


Rev No. B	Form No.		BHARAT HEAVY ELECTRICALS LIMITED RC PURAM, HYDERABAD - 32 PROJECT ENGINEERING - MECHANICAL		PEMC- 04561
COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED, It must not be used directly or indirectly in any way detrimental to the interest of the company.			<h2>PRE-FABRICATED PIPING – PACKAGE # 1</h2> <div style="border: 1px solid black; padding: 20px; margin: 20px auto; width: 80%;"> <p>CUSTOMER : RIL</p> <p>PROJECT : 4 X 93.1 MW STG –HMD -HAZIRA</p> </div>		
			Ref. Doc	Revisions : Refer to record of revisions :	Prepared : VUK

ANNEXURE-A

ANNEXURE-A

TECHNICAL SPECIFICATION		
SL.NO	DESCRIPTION	DOCUMENT NUMBER
1	Technical specification for Standard Engineering specification for shop fabricated piping as per ASME B 31.1	3SS-PS02-00002
2	Engineering design standard for field weld end preparation and transition detail	3DS-P72G-M0004
3	Engineering design standard for branch connection details	3DS-P72G-00006
4	Engineering design standard for thermo well fabrication and installation details	3DS-P72G-00009
5	Technical Specification for painting and coatings	10080-1-SS-PP-014_2

