = 60 microns min. Shade : Redoxide		
					Below 60 deg.C	SSPC-SP3/Power Tool Cleaning	2 coats of 50 microns each of HB Chlorinated Rubber based Zinc Phosphate Primer	-----	2 coats of 30 microns each of Chlorinated Rubber based finish paint	Total DFT = 160 microns min. Shade : Smoke Grey Shade No 692 of IS 5		
d.1	Uninsulated Carbon Steel Piping with Operating Temp <= 93 Deg C (Outdoor)	PE&SD,PC	TG HALL	INDOOR	<= 93 Deg C	SP-6	3-5 mils (76-127 microns) of Inorganic Zinc	4-6 mils (102-152 microns) of Epoxy	3-5 mils (76-127 microns) of Polyurethane	60 microns	Redoxide	2nd & 3rd Coat in Shop or Field
d.2	Uninsulated Carbon Steel Piping with Operating Temp > 93 & <= 400 Deg C (Outdoor/Indoor)	PE&SD,PC	TG HALL	INDOOR	> 93 & <= 400 Deg C	SP-10	3-5 mils (76-127 microns) of Inorganic Zinc	1.5-2.5 mils (38-64 microns) of Silicone Aluminium	1.5-2.5 mils (38-64 microns) of Silicone Aluminium			2nd & 3rd Coat in Shop or Field
d.3	Insulated Carbon Steel / Stainless Steel Piping with Operating Temp <= 200 Deg C (Outdoor/Indoor)	PE&SD,PC	TG HALL	INDOOR	<= 200 Deg C	SP-7/15	6-8 mils (152-203 microns) of High Temp Epoxy Phenolic with Glass Flakes	-	-			
d.4	Uninsulated Stainless Steel Piping with Operating Temp <= 93 Deg C (Outdoor/Indoor)	PE&SD,PC	TG HALL	INDOOR	<= 93 Deg C	SP-7/15	4-6 mils (102-152 microns) of Epoxy Mastic	3-5 mils (76-127 microns) of Polyurethane	-			
d.5	Insulated Carbon Steel / Stainless Steel Piping with Operating Temp > 200 Deg C (Outdoor/Indoor)	PE&SD,PC	TG HALL	INDOOR	> 200 Deg C	SP-3	2 coats of Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	-	-	60 microns		Shade : Redoxide
d.6	Insulated Alloy Steel Piping (Outdoor/Indoor)	PE&SD,PC	TG HALL	INDOOR	> 400 Deg C	SP-3	2 coats of Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	-	-	60 microns		Shade : Redoxide
e	Valves - Others											refer d.1 to d.6
f	Expansion bellows - others											refer d.1 to d.6
g	Pre-Fabricated Piping (Non-IBR service)											covered in the above demarcation
h	Steam Traps											refer d.1 to d.6
i	Piping Insulation											no -pinting for insulation
j	Pipe hangers											refer d.1 to d.6
k	Pre-fabricated pipe support shoes											refer d.1 to d.6
l	Structural steel for pipe supports											refer d.1 to d.6
m	Pre-Fabricated Piping (Non-IBR service_Integral scope)											
i	Oil piping-Carbon Steel		TG HALL	Indoor	149 Deg. F	SA 2 1/2 Shop	Inorganic Zinc Silicate/50	NA	Zinc Free" High Temperature Air Curing Finish Coat /100-125	165-215	Light Grey IS 631	
ii	Oil piping- Stainless steel		TG HALL	Indoor	113 Deg. F	SSPC SP 16 Shop	High Temperature Epoxy Novolac / 50-80	NA	High Temperature Epoxy Novolac / 50-80	200-300	Light Grey IS 631	
iii	Control oil piping_Carbon Steel		TG HALL	Indoor	149 Deg. F	SA 2 1/2 Field	Inorganic Zinc Silicate/50	NA	Zinc Free" High Temperature Air Curing Finish Coat /100-125	165-215	Light Grey IS 631	
iv	Control oil piping_Stainless steel		TG HALL	Indoor	113 Deg. F	SSPC SP 16 Field	High Temperature Epoxy Novolac / 50-80	NA	High Temperature Epoxy Novolac / 50-80	200-300	Light Grey IS 631	
v	Integral steam piping_Carbon Steel		TG HALL	Indoor	500 Deg. F	SA 2 1/2 Shop	Inorganic Zinc Silicate/50	NA	Zinc Free" High Temperature Air Curing Finish Coat /100-125		Light Grey IS 631	

vi	Integral steam piping_Alloy steel		TG HALL	Indoor	984 Deg. F	SA 2 1/2 Field	High Temperature Silicone Aluminium/25-40	High Temperature Silicone Aluminium/25-40	High Temperature Silicone Aluminium/25-40	75-120	Light Grey IS 631	
13	**HEAT EXCHANGERS**											
a	Equipment and Supports (≥ 2.5 square meter surface)	PE& SD			≤ 93 Deg. F	SP 10	Zinc Rich epoxy DFT- 3-5 mils	Epoxy DFT - 4-6 mils	Polyurethane DFT -3-5 mils		Aluminium/Grey	
14	**DOSING SYSTEMS**											
	CHEMICAL DOSING SKIDS(HYDRAZINE/AMMONIA & NaOH)											
i.	Not Exposed to Coal, coal Dust, Ash (Fly & Bottom), lime Stone or Bed sand – Structural steal, Misc. steel, Stairways (not galvanized), pipe racks, platforms, walkways Steel,& Supplement Support steel, etc.	PE& SD			≤ 93 Deg. F	SP 10	Inorganic zinc / 3-5 mils	---	---		Light Grey Colour For Beams And Pipe Supports	
iia	Stair Support Steel, Stringers, ladders, including safety cages	PE& SD			≤ 93 Deg. F	SP 10	Inorganic zinc or Epoxy Zinc rich / 3-5 mils	Epoxy /4-6 mils	Polyurethane / 3-5 mils		Black Colour For Platform	
	or											
iib	Stair Support Steel, Stringers, ladders, including safety cages	PE& SD			≤ 93 Deg. F	--	Hot Dip galvanized / To a minimum of 600 g/m2 per ASTM A123	Brush Blast (SP-7) / 4-6 mils of Epoxy mastic	Polyurethane / 3-5 mils		Black Colour for Ladders	
iii.a	Handrails Assemblies Steel	PE& SD			≤ 93 Deg. F	SP 10	Inorganic zinc or Epoxy Zinc rich /3-5 mils	Epoxy /4-6 mils	Polyurethane / 3-5 mils		Golden Yellow for Handrails	Safety Yellow Colour
	or											
iii.b	Handrails Assemblies Steel	PE& SD			Ambient	--	Hot Dip galvanized / To a minimum of 600 g/m square per ASTM A123	Brush Blast (SP-7) / 4-6 mils of Epoxy mastic	Polyurethane / 3-5 mils		Golden Yellow for Handrails	2nd and 3rd costs in shop or field with safety yellow colour
iv.	Safety Showers, Eye Wash Stations	PE& SD			Ambient	--	Manufacturer's Standard suitable for seacoast to extent possible				Green	
v.a	Electricals cabinets and panels	PE& SD			Ambient	SP 10					Light Grey	
or												
v.b	Electricals cabinets and panels	PE& SD			Ambient	Galvanized or galvalumed steel coated with 5 to 6 mils of TGIC powder coating or acceptable equal.					Light Grey	
vi.	Exposed Instrument Tubing	PE& SD			Ambient	Suitable grade of 2205 Duplex stainless steel or acceptable equal.					Light Grey	
vii.	Off-The-Shelf items or small pumps, Instrument, motors (<15HP) components/Equipment (<2.5 M)	PE& SD			Ambient	Supplier standard's coating suitable for sea coast exposure to the extent possible					Light Grey	
15	**POWER CYCLE SYSTEMS**											
a	Control Valves	As per Manufacrurar's Standard										
b	Desuperheaters											
c	Atmospheric Flash Tank	PE&SD	Outside STG building	Outdoor	-196˚C to 230˚C	SA 2 ½	High temperature Epoxy Novolac / DFT: 100-150 microns	NA	High temperature Epoxy Novolac / DFT: 100-150 microns	200-300 microns	White(BS: Code 00-E-55)	External surface
					150˚C	SA 2 ½	Amine Adduct Cured Epoxy / DFT: 100-150 microns	NA	Amine Adduct Cured Epoxy / DFT: 100-150 microns	200-300 microns		Internal surface
16	**PUMPS**											
a.1	Condensate Extraction Pumps	Each Unit	STG Builiding	Outdoor	50 Deg. C	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
a.2	Motors for Condensate Extraction Pumps	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
b.1	CCW Pumps (For PHE)	Common for All 3 Units	STG Builiding	Outdoor	50 Deg. C	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
b.2	Motors for CCW Pumps (For PHE)	Common for All 3 Units	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
c.1	Potable sump pumps	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
c.2	Motors for Potable sump pumps	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
d.1	Condensate forwarding pumps	Each Unit	STG Builiding	Outdoor	50 Deg. C	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
d.2	Motors for Condensate forwarding pumps	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
e.1	ACW Pump	Each Unit	STG Builiding	Outdoor	50	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
e.2	Motors for ACW Pump	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
f.1	Air Compressor	Common for All 3 Units	STG Builiding	Outdoor	50 Deg. C	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
f.2	Motors for Air Compressor	Common for All 3 Units	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
17	**TANKS**											
17.1	Condensdate Storage tank (150m3)											
a	External Uninsulated upto 120 Deg. C	PE&SD		Outdoor		SA 2½	-Inorganic Zinc Silicate Primer -Dry film thickness: 65-90 microns -Required surface profile: 50 microns -Maximum temperature resistances: 400°C -Minimum Volume Solids: 58 ASTM D2697 1. The product shall conform to SSPC Paint 20 Type 1-C with a zinc dust level of greater than 70% by weight in the dry film. The zinc dust shall have a "metallic" zinc content that meets the requirements of ASTM D-520 Type 1. Random sample for zinc dust content to be checked at site/lab.	High Build MIO Epoxy -Intermediate Dry film thickness: 100-150 microns -Required surface preparation: Clean, dry epoxy primer (type 04) -Maximum temperature resistance: 120oC -Minimum Volume Solids: 55ASTM D2697 The quantity of MIO in the main pigment shall be 80% by weight.	Aliphatic Urethane Finish -Dry film thickness: 40-75 microns -Required surface preparation: Clean, dry epoxy intermediate(type 05) -Maximum temperature resistance: 120oC -Minimum Volume Solids: 60 ASTM D2697	215-350	White(BS: Code 00-E-55)	Where prep. Is carried out in a shop or offsite it is mandatory that the painting to be carried out at the same location.

b	Internal(Condensate Tanks)	PE&SD		Outdoor		SA 2 1/2	HB Epoxy Phenolic -Required surface profile: 50-80 microns -Minimum Volume solids : 65% ASTM D2697 -Dry film thickness : 100-150 microns/coat -Maximum temperature resistance :150°C	HB Epoxy Phenolic -Required surface profile: 50-80 microns -Minimum Volume solids : 65% ASTM D2697 -Dry film thickness : 100-150 microns/coat -Maximum temperature resistance :150°C	HB Epoxy Phenolic -Required surface profile: 50-80 microns -Minimum Volume solids : 65% ASTM D2697 -Dry film thickness : 100-150 microns/coat -Maximum temperature resistance :150°C	300-375		
c	Tank Bottom plate (inside)	PE&SD		Outdoor		SA 2 1/2	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	200-300		Shop built tanks will be shop painted.
d	External of underside of all tank	PE&SD		Outdoor		SA 2 1/2	Coal Tar Epoxy -Dry film thickness: 150-200 microns -Required surface profile: 75 microns	NA	NA	150-200		A strip 75 mm wide at plate edge shall be left bare to avoid welding cantamination
17.2	Expansion Tank for DMCW Circuit											
a	External Uninsulated upto 120 Deg. C	PE&SD		Outdoor		SA 2 1/2	-Inorganic Zinc Silicate Primer -Dry film thickness: 65-90 microns -Required surface profile: 50 microns -Maximum temperature resistances: 400°C -Minimum Volume Solids: 58 ASTM D2697 1. The product shall conform to SSPC Paint 20 Type 1-C with a zinc dust level of greater than 70% by weight in the dry film. The zinc dust shall have a "metallic" zinc content that meets the requirements of ASTM D-520 Type 1. Random sample for zinc dust content to be checked at site/lab.	High Build MIO Epoxy -Intermediate Dry film thickness: 100-150 microns -Required surface preparation: Clean, dry epoxy primer (type 04) -Maximum temperature resistance: 120oC -Minimum Volume Solids: 55ASTM D2697 The quantity of MIO in the main pigment shall be 80% by weight.	Aliphatic Urethane Finish -Dry film thickness: 40-75 microns -Required surface preparation: Clean, dry epoxy intermediate(type 05) -Maximum temperature resistance: 120oC -Minimum Volume Solids: 60 ASTM D2697	215-350	White(BS: Code 00-E-55)	Where prep. Is carried out in a shop or offsite it is mandatory that the painting to be carried out at the same location.
b	Internal(Demineralised water)	PE&SD		Outdoor		SA 2 1/2	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	NA	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	300-200		Shop built tanks will be shop painted.
c	Tank Bottom plate (inside)	PE&SD		Outdoor		SA 2 1/2	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	200-300		Shop built tanks will be shop painted.
d	External of underside of all tank	PE&SD		Outdoor		SA 2 1/2	Coal Tar Epoxy -Dry film thickness: 150-200 microns -Required surface profile: 75 microns	NA	NA	150-200		A strip 75 mm wide at plate edge shall be left bare to avoid welding cantamination
18	**ELECTRICAL SYSTEM ITEMS**											
a	LV PMCC's	PE&SD	Switchgear room/ Indoor	Ambient	Ambient	As per manufacturers standard					Shade 631 of IS 5	
b	LV MCC's	PE&SD		Ambient	Ambient	As per manufacturers standard					Shade 631 of IS 5	
c	Cable tray material	PE&SD	Entire STG & Switchgear building/Indoor	Ambient	Ambient	Hot Dip Galvanization as per IS 2629 & minimum thickness of Galvanization shall be 610gm/m ^{2}					Not Applicable	
d	LV Power cables	PE&SD		Ambient	Ambient	Not Applicable					Outer sheath shall be black	
e	Control cables	PE&SD		Ambient	Ambient	Not Applicable					Outer sheath shall be black	
f	Cable Glands & Lugs	PE&SD		Ambient	Ambient	Not Applicable					Not Applicable	
	Structural steel for cable tray supports	PE&SD	Entire STG & Switchgear building/Indoor	Ambient	Ambient	Red oxide Zinc Chromate primer					Not Applicable	
19	**C & I SYSTEM ITEMS**											
a	Field instrument package	PE&SD	Each Unit	indoor & out door	Amb. Temp	Supplier standard coating suitable for power plant/Industrial applications				As reqd.	Vendor standard	
b	Instrument hook up material	PE&SD	Each Unit	indoor & out door	Amb. Temp	Supplier standard coating suitable for power plant/Industrial applications				As reqd.	Vendor standard	
c	Instrumentation cables	PE&SD	Each Unit	indoor & out door	Amb. Temp	NA	NA	NA		NA	Black	
d	SWAS System	PE&SD	Each Unit	Indoor	Amb. Temp	Supplier standard coating suitable for power plant/Industrial applications				As reqd.	RAL 7035	
e	Flow elements-Orifice	PE&SD	Each Unit	Out door	Amb. Temp	Supplier standard coating suitable for power plant/Industrial applications				As reqd.	Vendor standard	
g	Flow elements-Nozzle	PE&SD	Each Unit	Out door	Amb. Temp	Supplier standard coating suitable for power plant/Industrial applications				As reqd.	Vendor standard	

