Appendix A2-2-1 (1/4) Detailed Schedule of The First Field Survey (1st Week)

	A A	Therefore	Group-A	p-A K Inque	Gro	Group-B	Croup-C Kojitani X	p-C Xawaharada	Group-D Hidaka	D-D Oshima	Sako	Group-E Kawaka	Group-E Kawakami
Date	Mission	Coordinator	Utility (Gas. Water)	Utility (Electricity)	Market Study	Financial & Economical Analysis, Implementation Plan	Port and Port Facility	Plant Layout	Project Planning	ota!	Raw Materials, Steel making Direct Reduction Plant	Steel making Technology	ygo!
Feb. 12 (Thu)							Lv. Japan for Oman	e					
13 (Fri)				.:									
14 (Sat)		AM: Embassy of Japan	Japan		PM: Stee	PM: Steering Committee	- Explanation &	Explanation & Discussion of Inception Report	eption Report	- Ouestion or	Ouestion on Fundamental Matters	fattens	- 1
15 (Sun)	Join to GrB & E	15 (Sun) Join to GrB Arrangement & E of Schodule	Ministry of Commerce and Industry	ommerce and sury	12~14 p.m. Commerce a Dr.Faisal	12~14 p.m.: Ministry of Commerce and Industry / Dr.Faisal, Adviser	Ministry of Commerce and Industry	iny	Ministry of C Indu	Ministry of Commerce and Industry	12-14 p.m.: Ministry of Commerce and Industry Dr.Faisal, Adviser	p.m.: Ministry of Commerc Industry Dr.Faisal, Adviser	გ≼
16 (Mon)	16 (Mon) Join to GrA	Join to GrA and then to GrD, and arrangement of schedule	8 am : Ministry of Oil and Gas Mr. Adnan A.El-Mudailwy, Director General of Gas / Mr. Khalid S. Al-Fadjali, Director of Operation & Maintenance / Mr. Adnan Daher, Adviser Gas Project, and others 2 persons	of Oil and Gas El-Mudailwy, crul of Gas / .Al-Fadjali, peration & Mr. Adnan Jas Project ,and persons	Ministry of C	Ministry of Commerce and Industry	9 am : Ministry of Communication Mr.Hassan Sulaiman, Director of Port Affairs and Mr.K.Kudo, Adviser	Communication nan, Director of 1 Mr.K.Kudo, ser	9 p.m.: Ministry of Higher Education / Mr. Soud M. Al Timami, Director General / Dr. Adnan A. Al- Hajj, Direct of information and stabistics Mr. Rashid, Directorate Gene- Institute and College	9 p.m.: Ministry of Higher Education / Mr. Soud M. Al- Timami, Director General / Dr. Adnan A. Al- Hajj, Director of information and statistics / Mr. Rashid, Directorate General Institute and College	Ministry of Commerce and Industry	Commette	g l
17 (Tue)	17 (Ive) Join to GrC	Join to GrB and then to GrE, and arrangement of schedule	10 am : Ministry of Electric and Water / Eng. Mohamad Redha, Director General of Electric	of Electric and chamad Redha, ral of Electric	9 am: N. Finance/Mr.Ali Director of Directorate Ger & Investment Awatuf M.Al-H General of In Assessment a	9 am: Ministry of Finance/Mr.Ali Mohad.R.Jafar, Director of Loan Dept., Directorate General of Revenue & Investments / 10 am: Ms Awattif M.Al-Hakman, Director General of Investigation & Assessment and Mr. Saeeda	12 p.m. : The same as above		11am : Ministry . & Environment. Farsy, Expert of	& Environment / Ms Fatina Al- Farsy, Expert of Environment	12 p.m. : Ministry of Commerce and Industry Dr.Hamed H. Al-Dhahab, Director General, Dr.Faisal, Adviser and Mr.Nabil	nistry of C med H. Al- isal, Advis	88 i
18 (Wed)	18 (Wed) Join to Gr. E	Arrangement of schedule and join to GrE	Ministry of Commerce and Industry		10 am : Minis Mr. Raj, Ta 12:30 p.m. : C Oman Mr. Ali F of Statistic & In	10 am: Ministry of Finance Mr. Raj, Tavaton Dept. 12:30 p.m.: Central Bank of Oman Mr. Ali Hamdan, Director of Statistic & Information Dept.	Ministry of Communication Mr.Kudo & Mr.Cyadomari, JICA Experts / Ministry of Commerce and Industry	mnunication yadomari, JICA y of Commerce lustry	Caledonian To	Caledonian Technical College	12:30 p.m. : Ministry of Commerce and Industry Dr. Hamed Ali-Dhahab, Director General and Dr. Faisal, Adviser	90 p.m. : Ministry of Commerce try Dr. Hamed Ali-Dhahab, Dit General and Dr. Faisal, Adviscr	ੂੰ ਮੁੱਖ

Appendix A2-2-1 (2/4) Detailed Schedule of The First Field Survey (2nd Week)

					Gount-B	B.	D-dnoug	Ų	Gro	Group-D		Group-E	
	Akedo	Tonaka	T. Inoue	K. Inoue	Hosokawa	ose Ose	Kojitani	Kawaharada	Hidaka	Oshima	Sako	Kawakami	Hamanaka
Date	Mission	Coordinator	Utility (Gas. Water)	Utility (Electricity) Market	Study	Financial & Economical Analysis, Implementation Plan	Port and Port Pacility	Plant Layout	Project Planning	Environmental Assessment	Raw Materials, Direct Reduction Plant	Steel making Technology	Rolling Technology
Feb.						Ď	Data Arrangement						
20 (Fn)						Move fr	Move from Muscat to Salalah	lalah				,	
21 (Sat)	Meeting a	t MOCI Salalal	h Branch : Mr.Abd	Meeting at MOCI Salalah Branch: Mr. Abdullah N. Al-Ghassani, Director General / Mr. Taher A. Ibrahim, Adviser / Mr. Sami Al-Zubaidi, Director of Industry / Mr. Mohamed Ramadhan, Head of Indus Development / other 3 persons of Salalah Branch Mr. Hassan B.A. Fadal, Director of Engineering & Maintenance, Port Raysut of MOC	, Director Gener Directorate C	ral / Mr. Taher A revelopment / ot General of Port &	tor General / Mr.Taher A. Ibrahim, Adviser / Mr. Sami Al-Zubaidi, Director of Industry / Development / other 3 persons of Salalah Branch erorate General of Port & Mantime Affairs / Mr. Hassan B.A. Fadal, Director of Engineer	r / Mr. Sami Al- Salalah Branch s / Mr. Hassan B	Zubaidi, Directo 3.A. Fadal, Direc	r of Industry / Mr.) tor of Engineering &	Mr.Mohamod Ramadhan, Head of Industrial, ng & Maintenance, Port Raysut of MOC	than, Head of D ort Raysut of N	odusmai. 100
22 (Sun)	Join to GrA	22 (Sun) Join to GrA of Schedule	Salalah San Service/Mr. Barik / Mr. Yusn A.F.	MOOG Salah Branch NOOG Salah Branch Salah Santary Dranage Service/Mr. Bark S. A. Rawas, AGM / Mr. Yusn A.H. Hamid, Project	MOCI Salalah / Mr.Sami Al- Zubaidi, Director of Industry	Salalah / Mr.Sami Al- i, Director of Industry	Ministry of Housing / Mr.Ahmed A. Alhabshi, Director of Planning & Survey Mr.Abdul M. Jabali, Tower Planner	Housing / Alhabshi, ng & Survey / ibali, Tower	MOCI Salalah Ramadhan, H Devel	MOCI Salalah / Mr.Mohamed Ramadhan, Head of Industrial Development	MOCI Salal Mr.Kahid A. B Mr.Mohamm	MOCI Salalab - Mineral Section / Mr.Kahiid A. Bankhiff, GM of Mineral / Mr.Mohammed I. Kahlif, Geologist	ction / (Mineral / sologist
		Join to GrA		Advisset Raysut Cement Co. Mr. Said B. A., Al-Rawas, Managing Director	-Rawas, Manag	ing Director	MOC Port & Maritime Affairs / Port Raysut Padron / Eng. Jack Fernandez	antime Affairs Han- ck Fernandez	Raysut	Raysut Cement Co Mr. Said B.A. Al-Rawas Managing Director	B.A. Al-Rawas.	Managing Direc	20,
23 (Mon)	23 (Mon) Join to GrA	Join to GrA. and arrangement of schedule		MOEW Salalah / Mr. Ahmed S.S. Massan, Director of Trausmission E.S. Massan, Director of Trausmission A. Taweel, Chof Engineer / Mr. Abdul Mr. Thomas Jacob, Supervisor R. A. Al-Ibrahim, Engineer Head of Project Section	Handan Trading Group Mr.Thomas Jacob, Supervi		MOC Port & Maritime Affairs Port Raysut	ritime Affairs ysut	Department of	Department of Salalah Airport	MOCI	MOCI Mineral Section Limestone Resources	g "
24 (Tue)	Join to GrA	24 (Tue) Join to GrA, Join to GrA		Office of the Minister & Governorate of Dhofar Province / Eng.Ghali B.A.Al-Mashali, Director General. Water Supply & Transport	MOCI Salalah Branch Move to Muscat	XXI Salalah Branch Move to Muscat	MOC Port & Maritime Affairs Port Raysut		Environment/Go / Mr.Salim M.A Jeneral / Mr.Fay Inspector Water :	Environment/Governorate of Dhofar / Mr.Salim M.A.B.Saced, Director General / Mr.Fayez Bataunch, Schior Inspector Water and Waste Pollution	ASSAG ADI MR.OMA SHANFARI Mr.Ahmed I	ASSAG ADDHABI TRADING CO. MR.OMAR M. FADHIL, MD. SHANFARI AND PARTNERS CO. Mr.Ahmed B.A.M. Al-Shaidh, MD.	NG 00 18 NG 00 18 NG 00 18 NG 00
	and then to GrE	and then to GrE	Mr. Said Al-Sh Water St Salalah Sanitar Co.Mr. Moha Technical Advi Aqeel, Chai	Mr. Said Al-Shanfali, Director of Water Supply Dept. / Salalah Sanitary Dramage Service Co.Mr. Mohamed A.A. Younis. Technical Adviser /H.E.Abdulah Aget. Chairman of Dhofar Municipality	•				Ministry of Heal Alim / Hig Administrativ Services / Ms Tl Abazal, GM / A.A.Maturnel	Ministry of Health / Mr.Salim H.Ba- Alim / High Institute of Administrative and Technical Services / Ms Thaniyan B.B.M.Al- Ahazal, CM / Mr.Mohammad A.A.Maurneh, Dy. Managing Quality Control	H.E.Musallam B.A.Al-Busaidi. Minister of the State and Governor of Dhofar	Musallam B.A.Al-Busaidi. Minist the State and Governor of Dhofar	Minister of Dhofar
25 (Wed)	Join to GrE	25 (Wed) Join to GrE Join to GrE		Office of the Minister & Governorate of Dhofar Province / Mr.Ali A.A.Shanfii, Dy, Director Dept. of MOCI Salatah Branch / Wrap-up MoCI Salatah Branch / Wrap-up Meeting	MOCI Musc Abdullah, Dury Ext	MOCI Muscat / Mr.Salah Abdullah, Duty Exemption of Export	Same as GrE	а Ю	Ministry o Ministry MOCI Salalah	Ministry of Education / Ministry of Housing/ MOCI Salalah Branch / Wrap-up Meeting	MOC Port Mr. Abdullah B.A. Fadal MOCI Salalah I	MOC Port & Maninne Affairs / Mr.Abdullah B.S.A.Qader/Mr.Hassan B.A.Fadai, Director of Eng's & Maintenance MOC! Salalah Branch / Wrnp-up Moeting	fairs / r.Hassan g'g & ap Meeting
26 (Thu)						Move f	Move from Salalah to Muscat	uscat					

Appendix A2-2-1 (3/4) Detailed Schedule of The First Field Survey (3rd Week)