ANNEXURE-B

RIL HMD 4 X 93.1 MW STG
LIST OF NON IBR PIPING ISOMETRICS

SL NO	ISOMETRIC DESCRIPTION	ISO DRG NO	REV	SHTS	APPLICABLE UNIT	REMARKS
A	COMMON PIPING					
1	0-SPRAY WATER PIPING TO BSS DS	1-381-01-05990	00P	3	FOR TOTAL HMD	
2	0-COW EXPN TANK TO COW SUCTION HEADER	1-381-01-05991	00P	1	FOR TOTAL HMD	
3	0-COW EXPN TANK OVERFLOW & DRAIN	1-381-01-05992	00P	1	FOR TOTAL HMD	
4	0-COW PUMP SUCTION PIPING	1-381-01-05993	00P	1	FOR TOTAL HMD	
5	0-COW PUMP DISCHARGE PIPING	1-381-01-05994	00P	1	FOR TOTAL HMD	
6	0-COW SUPPLY PIPING TO PHEs	1-381-01-05995	00P	1	FOR TOTAL HMD	
7	0-COW RETURN PIPING FROM PHEs	1-381-01-05996	00P	1	FOR TOTAL HMD	
8	0-COW SUPPLY PIPING TO IAPA PACKG	1-381-01-05997	00P	1	FOR TOTAL HMD	
9	0-COW RETURN PIPING FROM IAPA PACKG	1-381-01-05998	00P	1	FOR TOTAL HMD	
10	0-COW SUPPLY HEADER PIPING	1-381-01-05999	00P	2	FOR TOTAL HMD	
11	0-COW RETURN HEADER PIPING	1-381-01-06000	00P	2	FOR TOTAL HMD	
12	0-IAPA FROM COMPRESSORS TO SURGE AIR RECEIVER	1-381-01-06001	00P	1	FOR TOTAL HMD	
13	0-IA FROM SURGE AIR RECEIVER TO DRYERS	1-381-01-06002	00P	1	FOR TOTAL HMD	
14	0-IA FROM DRYERS TO DRY AIR RECEIVERS	1-381-01-06003	00P	1	FOR TOTAL HMD	
15	0-IA SUPPLY PIPING FROM COMPR PACKG	1-381-01-06004	00P	1	FOR TOTAL HMD	
16	0-PA SUPPLY PIPING FROM COMPR PACKG	1-381-01-06005	00P	1	FOR TOTAL HMD	
17	0-INSTRUMENT AIR HEADER PIPING	1-381-01-06006	00P	1	FOR TOTAL HMD	
18	0-PLANT AIR HEADER PIPING	1-381-01-06007	00P	1	FOR TOTAL HMD	
19	1-ACW PUMPS DISCHARGE PIPING TO PHEs	1-381-01-06057	00P	1	UNIT#1	
20	1-ACW RETURN PIPING FROM PHEs	1-381-01-06058	00P	1	UNIT#1	
21	2-ACW PUMPS DISCHARGE PIPING TO PHEs	1-381-01-06073	00P	1	UNIT#2	
22	2-ACW RETURN PIPING FROM PHEs	1-381-01-06074	00P	1	UNIT#2	
23	3-ACW PUMPS DISCHARGE PIPING TO PHEs	1-381-01-06075	00P	1	UNIT#3	
24	3-ACW RETURN PIPING FROM PHEs	1-381-01-06076	00P	1	UNIT#3	
25	4-ACW PUMPS DISCHARGE PIPING TO PHEs	1-381-01-06077	00P	1	UNIT#4	
26	4-ACW RETURN PIPING FROM PHEs	1-381-01-06078	00P	1	UNIT#4	
27	SITE ROUTED PIPING BOQ	1-381-01-06079	00P	1	FOR TOTAL HMD	
28	CONTINGENCY PIPING FOR HMD	1-381-01-06081	00P	1	FOR TOTAL HMD	
B	UNITISED PIPING - FOR UNIT#1 (TO BE REPLICATED FOR UNITS # 2, 3 & 4)					
1	1-CEP SUCTION PIPING	1-381-01-06008	00P	1	UNIT#1,#2,#3,#4	VENDOR TO NOTE THAT APPLICABLE BOM TO BE MULTIPLIED 4 TIMES (i.e FOUR SETS OF PIPING ASSEMBLIES TO BE SUPPLIED FOR EACH DRAWING)
2	1-CEP DISCHARGE UPTO SJAE	1-381-01-06009	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
3	1-CONDENSATE PIPING FROM SJAE UPTO GSC	1-381-01-06010	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
4	1-CONDENSATE PIPING FROM GSC TO CFT	1-381-01-06011	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
5	1-CONDENSATE MINIMUM RECIRCULATION PIPING	1-381-01-06012	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
6	1-CFP SUCTION PIPING	1-381-01-06013	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
7	1-CFP-A RECIRCULATION PIPING	1-381-01-06014	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
8	1-CFP-B RECIRCULATION PIPING	1-381-01-06015	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
9	1-CFP-C RECIRCULATION PIPING	1-381-01-06016	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
10	1-CFP DISCHARGE PIPING UPTO DRAIN COOLER	1-381-01-06017	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
11	1-CONDENSATE PIPING FROM DC TO LPH1	1-381-01-06018	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
12	1-CONDENSATE PIPING FROM LPH1 TO LPH2	1-381-01-06019	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
13	1-CONDENSATE PIPING FROM LPH2 TO LPH3	1-381-01-06020	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
14	1-CONDENSATE PIPING FROM LPH3 TO DEAERATOR	1-381-01-06021	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
15	1-SPRAY WATER PIPING FROM CFP DISCH TO BSS DS/ COND DUMP NOZZ	1-381-01-06022	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
16	1-HPH6 DRAIN PIPING	1-381-01-06023	00P	2	UNIT#1,#2,#3,#4	SAME AS ABOVE
17	1-HPH5 DRAIN PIPING	1-381-01-06024	00P	2	UNIT#1,#2,#3,#4	SAME AS ABOVE
18	1-DEAERATOR OVERFLOW & DRAIN PIPING	1-381-01-06025	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
19	1-HP FLASH TANK VENT PIPING	1-381-01-06026	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
20	1-HP FLASH TANK DRAIN PIPING	1-381-01-06027	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
21	1-LPH3 DRAIN PIPING	1-381-01-06028	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
22	1-LPH2 DRAIN PIPING	1-381-01-06029	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
23	1-LPH1 DRAIN PIPING TO DC	1-381-01-06030	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
24	1-DC DRAIN PIPING TO CONDENSER	1-381-01-06031	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
25	1-LPH3 VENT PIPING	1-381-01-06032	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
26	1-LPH2 VENT PIPING	1-381-01-06033	00P	2	UNIT#1,#2,#3,#4	SAME AS ABOVE
27	1-LPH1 VENT PIPING	1-381-01-06034	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
28	1-CONDENSER AIR EVACUATION PIPING	1-381-01-06035	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
29	1-SJAE EXHAUST PIPING	1-381-01-06036	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
30	1-GSC EJECTOR EXHAUST PIPING-1	1-381-01-06037	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
31	1-GSC EJECTOR EXHAUST PIPING-2	1-381-01-06038	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
32	1-SJAE-A INTER CONDENSER DRAIN PIPING	1-381-01-06039	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE

SL NO	ISOMETRIC DESCRIPTION	ISO DRG NO	REV	SHTS	APPLIACABLE UNIT	REMARKS
33	1-SJAE-A AFTER CONDENSER DRAIN PIPING	1-381-01-06040	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
34	1-SJAE-B INTER CONDENSER DRAIN PIPING	1-381-01-06041	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
35	1-SJAE-B AFTER CONDENSER DRAIN PIPING	1-381-01-06042	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
36	1-GSC EJECTOR DRAIN PIPING	1-381-01-06043	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
37	1-CFT OVERFLOW & DRAIN	1-381-01-06044	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
38	1-HPH6 SHELL SIDE PSV OUTLET TO ATM FLASH TANK	1-381-01-06045	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
39	1-HPH5 SHELL SIDE PSV OUTLET TO ATM FLASH TANK	1-381-01-06046	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
40	1-LPH3 SHELL SIDE PSV OUTLET TO ATM FLASH TANK	1-381-01-06047	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
41	1-LPH2 SHELL SIDE PSV OUTLET TO ATM FLASH TANK	1-381-01-06048	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
42	1-LPH1 SHELL SIDE PSV OUTLET TO ATM FLASH TANK	1-381-01-06049	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
43	1-DEAERATOR HEATER PSV-1 OUTLET TO ATM	1-381-01-06050	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
44	1-DEAERATOR HEATER PSV-2 OUTLET TO ATM	1-381-01-06051	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
45	1-CW SUPPLY PIPING-1 TO CONDENSER	1-381-01-06052	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
46	1-CW SUPPLY PIPING-2 TO CONDENSER	1-381-01-06053	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
47	1-CW RETURN PIPING-1 FROM CONDENSER	1-381-01-06054	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
48	1-CW RETURN PIPING-2 FROM CONDENSER	1-381-01-06055	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
49	1-ACW PUMPS SUCTION PIPING	1-381-01-06056	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
52	1-CW SUPPLY PIPING TO ST LUBE OIL COOLERS	1-381-01-06059	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
53	1-CW SUPPLY PIPING TO STG AIR COOLERS	1-381-01-06060	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
54	1-CW SUPPLY PIPING TO HPSJ COOLERS	1-381-01-06061	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
55	1-CW SUPPLY PIPING TO SWAS PANEL	1-381-01-06062	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
56	1-CW SUPPLY PIPING TO BFP-A AUXILIARIES	1-381-01-06063	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
57	1-CW SUPPLY PIPING TO BFP-B AUXILIARIES	1-381-01-06064	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
58	1-CW SUPPLY PIPING TO BFP-C AUXILIARIES	1-381-01-06065	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
59	1-CW RETURN PIPING FROM ST LUBE OIL COOLERS	1-381-01-06066	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
60	1-CW RETURN PIPING FROM STG AIR COOLERS	1-381-01-06067	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
61	1-CW RETURN PIPING FROM HPSJ COOLERS	1-381-01-06068	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
62	1-CW RETURN PIPING FROM SWAS PANEL	1-381-01-06069	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
63	1-CW RETURN PIPING FROM BFP-A AUXILIARIES	1-381-01-06070	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
64	1-CW RETURN PIPING FROM BFP-B AUXILIARIES	1-381-01-06071	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE
65	1-CW RETURN PIPING FROM BFP-C AUXILIARIES	1-381-01-06072	00P	1	UNIT#1,#2,#3,#4	SAME AS ABOVE

ANNEXURE-C

3. ANNEXURE-C

PMS-PIPING MATERIAL SPECIFICATIONS

SL.NO	DESCRIPTION	DOCUMENT NUMBER
1	SS 304 CLASS # 300	22B
2	CS CLASS # 150	21B
3	CS CLASS # 150 VACCUM SERVICE	21G
4	SS 304 CLASS # 150	12B
5	CS CLASS # 150	11B
6	CS CLASS # 150	11D
7	CS CLASS # 150 (GALVANIZED)	11E
8	CS CLASS # 150 VACCUM SERVICE	11G

ANNEXURE-D

4. ANNEXURE-D

PURCHASE SPECIFICATIONS OF PIPING ITEMS		
SL.NO	DESCRIPTION	DOCUMENT NUMBER
1	Technical delivery conditions for ANSI Pipe Fittings	AA0851402.
2	Purchase specification For CS Pipes	AA10455
3	Purchase specification For SS Pipes	AA10755
4	Technical Delivery conditions for pipes	AA0490001

ANNEXURE-E

5. ANNEXURE-E

QAP-		
SL.NO	DESCRIPTION	DOCUMENT NUMBER
1	MANUFACTURING QUALITY PLAN- QAP	-

ANNEXURE-F

6. ANNEXURE F

WPS-		
SL.NO	DESCRIPTION	DOCUMENT NUMBER
1	PESD WPS	-

BHEL- Project Engineering & System Division

WPS Number Table

Sr no.	Welding Between Mat.	Thickness (mm)	New WPS NO.	Remark (with Revision)	Post Weld Heat Treatment Requirement
1	CSto CS (P1 to P1)	Up to 5.0	WE301	Only GTAW	PWHT is Required above 19mm Thk .
		> 5.0 to 18.0	WE003	GTAW + SMAW	
		> 18.0 to 36.0	WE004	GTAW + SMAW	
2	SSto SS (P8 to P8)	Up to 5.0	WE313-ER347 WE314-ER308L	Only GTAW	PWHT is NOT Required.
		> 5.0 to 18.0	WE313+WE042/ 045	GTAW + SMAW (WE 045 instead of 042 for E347 Electrode)	
3	CSto SS (P1 to P8)	Up to 5.0	WE315	Only GTAW	PWHT is NOT Required.
		> 5.0 to 18.0	WE315 + WE 046	GTAW + SMAW	