PAINTING & COATING SCHEDULE FOR RIL- HMD

Sl.No.	Equipment/ Surface	Units involved	Area/ Location	Arrangement (Indoor / Outdoor)	Temp.	Surface Prepatation	Primer or 1st Coat Name of paint /DFT	2nd Coat Name of paint /DFT	3rd Coat Name of paint /DFT	Total DFT	Colour	Remarks
1	**STEAM TURBINE**											
a	Outer Casing	PESD	TG HALL	Indoor	113 deg.F	Blasting SA2 1/2	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	75	Aluminium RAL 9006	
b	Exhaust Hood	PESD	TG HALL	Indoor	113 deg.F	Blasting SA2 1/2	Inorganic Zinc Silicate/50	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	100	Aluminium RAL 9006	
c	Steam Pipes & Brackets (Interconnecting Pipes & Piping on casing)	PESD	TG HALL	Indoor	113 deg.F	Pickling/ Mechanical Cleaning	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	75	Aluminium RAL 9006	
d	Steam Gland Body Cover	PESD	TG HALL	Indoor	113 deg.F	Blasting SA2 1/2	Inorganic Zinc Silicate / 50	Heat Resistant Air drying Aluminium/ 25	Heat Resistant Air drying Aluminium/ 25	100	Aluminium RAL 9006	
e	Governing Actuators	PESD	TG HALL	Indoor	113 deg.F	Solvent Cleaning/Mech. Cleaning	Epoxy Zinc Rich	High Build MIO Epoxy / 100			As per supplier standard	
f	Governing: HPSU	PESD	TG HALL	Indoor	113 deg.F	Solvent Cleaning/Mech. Cleaning	Epoxy Zinc Rich / 50	High Build MIO Epoxy / 100			As per supplier standard	
g	Bearing Pedestals, Bed Plates,	PESD	TG HALL	Indoor	113 deg.F	Blasting SA2 1/2	Epoxy Zinc Rich / 50	High Build MIO Epoxy / 100	Aliphatic Urethane / 50	200	Grey White RAL 9002	
2	**ST GENERATOR**											
a	Generator Enclosure	EM	TG HALL	Indoor	Ambient	Shot Blasting SA 2 1/2	Epoxy Zinc Rich/75	2 Coats of Epoxy high build/100	2 coats of Epoxy Polyurethane/75	250	Light Grey shade no 631 of IS 5	
b	Generator air duct	EM	TG HALL	Indoor	Ambient	Shot Blasting SA 2 1/2	Epoxy Zinc Rich/75	2 Coats of Epoxy high build/100	2 coats of Epoxy Polyurethane/75	250	Light Grey shade no 631 of IS 5	
c	Generator stator frame	EM	TG HALL	Indoor	Ambient	Shot Blasting SA 2 1/2	Epoxy Zinc Rich/75	2 Coats of Epoxy high build/100	2 coats of Epoxy Polyurethane/75	250	Light Grey shade no 631 of IS 5	
d	Generator bearings	EM	TG HALL	Indoor	Ambient	Shot Blasting SA 2 1/2	Epoxy Zinc Rich/75	2 Coats of Epoxy high build/100	2 coats of Epoxy Polyurethane/75	250	Light Grey shade no 631 of IS 5	
e	Exciter stator frame	EM	TG HALL	Indoor	Ambient	Shot Blasting SA 2 1/2	Epoxy Zinc Rich/75	2 Coats of Epoxy high build/100	2 coats of Epoxy Polyurethane/75	250	Light Grey shade no 631 of IS 5	
3	**BOILER FEED PUMP**	HPEP-Hyd.	TG HALL	Indoor	Room Temp.	Surface of equipment shall be made free from rust ,mill scales,grease,oil,dirt,etc and made fit to receive one coatof primer.	Inorganic Zinc Silicate Primer	Heat Resistant Air Drying Silicon Aluminum	Heat Resistant Air Drying Silicon Aluminum	50	Aluminium of IS: 5	1. One coat of rust penetrative,hard film yellow to be applied on all exposed machined surfaces. 2.Grease IS:958 shall be applied liberally on all exposed threded portions
4	**SURFACE CONDENSER**	HPEP Hyd.		Indoor	≤ 199.4 Deg. F	SP 10	Epoxy Zinc Rich/100-150	Finishing paint at site Polyurethane/80-120	-	180-270	Red/Grey	
5	**HP HEATER**	HPEP Hyd.		Indoor	≥ 428 Deg. F	SP 10	Inorganic Zinc/80-120	Silicone Aluminium/80	-	160-200	Aluminium	
6	**LP HEATER**	HPEP Hyd.		Indoor	≥ 428 Deg. F	SP 10	Inorganic Zinc/80-120	Silicone Aluminium/80	-	160-200	Aluminium	
7	**DEAERATOR**	HPEP Hyd.		Outdoor	≥ 428 Deg. F	SP 10	Inorganic Zinc/80-120	Silicone Aluminium/80	-	160-200	Aluminium	
8	**SJAE**	HPEP Hyd.		Indoor	≥ 428 Deg. F	SP 10	Inorganic Zinc/80-120	Silicone Aluminium/80	-	160-200	Aluminium	
9	**GENERATOR AIR COOLER**	HPEP Hyd.		Indoor	< 392 Deg. F	SP 10	Epoxy based zinc rich/100-150	Polyurethane/80-120		180-270	Grey	
10	**GLAND STEAM CONDENSER**	HPEP Hyd.		Indoor	≥ 428 Deg. F	SP 10	Inorganic Zinc/80-120	Silicone Aluminium/80	-	160-200	Aluminium	
11	**LUBE OIL CONSOLE**	HPEP Hyd.										
a	Lube Oil Tank (C.S.) (Outer)	HPEP Hyd.	TG HALL A-A2/ (6-7,12-13, 25-26,31-32)	Indoor	113 Deg. F	Blasting SA2½	Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
b	Lube Oil Tank (C.S.) (Inside)	HPEP Hyd.		Indoor	113 Deg. F		Temperature Rust Preventive coating, Category 'E'/ 40	Temperature Rust Preventive Rust Base 394 / 40	Temperature Rust Preventive Rust Base 394 / 40	120	--	
c	Duplex Filter (Outer)	HPEP Hyd.		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
d	Oil Seperator	HPEP Hyd.		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
e	Lube Oil Pump (LOP, AOP & EOP)	HPEP Hyd.		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
f	Vapour Exraction Fan	HPEP Hyd.		Indoor	113 Deg. F	Solvent Cleaning or Mechanical Cleaning	Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
g	Oil Purification Unit (Not a console part)	HPEP Hyd.		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
h	Jacking Oil Pump (Not a console part)	HPEP Hyd.		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
i	Gov Oil Accumulator (Not a console part)	HPEP Hyd.		Indoor	113 Deg. F		Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
j	Acoustic Enclosure for Turbine (Not a console part)	HPEP Hyd.		Indoor	113 Deg. F	Blasting SA2½ / mechanical cleaning	Epoxy Zinc Rich/75	High Build MIO Epoxy / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
k	Overhead Oil Tank (Not a console part)	HPEP Hyd.	TG HALL B-C Bay	Outdoor	122 Deg. F	Blasting SA2½	Epoxy Zinc Rich/75	High Build MIO Epoxy for SS / 100	Aliphatic Urethane /50	225	Light Grey RAL 7035	
12	**PIPING & VALVES**											
a	**Valves -BHEL Trichy**											
a.1	Safety valves - BHEK Trichy	HPBP-TRICHY			400/600 Deg. F	SSPC-SP3	HR ALUMINUM GR.II UP TO 400deg.C/GR. I UP TO 600deg.C - DFT = 20microns	HR ALUMINUM GR.II UP TO 400deg.C/GR. I UP TO 600deg.C - DFT = 20microns	NIL	40 MICRONS		
a.2	Silencers - BHEL Trichy	HPBP-TRICHY			>400 Deg. F	SSPC-SP3	HR ALUMINUM GR. I UP TO DFT = 20microns	HR ALUMINUM GR. I UP TO DFT = 20microns	NIL	40 MICRONS		
b	Valves - BHEL Bhopal											
a.1	For External Unmachined Surface	BHEL- Bhopal	CW/ACW/CCW Water system	-	149 Deg. F	Shot Blast	Chemical Resistant Epoxy (Zinc Chromate/Zinc Phosphate) primer	Chemical Resistant Epoxy Finish paint (Colour-Grey)		(Total DFT - Primer +Finish Paint = 150 microns)		
b.2	For Direct Water passage & Water immersed surfaces	BHEL- Bhopal		-	149 Deg. F	Shot Blast	Chemical Resistant Epoxy (Zinc Chromate/Zinc Phosphate) primer	Coal Tar Pitch Epoxy Paint (Colour-Black)		(Total DFT - Primer +Finish Paint = 175 microns)		
b.3	For mated machined surface	BHEL- Bhopal		-	149 Deg. F	Shot Blast	-	Liberal Coat of Temporary Rust Preventive coat to get jet black finish				
c	Expansion bellows -BHEL Bhopal	BHEL- Bhopal	Flanges	-	149 Deg. F	Sand/Shot Blasted	Chemical Resistant Chlorinated Rubber based Primer paint	Chemical Resistant Chlorinated Rubber based Finishing paint	9,700.00	=J36/100		
d	IBR piping input - Piping centre				60 deg.C and Above	SSPC-SP3/Power Tool Cleaning	2 coats of Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	-----	-----	Total DFT = 60 microns min. Shade : Redoxide		
					Below 60 deg.C	SSPC-SP3/Power Tool Cleaning	2 coats of 50 microns each of HB Chlorinated Rubber based Zinc Phosphate Primer	-----	2 coats of 30 microns each of Chlorinated Rubber based finish paint	Total DFT = 160 microns min. Shade : Smoke Grey Shade No 692 of IS 5		
d.1	Uninsulated Carbon Steel Piping with Operating Temp <= 93 Deg C (Outdoor)	PE&SD,PC	TG HALL	Indoor	<= 93 Deg C	SP-6	3-5 mils (76-127 microns) of Inorganic Zinc	4-6 mils (102-152 microns) of Epoxy	3-5 mils (76-127 microns) of Polyurethane	60 microns	Redoxide	2nd & 3rd Coat in Shop or Field
d.2	Uninsulated Carbon Steel Piping with Operating Temp > 93 & <= 400 Deg C (Outdoor/Indoor)	PE&SD,PC	TG HALL	Indoor	> 93 & <= 400 Deg C	SP-10	3-5 mils (76-127 microns) of Inorganic Zinc	1.5-2.5 mils (38-64 microns) of Silicone Aluminium	1.5-2.5 mils (38-64 microns) of Silicone Aluminium			2nd & 3rd Coat in Shop or Field
d.3	Insulated Carbon Steel / Stainless Steel Piping with Operating Temp <= 200 Deg C (Outdoor/Indoor)	PE&SD,PC	TG HALL	Indoor	<= 200 Deg C	SP-7/15	6-8 mils (152-203 microns) of High Temp Epoxy Phenolic with Glass Flakes	-	-			
d.4	Uninsulated Stainless Steel Piping with Operating Temp <= 93 Deg C (Outdoor/Indoor)	PE&SD,PC	TG HALL	Indoor	<= 93 Deg C	SP-7/15	4-6 mils (102-152 microns) of Epoxy Mastic	3-5 mils (76-127 microns) of Polyurethane	-			
d.5	Insulated Carbon Steel / Stainless Steel Piping with Operating Temp > 200 Deg C (Outdoor/Indoor)	PE&SD,PC	TG HALL	Indoor	> 200 Deg C	SP-3	2 coats of Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	-	-	60 microns		Shade : Redoxide
d.6	Insulated Alloy Steel Piping (Outdoor/Indoor)	PE&SD,PC	TG HALL	Indoor	> 400 Deg C	SP-3	2 coats of Red oxide Zinc Phosphate Primer (Alkyd Base) to IS 12744	-	-	60 microns		Shade : Redoxide
e	Valves - Others											refer d.1 to d.6
f	Expansion bellows - others											refer d.1 to d.6
g	Pre-Fabricated Piping (Non-IBR service)											covered in the above demarcation
h	Steam Traps											refer d.1 to d.6
i	Piping Insulation											no -pinting for insulation
j	Pipe hangers											refer d.1 to d.6
k	Pre-fabricated pipe support shoes											refer d.1 to d.6
l	Structural steel for pipe supports											refer d.1 to d.6
m	Pre-Fabricated Piping (Non-IBR service_Integral scope)											
i	Oil piping-Carbon Steel		TG HALL	Indoor	149 Deg. F	SA 2 1/2 Shop	Inorganic Zinc Silicate/50	NA	Zinc Free" High Temperature Air Curing Finish Coat /100-125	165-215	Light Grey IS 631	
ii	Oil piping- Stainless steel		TG HALL	Indoor	113 Deg. F	SSPC SP 16 Shop	High Temperature Epoxy Novolac / 50-80	NA	High Temperature Epoxy Novolac / 50-80	200-300	Light Grey IS 631	
iii	Control oil piping_Carbon Steel		TG HALL	Indoor	149 Deg. F	SA 2 1/2 Field	Inorganic Zinc Silicate/50	NA	Zinc Free" High Temperature Air Curing Finish Coat /100-125	165-215	Light Grey IS 631	
iv	Control oil piping_Stainless steel		TG HALL	Indoor	113 Deg. F	SSPC SP 16 Field	High Temperature Epoxy Novolac / 50-80	NA	High Temperature Epoxy Novolac / 50-80	200-300	Light Grey IS 631	
v	Integral steam piping_Carbon Steel		TG HALL	Indoor	500 Deg. F	SA 2 1/2 Shop	Inorganic Zinc Silicate/50	NA	Zinc Free" High Temperature Air Curing Finish Coat /100-125		Light Grey IS 631	
vi	Integral steam piping_Alloy steel		TG HALL	Indoor	984 Deg. F	SA 2 1/2 Field	High Temperature Silicone Aluminium/25-40	High Temperature Silicone Aluminium/25-40	High Temperature Silicone Aluminium/25-40	75-120	Light Grey IS 631	
13	**HEAT EXCHANGERS**											