Akedo Date Mission Leader Feb. 27 (Fri)		_			6 1100		_	Chief	5		Croup-th	
	do Tanaka	T. Inoue	K. Inoue	Hosokawa	Ose	Kojitani	Kawaharada	Hidaka	Oshima	Sako	Kawakami	Hamanaka
Feb. 27 (Fri)	<u> </u>		Utility (Electricity)	Market Study	Financial & Economical Analysis, Implementation Pian	Port and Port Facility	Plant Layout	Project Planning	Environment al Assessment	Raw Materials, Direct Reduction Plant	Steel making Technology	Rolling Technology
					Data Arran	Data Arrangement						
28 (Sat)	Embassy	Embassy of Japan (leader, Ose & Tanaka)	e & Tanaka)	Ste	Steering Committee; Report of Investigation at Salalah and Site Location & Basic Concept of Steel Complex	teport of Investig	gation at Salala	th and Site Loc	ation & Basic (Concept of Ste	cl Complex	
Mar		Sohar Ind	ustrial Estate / Mr.H	Tamad Bin Salem	Sohar Industrial Estate / Mr. Hamad Bin Salem Al-Mahdali, Estate Director / Mr. Ahmed Nasser Al Bulushi, Supervisor and Majis Jetty	rrector / Mr.Ahr	med Nasser Al.	Bulushi, Super	visor and Maji	s Jetty		
1 (Sun)				Sobar Municipalit	Municipality / Sheik Ahmed Bin Abdullah Al Kendy, Wali of Sohar	a Abdullah Al K	endy. Wali of ;	Sohar				
2 (Mon)		Oman Mining Co	mpany LLC / Mr.Al	Ii Said Abdullah A. Dewan So	Oman Mining Company LLC / Mr. Ali Said Abdullah Al-Waily, Acting General Manager Sharq Soh Dewan Sohar Office / Mr. Abdul Nabi Ahmed Al-Baloushi	eral Manager ul Nabi Ahmed	Sharq Sohar Al-Baloushi	Sharq Sobar Steel Rolling Mills LLC / Mr.Sundeep Rao -Baloushi	Mills LLC / Ma	r.Sundeep Rao		
3 (Tue) Join to	3 (Tue) Join to GrA Join to GrB		Chubrah Poer Station & Desalination Plant / Mr. Ribbi Hamdan, Plant Manager / Mr. P. K. Mukejie, Chief Chemical	Amianti Oman' GM Steel/Mr.T. Chain link Fencin Al Ajmi Mt Co/Mr.F.Miranda	Amiantit Oman/Mr.C.N.Raorane, GM Al-Khoud Steel/Mr.T.Joseph. GM Chain link Fencing/Mr.M.Q.Awadh Al Ajmi Muscat Industrial Co/Mr.F.Miranda, Factory Manager, Same as GrE	Ministry of Communication Mr.Kudo, Adviser to the Minister	mmunication Wiser to the Ster	Same as GrA	GrA	Oman Meta Bilad Omar	Oman Metal / Eng.Nidal Ahmed, GM. Bilad Oman / Mr.Gassam Souli, GM	chmed, GM Souli, GM
4 (Wed) Join to	Join to GrE. Join to GrB		Ministry of Oil & Gas / Mr. Adnan Ali Al-Mudailwy, Director General of Gas/Mr. Suleiman S. Al Balishi, Dy Director General of Gas & Petroleun Industry/ Mr. Adnan Dhafer, Adviser Gas Project Mr. P. C. Den Reijer, Government Gas Study Team Leader AEG/1PDO / Mr. K. J. Pascoc, Head of Gas Operation & Eng'g AGG PDO		Ministry of National Economy / Mr. Mahmoud Al Bahlani, ADG of Development Planning/Dr. Mahmoud E.S. Mahgoub, Consultant Dr. R.L. Chawala, Consultant An Y. Al-BalushiMr. Humaid Al Saadi/Mr. Said M. Al- Masoud, Director of Natural Resources Development Dept. Mr. Khalid Al Zakwani, Director of Manpower Planning/Eng. Khamis A. Al-Shandoudi, Director of Regional Development & Infrastructure/Mr. Ali M. Hassan, Director General of Social Statistics	Wimpey Alawi LLC / Mr. A. J. Barciay, Regional Quantity Supervisor Galfar Engineering & Contracting L.L. / Mr. Salem Saeed Hamed Al Fannab Al Araimi, Chuirman Mr. A. Nushad, Business Development Manager		Ministry of Regional Municipality & Environment / Mr. Leaszek Kuczynski		Oman Meta Al Mutahidha GM Mr-Eustac	Oman Meta] / Mr. Govindarajan, GM Al Mutabidba Transport/Mr. George Carr, GM Elco Industrial Trading / Mr. Eustace Luis, Chief Executive	arajan, GM Goorge Carr, Il Trading / Executive
5 (Thu) Arrangem	Data Data Arrangement Arrangement		Data Arrangement	Subail & Saud Materials LLC / C Oman Cans / Mi Chairman / Mr.	Suhail & Saud Bahwan Building Materials LLC / Mr. Ajay Agarwal, GM Oman Cans / Mr. Muradha Jaffer, Chairman / Mr. A. Hadi, Manager	Same as GrB		United Engineering Services / Mr.Sri Ram, Seniot Engineer	ring Services m, Senior icer		Same as GrD	
6 (Fn)					Data Arrangement	ngement						

Appendix A2-2-1 (4/4) Detailed Schedule of The First Field Survey (4th Week)

					Ċ	a din	O-more	O de	Gro	Group-D		Group-E	
			Group-A	4-4-	5	ordina.		2			2.50	in of one	Tomonoto.
!	Akedo	Tanaka	T. Inoue	K. Inoue	Hosokawa	Ose	Kojitani	Kawaharada	Hidaka	Oshima	Sako	NAWAKIIIII	- Administra
Date	Mission Leader	Coordinator	Utility (Gas, Water)	Utility (Electricity)	Market Study	Financial & Economical Analysis, Implementation Plan	Port and Port Facility	Plant Layout	Project El	Environmental Assessment	Materials, Direct Reduction Plant	Steel making Technology	Rolling Technology
Mar 7 (Sat)	MOCI	Ď	Muscat Mumicipality Office / Sewage Treatmen Plant / Eng.Saeed Al Qaismi, Director of Sewage Treatment Dept. / GTO, Director General of Strategic Planning	Muscat Municipality Office / Sewage Treatment Plant / Eng.Saeed Al Qaismi, Director of Sewage Treatment Dept. / GTO, Director General of Strategic Planning		•	Bahwan Engineering Co. LLC. / Mr.Suresh K.Virmani, GM/ Mr.D.C.Munshi, Manager Civil Construction Operation / Mr.C.K., Manager Mechanical & Electrical Div.	Bahwan Engineering Co. LLC. / Mr.Suresh K.Virmani, GM/ Mr.D.C.Munshi, Manager Civil Construction Operation / Mr.C.K., Manager Mechanical & Electrical Div.	Ministry Affairs ar Mr. Ahme Shanfari General of Authority / Majali, \	Ministry of Social Affairs and Labors / Mr.Ahmed B.A. Al- Shanfari, Director General of Vocational Authority / Mr.Odeh El Majali, Vocational Counselor			
8 (Sun)	Embassy of Japan	Same as Leader / MOCI				占 	Draw-up of D	Draft Progress	Report				
9 (Mon)	Same as GrA / Alawi Bin Abdu Foreign Affairs Ambassador &	Same as GrA / H.E. Yousuf Bin Alawi Bin Abdullah, Minister of Foreign Affairs with Japanese Ambassador & First Secretary		H.E. Maqbool Bin Ali Sultan, Minister of MCCI/Dr. Hamed H. Al-Dhahab, Director General of Industry, MCCI / Dr. Faisal M. Elamir, Adviser of MCCI and others		Same as Leader			8	Same as GrA			
					Draw-up	-up of Final	1 Progress	Report					
10 (Tuc)	H.E. Mohammed B. Al Zubair B. Ali, His Majesty Sultan's Adviser with Japanese Ambassador & First Secretary	MOCI / Mr.Nabil Mubarak Same as Leader		Draw-up of Final Progress Report	ss Report	Same as Leader Same as GrA	Dra	Draw-up of Final Progress Report	Progress Re	הסק	Α,	Same as GrA Leave from Oman	A nan
11 (Wed)			St	Steering Commit	ttee / Present	tee / Presentation of Progress Report	s Repor t					Arrive at Japan	ផ
12 (Thu)					Data Arrangement	gentent							
13 (Fri)					Data Arrangement	gement							
14 (Sat)		:	Š	teering Comm	itee / Signin	Steering Committee / Signing on Minutes of Meeting	Meeting	:					
15 (Sun)			Embassy of Japan	f Japan	7:	7	Leave from Oman	nan					
16 (Mon)					Arrive at Japan	Japan							
						•							

Appendix A2-2-2 (1/3) Detailed Schedule of The Second Field Survey (1st Week)

		Date	June 23 (Tue)	24 (Wed)	25 (Thu)	26 (Fn)	27 (Sat)	28 (Sun)	29 (Wed
	Akedo	Mission Leader							29 (Wed) Minister of Foreign Affairs MOCI
	Tanaka	Coordinator		9 am : Embassy of Japan				Join to GrE	····
Group-A	T. Inoue	Utility (Gas, Water)		l Japan				Ministry of Oil and Gas Mr. Adnan Ali Al-Mudailwi, Director General of Gas, Mr. Khalid S. Al-Fadjali, Director of Operation & Maintenance, Mr. A. Dhaher, Adviser, Mr. P. C. Den Reijer, Study Team Leader, AEG/I PDO	Ministry of Electricity and Water Mr.Mobarnad Redha Hassan, Director General of Electricity
A-A	K. Inoue	Ublity (Electricity)		11 am : Minist			9 am : Secring	Mi and Cas Al-Mudailwi, eral of Gas, Al-Fadjali, Peration & Ar-A.Dhaher, C.Den Reijer. zader, AEG/1	ricity and Water techa Hassan, I of Electricity
95	Hosokawa	Market Study	Lv. Japan	ry of Commerce	Datn (Dat	Committee -	M	MOCI Dr.Faisal
Group-B	Ose	Financial & Economical Analysis, Implementation Plan	Arr. Oman	11 am: Ministry of Commerce and Industry - Explanation and discussion of the Schedule and Interim Report	Data Collection	Data Arrangement and Preparation for Steering Committee	9 am : Steering Committee - Explanation and Discussion of Interim Report and Methodology for Site Selection	MOCI	Same as Leader MOCI/Dr.Fusal
Group-C	Kojitani	Port and Port Facility		Explanation and		Preparation for (Discussion of Inte	Ministry of Communications Mr.Janal T. Aziz, Director General of Port & Maritime Affairs, Mr.Khalid Mirza, Mr.H.Sasajima, Adviser	MOC/Mr.H.Sasajıma, JICA Adviser
ည	Kawaharada	Plant Layout		discussion of the		Steering Comm	rim Report and .		i.Sasajima, dviser
G-dnovD	Hidaka	Project Planning		Schedule and I		ttee	Methodology fo	Ministry of Regional Municipality and Environt Mr.Leazek Kuczynski	Same a
Qd	Osbima	Environmental Assessment		nterim Report			r Site Selection	Miniscy of Regional Muncipality and Environment Mr. Leazek Kuczynski	Same as GrE
	Sako	Raw Matenals, Direct Reduction Plant			5.73			MOCI / Mr.Ahamad Nasser, Geologist. Geological Survey Dept., Dr. Hayat A. Quidwai, Geological Expert of Directorate of Minerals Dr.H.H.Dhahab, Director General of Industry, Dr. Faisal, Technical Adviser	SPECO (Scrap
Group-E	Kawakami	Steel making Technology		/	Lv. Japan Ar. Oman			MOCI / Mr.Ahamad Nasser, Geologist. Geological Survey Dept., Dr. Hayat A. idwai, Geological Expert of Directorate Minorals H.H.Dhahab, Director General of Indus Dr. Faisal, Technical Adviser	SPECO (Scrap Processing & Earthmoving Co. LLC.) Mr.Ullas
	Hamanaka	Rolling Technology			e			Geologist. Hayat A. Directorate of	Sarthmoving

Appendix A2-2-2 (2/3) Detailed Schedule of The Second Field Survey (2nd Week)