ANNEXURE-G

7. ANNEXURE-G

LIST OF SUB VENDORS FOR BOUGHT OUT ITEMS	
SL.NO	VENDOR
A	PIPES (AS/ CS SEAM LESS PIPES)
1	BHEL
2	ISM T Ltd
3	Jindal Saw Ltd
4	Maharashtra Seamless Ltd
5	JFE Steel Corporation, Japan
6	Nippon Steel Sumitomo Corp, Japan
7	Vallourec & Mannesman, Germany
8	Productos Tubulares, Spain
9	IBF, Italy
10	Ratnamani Metals & Tubes Ltd
11	Heavy Metal & tubes.
12	Remi metals Gujarat Ltd.
13	Bentler GROUP
14	Wyman Gordon
B	PIPES (CS-EFSW PIPES)
1	JINDAL STEEL
2	TATA STEEL
3	KLT AUTOMOTIVE & TUBULARES
4	TUBE INVESTMENT OF INDIA LTD
5	Ratnamani Metals & Tubes Ltd
6	LALIT PIPES
C	PIPES (ERW PIPES)
1	JINDAL STEEL
2	TATA STEEL
3	KLT AUTOMOTIVE & TUBULARES
4	TUBE INVESTMENT OF INDIA LTD
D	PIPES (SS TUBES & PIPINGS)
1	BHEL
2	Ratnamani Metals & Tubes Ltd
3	Sandvik
4	Sumitomo japan
5	remi
6	Plymouth
7	ISM T Ltd
8	Jindal Saw Ltd
9	Maharashtra Seamless Ltd
10	JFE Steel Corporation, Japan
11	Nippon Steel Sumitomo Corp, Japan
12	Vallourec & Mannesman, Germany
13	Productos Tubulares, Spain
14	IBF, Italy
15	TUBOS REUNIDOS SA ,SPAIN
16	BENTELER STAHL ROHR
17	TATA STEEL
18	KLT AUTOMOTIVE & TUBULARES
19	TUBE INVESTMENT OF INDIA LTD

7. ANNEXURE-G

E	PIPE FITTINGS
1	A K Pipe Fittings
2	Eby Fasteners
3	Dee Development
4	Teekay tubes
5	M S fittings
6	Allied International
7	IBF Italy
8	Gujarat Infrapipes pvt ltd
9	CSA Fittings
10	Tube Products
11	K S Pipe Fittintgs Pvt Ltd
12	gujarat engineering
13	TRUE FORGE PVT LTD
14	P K TUBES & FITTINGS LTD
15	PRECISION ENGINEERING INDS
16	TUBE TURN INDIA P LTD
F	Screwe and socket welded fittings
1	A K Pipe Fittings
2	Eby Fasteners
3	Dee Development
4	Teekay tubes
5	M S fittings
6	Allied International
7	IBF Italy
8	Gujarat Infrapipes pvt ltd
9	CSA Fittings
10	leader valves
11	Tube Products
12	KS Pipe Fittings
13	TRUE FORGE PVT LTD
14	PRECISION ENGG INDS
15	P.K. TUBES & FITTINGS PVT. LTD.
G	PAINTS
1	ASIAN PAINTS
2	AKZO NOBEL
3	BERGER
4	HAM PEL

NOTE : Vendor Seller shall not source material from any raw materials or bought out components required to execute this job from **CHINA** or **East European countries** (i.e ALBANIA, ARM ENIA, AZERBAIJAN, BELARUS,BOSNIA, HERZEGOVINA,BULGARIA,CROATIA,CZECH REPUBLIC, GEORGIA,HUNGARY,KOSOV,M ACEDONIA,M OLDOVA,M ONTENEGRO,POLAND,ROM ANIA,RU SSIA,SERBIA,SLOAVIKIA,SLOVENIA AND UKRAINE) and for raw materials and brought out items seller shall strictly follow vendors mentioned in vendor list.