a	Equipment and Supports (≥ 2.5 square meter surface)	PE& SD			≤ 93 Deg. F	SP 10	Zinc Rich epoxy DFT- 3-5 mils	Epoxy DFT - 4-6 mils	Polyurethane DFT -3-5 mils		Aluminium/Grey	
14	**DOSING SYSTEMS**											
	CHEMICAL DOSING SKIDS(HYDRAZINE/AMMONIA & NaOH)											
i.	Not Exposed to Coal, coal Dust, Ash (Fly & Bottom), lime Stone or Bed sand – Structural steal, Misc. steel, Stairways (not galvanized), pipe racks, platforms, walkways Steel,& Supplement Support steel, etc.	PE& SD			≤ 93 Deg. F	SP 10	Inorganic zinc / 3-5 mils	---	---		Light Grey Colour For Beams And Pipe Supports	
iia	Stair Support Steel, Stringers, ladders, including safety cages	PE& SD			≤ 93 Deg. F	SP 10	Inorganic zinc or Epoxy Zinc rich / 3-5 mils	Epoxy /4-6 mils	Polyurethane / 3-5 mils		Black Colour For Platform	
	or											
iib	Stair Support Steel, Stringers, ladders, including safety cages	PE& SD			≤ 93 Deg. F	--	Hot Dip galvanized / To a minimum of 600 g/m2 per ASTM A123	Brush Blast (SP-7) / 4-6 mils of Epoxy mastic	Polyurethane / 3-5 mils		Black Colour for Ladders	
iii.a	Handrails Assemblies Steel	PE& SD			≤ 93 Deg. F	SP 10	Inorganic zinc or Epoxy Zinc rich /3-5 mils	Epoxy /4-6 mils	Polyurethane / 3-5 mils		Golden Yellow for Handrails	Safety Yellow Colour
	or											
iii.b	Handrails Assemblies Steel	PE& SD			Ambient	--	Hot Dip galvanized / To a minimum of 600 g/m square per ASTM A123	Brush Blast (SP-7) / 4-6 mils of Epoxy mastic	Polyurethane / 3-5 mils		Golden Yellow for Handrails	2nd and 3rd costs in shop or field with safety yellow colour
iv.	Safety Showers, Eye Wash Stations	PE& SD			Ambient	--	Manufacturer's Standard suitable for seacoast to extent possible				Green	
v.a	Electricals cabinets and panels	PE& SD			Ambient	SP 10					Light Grey	
	or											
v.b	Electricals cabinets and panels	PE& SD			Ambient	Galvanized or galvalumed steel coated with 5 to 6 mils of TGIC powder coating or acceptable equal.					Light Grey	
vi.	Exposed Instrument Tubing	PE& SD			Ambient	Suitable grade of 2205 Duplex stainless steel or acceptable equal.					Light Grey	
vii.	Off-The-Shelf items or small pumps, Instrument, motors (<15HP) components/Equipment (<2.5 M)	PE& SD			Ambient	Supplier standard's coating suitable for sea coast exposure to the extent possible					Light Grey	
15	**POWER CYCLE SYSTEMS**											
a	Control Valves	As per Manufacrurar's Standard										
b	Desuperheaters											
c	Atmospheric Flash Tank	PE&SD	Outside STG building	Outdoor	-196˚C to 230˚C	SA 2 ½	High temperature Epoxy Novolac / DFT: 100-150 microns	NA	High temperature Epoxy Novolac / DFT: 100-150 microns	200-300 microns	White(BS: Code 00-E-55)	External surface
					150˚C	SA 2 ½	Amine Adduct Cured Epoxy / DFT: 100-150 microns	NA	Amine Adduct Cured Epoxy / DFT: 100-150 microns	200-300 microns		Internal surface
16	**PUMPS**											
a.1	Condensate Extraction Pumps	Each Unit	STG Builiding	Outdoor	50 Deg. C	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
a.2	Motors for Condensate Extraction Pumps	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
b.1	CCW Pumps (For PHE)	Common for All 4 Units	STG Builiding	Outdoor	50 Deg. C	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
b.2	Motors for CCW Pumps (For PHE)	Common for All 4 Units	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
c.1	Potable sump pumps	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
c.2	Motors for Potable sump pumps	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
d.1	Condensate forwarding pumps	Each Unit	STG Builiding	Outdoor	50 Deg. C	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
d.2	Motors for Condensate forwarding pumps	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
e.1	ACW Pump	Each Unit	STG Builiding	Outdoor	50 Deg. C	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
e.2	Motors for ACW Pump	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
f.1	Air Compressor	Common for All 4 Units	STG Builiding	Outdoor	50 Deg. C	SP-10	1 Coat of two component of Inorganic Zinc Silicate Coating@ 65-75µ DFT /Coating Total: 65-75µ	1 Coat of Two component Epoxy Zinc phosphate primer cured with polyamine hardener@40µ DFT/Coat Total: 40µ	2 Coat of High Build Epoxy finish coating cured with polyamine harder@ 100 µ DFT/Coat & 1 Coat of Two component Acrylic-Polyurethane finish paint@ 400 µ DFT/Coat: Total=2x100+40=240 µ	345-355 µ	Navy Blue (RAL 5014)	
f.2	Motors for Air Compressor	Each Unit	STG Builiding	Outdoor	Ambient	SP-10	3 mils of Epoxy Primer	3 mils of Epoxy	3 mils of Epoxy Polyurethane	225 µ	Blue Grey (RAL 7031)	
17	**TANKS**											
17.1	Condensdate Storage tank (150m3)											
a	External Uninsulated upto 120 Deg. C	PE&SD		Outdoor		SA 2½	-Inorganic Zinc Silicate Primer -Dry film thickness: 65-90 microns -Required surface profile: 50 microns -Maximum temperature resistances: 400°C -Minimum Volume Solids: 58 ASTM D2697 1. The product shall conform to SSPC Paint 20 Type 1-C with a zinc dust level of greater than 70% by weight in the dry film. The zinc dust shall have a "metallic" zinc content that meets the requirements of ASTM D-520 Type 1. Random sample for zinc dust content to be checked at site/lab.	High Build MIO Epoxy -Intermediate Dry film thickness: 100-150 microns -Required surface preparation: Clean, dry epoxy primer (type 04) -Maximum temperature resistance: 120oC -Minimum Volume Solids: 55ASTM D2697 The quantity of MIO in the main pigment shall be 80% by weight.	Aliphatic Urethane Finish -Dry film thickness: 40-75 microns -Required surface preparation: Clean, dry epoxy intermediate(type 05) -Maximum temperature resistance: 120oC -Minimum Volume Solids: 60 ASTM D2697	215-350	White(BS: Code 00-E-55)	Where prep. Is carried out in a shop or offsite it is mandatory that the painting to be carried out at the same location.

b	Internal(Condensate Tanks)	PE&SD		Outdoor		SA 2 1/2	HB Epoxy Phenolic -Required surface profile: 50-80 microns -Minimum Volume solids : 65% ASTM D2697 -Dry film thickness : 100-150 microns/coat -Maximum temperature resistance :150°C	HB Epoxy Phenolic -Required surface profile: 50-80 microns -Minimum Volume solids : 65% ASTM D2697 -Dry film thickness : 100-150 microns/coat -Maximum temperature resistance :150°C	HB Epoxy Phenolic -Required surface profile: 50-80 microns -Minimum Volume solids : 65% ASTM D2697 -Dry film thickness : 100-150 microns/coat -Maximum temperature resistance :150°C	300-375		
c	Tank Bottom plate (inside)	PE&SD		Outdoor		SA 2 1/2	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	200-300		Shop built tanks will be shop painted.
d	External of underside of all tank	PE&SD		Outdoor		SA 2 1/2	Coal Tar Epoxy -Dry film thickness: 150-200 microns -Required surface profile: 75 microns	NA	NA	150-200		A strip 75 mm wide at plate edge shall be left bare to avoid welding cantamination
17.2	Expansion Tank for DMCW Circuit											
a	External Uninsulated upto 120 Deg. C	PE&SD		Outdoor		SA 2 1/2	-Inorganic Zinc Silicate Primer -Dry film thickness: 65-90 microns -Required surface profile: 50 microns -Maximum temperature resistances: 400°C -Minimum Volume Solids: 58 ASTM D2697 1. The product shall conform to SSPC Paint 20 Type 1-C with a zinc dust level of greater than 70% by weight in the dry film. The zinc dust shall have a "metallic" zinc content that meets the requirements of ASTM D-520 Type 1. Random sample for zinc dust content to be checked at site/lab.	High Build MIO Epoxy -Intermediate Dry film thickness: 100-150 microns -Required surface preparation: Clean, dry epoxy primer (type 04) -Maximum temperature resistance: 120oC -Minimum Volume Solids: 55ASTM D2697 The quantity of MIO in the main pigment shall be 80% by weight.	Aliphatic Urethane Finish -Dry film thickness: 40-75 microns -Required surface preparation: Clean, dry epoxy intermediate(type 05) -Maximum temperature resistance: 120oC -Minimum Volume Solids: 60 ASTM D2697	215-350	White(BS: Code 00-E-55)	Where prep. Is carried out in a shop or offsite it is mandatory that the painting to be carried out at the same location.
b	Internal(Demineralised water)	PE&SD		Outdoor		SA 2 1/2	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	NA	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	300-200		Shop built tanks will be shop painted.
c	Tank Bottom plate (inside)	PE&SD		Outdoor		SA 2 1/2	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	Amine Adduct Cured Epoxy -Dry film thickness: 100-150 microns -Required surface profile: 50 microns	200-300		Shop built tanks will be shop painted.
d	External of underside of all tank	PE&SD		Outdoor		SA 2 1/2	Coal Tar Epoxy -Dry film thickness: 150-200 microns -Required surface profile: 75 microns	NA	NA	150-200		A strip 75 mm wide at plate edge shall be left bare to avoid welding cantamination
18	**ELECTRICAL SYSTEM ITEMS**											
a	LV PMCC's	PE&SD	Switchgear room	Indoor	Ambient	As per manufacturers standard					Shade 631 of IS 5	
b	LV MCC's	PE&SD			Ambient	As per manufacturers standard					Shade 631 of IS 5	
c	Cable tray material	PE&SD	Entire STG & Switchgear building	Indoor	Ambient	Hot Dip Galvanization as per IS 2629 & minimum thickness of Galvanization shall be 610gm/m^2					Not Applicable	
d	LV Power cables	PE&SD			Ambient	Not Applicable					Outer sheath shall be black	
e	Control cables	PE&SD			Ambient	Not Applicable					Outer sheath shall be black	
f	Cable Glands & Lugs	PE&SD			Ambient	Not Applicable					Not Applicable	
g	Structural steel for cable tray supports	PE&SD	Entire STG & Switchgear building	Indoor	Ambient	Red oxide Zinc Chromate primer					Not Applicable	
19	**C & I SYSTEM ITEMS**											
a	Field instrument package	PE&SD	Each Unit	indoor & out door	Amb. Temp	Supplier standard coating suitable for power plant/Industrial applications				As reqd.	Vendor standard	
b	Instrument hook up material	PE&SD	As reqd.	indoor & out door	Amb. Temp	Supplier standard coating suitable for power plant/Industrial applications					Vendor standard	
c	Instrumentation cables	PE&SD	As reqd.	indoor & out door	Amb. Temp	NA	NA	NA	NA	NA	Black	
d	SWAS System	PE&SD	Each Unit	Indoor	Amb. Temp	Supplier standard coating suitable for power plant/Industrial applications				As reqd.	RAL 7035	
e	Flow elements-Orifice	PE&SD	Each Unit	Out door	Amb. Temp	Supplier standard coating suitable for power plant/Industrial applications				As reqd.	Vendor standard	
g	Flow elements-Nozzle	PE&SD	Each Unit	Out door	Amb. Temp	Supplier standard coating suitable for power plant/Industrial applications				As reqd.	Vendor standard	

INPUT TO E&C TENDER

PROJECT: RIL CCPP 4 x 93.1 MW STG (HMD)