Mission Coordinator Water) Sohar / Planned Port Area, Planned Site Area, Wadi Jizzi Power Station / Mr. Manny Arguero, Head of Wadi Jizzi PyS Sohar Fishery Development of Ministry of Agriculture and Fishing/Mr. Yaquob Al Ghassany, Director, Mr. All All Jami, Technician of Fishing/Mr. Yaquob Al Ghassany, Director, Mr. All All Jami, Technician of Fishery Development of Move from Muscat to Salalah Move from Muscat to Salalah Move from Muscat to Salalah Mr. Sami Al-Zabaidi, Director of Industry / Mr. Mohamed Mr. Sami Al-Zabaidi, Director of Industry / Mr. Mohamed	A. EDOTE	Hosokawa Ose	Kojitani Kawaharada	da Hidaka	Oshima	Sako	Kawakami Hamanaka
Sohar / Planned Site Area, Wadi J Mr. Manny Arqi Mr. Manny Arqi Sohar Fishery Ministry of, Fishing/Mr. Yad Fishery Tools (! Office, M Hashine, D. A.A.Kish Water, Mr. Abdul Mr. Abdulariz Awad Alu Mr. Abdulariz Awad Alu Mr. Taher A. Ibrah widi, Director of Industry	Unitry (Electricity), Market Study	Find Eco An Imple	Port and Port Plant Layout	Project Planning	Environmental Assessment	Raw Materials. Direct Roduction Plant	Steel making, Rolling Technology Technology
Sohar Fishery Ministry of, Fishing/Mr. Yac Fishing/Mr. Yac Director-Mr.Abl / Fishery Tools // Office, M Hashned, A.A.Kish Water, Mr. Kha Salalah Branch: Mr. Abdul Salalah Branch: Mr. Abdul Move from Muscat to Salali Salalah Branch: Mr. Abdul Move from Muscat to Salali Fishery Mr. Taher A. Ibrah Jubaidi, Director of Industry	Sohar / Planned Port Area, Planned Site Area, Wadi Jizzi Power Station / Mr. Manny Arquero, Head of Wadi Jizzi P/S	Sohar/Planned Port Area. Mahdali, Estate Director, M charge of Industry	Sohar/Planned Port Arca, Planned Site Area/Sohar Industrial Estate, Mr. Hamd B. Salem Al-Mahdali, Estate, Mr. Hamd B. Salem Al-Bulushi,Civil Engineer.Mr.Ahamad Nasser.in charge of Industry and Mr.Sulaiman,in charge of Toursm.MOCI Sohar Branch	strial Estate, Mr. Ha hi,Civil Engineer.Mr Tourism,MOCI Soh	md B. Salem Al- r.Ahamad Nasser,in ar Branch	Sohar / Lime Ahmed Nass Oman Mining Ismail, Forer	Sobar / Limestone Deposit with Mr. Ahmed Nasser, Geologist of MOCI Oman Mining Company / Mr. Farah A. Ksmail, Foreman of Mobile Crusber
Move from Muscat to Salaiz I Salalah Branch: Mr. Abdul ral / Mr. Abudiaziz Awad Al. General / Mr. Taher A. Ibrah Zabaidi, Director of Industry	Sohar Fishery Development of Ministry of Agriculture and Fishing/Mr. Yaquob Al Ghassany. Director_Mr.Ai J Jami, Technician of Fishery Tools / Sohar Development Office, Mr.Saleh A.A. Hashme.D.G., Mt. Mohmed A.A. Kitshn, Duector of Water, Mr. Khadeem A.Omarani	Al Mushidha Transport Co. LLC. Mr. George Carr, General Manager	Sur / Mr. Yousef Al-Alawi. MOCI Sur Branch Sur LNG Office, Mr. Ali B. Juma Al- Musharafi, Head of Sur Office (Chiyoda Corporation, Mr. Kobayashi, Chief Executive & Project Durector/ Taisei Corporation, Mr. Takeda, GM of Site Office, Mr. Furukawa, Adm., Mgr.	G cc ive Same as GrB	Same as GrC	MOCI / Dr. H. I Dr. Faisa	MOCI / Dr. H. Dhahab, D. G. of Industry, Dr. Faisal, Technical Adviser
Move from Muscat to Salais (Salalah Branch: Mr. Abdul al / Mr. Abudlaziz Awad Al- General / Mr. Taher A. Ibrah Zabaidi, Director of Industry			Data arrangement				
I Salalah Branch: Mr. Abdul ral / Mr. Abudiaziz Awad Al- General / Mr. Taher A. Ibrah Zabaidi, Director of Industry	lah	Data arrangement		Move	Move from Muscat to Salalah	аh	
Ramadhan, Head of Industrial Development and other 2 persons of MOCI Salalah Branch	Jilah N. Al-Ghassani, L'Chassani, Acting Jim, Adviser ry/Mr. Mohamed and other 2 persons of	MOCI Muscar	Meeting at MOCI Salalah Branch: Mr. Abdullah N. Al-Ghassani, Director General / Mr. Abudlaziz Awad Al-Ghassani, Acting Director General / Mr. Taber A. Brahim, Advisor Mr. Sami Al-Zubaidi, Director of Industry / Mr. Mohamed Ramadhan, Head of Industrial Development and other 2 persons of MOCI Salalah Branch	Branch : Mr. Abdulli sani, Acting Director rector of Industry / N other 2 perse	: Mr. Abdullah N. Al-Ghassani, Director (ting Director General / Mr. Taber A. Ibra f Industry / Mr. Mohamed Ramadhan, He other 2 persons of MOCI Salalah Branch	virector General / ? r A. Ibrahim, Advi dhan, Head of Indi Branch	Vr. Abudlaziz Awa ser ustrial Developmen
Salalah Santary Co./Mr. B. S. A. / GM, Mt. Y. Ali Ad	Salalah Santery Drainage Service Co./Mr. B. S. A. A. Al-Rawas, Acting GM, Mt. Y. Ali Hassan, Technical Adviser		MOC Port Raysut/Mr. Abdullah B.S.A. QADER, A.G.M. Directorate General of Port & Maritime Affairs, Port Raysut of MOC, HAN-PADORON ASSOCIATES, Mr.G.Lioyd, Asst. Resident Engineer		High Institute of Administrative and Technical Sciences / Mr.G.Robert, Project Manager, Mr.Thaniyan B.B.M.Al-Ghazal, Ceneral Manager		Join to GrC
Join to GrA Omar Al-Abadi, omar Al-Abadi, omoci SalalahWrap-up Meeting Move from	MOEW Salalah Branch / Mr.Said Omar Al-Abadi, Generation Director ting Move from Salalah to Muscat	MOCI Muscat	HAN-PADORON ASSOCIATES / MR.G. Lloyd, Asst. Resident Engineer MOCI Salal	त	lustrial Co awi, Direct itab, Head Dept.		MOCI Salalah Mineral Department / Mr.Khalid M. Rawas, Director of Quanes, Mr.Mohammad Ishaq Khalifa, Geologist from Salalah to Muscat
MOCI / Dr. H. Dhahab, D.G. of Industry Join to GrC	Join to GrD	Join to GrC.	Ministry of Housing/Mr.Ali M.Al-Marndi, Director General of Town Planting Survey, MCC/Mr.Hassan Slaiman, Mr.H.Sasajima, HCA Expert		MOCIVAT. Nabil Mubarak, Ministry of Regional Municipality and Environment/Mr. Salim A.H. Al-Jufali, Head of Marine Pollution Section	MOCI Mine A.Ibrahim Exploration, Mr. Mr.R.Nob	MOCI Mineral Dept/Mr.Salim O. A.Ibrahim, Director of Mineral Exploration, Mr.Ahmed Nasser, Geologist, Mr.R.Nobumoto, JICA Expert

Appendix A2-2-2 (3/3) Detailed Schedule of The Second Field Survey (3rd Week)

	-		Š	Group-A	ర్	Group-B	Sro.	Group-C	Š	Group-D		Group-E	
-	Akedo	Tanaka	T. Inoue	K. Inoue	Hosokawa	Ose	Kojitani	Kawaharada	Hudaka	Oshima	Sako	Kawakami	Hamanaka
Date	Mission Leader	Coordinator	Ublity (Gas. Water)	Utility Utility (Gas. Water)	Market Study	Financial & Economical Analysis, Implementation Plan	Port and Port Facility	Plant Layout	Project Planning	Environmental Assessment	Raw Materials, Direct Reduction Plant	Steelmaking Technology	Rolling Technology
July 7 (Tue)				Data arran	gement / Dr.	Data arrangement / Draw-up of Minutes of Mecting / Draw-up of Progress Report Π	s of Meeting	/ Draw-up of P	rogress Rep	סדו 11			
8 (Wed)			Mr. Ali M	asoud Al-Suna	udy. Underse	Mr. Ali Masoud Al-Sunaidy, Undersecretary of MOCI		g Committee /	Signing on I	Steering Committee / Signing on Minutes of Meeting	Su		
9 (Thu)		-	•			Draw-up of Progress Report II	Progress Rep	n II					
10 (Fri)						Draw-up of F	Draw-up of Progress Report II	m II					
11 (Sat)	Minister of Communications / H.E. Salim bin Abdullah al Ghazali Presentation of Progress Report It to Steering Commutee	nmunications / a Abdullah al zali Progress Report		tion of Progress Reg Steering Committee	Report II to	Presentation of Progress Report II to Same as Leader Steering Committee		Presentation	n of Progr	Presentation of Progress Report II to Steering Committee	o Steering	Committee	
12 (Sun)		. :		ug	Embassy of Japan	an		Leave fro	Leave from Oman				
13 (Mon)						Ami	Arrive at Japan						

Appendix A2-2-3 Detailed Schedule of the Third Field Survey

		Mr. Akedo	(Mr. Ose) (Mr. Tanaka) (Financial &
	Date	Leader	Economical (Technical Analysis, Coordinator) Implementation Plan)
	Sept. 1 (Tue)	Leave Japan Arrive in Oman	9
2	2 (Wed)	8:00 Embassy of Japan	
		9:00 Steering Committee - Explanation & Discussion of Site Evaluation Report	port
60	3 (Thu)	Ministry of Communications / H.E. Salim b.A. al Ghazali, Minister. Mr. Jamal Aziz, Director General of Port & Maritime, Mr. H.Sasajima, Adviser to the Minister, JICA Expert	ziz, Director General of Port & Maritime. to the Minister, JICA Expert
Ħ	4 (FB)		
S	5 (Sat)	Ministry of Oil & Gas / H.E. Dr. Mohammad B. Hamad B. Saif al Rumhi, Minister. Mr. Sulciman S. al Balushi, Dy. Director General of Gas Affairs & Petroleum Industry & Petrol Production, Mr. Adnan A. Al-Mudailwi, Gas & Petroleum Industry	nan S. al Balushi, Dy. Director General of Gas Affairs etroleum Industry P. Manson Al Toki, Chief of Asian Department.
		Ministry of Foreign Affairs / H.E. Yousuf B. Alawi B. Abdullan, Minister, Mr. H. B. Nasser B. Manison A. 1001, Chief of Asian Economic & Technical Cooperation Mr. Awadi B. B. M. Al Shanfan, Chief of Economic & Technical Cooperation	chnical Cooperation
		Steering Committee - Discussion of Site Evaluation Report and Signing on MOM	and Signing on MOM
9	6 (Sun)	H. H. Mohammed B. Al Zubair B. Ali, His Majesty the Sultan's Adviser for Economic Plann	His Majesty the Sultan's Adviser for Economic Planning Affairs and President of Sultan Qaboos University
		Ministry of Commerce & Industry / H.E. Ali M. Al-Sunaidy, Undersecretary of Industry. L. Mr. Nabil M. Al-Mukhaini, Economic Researcher	E. Ali M. Al-Sunaidy, Undersecretary of Industry. Dr. Hamed H. Al-Dhahab, Director General of Industry. Mr. Nabil M. Al-Mukhaini, Economic Researcher of Industry
		Embassy of Japan Leave Oman	man
7	7 (Mon)	Arrive in Japan	

Appendix A2-2-3 Detailed Schedule of the Third Field Survey

oran oranan.		Mr. Akedo	(With CNC)	
an en grungsternanne	Date	? cader	Economical (Technical Analysis, Coordinator) (Plan.)	
	Sept. 1 (Tue)	Leave Jupan Arrive in Oman	u	44
C1	2 (Wed)	8,00 Embassy of Japan		
		9.00) Steering Committee - Explanation & Discussion of Site Evaluation Report	por	
· · ·	3 (Thu)	Ministry of Communications / H.E. Salim b.A. al Ghazali, Minister, Mr. Jamal Aziz, Director General of Port & Maritime. Mr. H.Sasajima, Adviser to the Minister, JICA Expert	iz, Director General of Port & Mariume, to the Minister, JICA Expert	
4	4 (Fri)			
·	(Cut)	Ministry of Oil & Gas / H.E. Dr. Mohammad B. Hamad B. Saif al Rumhi, Minister. Mr. Suleiman S. al Balushi. Dy, Director General of Gas Affairs & Petroleum Industry & Petrol Production, Mr. Adnan A. Al-Mudailwi, Gas & Petroleum Industry	nan S. al Balushi. Dy, Director General of G. groleum Industry	as Affairs
``		Ministry of Foreign Affairs / B.E. Yousuf B., Alawi B., Ahdullah, Minister, Mr. H. B. Nasser B. Mansoor Al Tobi, Chief of Asian Department. Mr., Awadi B., B., M., Al Shanfani, Chief of Economic & Technical Cooperation	r B. Mansoor Al Tobi, Chief of Asian Depart chnical Cooperation	tment.
		Steering Committee - Discussion of Site Evaluation Report and Signing on MOM	ind Signing on MOM	
Ó	6 (Sun)	H. H. Mohammed B. Al Zubair B. Ali, His Majesty the Sultan's Adviser for Economic Planning Affairs and President of Sultan Quboos University	ig Affairs and President of Sultan Qaboos Ur	niversity
		Ministry of Commerce & Industry / H.E. Ali M. Al-Sunaidy, Undersecretary of Industry. Dr. Humed H. Al-Dhahub, Director General of Industry. Mn. Nabil M. Al-Mukhaini, Economic Researcher of Industry.	Humed H. Al-Dhahub, Director General of I if Industry	Industry.
		Embassy of Japan Leave Oman	man	
1	7 (Mon)	Arrive in Jupan		

Appendix A2-2-4 Detailed Schedule of the Fourth Field Survey

	Date				17 (Thu)	19 (Sat)	1 3	}	21 (Mon)	22 (Tue)	
Mr.Akedo	Leader	Dec. 15 (Tue)	16 (Wed)		â	(1	20 (Sun)	·	(u		
Mr.Hosokawa	Market Study			10 am			Ministry of Region	Ministry of I	Ministry of	mittee (Ministry of Co	
Mr.Ose	Financial & Economical Analysis, Implementation Plan	Leave Japan	9 am	Steering Committee - Explanation & Discussion of Draft Final Report	Preparation for Dis	Steering Committee -	Regional Municipalities and Environment	Ministry of Foreign Affairs / H.E. Yousuf B. Alawi B. Abdullah, Minister and Others	Ministry of Oil & Gas / H.E. Dr. Mohammad B. Hamad B. Saif al Rumhi, Minister	Steering Committee (Ministry of Commerce and Industries) - Signing on MOM	
Mr.T,Inoue	Utilities (Natural gas, Water)	Arrive in Oman	Embassy of Japan	splanation & Discussion	Preparation for Discussion of Draft Final Report	Steering Committee - Discussion of Draft Final Report		usuf B. Alawi B. Abdulla	hammad B. Hamad B. S.	Signing on MOM	
Mr.Kojitani	Port and Port Facilities	man		of Draft Final Report	port	al Report	Ministry of National Economy	th, Minister and Other	aif al Rumbi, Ministe	Embassy of Japan	
Mr.Hidaka	Plant Management						conomy	XI.	ī	an Leave Oman	
Mr.Tanaka	Coordinator							;		usu.	