ANNEXURE-H

8. ANNEXURE-H

LIST OF P&I.D

SL.NO	DESCRIPTION	DOCUMENT NUMBER
1	P&ID FOR CONDENSATE SYSTEM	1-381-01-05776
2	P&ID FOR CONDENSATE FORWARDING SYSTEM	1-381-01-05777
3	P&ID FOR HP HEATER DRAIN & VENT SYSTEM	1-381-01-05779
4	P&ID FOR LP HEATER DRAIN & VENT SYSTEM	1-381-01-05780
5	P&ID FOR CCW SYSTEM	1-381-01-05764
6	P&ID FOR CW/ ACW SYSTEM	1-381-01-05765
7	P&ID FOR INSTRUMENT AIR DISTRIBUTION	2-381-01-04232
8	P&ID FOR PLANT AIR DISTRIBUTION	2-381-01-04233
9	P&ID FOR SWAS SYSTEM	2-381-01-04243

ANNEXURE-I

VENDOR TO ALSO ADD THE SITE ROUTED BOQ AND CONTINGENCY BOQ TO THE BELOW LISTED BOQ TO ARRIVE AT THE TOTAL PACKAGE BOQ

ITEM 1	ITEM DESCRIPTION	NB1	NB2	NB3	SCHEDULE	RATING	M ATERIAL	BASEM AT	QTY (m/ Nos)
CAP:1000	CAP ASME B16.9 BW	1000			STD		A234GRWPB	CS	3
CAP:150	CAP ASME B16.9 BW	150			STD		A234GRWPB	CS	2
CAP:350	CAP ASME B16.9 BW	350			S10		A234GRWPB	CS	4
CAP:350	CAP ASME B16.9 BW	350			S10S		A403GRWP304	SS	4
CAP:500	CAP ASME B16.9 BW	500			S10S		A403GRWP304	SS	4
CAP:750	CAP ASME B16.9 BW	750			STD		A234GRWPB	CS	3
CRDCR:100_40	RDCR CONC ASME B16.9 BW	100	40		S40XS80		A234GRWPB	CS	12
CRDCR:100_50	RDCR CONC ASME B16.9 BW	100	50		STDXSTD		A234GRWPB	CS	24
CRDCR:100_80	RDCR CONC ASME B16.9 BW	100	80		S10SXS10S		A403GRWP304	SS	2
CRDCR:100_80	RDCR CONC ASME B16.9 BW	100	80		STDXSTD		A234GRWPB	CS	24
CRDCR:150_100	RDCR CONC ASME B16.9 BW	150	100		S40XS40		A234GRWPB	CS	80
CRDCR:150_100	RDCR CONC ASME B16.9 BW	150	100		STDXSTD		A234GRWPB	CS	40
CRDCR:150_80	RDCR CONC ASME B16.9 BW	150	80		S10SXS10S		A403GRWP304	SS	12
CRDCR:200_100	RDCR CONC ASME B16.9 BW	200	100		S20XS40		A234GRWPB	CS	4
CRDCR:200_100	RDCR CONC ASME B16.9 BW	200	100		S20XSTD		A234GRWPB	CS	7
CRDCR:200_100	RDCR CONC ASME B16.9 BW	200	100		S40XS40		A234GRWPB	CS	8
CRDCR:200_150	RDCR CONC ASME B16.9 BW	200	150		S20XS40		A234GRWPB	CS	12
CRDCR:200_150	RDCR CONC ASME B16.9 BW	200	150		S40XS40		A234GRWPB	CS	12
CRDCR:250_150	RDCR CONC ASME B16.9 BW	250	150		S10SXS10S		A403GRWP304	SS	12
CRDCR:250_150	RDCR CONC ASME B16.9 BW	250	150		S20XS40		A234GRWPB	CS	16
CRDCR:250_150	RDCR CONC ASME B16.9 BW	250	150		S40XS40		A234GRWPB	CS	4
CRDCR:250_200	RDCR CONC ASME B16.9 BW	250	200		S20XS20		A234GRWPB	CS	24
CRDCR:250_200	RDCR CONC ASME B16.9 BW	250	200		S40XS40		A234GRWPB	CS	4
CRDCR:350_300	RDCR CONC ASME B16.9 BW	350	300		S10SXS10S		A403GRWP304	SS	40
CRDCR:400_300	RDCR CONC ASME B16.9 BW	400	300		S10XS20		A234GRWPB	CS	16
CRDCR:400_350	RDCR CONC ASME B16.9 BW	400	350		S10SXS10S		A403GRWP304	SS	4
CRDCR:500_350	RDCR CONC ASME B16.9 BW	500	350		S10XS10		A234GRWPB	CS	3
CRDCR:750_600	RDCR CONC ASME B16.9 BW	750	600		STDXSTD		A234GRWPB	CS	1
CRDCR:80_40	RDCR CONC ASME B16.9 BW	80	40		S10SXS40S		A403GRWP304	SS	12
CRDCR:80_50	RDCR CONC ASME B16.9 BW	80	50		S10SXS40S		A403GRWP304	SS	6
ELB45:100	ELBOW LR 45 DEG ASME B16.9 BW	100	100		STD		A234GRWPB	CS	1
ELB45:150	ELBOW LR 45 DEG ASME B16.9 BW	150	150		S40		A234GRWPB	CS	12
ELB45:150	ELBOW LR 45 DEG ASME B16.9 BW	150	150		STD		A234GRWPB	CS	8
ELB45:200	ELBOW LR 45 DEG ASME B16.9 BW	200	200		S20		A234GRWPB	CS	4
ELB45:250	ELBOW LR 45 DEG ASME B16.9 BW	250	250		S20		A234GRWPB	CS	8
ELB45:350	ELBOW LR 45 DEG ASME B16.9 BW	350	350		S10S		A403GRWP304	SS	12
ELB45:500	ELBOW LR 45 DEG ASME B16.9 BW	500	500		S10		A234GRWPB	CS	16