WONO: 1-0-851-358-00

ESTIMATED PIPING INSULATION AREA/VOLUME

SL NO	LINE NUMBER	WORK TEMP	INS THK	INSULATION MATERIAL	NB	OD	INS THK PYROGEL	INS THK MINWOOL	INS THK TOTAL	PIPE LENGTH	NO OF UNITS	PER UNIT				TOTAL			
												INS AREA PER UNIT	INS VOL PG PER UNIT	INS VOL MW PER UNIT	INV VOL COMB PER UNIT	INS AREA TOTAL	INS VOL PG TOTAL	INS VOL MW TOTAL	INS VOL COMB TOTAL
		[Deg C]	[mm]			[mm]	[mm]	[mm]	[mm]	[m]		[Sq.m]	[Cu.m]	[Cu.m]	[Cu.m]	[Sq.m]	[Cu.m]	[Cu.m]	[Cu.m]
1	HSAB-BSS-BHL-0-B051-10-65C-HC	530	40/210	PGEL/MW	250	273.1	40	210	250	39.66	1	40.84	1.63	8.58	10.21	40.84	1.63	8.58	10.21
2	HSAB-BSS-BHL-0-B052-10-65C-HC	530	40/210	PGEL/MW	250	273.1	40	210	250	1.5	1	1.55	0.06	0.32	0.38	1.55	0.06	0.32	0.38
3	HSAB-BSS-BHL-0-B053-10-65C-HC	530	40/210	PGEL/MW	250	273.1	40	210	250	3.24	1	3.34	0.13	0.7	0.83	3.34	0.13	0.7	0.83
4	HSAB-BSS-BHL-0-B054-32-23C-HC	474	40/200	PGEL/MW	800	819	40	200	240	1	1	3.08	0.12	0.61	0.73	3.08	0.12	0.61	0.73
5	HSAB-BSS-BHL-0-B055-32-23C-HC	474	40/200	PGEL/MW	800	819	40	200	240	1	1	3.08	0.12	0.61	0.73	3.08	0.12	0.61	0.73
6	HSAB-BSS-BHL-0-B062-28-11C-HC	200	10/65	PGEL/MW	700	711	10	65	75	139.4	1	373.64	3.73	24.29	28.02	373.64	3.73	24.29	28.02
7	HSAB-HS-BHL-0-B001-20-65C-HC	530	50/200	PGEL/MW	500	508	50	200	250	6.29	1	12.05	0.6	2.41	3.01	12.05	0.6	2.41	3.01
8	HSAB-HS-BHL-0-B002-20-65C-HC	530	50/200	PGEL/MW	500	508	50	200	250	6.29	1	12.05	0.6	2.41	3.01	12.05	0.6	2.41	3.01
9	HSAB-HS-BHL-0-B003-20-65C-HC	530	50/200	PGEL/MW	500	508	50	200	250	116.8	1	223.68	11.18	44.74	55.92	223.68	11.18	44.74	55.92
10	HSAB-HS-BHL-0-B004-20-65C-HC	530	50/200	PGEL/MW	500	508	50	200	250	111.8	1	214.1	10.7	42.82	53.52	214.1	10.7	42.82	53.52
11	HSAB-HS-BHL-0-B010-4-65C-HC	530	50/165	PGEL/MW	100	114.3	50	165	215	22.11	1	9.53	0.48	1.57	2.05	9.53	0.48	1.57	2.05
12	HSAB-HS-BHL-0-B201-1.5-65C-HC	530	0/175	PGEL/MW	40	48.3	0	175	175	1.3	1	0.24	0	0.05	0.05	0.24	0	0.05	0.05
13	HSAB-HS-BHL-0-B202-1.5-65C-HC	530	0/175	PGEL/MW	40	48.3	0	175	175	1.89	1	0.35	0	0.06	0.06	0.35	0	0.06	0.06
14	HSAB-HS-BHL-0-B251-3-65C-HC	530	40/160	PGEL/MW	80	88.9	40	160	200	1.77	1	0.59	0.02	0.1	0.12	0.59	0.02	0.1	0.12
15	HSAB-HS-BHL-0-B252-3-65C-HC	530	40/160	PGEL/MW	80	88.9	40	160	200	1	1	0.34	0.01	0.05	0.06	0.34	0.01	0.05	0.06
16	HSAE-FDW-BHL-0-B651-18-61C-HC	236.5	20/75	PGEL/MW	450	457	20	75	95	58.49	1	100.76	2.02	7.56	9.58	100.76	2.02	7.56	9.58
17	HSAE-FDW-BHL-0-B652-18-61C-HC	236.5	20/75	PGEL/MW	450	457	20	75	95	73.67	1	126.92	2.54	9.52	12.06	126.92	2.54	9.52	12.06
18	HSAE-FDW-BHL-0-B653-18-61C-HC	236.5	20/75	PGEL/MW	450	457	20	75	95	14.93	1	25.73	0.52	1.93	2.45	25.73	0.52	1.93	2.45
19	HSAE-FDW-BHL-0-B654-18-61C-HC	236.5	20/75	PGEL/MW	450	457	20	75	95	14.93	1	25.73	0.52	1.93	2.45	25.73	0.52	1.93	2.45
20	HSAE-FDW-BHL-0-B655-3-51C-HC	174.4	20/40	PGEL/MW	80	88.9	20	40	60	122.17	1	40.94	0.82	1.63	2.45	40.94	0.82	1.63	2.45
21	HSAE-FDW-BHL-0-B661-1-51C-HC	174.4	0/40	PGEL/MW	25	33.4	0	40	40	20.46	1	2.58	0	0.11	0.11	2.58	0	0.11	0.11
22	HSAE-FDW-BHL-0-B662-1-51C-HC	174.4	0/40	PGEL/MW	25	33.4	0	40	40	20.18	1	2.54	0	0.1	0.1	2.54	0	0.1	0.1
23	HSAE-FDW-BHL-0-B671-2-51C-HC	174.4	20/25	PGEL/MW	50	60.3	20	25	45	16.22	1	3.68	0.07	0.1	0.17	3.68	0.07	0.1	0.17
24	HSAE-FDW-BHL-0-B671-8-11B-HC	170.4	20/50	PGEL/MW	200	219.1	20	50	70	64.4	1	53.2	1.07	2.66	3.73	53.2	1.07	2.66	3.73
25	HSAE-FDW-BHL-0-B672-2-51C-HC	174.4	20/25	PGEL/MW	50	60.3	20	25	45	16.22	1	3.68	0.07	0.1	0.17	3.68	0.07	0.1	0.17
26	HSAE-FDW-BHL-0-B672-8-11B-HC	170.4	20/50	PGEL/MW	200	219.1	20	50	70	41.1	1	33.95	0.68	1.69	2.38	33.95	0.68	1.69	2.38
27	HSAE-FDW-BHL-0-B673-8-11B-HC	170.4	20/50	PGEL/MW	200	219.1	20	50	70	9.01	1	7.44	0.14	0.37	0.52	7.44	0.14	0.37	0.52
28	HSAE-FDW-BHL-0-B674-8-11B-HC	170.4	20/50	PGEL/MW	200	219.1	20	50	70	8.99	1	7.43	0.14	0.37	0.52	7.43	0.14	0.37	0.52
29	HSAF-BS-BHL-0-B191-6-11C-HC	172	20/40	PGEL/MW	150	168.3	20	40	60	15.25	1	9.67	0.19	0.38	0.58	9.67	0.19	0.38	0.58
30	HSAF-BS-BHL-0-B192-6-11C-HC	172	20/40	PGEL/MW	150	168.3	20	40	60	15.23	1	9.66	0.19	0.38	0.58	9.66	0.19	0.38	0.58
31	HSAF-BS-BHL-0-B193-6-11C-HC	172	20/40	PGEL/MW	150	168.3	20	40	60	105.65	1	67.03	1.34	2.68	4.02	67.03	1.34	2.68	4.02
32	HSSA-AXS-BHL-0-B203-3-23C-HC	480	35/140	PGEL/MW	80	88.9	35	140	175	9.31	1	3.12	0.11	0.43	0.54	3.12	0.11	0.43	0.54
33	HSSA-AXS-BHL-0-B206-3-23C-HC	480	35/140	PGEL/MW	80	88.9	35	140	175	8.84	1	2.96	0.11	0.42	0.53	2.96	0.11	0.42	0.53
34	HSSA-AXS-BHL-0-B211-3-21C-HC	260	15/65	PGEL/MW	80	88.9	15	65	80	24.94	1	8.36	0.12	0.54	0.66	8.36	0.12	0.54	0.66
35	HSSA-AXS-BHL-0-B212-3-21C-HC	260	15/65	PGEL/MW	80	88.9	15	65	80	169.17	1	56.7	0.85	3.68	4.54	56.7	0.85	3.68	4.54
36	HSSA-AXS-BHL-0-B213-3-21C-HC	260	15/65	PGEL/MW	80	88.9	15	65	80	164.95	1	55.28	0.83	3.59	4.42	55.28	0.83	3.59	4.42
37	HSSA-AXS-BHL-0-B253-10-23C-HC	475.9	40/175	PGEL/MW	250	273.1	40	175	215	14.26	1	14.68	0.59	2.57	3.16	14.68	0.59	2.57	3.16
38	HSSA-AXS-BHL-0-B256-10-23C-HC	475.9	40/175	PGEL/MW	250	273.1	40	175	215	14.02	1	14.44	0.58	2.53	3.11	14.44	0.58	2.53	3.11
39	HSSA-AXS-BHL-0-B261-10-11C-HC	190	20/50	PGEL/MW	250	273.1	20	50	70	0.5	1	0.52	0.01	0.02	0.04	0.52	0.01	0.02	0.04
40	HSSA-AXS-BHL-0-B262-10-11C-HC	190	20/50	PGEL/MW	250	273.1	20	50	70	43.11	1	44.39	0.89	2.22	3.11	44.39	0.89	2.22	3.11
41	HSSA-AXS-BHL-0-B263-10-11C-HC	190	20/50	PGEL/MW	250	273.1	20	50	70	77.39	1	79.68	1.6	3.98	5.58	79.68	1.6	3.98	5.58
42	HSAB-AV-BHL-1-B009-6-11B-HC		25/90	PGEL/MW	150	168.3	25	90	115	14.07	4	8.93	0.23	0.8	1.03	35.72	0.92	3.2	4.12
43	HSAB-BSS-BHL-1-B063-18-11C-HC	200	10/65	PGEL/MW	450	457	10	65	75	53.25	4	91.74	0.91	5.96	6.88	366.96	3.64	23.84	27.52
44	HSAB-BSS-BHL-1-B064-12-11C-HC	200	20/50	PGEL/MW	300	323.8	20	50	70	3.43	4	4.19	0.08	0.2	0.29	16.76	0.32	0.8	1.16
45	HSAB-BSS-BHL-1-B065-12-11C-HC	200	20/50	PGEL/MW	300	323.8	20	50	70	2.26	4	2.76	0.06	0.14	0.2	11.04	0.24	0.56	0.8
46	HSAB-HS-BHL-1-B005-16-65C-HC	530	50/200	PGEL/MW	400	406.4	50	200	250	32.47	4	49.75	2.48	9.95	12.43	199	9.92	39.8	49.72
47	HSAB-HS-BHL-1-B006-12-65C-HC	530	40/210	PGEL/MW	300	323.8	40	210	250	7.3	4	8.92	0.36	1.87	2.23	35.68	1.44	7.48	8.92
48	HSAB-HS-BHL-1-B007-12-65C-HC	530	40/210	PGEL/MW	300	323.8	40	210	250	10.05	4	12.26	0.49	2.58	3.07	49.04	1.96	10.32	12.28
49	HSAB-HS-BHL-1-B008-2-65C-HC	530	25/150	PGEL/MW	50	60.3	25	150	175	21.92	4	4.98	0.12	0.74	0.86	19.92	0.48	2.96	3.44
50	HSAD-CDD-BHL-1-B513-14-22B-HC	75.5	10/40	PGEL/MW	350	355.6	10	40	50	33.5	4	44.9	0.44	1.8	2.24	179.6	1.76	7.2	8.96
51	HSAD-CDD-BHL-1-B514-14-22B-HC	104.7	10/40	PGEL/MW	350	355.6	10	40	50	49.47	4	66.32	0.66	2.65	3.31	265.28	2.64	10.6	13.24
52	HSAD-CDD-BHL-1-B515-14-22B-HC	140.1	10/40	PGEL/MW	350	355.6	10	40	50	4.48	4	6	0.06	0.24	0.3	24	0.24	0.96	1.2