Appendix A2-2-4 Detailed Schedule of the Fourth Field Survey

		Mr.Akedo	Mr.Hosokawa	Mr.Oxe	Mr.T. Inoue	Mr.Kojitani	Mr.Hidaka		Mr.Tanaka
	Date	Leader	Market Stady	Financial & Economical Analysis, Implementation Plan	Utilities (Naturol gas, Water)	Port and Port Facilities	Plant Management		Coordinator
	Dec. 15 (Tue)			Leave Japan	Arrive in Oman)man			
C1	16 (Wed)			9 am	Embassy of Japan				
			30 am S	Steering Committee - Explanation & Discussion of Draft Final Report	planation & Discussion	of Draft Final Repor	1		
100	17 (Thu)	The second project of the second seco		Preparation for Dive	Preparation for Discussion of Draft Final Report	eport			
4	18 (Pro)								
v.	19 (Sat)			Steering Committee - Discussion of Draft Final Report	Discussion of Draft Fin	ial Report			
ي ا	20 (Sun)		Ministry of Region	ground Municipalities and Environment		Ministry of National Economy	Seenomy		
,			Ministry of F	of Foreign Affairs / H.E. Yousuf B. Alawi B. Abdullah, Minister and Others	saf B. Alawi B. Abdull	ah, Minister and Oth	ري د		
r-	21 (Mon)		Ministry of	Ministry of Oil & Gas / H.E. Dr. Mohammad B. Hamad B. Saif al Rumhi. Minister	nammad B. Hamad B. S	iaif al Rumhi. Minisa	נים		
×	22 (Tuc)	Steering Com	Steering Committee (Ministry of Co	of Commerce and Industries) - Signing on MOM	Signing on MOM	Embassy of Japan		Leave Oman	
5	23 (Wed)	· · · · · · · · · · · · · · · · · · ·		Att	Arnve in Japan				

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Appendix A4-1-1 Ranges and limits of Steel Products and Regions

1. Steel Products

Semi-finished			Billet, Bloom, Slab
		Bar & wire rod	Bar, Wire rod, Wire
	Long products	Section	Wide-flange beam. Angle. Channel. Steel sheet pile
	<u> </u>	Other	Rail. Rail accessories
Finished	Flat products	Sheet	Hot rolled. Cold rolled. Coated
		Plate	
	Pipes	Seamless	
		Welded	ERW. Forge welding, Electric arc

2. Regions

Region		Country
Middle East	GCC5 or 6	Saudi Arabia, UAE, Kuwait, Qatar, Bahrain, (Oman)
	Other Middle East	Except for Egypt, Turkey
	South Asia	Pakistan, India, Sri Lanka, Bangladesh
Asia	ASEAN5	Thailand, Malaysia, Indonesia, Singapore, Philippines
	Other Asia	China, Japan, R. Korea, Taiwan, Vict Nam
Africa	East Africa	Kenya, Tanzania, South Africa
	Other Africa	Except for East Africa. Egypt, included
Western Europe	EU(15)	EU10, Austria, Finland, Greece, Portugal, Sweden
	Other Western Europe	Except for EU(15). Turkey, Slovenia, Yugoslavia, included
Eastern Europe	The Former USSR	
	Other Eastern Europe	Except for Slovenia, Yugoslavia
North America	Central America, included	USA, Mexico, etc.
South America	Central America, excepted	Except for Mexico
Oceania		Australia, New Zeafand

Source: IISI

Appendix A4-1-2 Steel Consumption of End-Users by Field Survey in Oman

(Unit:ton/year)

End-User	Steel Products	Consumption Volume *
	Plates	700 - 1,400
	Sections	1,000 - 2,000
Steel fabricator	Pipes	200 - 400
	Bars	100 - 200
	Total	2,000 - 4,000
	Cold sheets	2,000
Steel furniture	Pipes	300
	Total	2,300 (70%)
	Wire rods	3,000
Steel fencing	Sections	840
	Total	3,840 (90%)
Steel cans	Tin plates	4,500 (50%)
Steel nails	Wire rods	7,000 (100%)

Source: First Field Survey

Note: (%) in "Consumption Volume *" is market share of end-user's companies which the Survey Team visited.

Appendix A4-3-1 Macro Indicators in 2000, 2010 and 2020 in Oman

(Unit: Million R.O)

Macro Indicators		2000	2010	2020
	GDP	5,990	10,232	21,914
1988 Constant Prices	Petroleum Sector	1,822	2,697	4,164
	Industrial Sector	866	2,459	6,355
	Construction Sector	379	983	2,191
	GDP	6,806	12,189	28,378
Current Prices	Petroleum Sector	2,103	3,426	5,392
	Industrial Sector	1,266	3,595	8,230

Source: The Fifth Five-Year Development Plan by MONE, July 1997.

Note: Figures in 2010 are given by annual growth rates between 2000 and 2020.

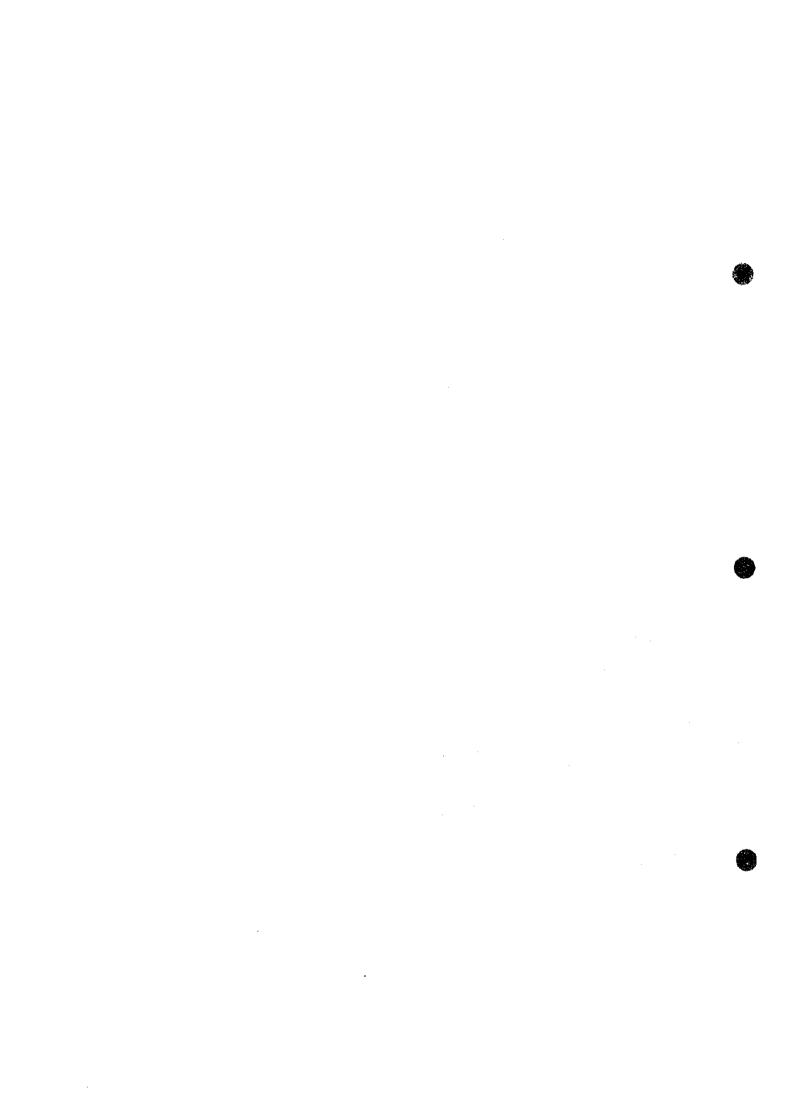
Industrial Sector concludes mining, manufacturing, electricity & water service and construction.

Appendix A4-3-2 Elasticity Rate of Steel Consumption for GDP

Elasticity rate is a ratio between growth rate of steel consumption and that of GDP.

Example

	Annual Growth Rate (1981-1996)	Elasticity Rate of Steel Consumption for GDP
Steel Consumption	† `	1.075
GDP	6.6%	



Appendix A4-4-1 About the Market of Seml-Finished Steel Products

Semi-finished products are rolled for some kinds of the following hot rolled products.

The market for semi-finished steel products is very special. The market is characterized by two factors; low profitability and instability in the supply-demand balance. The main causes are as follows:

1. Semi-finished products and hot rolled products

Semi-finished products	Hot rolled products
Billet	Bar, wire rod, small sections
Bloom	Large sections, seamless pipe
Slab	Sheet, plate

- 2. General characteristics of the world steel industry in recent years
 - Extension of integrated steel works throughout the world; from the upper stream to the down stream, from iron materials to finished steel products
 - -- Necessity for stable operation in the upper stream where iron and steel is made under very high temperatures
 - -- Tendency to make and sell high value added finished steel products
 - -- Low value added semi-finished steel products which are produced in the upper stream, than finished steel products
 - Necessity for rigid cost competitiveness of steel products because of typical worldwide trade goods
- 3. Particularity in trade of semi-finished steel products
 - Unstable market re volume and price, especially on tendency to low price
 - Little growth in the market because of the extension of integrated steel works throughout the world
 - Trade led by supply sides such as many spotted exports of semi-finished steel products by the integrated steel manufacturers under business depression which seek marginal profit by stable operation in the upper stream
- 4. Requirements to be realized for trade of semi-finished steel products
 - Requirements for purchase side
 - -- Unbalance of production capacity between the upper stream and down stream (upper stream < down stream) in the integrated steel works
 - -- Profitability as main material in re-rollers

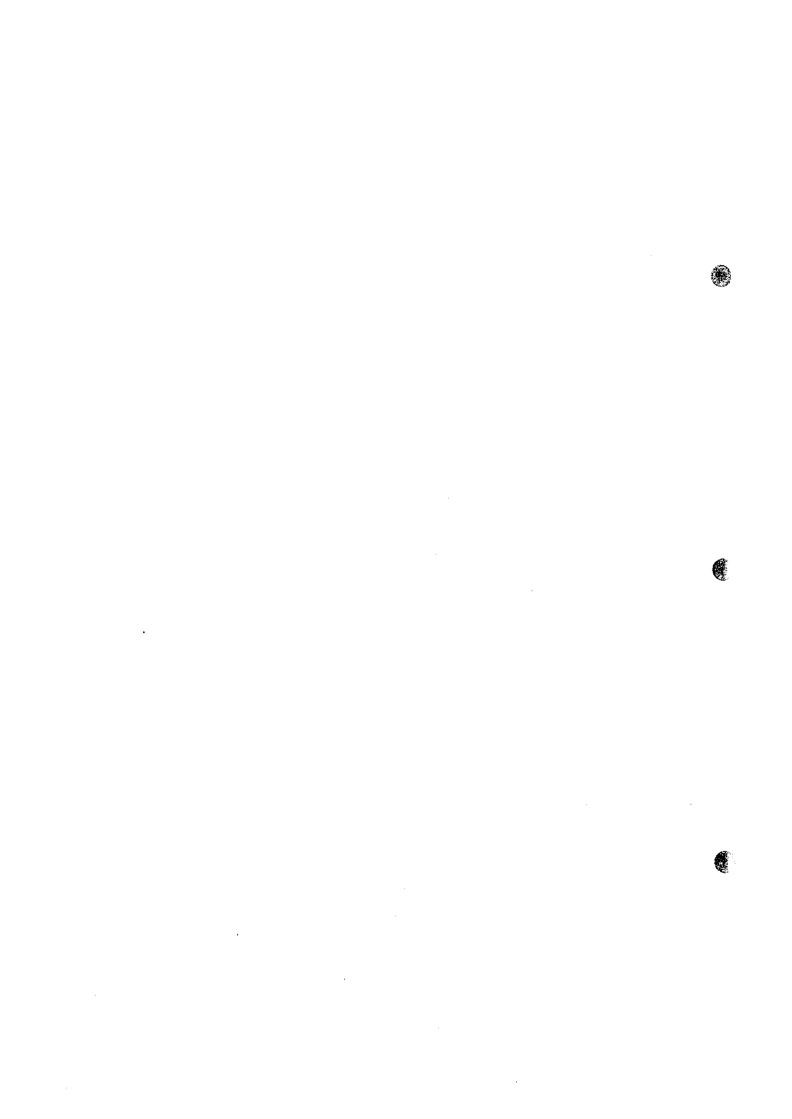
- Requirements for supply side
 - -- Unbalance of production capacity between the upper stream and down stream (upper stream > down stream) in the integrated steel works
- 5. Requirements to be realized for stable export of semi-finished steel products
 - Absolute cost competitiveness of semi-finished steel products by supply side in main materials such as iron ore and energy
 - Long term contract between purchase side and supply side in special quality of steel which has common merit each other
 - Actually rare examples as satisfying either of the above cases

Appendix A6-1-1 Major Equipment List of Raw Material Handling Facilities

No.	Equipment	Q' ty	Specification
мнот.	Transport Conveyor		
0101	Belt conveyor	1	2000 <i>V</i> h, 1500 mm width
0102	Belt conveyor	1	2000 t/h, 1200 mm width
0103	Belt conveyor	1	2000 t/h, 1500 mm width
MH02	Storage Yard Facilities	O CCCI CEMENTAL COPT	
0201	Diverter	1	(d()-10-01-10-10-10-10-10-10-10-10-10-10-10-
0202	Belt conveyor	1	2000 t/h, 1500 mm width
0203	Stacker	2	2000 t/h
0204	Reclaimer	1	500 t/h
0205	Belt conveyor	1	500 t/h
0206	Diverter	1	
0207	Belt conveyor	2	500 t/h
		1	

Appendix A6-1-1 Major Equipment List of Raw Material Handling Facilities

No.	Equipment	Q' ty	Specification
мноі	Transport Conveyor		
0101	Belt conveyor	1	2000 t/h, 1500 mm width
0102	Belt conveyor	1	2000 <i>U</i> h, 1200 mm width
0103	Belt conveyor		2000 t/h, 1500 mm width
MH02	Storage Yard Facilities		
0201	Diverter	1	
0202	Belt conveyor	1	2000 t/h, 1500 mm width
0203	Stacker	2	2000 t/h
0204	Reclaimer	1	500 t/h
0205	Belt conveyor		500 t/h
0206	Diverter	<u> </u>	
0207	Belt conveyor	2	500 t/h



Appendix A6-2-1 Major Equipment List of Direct Reduction Plant

No.	Equipment	No.	Equipment
DR01	Reduction, Reforming & Process Gas System	,	
0101	Reduction furnace	1	162.5 t/ h, 6.65 mID
0102	Furnace feed leg	1	
0103	Cooling gas distributor	1	**************************************
0104	Cooling gas off-take	1	
0105	Burden feeder water tank	1	
0106	Reformer tube	1 lot	250 mmID
0107	Reformer	1	Box type
0108	Catalyst	1 lot	
0109	Reformed gas cooler	1	something and the state of the
0110	Top gas scrubber	1	••••••••••••••••••••••••••••••••••••••
0111	1st stage process gas compressor	2	Rotary lobe type
0112	Pulsation dumper for 1st process gas compressor	2	••••
0113	2nd stage process gas compressor	2	Rotary lobe type
0114	Pulsation dumper for 2nd process gas compressor	2	
0115	Process gas mixer	1	
0116	Process gas mist eliminator	1	·
0117	Process gas aftercooler	1	
0118	Cooling gas scrubber	1	
0119	Cooling gas compressor	1	Rotary lobe type
0120	Pulsation dumper for cooling gas compressor	2	-1.11.1: -1.11.11.11.11.11.11.11.11.11.11.11.11.1
0121	Cooling gas mist eliminator	11	
DR02	Heat Recovery & Combustion System	<u>}</u>	
0201	Main air blower	1	Centrifugal type
0202	Recuperator	2	***************************************
0203	Fuel gas mixer	1:	**************************************
0204	Main burner (A)	1 lot	Diffusion type
0205	Main burner (B)	1 lot	Diffusion type
0206	Auxiliary air blower	11	Centrifugal type
0207	Auxiliary burner	1 lot	Premix type
L			