ITEM 1	ITEM DESCRIPTION	NB1	NB2	NB3	SCHEDULE	RATING	M ATERIAL	BASEM AT	QTY (m/ Nos)
ELB45:500	ELBOW LR 45 DEG ASME B16.9 BW	500	500		S10S		A403GRWP304	SS	8
ELB45:750	ELBOW LR 45 DEG ASME B16.9 BW	750	750		STD		A234GRWPB	CS	2
ELB45:80	ELBOW LR 45 DEG ASME B16.9 BW	80	80		S10S		A403GRWP304	SS	1
ELB45:80	ELBOW LR 45 DEG ASME B16.9 BW	80	80		STD		A234GRWPB	CS	4
ELB45:900	ELBOW LR 45 DEG ASME B16.9 BW	900	900		XS		A234GRWPB	CS	8
ELB90:100	ELBOW LR 90 DEG ASME B16.9 BW	100	100		S10S		A403GRWP304	SS	13
ELB90:100	ELBOW LR 90 DEG ASME B16.9 BW	100	100		S40		A234GRWPB	CS	144
ELB90:100	ELBOW LR 90 DEG ASME B16.9 BW	100	100		STD		A234GRWPB	CS	381
ELB90:150	ELBOW LR 90 DEG ASME B16.9 BW	150	150		S10S		A403GRWP304	SS	88
ELB90:150	ELBOW LR 90 DEG ASME B16.9 BW	150	150		S40		A234GRWPB	CS	500
ELB90:150	ELBOW LR 90 DEG ASME B16.9 BW	150	150		STD		A234GRWPB	CS	161
ELB90:200	ELBOW LR 90 DEG ASME B16.9 BW	200	200		S20		A234GRWPB	CS	139
ELB90:200	ELBOW LR 90 DEG ASME B16.9 BW	200	200		S40		A234GRWPB	CS	20
ELB90:250	ELBOW LR 90 DEG ASME B16.9 BW	250	250		S20		A234GRWPB	CS	238
ELB90:250	ELBOW LR 90 DEG ASME B16.9 BW	250	250		S40		A234GRWPB	CS	20
ELB90:300	ELBOW LR 90 DEG ASME B16.9 BW	300	300		S10S		A403GRWP304	SS	8
ELB90:300	ELBOW LR 90 DEG ASME B16.9 BW	300	300		S20		A234GRWPB	CS	8
ELB90:350	ELBOW LR 90 DEG ASME B16.9 BW	350	350		S10S		A403GRWP304	SS	148
ELB90:400	ELBOW LR 90 DEG ASME B16.9 BW	400	400		S10		A234GRWPB	CS	84
ELB90:40	ELBOW 90 DEG LR ASME B16.11 CL3000 SW	40	40		CL3000		A182GRF304	SS	56
ELB90:450	ELBOW LR 90 DEG ASME B16.9 BW	450	450		S10		A234GRWPB	CS	4
ELB90:500	ELBOW LR 90 DEG ASME B16.9 BW	500	500		S10		A234GRWPB	CS	38
ELB90:500	ELBOW LR 90 DEG ASME B16.9 BW	500	500		S10S		A403GRWP304	SS	8
ELB90:50	ELBOW LR 90 DEG ASME B16.9 BW	50	50		S40		A234GRWPB	CS	300
ELB90:50	ELBOW LR 90 DEG ASME B16.9 BW	50	50		S40S		A403GRWP304	SS	34
ELB90:50	ELBOW LR 90 DEG ASME B16.9 BW	50	50		STD		A234GRWPB	CS	148
ELB90:600	ELBOW LR 90 DEG ASME B16.9 BW	600	600		STD		A234GRWPB	CS	6
ELB90:750	ELBOW LR 90 DEG ASME B16.9 BW	750	750		STD		A234GRWPB	CS	5
ELB90:80	ELBOW LR 90 DEG ASME B16.9 BW	80	80		S10S		A403GRWP304	SS	21
ELB90:80	ELBOW LR 90 DEG ASME B16.9 BW	80	80		STD		A234GRWPB	CS	94
ELB90:900	ELBOW LR 90 DEG ASME B16.9 BW	900	900		XS		A234GRWPB	CS	40
EQTEE:1000	TEE STRT ASME B16.9 BW	1000	1000	1000	XS		A234GRWPB	CS	1
EQTEE:100	TEE STRT ASME B16.9 BW	100	100	100	S10S		A403GRWP304	SS	2
EQTEE:100	TEE STRT ASME B16.9 BW	100	100	100	STD		A234GRWPB	CS	13
EQTEE:150	TEE STRT ASME B16.9 BW	150	150	150	S40		A234GRWPB	CS	32
EQTEE:150	TEE STRT ASME B16.9 BW	150	150	150	STD		A234GRWPB	CS	8
EQTEE:200	TEE STRT ASME B16.9 BW	200	200	200	S20		A234GRWPB	CS	9