SL NO	LINE NUMBER	WORK TEMP	INS THK	INSULATION MATERIAL	NB	OD	INS THK PYROGEL	INS THK MINWOOL	INS THK TOTAL	PIPE LENGTH	NO OF UNITS	PER UNIT				TOTAL			
												INS AREA PER UNIT	INS VOL PG PER UNIT	INS VOL MW PER UNIT	INV VOL COMB PER UNIT	INS AREA TOTAL	INS VOL PG TOTAL	INS VOL MW TOTAL	INS VOL COMB TOTAL
		[Deg C]	[mm]			[mm]	[mm]	[mm]	[mm]	[m]		[Sq.m]	[Cu.m]	[Cu.m]	[Cu.m]	[Sq.m]	[Cu.m]	[Cu.m]	[Cu.m]
53	HSAD-CDD-BHL-1-B516-14-22B-HC	140.1	10/40	PGEL/MW	350	355.6	10	40	50	21.73	4	29.14	0.29	1.16	1.45	116.56	1.16	4.64	5.8
54	HSAE-FDW-BHL-1-B601-16-11C-HC	170.4	20/50	PGEL/MW	400	406.4	20	50	70	42.75	4	65.5	1.31	3.28	4.58	262	5.24	13.12	18.32
55	HSAE-FDW-BHL-1-B602-6-11B-HC	170.4	20/40	PGEL/MW	150	168.3	20	40	60	3	4	1.91	0.04	0.07	0.11	7.64	0.16	0.28	0.44
56	HSAE-FDW-BHL-1-B603-12-11B-HC	170.4	20/50	PGEL/MW	300	323.8	20	50	70	1.88	4	2.29	0.05	0.12	0.17	9.16	0.2	0.48	0.68
57	HSAE-FDW-BHL-1-B604-14-11B-HC	170.4	20/50	PGEL/MW	350	355.6	20	50	70	8.05	4	10.79	0.22	0.54	0.76	43.16	0.88	2.16	3.04
58	HSAE-FDW-BHL-1-B605-12-11B-HC	170.4	20/50	PGEL/MW	300	323.8	20	50	70	11.93	4	14.57	0.29	0.73	1.02	58.28	1.16	2.92	4.08
59	HSAE-FDW-BHL-1-B606-10-51C-HC	174.4	20/50	PGEL/MW	250	273.1	20	50	70	10.09	4	10.39	0.2	0.52	0.72	41.56	0.8	2.08	2.88
60	HSAE-FDW-BHL-1-B607-4-51C-HC	174.4	20/40	PGEL/MW	100	114.3	20	40	60	26.91	4	11.59	0.23	0.47	0.7	46.36	0.92	1.88	2.8
61	HSAE-FDW-BHL-1-B608-12-11B-HC	170.4	20/50	PGEL/MW	300	323.8	20	50	70	1.88	4	2.29	0.05	0.12	0.17	9.16	0.2	0.48	0.68
62	HSAE-FDW-BHL-1-B609-14-11B-HC	170.4	20/50	PGEL/MW	350	355.6	20	50	70	8.05	4	10.79	0.22	0.54	0.76	43.16	0.88	2.16	3.04
63	HSAE-FDW-BHL-1-B610-12-11B-HC	170.4	20/50	PGEL/MW	300	323.8	20	50	70	11.93	4	14.57	0.29	0.73	1.02	58.28	1.16	2.92	4.08
64	HSAE-FDW-BHL-1-B611-10-51C-HC	174.4	20/50	PGEL/MW	250	273.1	20	50	70	10.09	4	10.39	0.2	0.52	0.72	41.56	0.8	2.08	2.88
65	HSAE-FDW-BHL-1-B612-4-51C-HC	174.4	20/40	PGEL/MW	100	114.3	20	40	60	30.91	4	13.32	0.26	0.53	0.79	53.28	1.04	2.12	3.16
66	HSAE-FDW-BHL-1-B613-12-11B-HC	170.4	20/50	PGEL/MW	300	323.8	20	50	70	1.88	4	2.29	0.05	0.12	0.17	9.16	0.2	0.48	0.68
67	HSAE-FDW-BHL-1-B614-14-11B-HC	170.4	20/50	PGEL/MW	350	355.6	20	50	70	8.05	4	10.79	0.22	0.54	0.76	43.16	0.88	2.16	3.04
68	HSAE-FDW-BHL-1-B615-12-11B-HC	170.4	20/50	PGEL/MW	300	323.8	20	50	70	11.93	4	14.57	0.29	0.73	1.02	58.28	1.16	2.92	4.08
69	HSAE-FDW-BHL-1-B616-10-51C-HC	174.4	20/50	PGEL/MW	250	273.1	20	50	70	11.32	4	11.65	0.23	0.59	0.82	46.6	0.92	2.36	3.28
70	HSAE-FDW-BHL-1-B617-4-51C-HC	174.4	20/40	PGEL/MW	100	114.3	20	40	60	26.91	4	11.59	0.23	0.47	0.7	46.36	0.92	1.88	2.8
71	HSAE-FDW-BHL-1-B618-14-51C-HC	174.4	20/50	PGEL/MW	350	355.6	20	50	70	7.44	4	9.97	0.2	0.5	0.71	39.88	0.8	2	2.84
72	HSAE-FDW-BHL-1-B619-14-51C-HC	174.4	20/50	PGEL/MW	350	355.6	20	50	70	50.6	4	67.84	1.36	3.4	4.75	271.36	5.44	13.6	19
73	HSAE-FDW-BHL-1-B620-14-51C-HC	202.9	20/75	PGEL/MW	350	355.6	20	75	95	32.34	4	43.36	0.86	3.25	4.12	173.44	3.44	13	16.48
74	HSAE-FDW-BHL-1-B621-14-61C-HC	236.5	20/75	PGEL/MW	350	355.6	20	75	95	41.68	4	55.87	1.12	4.19	5.3	223.48	4.48	16.76	21.2
75	HSAE-FDW-BHL-1-B622-3-51C-HC	174.4	20/40	PGEL/MW	80	88.9	20	40	60	70.88	4	23.76	0.48	0.95	1.43	95.04	1.92	3.8	5.72
76	HSAF-BS-BHL-1-B194-6-11C-HC	172	20/40	PGEL/MW	150	168.3	20	40	60	72.46	4	45.97	0.92	1.84	2.76	183.88	3.68	7.36	11.04
77	HSAF-EXS-BHL-1-B006-8-21C-HC	312.3	30/100	PGEL/MW	200	219.1	30	100	130	13.67	4	11.29	0.34	1.13	1.46	45.16	1.36	4.52	5.84
78	HSAF-EXS-BHL-1-B301-8-21C-HC	338.7	25/90	PGEL/MW	200	219.1	25	90	115	23.8	4	19.66	0.49	1.76	2.26	78.64	1.96	7.04	9.04
79	HSAF-EXS-BHL-1-B303-10-21C-HC	262.6	25/75	PGEL/MW	250	273.1	25	75	100	35.38	4	36.42	0.91	2.74	3.65	145.68	3.64	10.96	14.6
80	HSAF-EXS-BHL-1-B305-10-11C-HC	196.5	20/50	PGEL/MW	250	273.1	20	50	70	7.02	4	7.22	0.14	0.36	0.5	28.88	0.56	1.44	2
81	HSAF-EXS-BHL-1-B306-10-11C-HC	196.5	20/50	PGEL/MW	250	273.1	20	50	70	7.47	4	7.69	0.16	0.38	0.54	30.76	0.64	1.52	2.16
82	HSAF-EXS-BHL-1-B307-14-11C-HC	196.5	20/50	PGEL/MW	350	355.6	20	50	70	1	4	1.34	0.02	0.07	0.1	5.36	0.08	0.28	0.4
83	HSAF-EXS-BHL-1-B308-14-11C-HC	196.5	20/50	PGEL/MW	350	355.6	20	50	70	17.91	4	24.01	0.48	1.2	1.68	96.04	1.92	4.8	6.72
84	HSAF-EXS-BHL-1-B309-8-11C-HC	196.5	20/50	PGEL/MW	200	219.1	20	50	70	13.11	4	10.82	0.22	0.54	0.76	43.28	0.88	2.16	3.04
85	HSAF-EXS-BHL-1-B312-16-11C-HC	142.98	10/40	PGEL/MW	400	406.4	10	40	50	3.48	4	5.33	0.05	0.22	0.26	21.32	0.2	0.88	1.04
86	HSAF-EXS-BHL-1-B313-16-11C-HC	142.98	10/40	PGEL/MW	400	406.4	10	40	50	3.48	4	5.33	0.05	0.22	0.26	21.32	0.2	0.88	1.04
87	HSAF-EXS-BHL-1-B314-24-11C-HC	142.98	15/50	PGEL/MW	600	610	15	50	65	1	4	2.3	0.04	0.12	0.16	9.2	0.16	0.48	0.64
88	HSAF-EXS-BHL-1-B316-20-11C-HC	107.33	15/50	PGEL/MW	500	508	15	50	65	2.86	4	5.47	0.08	0.28	0.36	21.88	0.32	1.12	1.44
89	HSAF-EXS-BHL-1-B317-20-11C-HC	107.33	15/50	PGEL/MW	500	508	15	50	65	2.86	4	5.47	0.08	0.28	0.36	21.88	0.32	1.12	1.44
90	HSAF-EXS-BHL-1-B318-30-11C-HC	107.33	15/50	PGEL/MW	750	762	15	50	65	27.71	4	79.6	1.19	3.98	5.17	318.4	4.76	15.92	20.68
91	HSAF-EXS-BHL-1-B320-30-11C-HC	78.17	15/50	PGEL/MW	750	762	15	50	65	5.17	4	14.86	0.23	0.74	0.97	59.44	0.92	2.96	3.88
92	HSAF-EXS-BHL-1-B321-30-11C-HC	78.17	15/50	PGEL/MW	750	762	15	50	65	5.17	4	14.86	0.23	0.74	0.97	59.44	0.92	2.96	3.88
93	HSAF-EXS-BHL-1-B322-44-11C-HC	78.17	15/50	PGEL/MW	1100	1118	15	50	65	26.71	4	112.57	1.69	5.63	7.32	450.28	6.76	22.52	29.28
94	HSAF-HD-BHL-1-B701-6-21B-HC	208.8	20/65	PGEL/MW	150	168.3	20	65	85	19.39	4	12.3	0.25	0.8	1.06	49.2	1	3.2	4.24
95	HSAF-HD-BHL-1-B702-6-21B-HC	204.3	20/65	PGEL/MW	150	168.3	20	65	85	6.98	4	4.43	0.08	0.29	0.37	17.72	0.32	1.16	1.48
96	HSAF-HD-BHL-1-B703-6-21B-HC	208.8	20/65	PGEL/MW	150	168.3	20	65	85	4.03	4	2.56	0.05	0.17	0.22	10.24	0.2	0.68	0.88
97	HSAF-HD-BHL-1-B704-6-21B-HC	170.4	20/40	PGEL/MW	150	168.3	20	40	60	6.14	4	3.9	0.08	0.16	0.24	15.6	0.32	0.64	0.96
98	HSAF-HD-BHL-1-B705-6-21B-HC	208.8	20/65	PGEL/MW	150	168.3	20	65	85	4.58	4	2.9	0.06	0.19	0.25	11.6	0.24	0.76	1
99	HSAF-HD-BHL-1-B706-8-21B-HC	208.8	10/40	PGEL/MW	200	219.1	10	40	50	19.02	4	15.71	0.16	0.62	0.78	62.84	0.64	2.48	3.12
100	HSAF-HD-BHL-1-B708-6-21B-HC	180.4	20/40	PGEL/MW	150	168.3	20	40	60	4.03	4	2.56	0.05	0.11	0.16	10.24	0.2	0.44	0.64
101	HSAF-HD-BHL-1-B709-6-21B-HC	180.4	20/40	PGEL/MW	150	168.3	20	40	60	8.39	4	5.33	0.11	0.22	0.32	21.32	0.44	0.88	1.28
102	HSAF-HD-BHL-1-B710-6-21B-HC	180.4	20/40	PGEL/MW	150	168.3	20	40	60	4.58	4	2.9	0.06	0.12	0.18	11.6	0.24	0.48	0.72
103	HSAF-HD-BHL-1-B711-8-21B-HC	180.4	10/40	PGEL/MW	200	219.1	10	40	50	17.16	4	14.17	0.14	0.56	0.71	56.68	0.56	2.24	2.84
104	HSAF-HD-BHL-1-B714-36-11B-HC		15/50	PGEL/MW	900	914	15	50	65	5.46	4	18.82	0.29	0.94	1.22	75.28	1.16	3.76	4.88
105	HSAF-HD-BHL-1-B751-6-11B-HC	110.3	10/40	PGEL/MW	150	168.3	10	40	50	3.88	4	2.46	0.02	0.1	0.12	9.84	0.08	0.4	0.48
106	HSAF-HD-BHL-1-B753-6-11B-HC	110.3	10/40	PGEL/MW	150	168.3	10	40	50	5.94	4	3.77	0.04	0.16	0.19	15.08	0.16	0.64	0.76
107	HSAF-HD-BHL-1-B754-8-11B-HC	110.3	10/40	PGEL/MW	200	219.1	10	40	50	10.76	4	8.89	0.08	0.36	0.44	35.56	0.32	1.44	1.76
108	HSAF-HD-BHL-1-B755-8-11B-HC	81.1	10/40	PGEL/MW	200	219.1	10	40	50	3.99	4	3.3	0.04	0.13	0.17	13.2	0.16	0.52	0.68
109	HSAF-HD-BHL-1-B757-8-11B-HC	81.1	10/40	PGEL/MW	200	219.1	10	40	50	5.64	4	4.66	0.05	0.19	0.24	18.64	0.2	0.76	0.96
110	HSAF-HD-BHL-1-B758-10-11B-HC	81.1	10/40	PGEL/MW	250	273.1	10	40	50	10.99	4	11.32	0.11	0.46	0.56	45.28	0.44	1.84	2.24
111	HSAF-HD-BHL-1-B759-10-11B-HC	78	10/40	PGEL/MW	250	273.1	10	40	50	28.86	4	29.71	0.3	1.19	1.49	118.84	1.2	4.76	5.96