Appendix A6-2-1 Major Equipment List of Direct Reduction Plant

No.	Equipment	No.	Equipment
DROL	Reduction, Reforming & Process Gas System		
0101	Reduction furnace	1	162.5 √ h, 6.65 mHD
0102	Furnace feed leg	1	CONTRACTOR OF THE CONTRACTOR O
0103	Cooling gas distributor	1	children (control to the control to
0104	Cooling gas off-take	1	
0105	Burden feeder water tank	1	384
0106	Reformer tube	1 lot	250 mmID
0107	Reformer	1	Box type
0108	Catalyst	1 lot	
0109	Reformed gas cooler	1	
0110	Top gas scrubber	1	
0111	1st stage process gas compressor	2	Rotary lobe type
0112	Pulsation dumper for 1st process gas compressor	2	
0113	2nd stage process gas compressor	2	Rotary lobe type
0114	Pulsation dumper for 2nd process gas compressor	2	
0115	Process gas mixer	1	31.13.2.13.14.14.14.14.14.14.14.14.14.14.14.14.14.
0116	Process gas mist eliminator	1	
0117	Process gas aftercooler		
0118	Cooling gas scrubber	1	
0119	Cooling gas compressor	1	Rotary lobe type
0120	Pulsation dumper for cooling gas compressor	2	
0121	Cooling gas mist eliminator	<u> </u>	
DR02	Heat Recovery & Combustion System		
0201	Main air blower) ,	Centrifugal type
0202	Recuperator	2	
0203	Fuel gas mixer	1	
0204	Main burner (A)	1 lot	Diffusion type
0205	(a)	1 lot	Diffusion type
0206	· · · · · · · · · · · · · · · · · · ·	1	Centrifugal type
0207	Auxiliary burner	l lot	Premix type

 \bigcirc

No.	Equipment	Q'ty	Specification
DR03	Flue Gas System		
0301	Ejector stack	1	NAME OF THE PROPERTY OF THE PR
0302	Ejector stack fan	1	Centrifugal type
DR04	Seal Gas System		
0401	Seal gas cooler	1	
0402	Seal gas compressor	1	Positive displacement type
0403	Seal gas aftercooler	1	·
0404	Scal gas refrigerant dryer	1	
0405	Purge gas compressor	2	Positive displacement type
	Purge gas absorption dryer	1	
	Purge gas tank	3	
	Inert gas generation unit	1	
DR05	Process Water System))),)-(<i>-</i> 1,)-(-1,)-	
0501	Scrubber venturi booster pump	2	Centrifugal type
0502	Top gas scrubber recycle pump	1	Centrifugal type
0503	Clarifier	1	••••••••••••••••••••••••••••••••••••••
0504	Clarifier underflow pump	2	Centrifugal type
0505	Chemical dosing unit	1	pH control / flocculant
0506	Cold process water pump	3	Centrifugal type
	Heat exchanger	ī	Plate type
	Hot process water pump	2	Centrifugal type
DR06	Oxide Handling System		
0601	Oxide storage bin	3	2000 tons, each
0602		3	400 t/h
0603		1	
0604	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	1	10 (17) (17) (17) (17) (17) (17) (17) (17)
0605	Oxide screen	2	400 t/h, each
0606	Oxide fines reject conveyor	1	, , , , , , , , , , , , , , , , , , ,
0607	,	1	**************************************
0608		1	**************************************
0609	Feed bin discharge feeder	1	A CONTRACTOR OF THE CONTRACTOR

No.	Equipment	Q' ty	Specification
DR03	Plue Gas System	THE STATES OF THE	
0301	Ejector stack	1	
0302	Ejector stack fan		Centrifugal type
DR04	Seal Gas System	CARLAR CONTROL OF THE	
0401	Seal gas cooler		
0402	Seal gas compressor	1	Positive displacement type
0403	Seal gas aftercooler	1	
0404	Seal gas refrigerant dryer	1	\$ property and the second of t
0405	Purge gas compressor	2	Positive displacement type
0406	Purge gas absorption dryer	1	
0407	Purge gas tank	3	
0408	Inert gas generation unit	1	
DR05	Process Water System		
0501	Scrubber venturi booster pump	2	Centrifugal type
0502	Top gas scrubber recycle pump	1	Centrifugal type
0503	Clarifier	1	
0504	Clarifier underflow pump	2	Centrifugal type
0505	Chemical dosing unit	1	pH control / flocculant
0506	Cold process water pump	3	Centrifugal type
0507	Heat exchanger	1	Plate type
0508	Hot process water pump	2	Centrifugal type
DR06	Oxide Handling System		
0601		3	2000 tons, each
0602	Oxide storage bin discharge feeder	3	400 t∕h
0603		1	
0604	Oxide screen diverter	1	
0605	Oxide screen	2	400 t/h, each
0606	Oxide fines reject conveyor	1	
0607	Middle size oxide belt conveyor	1	
0608		1	
0609	Feed bin discharge feeder	1	

No.	Equipment	Q'ty	Specification
0606	Oxide fines reject conveyor	.	anti i apangka and apanti i apanti apanti apanti
0607	Middle size oxide belt conveyor	1	
0608	Middle size oxide feed bin		Y. (1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1
0609	Feed bin discharge feeder	1	
0610	Remet reclaim hopper	1)
0611	Remet feeder	1	
0612	Remet feed conveyor	1	
0613	Oxide transfer conveyor	1	400 t/h
0614	Furnace feed conveyor	1	400 t/h
0615	Furnace charge hopper	1	, 1885, 188 2, (1887, 1887, 1887, 1887, 1887, 1888, 1888, 1888, 1888, 1888, 1888, 1888, 1888, 1888, 1888, 1888,
ครึ่งเต ็จใหม่เกิด เจ) or
DR07	Product Handling System	7mm-1	
0701	Furnace discharge feeder	1	••••••••••••••••••••••••••••••••••••••
0702	Furnace discharge conveyor	1	ontantonamentalista
0703	Product transfer conveyor	1	444 913 12 14 24 33 24 44 44 44 44 44 44 4
0704	Product grizzly	1	
0705	Product elevating conveyor	1	
0706	Product bin feed conveyor	2	
0707	Product storage bin	3	7000 ton, each
0708	DRI discharge feeder	3	
0709	DRI discharge conveyor	1	
0710	Product screen feed conveyor	1	
0711	Product screen	2	
0712	DRI fines conveyor	1	
0713	DRI transfer conveyor	1	500 t/h
0714	DRI transport conveyor	<u></u>	500 t/h
DROS	Machinery Cooling Water System		
0801	Burden feeder cooling water pump	2	
0802	Machinery cooling water pump	2	
0803	Machinery cooling water heat exchanger	1	Plate type
1		<u></u>	

No.	Equipment	Q'ty	Specification
0606	Oxide fines reject conveyor		Nagaras a succession and a
0607	Middle size oxide belt conveyor		
0608	Middle size oxide feed bin	1	Vantoria - 10.000 - 1
0609	Feed bin discharge feeder	1	
0610	Remet reclaim hopper	1	
0611	Remet feeder	,	
0612	Remet feed conveyor		
0613	Oxide transfer conveyor		400 t/h
0614	Furnace feed conveyor	1	400 t/h
0615	Furnace charge hopper	1	
DR07	Product Handling System		
0701	Furnace discharge feeder	1	
	Furnace discharge conveyor	ı	
0703	Product transfer conveyor	1	
0704	Product grizzly	1	
0705	Product elevating conveyor		
0706	Product bin feed conveyor	2	
0707	Product storage bin	3	7000 ton, each
0708	DRI discharge feeder	3	
0709	DRI discharge conveyor	1	
0710	Product screen feed conveyor	ı	
0711	Product screen	2	
0712	DRI fines conveyor	1	
0713	DRI transfer conveyor	1	500 t/h
0714	DRI transport conveyor		500 Vb
DR08	Machinery Cooling Water System	o cress table	
0801	Burden feeder cooling water pump	2	
0802	Machinery cooling water pump	2	
0803	Machinery cooling water heat exchanger		Plate type

No.	Equipment	Q' ty	Specification
DR09	Non-process Service		
0901	Instrument air unit	1	
0902	Plant air unit	1	and the same as and bloom security (1990) and
AND THE STATE OF T			
DR99	Spare Parts and Consumable	70; 114:11:11:11:11:11:11:11:11:11:11:11:11:	arritaar ber rikketatarrijiski bibbliografiski bibblioki (1991 bisa thatrek
9901	Spare parts	1 set	
9902	Consumable	1 set	

Appendix A 6-3-1 Steel Making Plant Equipment List

No.	Equipment	Q'ty	Specification
SM01	Handling Facilities		
SM011	Scrap Handling Facilities	1 tot	(1) Scrap bucket:2 sets - 70 t scrap charge - Clam shell type
SM012	DRI and Additives Handling Facilities	-48	
SM01210	DRI/lime storage system	1 lot	 No.1 Junction house (J/H): 1 set No.1 DRI/lime conveyor: 1 set 350 t/h DRI transportation capacity From No.1 J/H to No.2 J/H No.2 J/H: 1 set No.2 DRI/lime conveyor: 1 set 350 t/h DRI transportation capacity From No.1 J/H to No.3 DRI/lime shuttle conveyor No.3 DRI/lime shuttle conveyor: 1 set
			 - 350 t/h DRI transportation capacity - From No.2 DRI/lime conveyor to DRI storage bin (6) DRI storage bin: 2 sets x 2 EAF - 300 m³ storage capacity (7) Lime storage bin: 1 set x 2 EAF - 200 m³ storage capacity

No.	Equipment	Q' ty	Specification
DR09	Non-process Service		
	Instrument air unit	1	
0902	Plant air unit	1	
DKYY	Spare Parts and Consumable		
9901	Spare parts	1 set	
9902	Consumable	1 set	
		<u> </u>	

Appendix A 6-3-1 Steel Making Plant Equipment List

No.	Equipment	Q'ty	Specification
SM01	Handling Facilities		
SM011	Scrap Handling Facilities	1 lot	(1) Scrap bucket:2 sets - 70 t scrap charge - Clam shell type
SM012	DRI and Additives Handling Facilities		
SM01210	DRI/lime storage system	Hot	 (1) No.1 Junction house (J/H): 1 set (2) No.1 DRI/lime conveyor: 1 set - 350 t/h DRI transportation capacity - From No.1 J/H to No.2 J/H (3) No.2 J/H: 1 set (4) No.2 DRI/lime conveyor: 1 set - 350 t/h DRI transportation capacity - From No.1 J/H to No.3 DRI/lime shuttle conveyor (5) No.3 DRI/lime shuttle conveyor: 1 set - 350 t/h DRI transportation capacity - From No.2 DRI/lime conveyor to DRI storage bin (6) DRI storage bin: 2 sets x 2 EAF - 300 m³ storage capacity (7) Lime storage bin: 1 set x 2 EAF - 200 m³ storage capacity

No.		Equipme	ent		Q'ty	Specification
SM01220	DRI/lime	feeding	system	into	l lot	(1) DRI weighing conveyor: 2 sets x 2
	EAF					EAF
	ĺ					- 130 t/h weighing capacity
						- For DRI storage bin
						- From DRI storage bin to No.1
						EAF conveyor
						(2) Lime weighing conveyor: 1 set x 2
						BAF
						- 30 t/h weighing capacity
						- For lime storage bin
						- From lime storage bin to No.1
						EAF conveyor and No.1 LF
						conveyor

No.	Equipment	Q'ty	Specification
SM01230	EAF/LP additives storage system	1 lot	(1) Dumping hopper: 1 set
			(2) No.1 additive conveyor: 1 set
			- From dumping hopper to No.2
			additive shuttle conveyor
			(3) No.2 additive shuttle conveyor: 1
ŧ			set
			- From No.1 additive conveyor to
			No.3 additive conveyor and to
			additive storage bin for No.1
			EAF and LF
			(4) No.3 additive conveyor: 1 set
			- From No.2 additive shuttle
			conveyor to No.4 additive shuttle
			conveyor
			(5) No.4 additive shuttle conveyor: 1
			set
			- From No.3 additive conveyor to
			additive storage bin for No.2
			EAF
			(6) Additive storage bin with feeder: 12
			sets for No. 1 EAF & LF and 6 sets
02.4040.40			for No.2 EAF
SM01240	EAF/LF additives feeding system	1 lot	(1) Weighing car: 1 set x 2 EAF
SM01250	EAF charging system	1 lot	(1) No.1 EAF conveyor: 1 set x 2 EAF
			- From DRI weighing conveyor
			and lime weighing conveyor to
			No.2 EAF conveyor
			(2) No.2 EAF conveyor: 1 set x 2 EAF
			- From No.1 EAF conveyor and No.2 weighing conveyor to EAF
			surge hopper
			(3) EAF surge hopper: 1 set x 2 EAF
			(4) EAF charging chute: 1 set x 2 EAF
I	1	ł	(1) EAT Charging chine. I Set X & EAF

No.	Equipment	Q'ty	Specification
SM01260	LF charging system	1 lot	(1) No.1 LP conveyor: 1 set
			- From lime weighing conveyor to
			No.2 LF conveyor
			(2) No.2 LF conveyor: 1 set
			- From No.1 LF conveyor and
			No.1 weighing car to LF surge
			hopper
			(2) LF surge hopper: 1 set
			(3) LF charging chute: 1 set