ITEM 1	ITEM DESCRIPTION	NB1	NB2	NB3	SCHEDULE	RATING	M ATERIAL	BASEM AT	QTY (m/ Nos)
EQTEE:250	TEE STRT ASME B16.9 BW	250	250	250	S20		A234GRWPB	CS	28
EQTEE:350	TEE STRT ASME B16.9 BW	350	350	350	S10S		A403GRWP304	SS	24
EQTEE:400	TEE STRT ASME B16.9 BW	400	400	400	S10		A234GRWPB	CS	20
EQTEE:40	TEE STRT ASME B16.11 CL3000 SW	40	40	40	CL3000		A182GRF304	SS	20
EQTEE:500	TEE STRT ASME B16.9 BW	500	500	500	S10		A234GRWPB	CS	4
EQTEE:50	TEE STRT ASME B16.9 BW	50	50	50	S40		A234GRWPB	CS	12
EQTEE:50	TEE STRT ASME B16.9 BW	50	50	50	STD		A234GRWPB	CS	9
EQTEE:80	TEE STRT ASME B16.9 BW	80	80	80	S10S		A403GRWP304	SS	6
EQTEE:80	TEE STRT ASME B16.9 BW	80	80	80	STD		A234GRWPB	CS	1
EQTEE:900	TEE STRT ASME B16.9 BW	900	900	900	XS		A234GRWPB	CS	16
ERDCR:350_150	RDCR ECC ASME B16.9 BW	350	150		S10XS10S		A403GRWP304	SS	12
ERDCR:400_300	RDCR ECC ASME B16.9 BW	400	300		S10XS20		A234GRWPB	CS	8
ERDCR:400_350	RDCR ECC ASME B16.9 BW	400	350		S10XS10		A234GRWPB	CS	2
ERDCR:450_300	RDCR ECC ASME B16.9 BW	450	300		S10XS20		A234GRWPB	CS	8
ERDCR:500_350	RDCR ECC ASME B16.9 BW	500	350		S10XS10		A234GRWPB	CS	10
ERDCR:600_400	RDCR ECC ASME B16.9 BW	600	400		STDXS10		A234GRWPB	CS	2
ERDCR:700_450	RDCR ECC ASME B16.9 BW	700	450		STDXS10		A234GRWPB	CS	3
ERDCR:80_50	RDCR ECC ASME B16.9 BW	80	50		S10XS40S		A403GRWP304	SS	2
HCPLNG:100_25	HALF COUPLING ASME B16.11 CL3000 SW	100	100	25	CL3000		A182GRF304	SS	6
HCPLNG:150_20	HALF COUPLING ASME B16.11 CL3000 SW	150	150	20		CL3000	A105	CS	8
HCPLNG:150_25	HALF COUPLING ASME B16.11 CL3000 SW	150	150	25		CL3000	A105	CS	44
HCPLNG:200_25	HALF COUPLING ASME B16.11 CL3000 SW	200	200	25		CL3000	A105	CS	20
HCPLNG:250_20	HALF COUPLING ASME B16.11 CL3000 SW	250	250	20		CL3000	A105	CS	8
HCPLNG:250_25	HALF COUPLING ASME B16.11 CL3000 SW	250	250	25		CL3000	A105	CS	16
HCPLNG:350_20	HALF COUPLING ASME B16.11 CL3000 SW	350	350	20		CL3000	A182GRF304	SS	12
HCPLNG:350_25	HALF COUPLING ASME B16.11 CL3000 SW	350	350	25	CL3000		A182GRF304	SS	8
HCPLNG:80_25	HALF COUPLING ASME B16.11 CL3000 SW	80	80	25	CL3000		A182GRF304	SS	1
PIPE:1000	PIPE ERW/SAW IS-3589 PE	1000			T10		IS3589GRFE330	CS	18.14
PIPE:100	PIPE ERW/SAW IS-1239 (PART 1) PE	100			HVY		IS1239(BLACK)	CS	655.85
PIPE:100	PIPE SMLS ASME B36.10 PE	100			S10S		A312GRTP304	SS	21.92
PIPE:100	PIPE SMLS ASME B36.10 PE	100			S40		A106GRB	CS	434.68
PIPE:150	PIPE ERW/SAW IS-1239 (PART 1) PE	150			HVY		IS1239(BLACK)	CS	654.66
PIPE:150	PIPE SMLS ASME B36.10 PE	150			S10S		A312GRTP304	SS	280.88
PIPE:150	PIPE SMLS ASME B36.10 PE	150			S40		A106GRB	CS	1941.2
PIPE:200	PIPE SMLS ASME B36.10 PE	200			S20		A106GRB	CS	268.44
PIPE:200	PIPE SMLS ASME B36.10 PE	200			S40		A106GRB	CS	82.6
PIPE:200	PIPE ERW/SAW IS-3589 PE	200			T6		IS3589GRFE330	CS	255.88