SL NO	LINE NUMBER	WORK TEMP	INS THK	INSULATION MATERIAL	NB	OD	INS THK PYROGEL	INS THK MINWOOL	INS THK TOTAL	PIPE LENGTH	NO OF UNITS	PER UNIT				TOTAL			
												INS AREA PER UNIT	INS VOL PG PER UNIT	INS VOL MW PER UNIT	INV VOL COMB PER UNIT	INS AREA TOTAL	INS VOL PG TOTAL	INS VOL MW TOTAL	INS VOL COMB TOTAL
		[Deg C]	[mm]			[mm]	[mm]	[mm]	[mm]	[m]		[Sq.m]	[Cu.m]	[Cu.m]	[Cu.m]	[Sq.m]	[Cu.m]	[Cu.m]	[Cu.m]
112	HSAF-HD-BHL-1-B760-10-11B-HC	78	10/40	PGEL/MW	250	273.1	10	40	50	14.75	4	15.19	0.16	0.61	0.77	60.76	0.64	2.44	3.08
113	HSSA-AXS-BHL-1-B004-14-11C-HC	220	10/65	PGEL/MW	350	355.6	10	65	75	2.59	4	3.47	0.04	0.23	0.26	13.88	0.16	0.92	1.04
114	HSSA-AXS-BHL-1-B214-3-21C-HC	260	15/65	PGEL/MW	80	88.9	15	65	80	4.83	4	1.62	0.02	0.11	0.13	6.48	0.08	0.44	0.52
115	HSSA-AXS-BHL-1-B215-1.5-21C-HC	260	0/80	PGEL/MW	40	48.3	0	80	80	5.31	4	0.97	0	0.07	0.07	3.88	0	0.28	0.28
116	HSSA-AXS-BHL-1-B216-1.5-21C-HC	260	0/80	PGEL/MW	40	48.3	0	80	80	4.59	4	0.84	0	0.07	0.07	3.36	0	0.28	0.28
117	HSSA-AXS-BHL-1-B264-8-11C-HC	190	20/50	PGEL/MW	200	219.1	20	50	70	65.24	4	53.89	1.08	2.7	3.78	215.56	4.32	10.8	15.12
118	WBS-GS-BHL-1-T100-2-21C-HC		20/65	PGEL/MW	50	60.3	20	65	85	1	4	0.23	0	0.01	0.01	0.92	0	0.04	0.04
119	WBS-GS-BHL-1-T103-12-11B-HC		30/100	PGEL/MW	300	323.8	30	100	130	1.37	4	1.67	0.05	0.17	0.22	6.68	0.2	0.68	0.88
120	WBS-GS-BHL-1-T104-6-11B-HC		25/90	PGEL/MW	150	168.3	25	90	115	2.37	4	1.5	0.04	0.13	0.17	6	0.16	0.52	0.68
121	WBS-GS-BHL-1-T105-10-11B-HC		25/100	PGEL/MW	250	273.1	25	100	125	2.93	4	3.01	0.07	0.3	0.37	12.04	0.28	1.2	1.48
122	WBS-GS-BHL-1-T120-6-11B-HC		25/90	PGEL/MW	150	168.3	25	90	115	26.3	4	16.69	0.42	1.5	1.92	66.76	1.68	6	7.68
123	WBS-GS-BHL-1-T121-6-11B-HC		25/90	PGEL/MW	150	168.3	25	90	115	8.59	4	5.45	0.13	0.49	0.62	21.8	0.52	1.96	2.48
	TOTAL											**3113.9**	**71.26**	**267.2**	**338.5**	**7357.17**	**148.9**	**526.37**	**675.22**

INPUT TO E&C TENDER

PROJECT: RIL CCPP 4 x 93.1 MW STG (HMD)

WONO: 1-0-851-358-00

ESTIMATED PIPING PAINTING AREA

SL NO	LINE NUMBER	MATERIAL	WORK TEMP	NB	OD	PIPE LENGTH	NO OF UNITS	PER UNIT PAINT AREA	TOTAL PAINT AREA
			[Deg C]		[mm]	[m]		[Sq.m]	[Sq.m]
A	**INSULATED PIPES**								
1	HSAB-BSS-BHL-0-B051-10-65C-HC	AS	530	250	273.1	39.66	1	40.84	40.84
2	HSAB-BSS-BHL-0-B052-10-65C-HC	AS	530	250	273.1	1.5	1	1.55	1.55
3	HSAB-BSS-BHL-0-B053-10-65C-HC	AS	530	250	273.1	3.24	1	3.34	3.34
4	HSAB-BSS-BHL-0-B054-32-23C-HC	AS	474	800	819	1	1	3.08	3.08
5	HSAB-BSS-BHL-0-B055-32-23C-HC	AS	474	800	819	1	1	3.08	3.08
6	HSAB-HS-BHL-0-B001-20-65C-HC	AS	530	500	508	6.29	1	12.05	12.05
7	HSAB-HS-BHL-0-B002-20-65C-HC	AS	530	500	508	6.29	1	12.05	12.05
8	HSAB-HS-BHL-0-B003-20-65C-HC	AS	530	500	508	116.8	1	223.68	223.68
9	HSAB-HS-BHL-0-B004-20-65C-HC	AS	530	500	508	111.8	1	214.1	214.10
10	HSAB-HS-BHL-0-B010-4-65C-HC	AS	530	100	114.3	22.11	1	9.53	9.53
11	HSAB-HS-BHL-0-B201-1.5-65C-HC	AS	530	40	48.3	1.3	1	0.24	0.24
12	HSAB-HS-BHL-0-B202-1.5-65C-HC	AS	530	40	48.3	1.89	1	0.35	0.35
13	HSAB-HS-BHL-0-B251-3-65C-HC	AS	530	80	88.9	1.77	1	0.59	0.59
14	HSAB-HS-BHL-0-B252-3-65C-HC	AS	530	80	88.9	1	1	0.34	0.34
15	HSSA-AXS-BHL-0-B203-3-23C-HC	AS	480	80	88.9	9.31	1	3.12	3.12
16	HSSA-AXS-BHL-0-B206-3-23C-HC	AS	480	80	88.9	8.84	1	2.96	2.96
17	HSSA-AXS-BHL-0-B253-10-23C-HC	AS	475.9	250	273.1	14.26	1	14.68	14.68
18	HSSA-AXS-BHL-0-B256-10-23C-HC	AS	475.9	250	273.1	14.02	1	14.44	14.44
19	HSAB-BSS-BHL-0-B062-28-11C-HC	CS	200	700	711	139.4	1	373.64	373.64
20	HSAE-FDW-BHL-0-B651-18-61C-HC	CS	236.5	450	457	58.49	1	100.76	100.76
21	HSAE-FDW-BHL-0-B652-18-61C-HC	CS	236.5	450	457	73.67	1	126.92	126.92
22	HSAE-FDW-BHL-0-B653-18-61C-HC	CS	236.5	450	457	14.93	1	25.73	25.73
23	HSAE-FDW-BHL-0-B654-18-61C-HC	CS	236.5	450	457	14.93	1	25.73	25.73
24	HSAE-FDW-BHL-0-B655-3-51C-HC	CS	174.4	80	88.9	122.17	1	40.94	40.94
25	HSAE-FDW-BHL-0-B661-1-51C-HC	CS	174.4	25	33.4	20.46	1	2.58	2.58
26	HSAE-FDW-BHL-0-B662-1-51C-HC	CS	174.4	25	33.4	20.18	1	2.54	2.54
27	HSAE-FDW-BHL-0-B671-2-51C-HC	CS	174.4	50	60.3	16.22	1	3.68	3.68
28	HSAE-FDW-BHL-0-B671-8-11B-HC	CS	170.4	200	219.1	64.4	1	53.2	53.20
29	HSAE-FDW-BHL-0-B672-2-51C-HC	CS	174.4	50	60.3	16.22	1	3.68	3.68
30	HSAE-FDW-BHL-0-B672-8-11B-HC	CS	170.4	200	219.1	41.1	1	33.95	33.95
31	HSAE-FDW-BHL-0-B673-8-11B-HC	CS	170.4	200	219.1	9.01	1	7.44	7.44
32	HSAE-FDW-BHL-0-B674-8-11B-HC	CS	170.4	200	219.1	8.99	1	7.43	7.43
33	HSAF-BS-BHL-0-B191-6-11C-HC	CS	172	150	168.3	15.25	1	9.67	9.67
34	HSAF-BS-BHL-0-B192-6-11C-HC	CS	172	150	168.3	15.23	1	9.66	9.66
35	HSAF-BS-BHL-0-B193-6-11C-HC	CS	172	150	168.3	105.65	1	67.03	67.03
36	HSSA-AXS-BHL-0-B211-3-21C-HC	CS	260	80	88.9	24.94	1	8.36	8.36
37	HSSA-AXS-BHL-0-B212-3-21C-HC	CS	260	80	88.9	169.17	1	56.7	56.70
38	HSSA-AXS-BHL-0-B213-3-21C-HC	CS	260	80	88.9	164.95	1	55.28	55.28
39	HSSA-AXS-BHL-0-B261-10-11C-HC	CS	190	250	273.1	0.5	1	0.52	0.52
40	HSSA-AXS-BHL-0-B262-10-11C-HC	CS	190	250	273.1	43.11	1	44.39	44.39
41	HSSA-AXS-BHL-0-B263-10-11C-HC	CS	190	250	273.1	77.39	1	79.68	79.68
42	HSAB-HS-BHL-1-B005-16-65C-HC	AS	530	400	406.4	32.47	4	49.75	199.00
43	HSAB-HS-BHL-1-B006-12-65C-HC	AS	530	300	323.8	7.3	4	8.92	35.68
44	HSAB-HS-BHL-1-B007-12-65C-HC	AS	530	300	323.8	10.05	4	12.26	49.04
45	HSAB-HS-BHL-1-B008-2-65C-HC	AS	530	50	60.3	21.92	4	4.98	19.92
46	HSAB-AV-BHL-1-B009-6-11B-HC	CS		150	168.3	14.07	4	8.93	35.72
47	HSAB-BSS-BHL-1-B063-18-11C-HC	CS	200	450	457	53.25	4	91.74	366.96
48	HSAB-BSS-BHL-1-B064-12-11C-HC	CS	200	300	323.8	3.43	4	4.19	16.76
49	HSAB-BSS-BHL-1-B065-12-11C-HC	CS	200	300	323.8	2.26	4	2.76	11.04
50	HSAE-FDW-BHL-1-B601-16-11C-HC	CS	170.4	400	406.4	42.75	4	65.5	262.00
51	HSAE-FDW-BHL-1-B602-6-11B-HC	CS	170.4	150	168.3	3	4	1.91	7.64
52	HSAE-FDW-BHL-1-B603-12-11B-HC	CS	170.4	300	323.8	1.88	4	2.29	9.16
53	HSAE-FDW-BHL-1-B604-14-11B-HC	CS	170.4	350	355.6	8.05	4	10.79	43.16
54	HSAE-FDW-BHL-1-B605-12-11B-HC	CS	170.4	300	323.8	11.93	4	14.57	58.28
55	HSAE-FDW-BHL-1-B606-10-51C-HC	CS	174.4	250	273.1	10.09	4	10.39	41.56
56	HSAE-FDW-BHL-1-B607-4-51C-HC	CS	174.4	100	114.3	26.91	4	11.59	46.36
57	HSAE-FDW-BHL-1-B608-12-11B-HC	CS	170.4	300	323.8	1.88	4	2.29	9.16
58	HSAE-FDW-BHL-1-B609-14-11B-HC	CS	170.4	350	355.6	8.05	4	10.79	43.16