No.	Equipment	Q'ty	Specification
SM01270	BBT sand filling facilities	1 lot	(1) Sand hopper: 1 set x 2 EAF (2) Sand chute: 1 set x 2 EAF
SM01280	Dedusting equipment for DRI/lime and additives handling facilities	1 lot	
SM013	Ladle Handling Facilities	1 lot	 (1) Ladle with ladle valve: 8 sets 150 t molten steel capacity (2) Ladle dryer: 2 sets Vertical and natural gas combustion type (3) Ladle preheater: 1 set Horizontal and natural gas combustion type (4) Ladle cover with burner: 1 set x 2 EAF Vertical and natural gas combustion type (5) Ladle valve station Ladle stand: 2 sets (5) Hydraulic units For ladle valve station: 1 set For CCM casting floor: 1 set For CCM casting floor: 1 set (6) Ladle relining station: 1 set For 2 ladles (7) Ladle dismantling station: 1set
SM014	Slag Handling Facilities	1 lot	(1) Slag pot: 8 sets

Equipment	Q'ty	Specification
Electric Arc Pumace Facilities		
Electric Are Furnace	2 sets	 DC furnace with EBT system, water cooled shell and roof Heat capacity: 150 t plus 30 t hot heel Transformer capacity: 88 MVA Graphite electrode: 28-inch diameter Furnace tilting, roof swinging, electrode hoisting, slag door hoisting: By hydraulic cylinder
EAF Auxiliary Equipment	1 lot	 (1) Tapping hole maintenance deck: 1 set x 2 EAF (2) Bottom electrode push-up device; 1 set (3) Oxygen and carbon lance manipulator; 1 set x 2 EAF For oxygen: Calorized steel pipe type For carbon: Calorized steel pipe type (4) Carbon injection system: 1 set x 2 EAF (5) Gunning machine: 1 set x 2 EAF (6) Electrode jointing device: 1 set (7) Electrode stand: 1 set x 2 EAF
	Electric Arc Furnace Facilities Electric Arc Furnace	Electric Arc Furnace Pacilities Electric Arc Furnace 2 sets

No.	Equipment	Q'ty	Specification
SM03	Fume Extraction System	1 lot	(1) Suction system 1) EAF direct suction system: 1 set
			x 2 EAF
			2) LF direct suction system: 1 set
			3) Building suction system: 1 set x
			2 BAF
			(2) Bag filter: 1 set
			(3) Dust handling facilities: 1 set
			(4) Fan: 2 sets

No.	Equipment	Q'ty	Specification
SM04	Ladle Furnace Facilities		
SM041	Ladle Furnace	1 set	 (1) Ladle capacity: 150 t (2) Transformer capacity: 22/26.4 MVA (3) Graphite electrode: 16 inch (4) Heating rate: 4 °C/min.
SM042	Ladle Furnace Auxiliary Equipment	1 lot	 (1) Temperature measuring and sampling device: 1 set (2) Ladle bottom bubbling device 1) Valve stand: 1 set x 2 EAF and 1 LF station 2) Automatic connecting device Male: 1 set x 2 EAF and 2 LF station Female: 1 set x 8 ladles (3) Top bubbling device for emergency: 1 set (4) Electrode stand: 1 set

No.	Equipment	Q'ty	Specification
SM05	Cranes and Transportation Facilities		
SM051	Cranes	1 lot	 (1) 110/30 t Scrap charging crane: 1 set At furnace aisle (2) 250/50 t Ladle crane: 1 set At ladle aisle (3) 10/5 t DRI service crane: 1 set At DRI aisle (4) 80/20 t CCM service crane: 1 set At casting aisle (5) 30 t BT handling crane: 1 set At billet aisle
SM052	Jib Cranes and Hoist	1 lot	 (1) 2 t Jib crane: 1 set At ladle valve station (2) 2 t Jib crane: 1 set At ladle relining station (3) 2 t Sub-materials handling jib crane: 1 set At furnace aiste
SM053	Transfer car	1 lot	 EAF Ladle transfer car with weigher: 2 sets 250 t transportation capacity LF Ladle transfer car: 2 sets 250 t transportation capacity Billet transfer car: 2 sets 150 mm sq. x 16 m long billet 150 t transportation capacity
SM054	Dig-out machine	1 set	

No.	Equipment	Q'ty	Specification
SM06	Electrical Equipment, Computer System and Instrumentation		
SM061	Electric Power Supply and Distribution	1 lot	 (1) 33 kV switchgear: 1 set - Type: Outdoor use, open structure type - Including DS, ES, LA (2) 33 kV/6.9 kV step-down transformer: 1 set (3) 6.6 kV switchgear: 1 set - Type: Indoor use, metal enclosed type (4) 6.6 kV/400 V step-down transformer: 1 set (5) LV power distribution panel: 1 set (6) 33 kV protective relay panel: 1 set - Protection: IP2X

No.	Equipment	Q'ty	Specification
SM062	Electric Arc Furnace Facilities	l lot	(1) 33 kV switchgear: 1 set x 2 EAF
			- Type: Indoor use, open structure
			type
			 Including DS, ES, VT, VS with surge absorber
			(2) Transformer-rectifier assembly: 1 set
	İ		x 2 EAF
			- 3 phase, 33 kV, 50 Hz, 88 MVA
			(3) DC reactor: 1 set x 2 EAF
	·		(4) Water cooled deionized water cooler
	1		1 set x 2 F'ce
			(5) High current DC aluminum bus assembly: 1 lot
	1		(6) Water cooled cable: 1 lot
		1	(7) LV motor starting panel, thyristor
			control panel, furnace control panel,
		1	protective relay panel, etc.: 1 lot
			- Protection: IP2X
			(8) Local operation panel: 1 lot
			- Protection: IP2X/IP4X
1			(9) Instruments and sensors: 1 lot

No.	Equipment	Q'ty	Specification
SM063	EAF Auxiliary Equipment	1 lot	 (1) LV power distribution panel (common), oxygen and carbon lance manipulator, carbon injection system, gunning machine, electrode jointing device, etc.: 1 lot Protection: IP2X (2) Local operation panel: 1 lot Protection: IP2X/IP4X
SM064	Ladle Furnace Pacilities	I lot	 (1) 33 kV switchgear: 1 set - Type: Indoor use, open structure type - Including DS, ES, VT, LA, VS with surge absorber (2) Furnace transformer: 1 set - 3 phase, 33 kV, 50 Hz, 22/26.4 MVA (3) LV motor starting panel, furnace control panel, protective relay panel, etc.: 1 lot - Protection: IP2X (4) Local operation panel: 1 lot - Protection: IP2X/IP4X (5) Instruments and sensors: 1 lot (6) Water cooled cable: 1 lot
SM065	LF auxiliary Equipment	1 lot	(1) LV distribution panel (common), temperature/sample control panel, etc.: 1 lot - Protection: IP2X (2) Local operation panel: 1 lot - Protection: IP2X/IP4X

No.	Equipment	Q'ty	Specification
SM066	Fume Extraction System	1 lot	(1) 6.6kV switchgear: 1 set
			- Type: Indoor use, metal enclosed
			type
			- Protection: IP2X
			- Including DS, VCB, VT, CT, etc.
	·		(2) 6.6 kV/400 V step-down transformer: 1 set
			(3) LV motor starting panel: 1 set
			- Protection: IP2X

No.	Equipment	Q'ty	Specification
SM066	Fume Extraction System		(4) Main fan motor: 2 sets
(Cont'd)	(Cont'd)		- 6,600 V, 50 Hz
			- Insulation: Class F
			- Protection: IP54
			(5) Control panel: 1 set
			- Protection: IP2X
		i	(6) Local operation panel: 1 lot
,			- Protection: IP2X/IP4X
SM067	Handling Facilities	1 lot	(1) LV motor starting panel: 1 lot
			- Protection: IP2X
		ł ł	(2) Control and local operation panel: 1
			lot
			- For DRI and additives handling
			facilities, ladle handling facilities
			- Protection: IP2X/IP4X
SM068	Information System		
SM06810	Computer control system	1 lot	(1) Operator control station for EAF: 1
			set x 2 EAF
			1) IBM compatible personal computer:
			2 sets x 2 EAF
			2) Color LCD monitor: 2 sets x 2 EAF
			- 16.1-inch size
			(2) Operator control station for LF: 1 set
Ì			x i LF
			1) IBM compatible personal computer:
			2 sets
			2) Color LCD monitor: 2 sets
	,		- 16.1-inch size
			(3) Level-2 computer system for 2 EAF
			and 1 LF: 1 set
			- DEC alpha server: 1 set
		1	- IBM compatible personal computer
			with 16.1-inch size color LCD
:			monitor: 1 set x 2 EAF, 1 LF,
			office and computer room

No.	Equipment	Q'ty	Specification
SM06820	Intercommunication system	1 lot	(1) Loud speaker intercom system: 1 lot
			(2) Radio communication system: 1 lot
SM06830	Television system	1 lot	(1) For EAF: 1 set x 2 EAF
	,		1) Color CCD camera: 4 sets x 2
			EAF
			Four split screen color monitor:
			1 set x 2 EAF
			- 21-inch size
			3) Four split screen controller: 1 set x 2
			EAF
			(2) For LF: 1 set x 1 LF
		İ	1) Color CCD camera: 2 sets
			2) Four split screen color monitor:
			l set
			- 21-inch size
			3) Four split screen controller: 1 set
SM069	Common Electrical	l lot	(1) Power supply to cranes and jib
			cranes: 1 lot
İ		:	(2) Distribution board for lighting: 1 lot
]		(3) Outlet for small power: 1 lot
			(4) Fire protection system: 1 lot
			(5) Power supply and control board for
			ventilation and air conditioning
* .		1	system: 1 lot

No.	Equipment	Q'ty	Specification
SM07	Continuous Casting Machine Facilities		
SM071	Billet Casting Facilities	1 lot	 (1) Billet casting machine: 1 set - Strand: 8 str Billet size: 150 mm sq. x 16 m length - Billet weight: 2.8 t - Casting speed: 2.0 m/min. max. 3.0 m/min. (2) Ladle handling equipment 1) Ladle turret: 1 set 2) Emergency trough: 1 set (3) Tundish facilities 1) Tundish: 8 sets 2) Tundish car: 2 sets 3) Tundish preheater: 2 sets (4) Mold and oscillating facilities: 8 sets (5) Strand guide and withdrawal unit: 1 lot (6) Dummy bar facilities: 1 set (7) Cutting facilities: 1 set (8) Discharging equipment: 1 lot (9) Steel structure: 1 lot
SM072	Maintenance Equipment	I lot	
SM073	Information system	I lot	Consists of (1) PC-base distributed control system (DCS) (2) Mold level control

No.	Equipment	Q'ty	Specification
SM074	Utilities Distribution	1 lot	Consists of
			(1) Water circuit and cooling system
			Mold cooling water system
			2) Secondary spray cooling water system
			3) Machine cooling water system
l L			(2) Gas and compressed air
			(3) Hydraulic and lubrication system
SM075	Electrical Power Supply and Distribution	1 lot	(1) 6.6 kV switchgear: 1 set including VCB, CT, PT, LA,DS
	and Distribution]	(2) Step-down power transformer: 1 set
			(3) LV power distribution panel
			(4) Control panel: 1 set
			(5) Control desk: 1 set
		1	(6) Local operation box: 1 set
			(7) Sensor: 1 set
			(8) Instrumentation: 1 set

No.	Equipment	Q'iy	Specification
SM08	Utility Piping	1 lot	Consists of
			(1) Cooling water piping
			(2) Compressed air piping
			(3) Natural gas piping
			(4) Nitrogen gas piping
			(5) Oxygen gas piping

Appendix A6-4-1 Bar Rolling Mill Plant Equipment List

No.	Equipment	Qʻty	Specification
RM01	BILLET REHEATING SECTION	·	
RMOIOI	Reheating Furnace	1 set	Type: Natural gas fired walking beam type Heating capacity: Max. 210 t/h (from cold billet) Consisting of: - Steel structure - Furnace doors - Refractories - Burners - Walking beam mechanism - Billet charging/discharging equipment - Scale conveyor, etc.
RM0102	Exhaust Gas System	1 set	Consisting of: - Recuperator - Flue gas damper - Dilution air fan - Flue gas duct - Stack, etc.
RM0103	Reheating Furnace Service Facilities	1 set	Consisting of: - Oit hydrautic system - Combustion blower - Head tank for emergency water, etc.
RM9104	Furnace Duct and Piping	1 lot	
RM0105	Billet Charging and Transfer Facilities	l set	Consisting of: - Connecting roller table - Billet receiving conveyor/billet separator - Charging roller table - Billet weighing equipment - Billet rejecting roller table/cradle, etc.
RM02	MILL MECHANICAL SECTION		
RM0201	Roughing Mill Train		
0201.0	No.1 to No.4 Stand	4	Type: 2-high compact type stands in the horizontal - vertical arrangement of roll stands, driven individually by a mill motor Roll size: 450 num dia. x 400 mm barrel Including (for each stand): - Rolls - Rolls stand car - Spindle carrier or support - Mill spindles - Gear unit with coupling, etc.

No.	Equipment	Q'ty	Specification
0201.02	No 5 to No 8 Stand	4	Type: 2-high compact type stands in the horizontal-vertical arrangement of roll stands, driven individually by a mill motor Roll size: 400 mm dia, x 350 mm barrel Including (for each stand): Rolls Rolls Roll stand car Spindle carrier or support Mill spindles Gear unit with coupling, etc.
RM0202	Intermediate Mill Train		
0202.01	No.9 & No.11 Stand	2	Type: 2-high horizontal/shiftable type mill stand, driven individually by a mill motor Roll size: 380 mm dia. x 700 mm barrel Including (for each stand): Rolls Sole plates with stand clamping and shifting device Spindle carrier Mill spindles Gear unit with coupling, etc.
0202.01	No.10 Stand		Type: 2-high vertical/liftable type mill stand, driven individually by a mill motor Rolf size: 380 mm dia x 700 mm barrel Including: Rolls Sole plates with stand champing and lifting device Spindle support Mill spindles Gear unit with coupling, etc.
6202.03	2 No.12 & No.13 Stand	2	Type: 2-high combination type mill stand, driven individually by a mill motor Roll size: 340 mm dia. x 700 mm barrel Including (for each stand): Rolls Sole plates with stand clamping and shifting/lifting device Spindle support Mill spindles Gear unit with coupling, etc.
0202 0	3 No.14 Stand	l	Type: 2-high horizontal/shiftable type mill stand, driven individually by a mill motor Roll size: 340 mm dia. x 700 mm barrel Including: Rolls Sole plates with stand clamping and shifting device Spindle support Mill spindles Gear unit with coupling, etc.