ITEM 1	ITEM DESCRIPTION	NB1	NB2	NB3	SCHEDULE	RATING	M ATERIAL	BASEM AT	QTY (m/ Nos)
PIPE:250	PIPE SMLS ASME B36.10 PE	250			S10S		A312GRTP304	SS	23.04
PIPE:250	PIPE SMLS ASME B36.10 PE	250			S20		A106GRB	CS	694.08
PIPE:250	PIPE SMLS ASME B36.10 PE	250			S40		A106GRB	CS	78.68
PIPE:250	PIPE ERW/SAW IS-3589 PE	250			T6		IS3589GRFE330	CS	29.38
PIPE:300	PIPE SMLS ASME B36.10 PE	300			S10S		A312GRTP304	SS	19.8
PIPE:300	PIPE SMLS ASME B36.10 PE	300			S20		A106GRB	CS	5
PIPE:300	PIPE ERW/SAW IS-3589 PE	300			T6		IS3589GRFE330	CS	7.2
PIPE:350	PIPE SMLS ASME B36.10 PE	350			S10S		A312GRTP304	SS	795.2
PIPE:350	PIPE SMLS ASME B36.10 PE	350			S40		A106GRB	CS	4.64
PIPE:350	PIPE ERW/SAW IS-3589 PE	350			T6		IS3589GRFE330	CS	180.06
PIPE:400	PIPE EFSW ASME B36.10 PE	400			S10		A672GRB60	CS	40.68
PIPE:400	PIPE ERW/SAW IS-3589 PE	400			T6		IS3589GRFE330	CS	894.75
PIPE:40	PIPE SMLS ASME B36.10 PE	40			S40S		A312GRTP304	SS	159.96
PIPE:450	PIPE ERW/SAW IS-3589 PE	450			T6		IS3589GRFE330	CS	32.44
PIPE:500	PIPE EFSW ASME B36.10 PE	500			S10		A672GRB60	CS	41.24
PIPE:500	PIPE SMLS ASME B36.10 PE	500			S10S		A312GRTP304	SS	89.96
PIPE:500	PIPE ERW/SAW IS-3589 PE	500			T6		IS3589GRFE330	CS	254.45
PIPE:50	PIPE ERW/SAW IS-1239 (PART 1) PE	50			HVY		IS1239(BLACK)	CS	638.13
PIPE:50	PIPE ERW/SAW IS-1239 (PART 1) PE	50			HVY		IS1239(GALV)	CS	0.5
PIPE:50	PIPE SMLS ASME B36.10 PE	50			S40		A106GRB	CS	647.56
PIPE:50	PIPE SMLS ASME B36.10 PE	50			S40S		A312GRTP304	SS	139.62
PIPE:600	PIPE ERW/SAW IS-3589 PE	600			T8		IS3589GRFE330	CS	149.29
PIPE:700	PIPE ERW/SAW IS-3589 PE	700			T8		IS3589GRFE330	CS	7.99
PIPE:750	PIPE ERW/SAW IS-3589 PE	750			T8		IS3589GRFE330	CS	70.49
PIPE:80	PIPE ERW/SAW IS-1239 (PART 1) PE	80			HVY		IS1239(BLACK)	CS	580.16
PIPE:80	PIPE SMLS ASME B36.10 PE	80			S10S		A312GRTP304	SS	178.53
PIPE:900	PIPE ERW/SAW IS-3589 PE	900			T10		IS3589GRFE330	CS	208.12
PIPE:900	PIPE EFSW ASME B36.10 PE	900			XS		A672GRB60	CS	23.84
TSTUB:150_25	TEMP STUB BECHTEL TYPE-T 1 NPT THRD"	150	150	25			A105	CS	36
TSTUB:200_25	TEMP STUB BECHTEL TYPE-T 1 1/4 NPT THRD"	200	200	25			A105	CS	12
TSTUB:250_25	TEMP STUB BECHTEL TYPE-T 1 1/4 NPT THRD"	250	250	25			A105	CS	16