SL NO	LINE NUMBER	MATERIAL	WORK TEMP	NB	OD	PIPE LENGTH	NO OF UNITS	PER UNIT PAINT AREA	TOTAL PAINT AREA
			[Deg C]		[mm]	[m]		[Sq.m]	[Sq.m]
59	HSAE-FDW-BHL-1-B610-12-11B-HC	CS	170.4	300	323.8	11.93	4	14.57	58.28
60	HSAE-FDW-BHL-1-B611-10-51C-HC	CS	174.4	250	273.1	10.09	4	10.39	41.56
61	HSAE-FDW-BHL-1-B612-4-51C-HC	CS	174.4	100	114.3	30.91	4	13.32	53.28
62	HSAE-FDW-BHL-1-B613-12-11B-HC	CS	170.4	300	323.8	1.88	4	2.29	9.16
63	HSAE-FDW-BHL-1-B614-14-11B-HC	CS	170.4	350	355.6	8.05	4	10.79	43.16
64	HSAE-FDW-BHL-1-B615-12-11B-HC	CS	170.4	300	323.8	11.93	4	14.57	58.28
65	HSAE-FDW-BHL-1-B616-10-51C-HC	CS	174.4	250	273.1	11.32	4	11.65	46.60
66	HSAE-FDW-BHL-1-B617-4-51C-HC	CS	174.4	100	114.3	26.91	4	11.59	46.36
67	HSAE-FDW-BHL-1-B618-14-51C-HC	CS	174.4	350	355.6	7.44	4	9.97	39.88
68	HSAE-FDW-BHL-1-B619-14-51C-HC	CS	174.4	350	355.6	50.6	4	67.84	271.36
69	HSAE-FDW-BHL-1-B620-14-51C-HC	CS	202.9	350	355.6	32.34	4	43.36	173.44
70	HSAE-FDW-BHL-1-B621-14-61C-HC	CS	236.5	350	355.6	41.68	4	55.87	223.48
71	HSAE-FDW-BHL-1-B622-3-51C-HC	CS	174.4	80	88.9	70.88	4	23.76	95.04
72	HSAF-BS-BHL-1-B194-6-11C-HC	CS	172	150	168.3	72.46	4	45.97	183.88
73	HSAF-EXS-BHL-1-B006-8-21C-HC	CS	312.3	200	219.1	13.67	4	11.29	45.16
74	HSAF-EXS-BHL-1-B301-8-21C-HC	CS	338.7	200	219.1	23.8	4	19.66	78.64
75	HSAF-EXS-BHL-1-B303-10-21C-HC	CS	262.6	250	273.1	35.38	4	36.42	145.68
76	HSAF-EXS-BHL-1-B305-10-11C-HC	CS	196.5	250	273.1	7.02	4	7.22	28.88
77	HSAF-EXS-BHL-1-B306-10-11C-HC	CS	196.5	250	273.1	7.47	4	7.69	30.76
78	HSAF-EXS-BHL-1-B307-14-11C-HC	CS	196.5	350	355.6	1	4	1.34	5.36
79	HSAF-EXS-BHL-1-B308-14-11C-HC	CS	196.5	350	355.6	17.91	4	24.01	96.04
80	HSAF-EXS-BHL-1-B309-8-11C-HC	CS	196.5	200	219.1	13.11	4	10.82	43.28
81	HSAF-EXS-BHL-1-B312-16-11C-HC	CS	142.98	400	406.4	3.48	4	5.33	21.32
82	HSAF-EXS-BHL-1-B313-16-11C-HC	CS	142.98	400	406.4	3.48	4	5.33	21.32
83	HSAF-EXS-BHL-1-B314-24-11C-HC	CS	142.98	600	610	1	4	2.3	9.20
84	HSAF-EXS-BHL-1-B316-20-11C-HC	CS	107.33	500	508	2.86	4	5.47	21.88
85	HSAF-EXS-BHL-1-B317-20-11C-HC	CS	107.33	500	508	2.86	4	5.47	21.88
86	HSAF-EXS-BHL-1-B318-30-11C-HC	CS	107.33	750	762	27.71	4	79.6	318.40
87	HSAF-EXS-BHL-1-B320-30-11C-HC	CS	78.17	750	762	5.17	4	14.86	59.44
88	HSAF-EXS-BHL-1-B321-30-11C-HC	CS	78.17	750	762	5.17	4	14.86	59.44
89	HSAF-EXS-BHL-1-B322-44-11C-HC	CS	78.17	1100	1118	26.71	4	112.57	450.28
90	HSAF-HD-BHL-1-B701-6-21B-HC	CS	208.8	150	168.3	19.39	4	12.3	49.20
91	HSAF-HD-BHL-1-B702-6-21B-HC	CS	204.3	150	168.3	6.98	4	4.43	17.72
92	HSAF-HD-BHL-1-B703-6-21B-HC	CS	208.8	150	168.3	4.03	4	2.56	10.24
93	HSAF-HD-BHL-1-B704-6-21B-HC	CS	170.4	150	168.3	6.14	4	3.9	15.60
94	HSAF-HD-BHL-1-B705-6-21B-HC	CS	208.8	150	168.3	4.58	4	2.9	11.60
95	HSAF-HD-BHL-1-B706-8-21B-HC	CS	208.8	200	219.1	19.02	4	15.71	62.84
96	HSAF-HD-BHL-1-B708-6-21B-HC	CS	180.4	150	168.3	4.03	4	2.56	10.24
97	HSAF-HD-BHL-1-B709-6-21B-HC	CS	180.4	150	168.3	8.39	4	5.33	21.32
98	HSAF-HD-BHL-1-B710-6-21B-HC	CS	180.4	150	168.3	4.58	4	2.9	11.60
99	HSAF-HD-BHL-1-B711-8-21B-HC	CS	180.4	200	219.1	17.16	4	14.17	56.68
100	HSAF-HD-BHL-1-B714-36-11B-HC	CS		900	914	5.46	4	18.82	75.28
101	HSAF-HD-BHL-1-B751-6-11B-HC	CS	110.3	150	168.3	3.88	4	2.46	9.84
102	HSAF-HD-BHL-1-B753-6-11B-HC	CS	110.3	150	168.3	5.94	4	3.77	15.08
103	HSAF-HD-BHL-1-B754-8-11B-HC	CS	110.3	200	219.1	10.76	4	8.89	35.56
104	HSAF-HD-BHL-1-B755-8-11B-HC	CS	81.1	200	219.1	3.99	4	3.3	13.20
105	HSAF-HD-BHL-1-B757-8-11B-HC	CS	81.1	200	219.1	5.64	4	4.66	18.64
106	HSAF-HD-BHL-1-B758-10-11B-HC	CS	81.1	250	273.1	10.99	4	11.32	45.28
107	HSAF-HD-BHL-1-B759-10-11B-HC	CS	78	250	273.1	28.86	4	29.71	118.84
108	HSAF-HD-BHL-1-B760-10-11B-HC	CS	78	250	273.1	14.75	4	15.19	60.76
109	HSSA-AXS-BHL-1-B004-14-11C-HC	CS	220	350	355.6	2.59	4	3.47	13.88
110	HSSA-AXS-BHL-1-B214-3-21C-HC	CS	260	80	88.9	4.83	4	1.62	6.48
111	HSSA-AXS-BHL-1-B215-1.5-21C-HC	CS	260	40	48.3	5.31	4	0.97	3.88
112	HSSA-AXS-BHL-1-B216-1.5-21C-HC	CS	260	40	48.3	4.59	4	0.84	3.36
113	HSSA-AXS-BHL-1-B264-8-11C-HC	CS	190	200	219.1	65.24	4	53.89	215.56
114	WBS-GS-BHL-1-T100-2-21C-HC	CS		50	60.3	1	4	0.23	0.92
115	WBS-GS-BHL-1-T103-12-11B-HC	CS		300	323.8	1.37	4	1.67	6.68
116	WBS-GS-BHL-1-T104-6-11B-HC	CS		150	168.3	2.37	4	1.5	6.00
117	WBS-GS-BHL-1-T105-10-11B-HC	CS		250	273.1	2.93	4	3.01	12.04
118	WBS-GS-BHL-1-T120-6-11B-HC	CS		150	168.3	26.3	4	16.69	66.76
119	WBS-GS-BHL-1-T121-6-11B-HC	CS		150	168.3	8.59	4	5.45	21.80
120	HSAD-CDD-BHL-1-B513-14-22B-HC	SS	75.5	350	355.6	33.5	4	44.9	179.60
121	HSAD-CDD-BHL-1-B514-14-22B-HC	SS	104.7	350	355.6	49.47	4	66.32	265.28
122	HSAD-CDD-BHL-1-B515-14-22B-HC	SS	140.1	350	355.6	4.48	4	6	24.00
123	HSAD-CDD-BHL-1-B516-14-22B-HC	SS	140.1	350	355.6	21.73	4	29.14	116.56

SL NO	LINE NUMBER	MATERIAL	WORK TEMP	NB	OD	PIPE LENGTH	NO OF UNITS	PER UNIT PAINT AREA	TOTAL PAINT AREA
			[Deg C]		[mm]	[m]		[Sq.m]	[Sq.m]
	INSULATED PIPES - TOTAL							**3113.94**	**7357.17**
B	**UNINSULATED PIPES**								
1	WCR-BHL-0-B013-44-11D	CS		1000	1016	4.44	1	17	17.00
2	WCR-BHL-0-B014A-28-11D	CS		700	711	2.31	1	6.19	6.19
3	WCR-BHL-0-B014B-28-11D	CS		700	711	2.31	1	6.19	6.19
4	WCR-BHL-0-B014C-28-11D	CS		700	711	2.31	1	6.19	6.19
5	WCR-BHL-0-B073B-10-11D	CS		250	273.1	11.72	1	12.07	12.07
6	WCR-BHL-0-B074A-14-11D	CS		350	355.6	43.64	1	58.5	58.50
7	WCR-BHL-0-B074B-24-11D	CS		600	610	71.92	1	165.4	165.40
8	WCR-BHL-0-B074C-20-11D	CS		500	508	98.71	1	189.04	189.04
9	WCR-BHL-0-B074D-14-11D	CS		350	355.6	43.99	1	58.97	58.97
10	WCR-BHL-0-B116-44-11D	CS		1000	1016	14.06	1	53.86	53.86
11	WCS-BHL-0-B001A-24-11D	CS		600	610	3.69	1	8.48	8.48
12	WCS-BHL-0-B001B-24-11D	CS		600	610	3.69	1	8.48	8.48
13	WCS-BHL-0-B001C-24-11D	CS		600	610	3.69	1	8.48	8.48
14	WCS-BHL-0-B002A-30-11D	CS		750	762	34.48	1	99.05	99.05
15	WCS-BHL-0-B002C-30-11D	CS		750	762	40.6	1	116.63	116.63
16	WCS-BHL-0-B007-24-11D	CS		600	610	61.78	1	142.07	142.07
17	WCS-BHL-0-B008-20-11D	CS		500	508	77.87	1	149.12	149.12
18	WCS-BHL-0-B009A-6-11D	CS		150	168.3	11.23	1	7.13	7.13
19	WCS-BHL-0-B010A-3-11D	CS		80	88.9	3.59	1	1.2	1.20
20	WCS-BHL-0-B011A-3-11D	CS		80	88.9	3.59	1	1.2	1.20
21	WCS-BHL-0-B012A-3-11D	CS		80	88.9	3.59	1	1.2	1.20
22	WCS-BHL-0-B073A-10-11D	CS		250	273.1	10.74	1	11.05	11.05
23	WCS-BHL-0-B076-14-11D	CS		350	355.6	43.64	1	58.5	58.50
24	WCS-BHL-0-B115-14-11D	CS		350	355.6	43.99	1	58.97	58.97
25	HSAD-CDD-BHL-0-B579-3-22B-NI	SS	48.5	80	88.9	37.71	1	12.64	12.64
26	HSAD-CDD-BHL-0-B580-3-22B-NI	SS	48.5	80	88.9	62.73	1	21.02	21.02
27	HSAD-CDD-BHL-0-B581-4-22B-NI	SS	48.5	100	114.3	41.8	1	18.01	18.01
28	HSAD-CDD-BHL-0-B582-4-22B-NI	SS	48.5	100	114.3	11.43	1	4.92	4.92
29	HSAD-CDD-BHL-1-B403-16-11B-NI	CS	47.3	400	406.4	1.25	4	1.92	7.68
30	HSAD-CDD-BHL-1-B404-16-11B-NI	CS	47.3	400	406.4	3.19	4	4.88	19.52
31	HSAD-CDD-BHL-1-B405-16-11B-NI	CS	47.3	400	406.4	3.19	4	4.88	19.52
32	HSAD-CDD-BHL-1-B406-10-11B-NI	CS	47.3	250	273.1	1.69	4	1.74	6.96
33	HSAD-CDD-BHL-1-B407-10-11B-NI	CS	47.3	250	273.1	1.69	4	1.74	6.96
34	HSAD-CDD-BHL-1-B408-10-11B-NI	CS	47.3	250	273.1	11.88	4	12.23	48.92
35	HSAD-CDD-BHL-1-B409-10-11B-NI	CS	49.2	250	273.1	7	4	7.21	28.84
36	HSAD-CDD-BHL-1-B410-3-11B-NI	CS	49.2	80	88.9	6.17	4	2.06	8.24
37	HSAD-CDD-BHL-1-B4XX-10-11B-NI	CS	47.3	250	273.1	14.5	4	14.93	59.72
38	HSAD-VA-BHL-1-B411-4-11B-NI	CS		100	114.3	13.27	4	5.72	22.88
39	HSAD-VA-BHL-1-B412-4-11B-NI	CS		100	114.3	8.6	4	3.71	14.84
40	HSAD-VA-BHL-1-B413-6-11B-NI	CS		150	168.3	11.52	4	7.31	29.24
41	HSAD-VA-BHL-1-B416-10-11B-NI	CS		250	273.1	3.89	4	4.01	16.04
42	HSAD-VA-BHL-1-B4X1-6-11B-NI	CS		150	168.3	4.08	4	2.59	10.36
43	HSAD-VA-BHL-1-B4X2-6-11B-NI	CS		150	168.3	4.08	4	2.59	10.36
44	LO-BHL-1-T027-8-11A	CS		200	219.1	2.47	4	2.04	8.16
45	LO-BHL-1-T028-8-11A	CS		200	219.1	5.51	4	4.55	18.20
46	LO-BHL-1-T029-6-11A	CS		150	168.3	5.88	4	3.73	14.92
47	LO-BHL-1-T030-6-11A	CS		150	168.3	5.9	4	3.74	14.96
48	LO-BHL-1-T032-10-11A	CS		250	273.1	7.92	4	8.16	32.64
49	LO-BHL-1-T034-4-11A	CS		100	114.3	29.52	4	12.72	50.88
50	WCR-BHL-1-B020-4-11D	CS		100	114.3	0.24	4	0.11	0.44
51	WCR-BHL-1-B021-4-11D	CS		100	114.3	0.24	4	0.11	0.44
52	WCR-BHL-1-B022-4-11D	CS		100	114.3	35.8	4	15.43	61.72
53	WCR-BHL-1-B026-3-11D	CS		80	88.9	2.72	4	0.91	3.64
54	WCR-BHL-1-B027-3-11D	CS		80	88.9	2.75	4	0.92	3.68
55	WCR-BHL-1-B028-3-11D	CS		80	88.9	47	4	15.76	63.04
56	WCR-BHL-1-B030-8-11D	CS		200	219.1	26.8	4	22.14	88.56
57	WCR-BHL-1-B034-2-11D	CS		50	60.3	4.13	4	0.94	3.76
58	WCR-BHL-1-B035-2-11D	CS		50	60.3	4.14	4	0.94	3.76
59	WCR-BHL-1-B036-2-11D	CS		50	60.3	24.89	4	5.66	22.64
60	WCR-BHL-1-B043-2-11D	CS		50	60.3	3.96	4	0.9	3.60
61	WCR-BHL-1-B044-2-11D	CS		50	60.3	3.96	4	0.9	3.60
62	WCR-BHL-1-B045-2-11D	CS		50	60.3	3.96	4	0.9	3.60
63	WCR-BHL-1-B048-3-11D	CS		80	88.9	15.31	4	5.14	20.56