No.	Equipment	Q'ty	Specification
RM0203	Finishing Mill Train		
0203.01	No.15A & No.15B Stand	2	Type: 2-high combination type mill stand, driven individually by a mill motor
		:	Roll size: 340 mm dia. x 700 mm barrel
			Including (for each stand): - Rolls
			- Sole plates with stand clamping and shifting/lifting device
			- Spindle support
			- Mill spindles - Gear unit with coupling, etc.
	. <u>,,</u>		- Gea uni with Cooping, CC.
0203.02	No.16A, 16B & No.18A, 18B Stand	4	Type: 2-high horizontal/shiftable type mill stand, driven
			individually by a milt motor Roll size: 340 mm dia. x 700 mm barrel
			Including (for each stand):
			- Rolls
			- Sole plates with stand clamping and shifting device
			- Spindle support - Mill spindles
			Gear unit with coupling, etc.
	No.17A & No.17B Stand	2	Type: 2-high vertical/liftable type mill stand, driven
0203.03	NO.17A & NO.17D STAIN		individually by a mill motor
			Roll size: 340 mm dia, x 700 mm barrel
			Including (for each stand): - Rolls
			- Sole plates with stand clamping and lifting device
			- Spindle support
		•	- Mill spindles - Gear unit with coupling, etc.
RM0204	Guiding Device	1 set	Consisting of:
			- Entry & delivery guides for mill stand - Mill entry pinch roller
			- Loopers with snap shear, etc.
RM0205	Hying Shear and Splitting Unit		
0205.01	No.1 Crop and Cobble Shear		Type: Rotary knife type, driven by motor
0203.01	rect crop and cooled stream	-	Including:
			- Crop chute
0205.02	No.2 Crop and Cobble Shear	2	Type: Rotary knife type, driven by motor
			Including:
			· Chopping shear & crop chute
0205.0	3 Dividing Shear	2	Type: Rotary knife type, driven by motor
	4 No.1 Splitting Unit	<u> </u>	Type: Split roller type, driven by motor
0205.0	No.2 Splitting Unit	2	Type: Split roller type, driven by motor
		1	

No.	Equipment	Qʻty	Specification
RM0206	Roll Changing Equipment		
0206.01	Stand Changing Equipment for finishing mill	2	Type: Shiftable platform wagon type
0206.02	Roll Changing Equipment	2	
0206.03	Stand Tilter for roughing mill	1	
0206.01	Stand Tilter for intermediate mill and finishing mill	1	
0206.05	Portable Hydraulic Pump Unit	i	
0206.06	Roll Neck Bearing Heater	1	
RM03	COOLING AND CUTTING SECTION		
RM0301	Run-in Guiding Equipment		
	Run-in Guide Trough with mechanical brake	2 sets	
	Line Selector	3	
	No.1 Pinch Roller	3	
	No.2 Pinch Rotter	8	
	Run-in Roller Table and Lifter	2 sets	
RM0302	Cooling Bed		
	Cooling Bed	2	Type: Motor driven walking beam type
			Length: Approx. 110 m Width: Approx. 6 m
0101.61	Dog Alicaing Dollar Tabla		
	Bar Aligning Roller Table Bar Collecting Device	2	
0302.03	Ba Curcing Lore	ļ	
RM0303	Runout Roller Table		
0303.01	Bar Traversing Device	2	
0303.02	Runout Roller Table	2	
0303.03	Cold Shear Entry Roller Table	2	
RM0304	Cold Shear and Shear Table		
0304.01	Cold Shear	2	Cutting capacity: Approx. 350 tons Including: - Crep chute - Blade changing device
03015	CARLES DAYS TALE		
	Cold Shear Roller Table	2	N
0301.0	3 Shear Gouge	2	Measuring range: Approx. 3.5 m to 13 m
		1	
ŀ	1		

	AR FINISHING SECTION		
RM0401 Tra	·		 -
	raversing Pacifities	2 sets	Consisting of: Cold shear runout roller table Traverser Feed conveyor Pullout device for irregular length bar Roller table with cradle for irregular length bar Bar counting and separating device Bar collecting and feeding device for small bundle Collecting and aligning device for large bundle
RM0402 Bu	undling Facilities		
0402.01 Sm	mall bundling machine	12	
0402.02 Su	opport frame for small bundling machine(Support	2 sets	
0402.03 Bu	undle former	8	
· · · · · · · · · · · · · · · · · · ·	arge bundling equipment	6	
	raveling car for large bundling machine	4	
RM0403 Pr	roduct Delivery Facilities	2 sets	Consisting of: - Collecting roller table - Bundling roller table - Bar weighing equipment - Shipping roller table - Shipping traverser - Shipping conveyor
RM0404 In	regular Length Product Handling Facilities	1 set	Consisting of: - Cold shear extension roller table - Traversing conveyor and roller table for irregular length bar - Cold shear for irregular length product - Shear gauge for irregular length product - Collecting device
RM05 U	литу		·
RM0501 O	XI Lubrication System		
0501.01 N	To 1 Oil Lubrication System	1 set	For roughing & intermediate mill trains
	Vo.2 Oil Lubrication System	l set	For Finishing mill train
	No.3 Oil Lubrication System	1 set	For cooling bed section
	nterconnecting Piping	1 lot	For oil lubrication system
RM0502 O	Dil Hydraulic System		
0502.01 N	No.1 Oil Hydraulic System	I set	For rolling mill section
0502.02	Interconnecting Piping	1 lot	For oil hydraulic system

No.	Equipment	Q'ty	Specification
RM0503	Grease Lubrication System		
0503,01	No.1 Grease Lubrication System	1 set	For rolling mill section
0503.02	No.2 Grease Lubrication System	2 sets	For cooling bed section
0503.03	No.3 Grease Lubrication System	l set	For bar finishing section
0503.04	Interconnecting Piping	1 lot	For grease lubrication system
RM0501	Oil Cellar Accessories		
	Exhaust Fan for oil cellar	3	
	Drainage Pump for oil cellar	3 3	en en en en en en en en en en en en en e
RM06	PLANT SUPPORTING FACILITIES		
RM0601	Roll Shop Equipment		
0601.01	Roll Lathe	2	
0601.02	Lathe for general use	j	
0601.03	Guide Roller Lathe	!	
0601.01	Universal Tool Grinding Machine		
0601.05	Rib Cutting Machine	2	
0601,06	Shaping Machine	1	
0601.07	Electric Discharge Machining Equipment	1	
0601.08	Roll Assembling Stand	2	
0601.09	Stand of Assembled Roll	7	
0601.10	Bearing Washing Device	11	
0601.11	Work Table	.4	
0601.12	Rack	4	
0601.13	Miscellaneous Items	1 lot	
RM0602	Transfer Car		
0602.01	Transfer car for roll shop	3	
	Transfer car for irregular bar	1	
0602.03	Transfer car product yard	1	
RM0603	Cranç and Hoist	<u> </u>	
	1007	١.	Consister 2010
	OHT crane for mill yard (2)	1	Capacity: 104
	3 OHT crane for mill yard (3)	<u>1</u>	Capacity: 10 t Capacity: 5 t
	1 OUT come for her product and (1)	1 4	Capacity: 10 t with lifting magnet attachments
	OHT crane for bar product yard (2)	6	Capacity: 10 t with lifting magnet attachments Capacity: 10 t with lifting magnet attachments
	6 Hoist for roll shop (1)	1 1	
	7 Waist for call about 2)	1	Considerate
	8 OHT crane for billet yard		
		3	Capacity: 201 with lifting magnet and/or claw attachments
0603.0	OHT crane for furnace entry yard	1	Capacity: 3 t

No.	Equipment	Q'ty	Specification
0604.01	Water Circulation Equipment Return Water Pump for indirect cooling Emergency Water Pump	2 I	One as standby
	Scale Pit Pump Scale Handling Crane	2 1	One as standby
RM07	ELECTRICAL EQUIPMENT		
RM0701	Power Receiving and Distribution System	I set	Consisting of: - Incoming switchgear and combination panels - Power transformers - DC battery and charger - Power factor compensation - High harmonic filter, etc.
RM0702	Reheating Furnace Control system	1 set	Consisting of: - Distributed control system (DCS) - Field instruments and sensors - Control panels, etc.
RM0703	Mill Line Drive and Control System	i set	Consisting of: Thyristor transformers for main mill train Thyristor converter panels for main DC motors AC/DC reactors and magnetic contactors for main DC motors Main DC motors Thyristor converter panels for auxiliary DC motors Auxiliary DC motors Low voltage distribution panels VVVF AC motor control panels AC motor control panels VVVP AC motors for vector control VVVF AC motors for voltage control AC motors Programmable logic controllers and auxiliary relay panes Operating desks and supervisory panel Uninterruptible power source (UPS) Local circuit protection boards for group starter motors Local safety switch boxes Sensors Solenoid valve control boards, etc.
RM0704	Computer system	1 set	For Levet-2
RM0705	Cabling, Wiring, Bus Duct & Piping Materials	1 lot	Consisting of: Power cable and accessories Control cable and accessories Instrument pipe and fitting Cable duct, tray, conduit tube and fitting Grounding material Crane trolley wire, etc.

No.	Bquipment	Q'ty	Specification
RM0706	Lighting and Socket Outlet System	Hot	Consisting of: - Lighting transformer and distribution board - Lighting fixture - Socket outlet and switch, etc.
RM0707	Communication System	1 fot	Consisting of: - Paging system - Closed circuit TV system - Milt running indication lamp - Clocks - Telephone system, etc.
RM0708	Fire Detection and Fighting System	1 lot	Consisting of: - Fire detecting system - Fire fighting system
RM0709	Auxiliary System for Building	1 lot	Consisting of: - Air conditioning system - Ventilation system - Lightening protection system
RM08	OPERATIONAL CHANGING PARTS		
RM0801	Changing Roll Stand		Including one set of roll chocks & rest bars for each changing stand.
0801.01	Changing Roll Stand (for No.1 to No.4 Stand)	4 sets	
0801.02	Changing Roll Stand (for No.5 to No.8 Stand)	4 sets	
0801.03	Changing Roll Stand (for No.9 & No.11 Stand)	2 sets	
0801.04	Changing Roll Stand (for No.10 Stand)	1 set	
9801.05	Changing Roll Stand (for No.12 & No.13 Stand)	2 sets	For horizontal stand
0801.06	Changing Roll Stand (for No.12 & No.13 Stand)	2 sets	For vertical stand
0801.07	Changing Roll Stand (for No.14 Stand)	1 set	
0801.08	Changing Roll Stand (for No.15 Stand)	2 sets	For horizontal stand
0801.09	Changing Roll Stand (for No.15 Stand)	2 sets	For vertical stand
0801.10	Changing Roll Stand (for No.16 & No.18 Stand)	4 sets	
0801.1	Changing Roll Stand (for No.17 Stand)	2 sets	
RM0802	Changing Roll Chock		Including one set of roll neck bearings for each changing check.
	I Changing Roll Chock (for No.9 & No.11 Stand)	2 sets	
	2 Changing Roll Check (for No.10 Stand)	l set	
	3 Changing Roll Chock (for No.12 & No.13 Stand)	2 sets	For horizontal stand
	4 Changing Roll Check (for No.12 & No.13 Stand)	2 sets	
1	6 Changing Roll Check (for No.14 Stand)	1 set	
	6 Changing Roll Check (for No.15 Stand)	2 sets	For horizontal stand
1	77 Changing Roll Chock (for No.15 Stand)		For vertical stand

No.	Equipment	Q'ty	Specification
0802.08	Changing Roll Chock (for No.16 & No.18 Stand)	4 sets	And the second section of the section of the second section of the section of the second section of the second section of the sectio
0802.09	Changing Roll Chock (for No.17 Stand)	2 sets	
RM09	SIMPLE PARTS & INTERCONNECTING PIPING		
RM0901	Simple Parts		
0901.01	Foundation Bolt and Gauge Plate	Hot	
0901.02	Installation Liner	Hot	· · · · · · · · · · · · · · · · · · ·
0901.03	Safety Cover	Litot	
0901.04	Working Deck	1 lot	
0901.05	Pit and Duct Cover	1 lot	
0901.06	Rack for roll and bar product	1 lot	
0901.07	Crop Bag	1 lot	
0901.08	Pulpit	1 lot	
RM0902	Interconnecting Piping		
0902.01	Interconnecting Piping for cooling water	1 lot	
0902.02	Interconnecting Piping for compressed air	1 lot	
0902.03	Interconnecting Piping for natural gas	1 lot	
0902.04	Interconnecting Piping for others	1 lot	
RM10	SPARE PARTS AND CONSUMABLES		
RM1001	Spare Mill Rolls	Hot	
RM1002	Spare Mill Entry and Delivery Guides	Het	
RM1003	Spare Parts	Flot	
RM1004	Consumables	i lot	