SL NO	LINE NUMBER	MATERIAL	WORK TEMP	NB	OD	PIPE LENGTH	NO OF UNITS	PER UNIT PAINT AREA	TOTAL PAINT AREA
			[Deg C]		[mm]	[m]		[Sq.m]	[Sq.m]
64	WCR-BHL-1-B056-4-11D	CS		100	114.3	3.6	4	1.55	6.20
65	WCR-BHL-1-B062-4-11D	CS		100	114.3	4.03	4	1.74	6.96
66	WCR-BHL-1-B065-4-11D	CS		100	114.3	12.3	4	5.3	21.20
67	WCR-BHL-1-B072-6-11D	CS		150	168.3	7.54	4	4.79	19.16
68	WCR-BHL-1-B083-4-11D	CS		100	114.3	3.6	4	1.55	6.20
69	WCR-BHL-1-B089-4-11D	CS		100	114.3	4.03	4	1.74	6.96
70	WCR-BHL-1-B092-4-11D	CS		100	114.3	12.3	4	5.3	21.20
71	WCR-BHL-1-B095-6-11D	CS		150	168.3	7.54	4	4.79	19.16
72	WCR-BHL-1-B101-4-11D	CS		100	114.3	3.6	4	1.55	6.20
73	WCR-BHL-1-B108-4-11D	CS		100	114.3	4.03	4	1.74	6.96
74	WCR-BHL-1-B111-4-11D	CS		100	114.3	12.3	4	5.3	21.20
75	WCR-BHL-1-B115-6-11D	CS		150	168.3	7.54	4	4.79	19.16
76	WCR-BHL-1-B507-14-11D	CS		350	355.6	128.21	4	171.88	687.52
77	WCR-BHL-1-B510-36-11D	CS		900	914	17.39	4	59.92	239.68
78	WCR-BHL-1-B511-36-11D	CS		900	914	1	4	3.44	13.76
79	WCR-BHL-2-B507-14-11D	CS		350	355.6	84.04	4	112.67	450.68
80	WCR-BHL-3-B507-14-11D	CS		350	355.6	54.51	4	73.08	292.32
81	WCR-BHL-4-B507-14-11D	CS		350	355.6	100.87	4	135.23	540.92
82	WCS-BHL-0-B003A-18-11D	CS		450	457	0.5	4	0.86	3.44
83	WCS-BHL-0-B003B-18-11D	CS		450	457	0.5	4	0.86	3.44
84	WCS-BHL-0-B004A-18-11D	CS		450	457	0.5	4	0.86	3.44
85	WCS-BHL-0-B004B-18-11D	CS		450	457	0.5	4	0.86	3.44
86	WCS-BHL-0-B005A-18-11D	CS		450	457	0.5	4	0.86	3.44
87	WCS-BHL-0-B005B-18-11D	CS		450	457	0.5	4	0.86	3.44
88	WCS-BHL-0-B006A-18-11D	CS		450	457	0.5	4	0.86	3.44
89	WCS-BHL-0-B006B-18-11D	CS		450	457	0.63	4	1.08	4.32
90	WCS-BHL-1-B017-4-11D	CS		100	114.3	37.92	4	16.34	65.36
91	WCS-BHL-1-B018-4-11D	CS		100	114.3	2.09	4	0.9	3.60
92	WCS-BHL-1-B019-4-11D	CS		100	114.3	0.95	4	0.41	1.64
93	WCS-BHL-1-B023-3-11D	CS		80	88.9	49.1	4	16.45	65.80
94	WCS-BHL-1-B024-3-11D	CS		80	88.9	3.06	4	1.02	4.08
95	WCS-BHL-1-B025-3-11D	CS		80	88.9	3.08	4	1.03	4.12
96	WCS-BHL-1-B029-8-11D	CS		200	219.1	28.74	4	23.74	94.96
97	WCS-BHL-1-B031-2-11D	CS		50	60.3	26.39	4	6	24.00
98	WCS-BHL-1-B032-2-11D	CS		50	60.3	4.16	4	0.95	3.80
99	WCS-BHL-1-B033-2-11D	CS		50	60.3	4.17	4	0.95	3.80
100	WCS-BHL-1-B037-3-11D	CS		80	88.9	14.11	4	4.73	18.92
101	WCS-BHL-1-B040-2-11D	CS		50	60.3	4.49	4	1.02	4.08
102	WCS-BHL-1-B041-2-11D	CS		50	60.3	4.49	4	1.02	4.08
103	WCS-BHL-1-B042-2-11D	CS		50	60.3	4.49	4	1.02	4.08
104	WCS-BHL-1-B052-4-11D	CS		100	114.3	4.71	4	2.03	8.12
105	WCS-BHL-1-B058-4-11D	CS		100	114.3	4.92	4	2.12	8.48
106	WCS-BHL-1-B064-4-11D	CS		100	114.3	16.54	4	7.13	28.52
107	WCS-BHL-1-B070-6-11D	CS		150	168.3	6.83	4	4.33	17.32
108	WCS-BHL-1-B075-6-11D	CS		150	168.3	6.83	4	4.33	17.32
109	WCS-BHL-1-B079-4-11D	CS		100	114.3	4.71	4	2.03	8.12
110	WCS-BHL-1-B085-4-11D	CS		100	114.3	4.92	4	2.12	8.48
111	WCS-BHL-1-B091-4-11D	CS		100	114.3	16.54	4	7.13	28.52
112	WCS-BHL-1-B099-4-11D	CS		100	114.3	4.71	4	2.03	8.12
113	WCS-BHL-1-B106-4-11D	CS		100	114.3	4.92	4	2.12	8.48
114	WCS-BHL-1-B110-4-11D	CS		100	114.3	16.54	4	7.13	28.52
115	WCS-BHL-1-B114-6-11D	CS		150	168.3	6.83	4	4.33	17.32
116	WCS-BHL-1-B501-18-11D	CS		450	457	8.64	4	14.88	59.52
117	WCS-BHL-1-B502-18-11D	CS		450	457	3.54	4	6.1	24.40
118	WCS-BHL-1-B503-18-11D	CS		450	457	8.17	4	14.08	56.32
119	WCS-BHL-1-B504-14-11D	CS		350	355.6	2.54	4	3.41	13.64
120	WCS-BHL-1-B505-14-11D	CS		350	355.6	7.47	4	10.02	40.08
121	WCS-BHL-1-B506-14-11D	CS		350	355.6	135.65	4	181.85	727.40
122	WCS-BHL-1-B508-36-11D	CS		900	914	7.67	4	26.42	105.68
123	WCS-BHL-1-B509-36-11D	CS		900	914	7.67	4	26.42	105.68
124	WCS-BHL-2-B506-14-11D	CS		350	355.6	95.15	4	127.56	510.24
125	WCS-BHL-3-B506-14-11D	CS		350	355.6	54.02	4	72.42	289.68
126	WCS-BHL-4-B506-14-11D	CS		350	355.6	93.58	4	125.45	501.80
127	HSAD-CDD-BHL-1-B501-20-12B-NI	SS	39.5	500	508	18.32	4	35.09	140.36
128	HSAD-CDD-BHL-1-B502-14-12B-NI	SS	39.5	350	355.6	1.23	4	1.64	6.56
129	HSAD-CDD-BHL-1-B503-14-12B-NI	SS	39.5	350	355.6	1.23	4	1.64	6.56

SL NO	LINE NUMBER	MATERIAL	WORK TEMP	NB	OD	PIPE LENGTH	NO OF UNITS	PER UNIT PAINT AREA	TOTAL PAINT AREA
			[Deg C]		[mm]	[m]		[Sq.m]	[Sq.m]
130	HSAD-CDD-BHL-1-B504-14-12B-NI	SS	39.5	350	355.6	1.23	4	1.64	6.56
131	HSAD-CDD-BHL-1-B505-6-22B-NI	SS	39.5	150	168.3	30.97	4	19.64	78.56
132	HSAD-CDD-BHL-1-B506-6-22B-NI	SS	39.5	150	168.3	29.01	4	18.41	73.64
133	HSAD-CDD-BHL-1-B507-6-22B-NI	SS	39.5	150	168.3	27.6	4	17.51	70.04
134	HSAD-CDD-BHL-1-B508-10-22B-NI	SS	39.5	250	273.1	1.09	4	1.13	4.52
135	HSAD-CDD-BHL-1-B509-10-22B-NI	SS	39.5	250	273.1	1.09	4	1.13	4.52
136	HSAD-CDD-BHL-1-B510-10-22B-NI	SS	39.5	250	273.1	1.09	4	1.13	4.52
137	HSAD-CDD-BHL-1-B511-14-22B-NI	SS	39.5	350	355.6	36.04	4	48.31	193.24
138	HSAD-CDD-BHL-1-B512-14-22B-NI	SS	45.6	350	355.6	25.86	4	34.67	138.68
139	HSAD-CDD-BHL-1-B576-3-22B-NI	SS	39.5	80	88.9	6.27	4	2.1	8.40
140	HSAD-CDD-BHL-1-B577-2-22B-NI	SS	39.5	50	60.3	57.09	4	12.98	51.92
141	HSAD-CDD-BHL-1-B578-1.5-22B-NI	SS	39.5	40	48.3	38.51	4	7.01	28.04
142	LO-BHL-1-T012-4-12A	SS		100	114.3	7.7	4	3.31	13.24
143	LO-BHL-1-T022-2-12A	SS		50	60.3	4.94	4	1.13	4.52
144	LO-BHL-1-T023-3-12A	SS		80	88.9	5.1	4	1.7	6.80
145	LO-BHL-1-T024-2-12A	SS		50	60.3	7.41	4	1.68	6.72
146	LO-BHL-1-T025-1.5-12A	SS		40	48.3	7.66	4	1.39	5.56
147	LO-BHL-1-T026-1.5-12A	SS		40	48.3	7.66	4	1.39	5.56
148	LO-BHL-1-T033-4-12A	SS		100	114.3	28.59	4	12.32	49.28
	UNINSULATED PIPES - TOTAL							**3046.21**	**8280.16**

	ALL PIPES - TOTAL							**6160.15**	**15637.33**

PIPE THICKNESSES -MATL WISE - SYSTEM WISE

SYSTEM	NPS	0.75	1	1.5	2	2.5	3	4	5	6	8	10	12	14	16	18	20	24	28	30	32	36	40	44
	NB	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	1100
	OD	26.7	33.4	48.3	60.3	73	88.9	114.3	141.3	168.3	219.1	273	323.8	355.6	406.4	457	508	610	711	762	813	914	1016	1118
AS (P91)																								
MAIN STEAM	IBR				5.54			11.13			18.26		25.4		30.96		38.1							
BOILER STARTUP STEAM	IBR							11.13				21.44												
AUXILIARY STEAM	IBR				5.54			11.13																
DEAERATOR PEGGING STEAM	IBR						7.62	11.13																
EXTRACTION STEAM	IBR																							
BOILER FLASH TANK VENT TO DEAERATOR	IBR																							
BFP-SUCTION	IBR																							
FEED WATER	IBR																							
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR																							
SPRAY TO BSS PRDS	NIBR																							
CONDENSATE - CS	NIBR																							
CONDENSATE - SS	NIBR																							
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR																							
HP HEATE 5 & 6 DRAIN	NIBR																							
COOLING WATER	NIBR																							
AUX COOLING WATER	NIBR																							
CLOSED CIRCUIT COOLING WATER	NIBR																							
MISC - DRAINS	NIBR																							
MISC - VENTS	NIBR																							
INSTRUMENT AIR & PLANT AIR	NIBR																							
AS (P22)																								
MAIN STEAM	IBR		6.35	10.15	11.07					7.11														
BOILER STARTUP STEAM	IBR		6.35	10.15							8.18										22.23			
AUXILIARY STEAM	IBR		4.55				5.49	6.02																
DEAERATOR PEGGING STEAM	IBR		4.55					6.02		7.11		9.27												
EXTRACTION STEAM	IBR																							
BOILER FLASH TANK VENT TO DEAERATOR	IBR																							
BFP-SUCTION	IBR																							
FEED WATER	IBR																							
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR																							
SPRAY TO BSS PRDS	NIBR																							
CONDENSATE - CS	NIBR																							
CONDENSATE - SS	NIBR																							
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR																							
HP HEATE 5 & 6 DRAIN	NIBR																							
COOLING WATER	NIBR																							
AUX COOLING WATER	NIBR																							
CLOSED CIRCUIT COOLING WATER	NIBR																							
MISC - DRAINS	NIBR																							
MISC - VENTS	NIBR																							
INSTRUMENT AIR & PLANT AIR	NIBR																							
CS																								
MAIN STEAM	IBR																							

PIPE THICKNESSES -MATL WISE - SYSTEM WISE

SYSTEM	NPS	0.75	1	1.5	2	2.5	3	4	5	6	8	10	12	14	16	18	20	24	28	30	32	36	40	44
	NB	20	25	40	50	65	80	100	125	150	200	250	300	350	400	450	500	600	700	750	800	900	1000	1100
	OD	26.7	33.4	48.3	60.3	73	88.9	114.3	141.3	168.3	219.1	273	323.8	355.6	406.4	457	508	610	711	762	813	914	1016	1118
BOILER STARTUP STEAM	IBR		4.55								6.35	6.35	9.53			9.53		9.53	9.53					
AUXILIARY STEAM	IBR		4.55	5.08		5.16	5.49																	
DEAERATOR PEGGING STEAM	IBR	3.91	4.55		3.91		5.49	6.02			6.35	9.27	9.53											
EXTRACTION STEAM	IBR	3.91	4.55							7.11	8.18	9.27	9.53	7.92	9.53	9.53	9.53	9.53		9.53				12.7
BOILER FLASH TANK VENT TO DEAERATOR	IBR		4.55					6.02		7.11														
BFP-SUCTION	IBR	3.91	4.55		3.91						8.18	9.27	9.53	7.92	9.53									
FEED WATER	IBR	3.91	4.55					13.49				28		38		50								
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR		4.55		8.74																			
SPRAY TO BSS PRDS	NIBR																							
CONDENSATE - CS	NIBR				3.91			6.02		7.11	6.35	6.35	6.35	11.13	6.35		6.35							
CONDENSATE - SS	NIBR																							
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR							6.02		7.11	6.35	6.35												
HP HEATE 5 & 6 DRAIN	NIBR							6.02		7.11	8.18	9.27										12.7		
COOLING WATER	NIBR						4.8	5.4		5.4												10		
AUX COOLING WATER	NIBR												6	6	6		6							
CLOSED CIRCUIT COOLING WATER	NIBR				4.5		4.8	5.4		5.4	8.18	6		6		6	6	8	8	8			10	
MISC - DRAINS	NIBR				3.91					7.11		6.35	6.35											
MISC - VENTS	NIBR							6.02		7.11		6.35												
INSTRUMENT AIR & PLANT AIR	NIBR				4.5		4.8	5.4	5.4	5.4	6													
SS																								
MAIN STEAM	IBR																							
BOILER STARTUP STEAM	IBR																							
AUXILIARY STEAM	IBR																							
DEAERATOR PEGGING STEAM	IBR																							
EXTRACTION STEAM	IBR																							
BOILER FLASH TANK VENT TO DEAERATOR	IBR																							
BFP-SUCTION	IBR																							
FEED WATER	IBR																							
SPRAY TO AUX DEAERATOR PEGG PRDS	IBR																							
SPRAY TO BSS PRDS	NIBR			3.68	3.91		3.05	3.05																
CONDENSATE - CS	NIBR																							
CONDENSATE - SS	NIBR				3.91					3.4		4.19	4.57	4.78			5.54							
LP HEATER 1, 2, 3 & DEAERATOR DRAIN	NIBR																							
HP HEATE 5 & 6 DRAIN	NIBR																							
COOLING WATER	NIBR																							
AUX COOLING WATER	NIBR																							
CLOSED CIRCUIT COOLING WATER	NIBR																							
MISC - DRAINS	NIBR																							
MISC - VENTS	NIBR																							
INSTRUMENT AIR & PLANT AIR	NIBR																							