Appendix A6-5-1 Major Equipment List of Lime Calcining Plant

No.	Equipment	Q'ty	Specification
LC01	Raw Material Handling System		
0101	Receiving hopper	1	
1	Vibrating feeder	1	100 t/h
0103	Belt conveyor	1	100 t/h
0104	Conveyor scale	1	100 t/h
0105	Belt conveyor	1	100 t/h
			1/4/2
LC02	Lime Calcining Plant		
0201	Limestone storage bin	1	
	Vibrating feeder	1	60 / h
	Single deck screen	3	60 Uh
	Belt conveyor	1	60 Vh
4	Scale hopper	1	
1	Vibrating feeder	1	60 (/h
	Belt conveyor	1	60 Vh
0208	Calcining kiln	1.	Shaft kiln type, 160 Vð
0209	Belt conveyor	1	10 vh
0210	Fines hopper	1	0
			A THE PROPERTY OF THE PROPERTY
LC03	Product Handling System		
0301	Belt conveyor	1	20 t/h
,	Damper	1	20 Vh
	Belt conveyor	1	20 t/h
E.	Belt conveyor	- 1	20 t/h
1	Vibrating screen	2	200 t∕h
0306	Jaw crusher	1	10 t/h
0307	Belt conveyor	1	20 Vh
0308	Belt conveyor	1 .	20 t/h
	Screw conveyor		3 Vh
	Chain conveyor	1	3 t/h
0311	Cushion hopper	1	15 t
0312	Screw conveyor	1	3 √ h

Appendix A6-5-1 Major Equipment List of Lime Calcining Plant

No.	Equipment	Q'ty	Specification
LCOI	Raw Material Handling System		
	Receiving hopper	1	
0102	Vibrating feeder	l .	100 t/h
0103	Belt conveyor	l	100 M
0104	Conveyor scale	ì	100 t/h
0105	Belt conveyor	. 1	100 / 1ı
LC02	Lime Calcining Plant		
	Limestone storage bin	1	Constitution Constitution of C
1	Vibrating feeder	1	60 t/h
0203	Single deck screen	1	60 v ∕h
0204	Belt conveyor	1	60 t/h
0205	Scale hopper	1	
0206	Vibrating feeder	1	60 Vh
0207	Belt conveyor	1	60 Vh
0208	Calcining kiln	1	Shaft kiln type, 160 t/d
0209	Bek conveyor	l	10 Vh
0210	Fines hopper	j	
LC03	Product Handling System		
	Belt conveyor	1	20 t/h
	Damper	1	20 t/h
0303	Beh conveyor	1	20 t∕h
	Belt conveyor	1	20 t∕h
0305	Vibrating screen	2	200 t/h
0306	Jaw crusher	1	10 t/h
0307	Belt conveyor	1	20 t/h
0308	Belt conveyor	1	20 Vh
0309	Screw conveyor	1	3 t/h
0310	Chain conveyor	1	3 <i>V</i> h
0311	Cushion hopper	1	15 t
0312	Screw conveyor	11	3 t/h

No.	Equipment	Q'ty	Specification
0313	Briquetting machine	i	2.5 Vh
0314	Belt conveyor		20 t/h
0315	Product bin	1	
0316	Vibrating feeder		200 t/h
0317	Belt conveyor		200 t/h
0318	Conveyor scale	1	200 t/h
0319	OHT hoist crane	1	5 1
0320	Dust collector	1	Bag type
0321	Bag filter	4	Control to the second decision (1) to the second
			• • • • • • • • • • • • • • • • • • •
LC04	Electrical Equipment		
0400	Power receiving and distribution system	1 set	· · · · · · · · · · · · · · · · · · ·
0420	Motors and motor controls	1 set	::
0440	DC power supply system	1 set	ss vagdigg eg seg sy a trans poop pa'r managyma Theolder (betti) er (s poballit best bill) (29 bo
0460	Ancillary equipment	1 set	in estatus i milyesty est y ellering and the col lectivity i i i electrical de collectivity est
0480	Cables and installation materials	1 set	
LC05	Instrumentation		
0500	Process supervising, sequencing control and data logging system	1 set	
0520	Instruments	1 set	
0540	Uninterruptible power supply system	1 set	
	Instrumental miscellaneous	1 set	
L			

No.	Equipment	Q'ty	Specification
0313	Briquetting machine		2.5 t/ h
0314	Belt conveyor	1	20 <i>t</i> /h
0315	Product bin	1	.,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,
0316	Vibrating feeder	1	200 t/h
0317	Belt conveyor		200 t/h
0318	Conveyor scale	1	200 Uh
0319	OHT hoist crane		5 ι
0320	Dust collector	1	Bag type
0321	Bag filter	4	
LC04	Electrical Equipment	NAMES OF THE OWNER OWNER	
0400	Power receiving and distribution system	1 set	
0420	Motors and motor controls	l set	
0440	DC power supply system	1 set	
0460	Ancillary equipment	1 set	
0480	Cables and installation materials	1 set	
LC05	Instrumentation		
0500	Process supervising, sequencing control and data logging system	1 set	
0520	Instruments	1 set	
0540	Uninterruptible power supply system	1 set	
	Instrumental miscellaneous	l set	
1			

Appendix A6-6-1 Equipment list of Substation

No.	Equipment	Quantity	Specification
PWOI	132 kV GIS		
	Receiving unit 1) Circuit breaker (CB)	2 sets	145kV,1250A, 25kA,2cycle Oil-hydraulic operation/
	2) Disconnect switch (DS)	4	SF6 gas insulated 145kV,1250A, 25kA(1 sec.) Motor operation / motor
	Main and feeder bus bar 1) Main bus bar	1 set	Double bus bar type 145kV 1250A, 25kA (1 sec.)
	2) Peeder bus bar		Single bus bar type 145kV 1250A, 25kA (1 sec.)
	PT 1) Disconnect switch	2 sets	145kV, 1250A, 25kA (1 sec.) Manual operation
	2) PT		132/√3kV : 110/√3V : 110/3V
	Transformer fceder unit 1) Circuit breaker (CB)	4 sets	145kV, 1250A, 25kA, 2cycle Oil-hydraulic operation, SF6 gas insulated
	2) Disconnect switch (DS)	8	145kV, 1250A, 25kA (1 sec.) Motor spring charge operation
	3) Earthing switch (ES)		145kV, 25kA (1 sec.) Motor operation
	Auxiliary devices 1) Local control panel 2) Gas monitoring device 132/33 kV power transformer	1 set	
	132/33 kV 3-phase on-load tap changer 1)Type 2)Capacity 3)Rated voltage	2 sets	Oil immersed outdoor use 80/110 MVA at ONAN/ONAF 3-phase 50Hz, 132/33 kV
	4)Primary taps 5)Connection		132kV+12% to -21% (1.5% tapping) On-load tap changer Yyd5
	Primary Secondary Tertiary		Wye (Solid grounding neutral) Wye (100A resistor grounding neutral) Delta (30MVA) with two external terminals closed outside the transformer Diaphram type
	6)Oil preservation 7)Accessories DS, LA, Buchholz relay 8)Fire fighting equipment Water pressure tank Air compressor		
022	132/33 kV 3-phase on-load tap changer 1)Type 2)Capacity	2 sets	Oil immersed outdoor use 110 MVA at ONAN
	3)Rated voltage 4)Primary taps		3-phase 50Hz, 132/33kV 132kV+12% to -21% (1.5% tapping) On-load tap changer

Appendix A6-6-1 Equipment list of Substation

No.	Equipment	Quantity	Specification
PW01	132 kV GIS		
011	Receiving unit	2 sets	
	1) Circuit breaker (CB)	ŀ	145kV,1250A, 25kA,2cycle
			Oil-hydraulic operation/ SF6 gas insulated
	2) Disconnect switch (DS)	1	145kV,1250A, 25kA(1 sec.)
			Motor operation / motor
012	Main and feeder bus bar	Lset	
	1) Main bus bar	<u> </u>	Double bus bar type 145kV
	2) Feeder bus bar		1250A, 25kA (1 sec.) Single bus bar type 145kV
	2,713,111		1250A, 25kA (1 sec.)
013	L. I	2 sets	
1/1.7	1) Disconnect switch	e sets	145kV, 1250A, 25kA (Esec.)
	1	İ	Manual operation
	[2) PT		132/√3kV : 110/√3V : 110/3V
014	Transformer feeder unit	4 sets	
	E) Circuit breaker (CB)		145kV, 1250A, 25kA, 2cycle
		i	Oil-hydraulic operation, SF6 gas insulated
	2) Disconnect switch (DS)	8	145kV, 1250A, 25kA (1 sec.)
			Motor spring charge operation
	3) Earthing switch (ES)		145kV, 25kA (1 sec.) Motor operation
015	Auxiliary devices	1 set	
	1) Local control panel		
PWG2	2) Gas monitoring device 132/33 kV power transformer		
021	132/33 kV 3-phase on-load	2 sets	
	tap changer		
	1)Type 2)Capacity		Oil immersed outdoor use 80/110 MVA at ONAN/ONAF
	3)Rated voltage		3-phase 50Hz, 132/33 kV
	4)Primary taps	ĺ	132kV+12% to -21% (1.5% tapping)
	S.C. and the		On-load tap changer
	i5)Connection Primary		Yyd5 Wye (Solid grounding neutrat)
	Secondary		Wye (100A resistor grounding neutral)
	Tertiary		Delta (30MVA) with two external
	ţ		terminals closed outside the transfermer
	6)Oil preservation		Diaphram type
	7)Accessories		
	DS, LA, Buchholz relay		
	8)Fire fighting equipment Water pressure tank	ĺ	
	Air compressor		
022		3	
UZZ	132/33 kV 3-phase on-load tap changer	2 sets	
	1)Type		Oil immersed outdoor use
	2)Capacity		HO MVA at ONAN
	(3)Rated voltage		3-phase 50Hz, 132/33kV
	4)Primary taps		132kV±12% to -21% (1.5% tapping)
			On-load tap changer

No.	Equipment	Quantity	Specification
	5)Connection Primary		Yyd5 Wye (Solid grounding neutral) Wye (100A resistor grounding neutral)
	Secondary Tettiary		Delta with two external terminals closed outside the transformer Diaphram type
	6)Oil preservation 7)Accessories DS, LA, Buchholz relay 8)Fire fighting equipment Water pressure tank Air compressor		
	33 kV switchgears Neutral grounding resistor(NGR) 1)NGR 2)DS	4 sets	33/√3kV,100A,190 ohm,10sec. 36kV,400A manual operation
032	Main panel	4 sets	
	1)VCB	_	36kV,2400A, 25kA, Motor spring charger operation
033	Bus tie panel 1)VCB	2 sets	36kV,2400A, 25kA, Motor spring charger operation
034	Feeder panel including spare 1)VCB	19 sets	36kV, 1250A, 25kA, Motor spring charger operation
035	GPT panel 1)GPT with fuse		Single phase resin mode type 33/√3kV: 110/√3V: 110/3V
036	Feeder panel for SVC	6 sets	
	1)GCB	_	36kV, 1250A, 25kA Motor spring charge operation
037	Feeder panel for EAF 1)GCB	4 sets	36kY, 1250A, 25kA Motor spring charge operation
PW04	Static var compensator (SVC) & power factor compensator	2 sets	
	High impedance transformer Thyristor equipment Auxiliary control panel		28MVA 28MVA
	and thyristor control panel 4) Power factor compensation		#2,#3,#4,#5,#7 harmonic filter Total 43MVA
	5) SVC supervisory panel		
PW05	33/6.6 kV power transformer 1) Type 2) Capacity 3) Rated voltage 4) Primary taps	lset	(including one spare) Oil immersed outdoor use 30/36MVA at ONAN/ONAF 3-phase 50Hz 33/6.6kV 34.5/33.75/32.25/31.5kV at full cap.
	5) Connection Primary / Secondary 6) Oil preservation		Dyl1 Delta/Wye (10A resistor grounding neutral) Diaphram type
PW06 061	6.6 kV switchgears NGR panel		CC/ F22AL 10A 20 **
	1) NGR 2) DS	1 set	6.6/√3kV, 10A, 38 ohm continuous Single phase type 7.2kV 100A manual operation

No.	Equipment	Quantity	Specification
062	Main panel 1)VCB	lset	7.2kV 2000A, 40kA Motor spring charge operation
	Feeder panel 1)VCB	10 sets	7.2kV, 1250A, 40kA Motor spring charge operation
	GPT and LA 1)GPT 2)LA	l set	3-phase resin molded type 6.6kV: 110V: 110/3V Zinc oxide type 8.4kV, 10kA
	Station service transformer 1) Type 2) Capacity 3) Rated voltage 4) Rated secondary voltage 5) Connection 6) Oil preservation	1 set	Oil immersed outdoor type 500kVA, ONAN 6.6kV 400V Delta/Wye, Dyl I Nitrogen sealed
066	Static capacitor unit 1)Static capacitor type 2)Capacity 3)Series reactor with discharging coil	I set	Outdoor use, mineral oil immersed, self cooled type 2000kVAr, 6.9kV Outdoor use, Oil immersed, self cooled type. 6.9kV 120kVA capacity
PW07	Diesel generators	2 sets	
071	Diesel engine		V-type, trunk piston type with super charger and intercooler output:2870PS, 1000rpm, 12 cylinder
072	Generator	2 sets	6.6kV, 2500kVA, pf: 0.8, insulation: F class, brushless, 6 poles star connection Over speed: 120% Protection: IP-23 ground resister: 10A continuous
073	Distribution panels 1)6.6 kV main switchgears 2)VCB	2 sets	7.2kV, 1250A, 40kA Motor spring charge operation
	3)ES		7.2kV manual operation
	4)6.6 kV feeder switchgears	8 sets	Vacuum contractor 7.2kV, 450A
	5)Exciter panel	- [
	6)GPT cubicle		
	7)380 V distribution panel		
	8)NGR panel	2 sets	6.6/√3kV, 10A, 381 ohm continuous DS:100A 7.2kV, manual operation
074	Starting system 1) Type 2) Air tank		Compressed air system Capable of automatically starting 3 times.

No.	Equipment	Quantity	Specification
	3)Air receiver		300 litter
	4)Air compressor		
075	Cooling system	l	Closed cooling system in two circuit
0/3	Cooling system		arrangement for each engine and is
			equipped with cooling tower, jacket
			water pump and cooler water pump.
			where have a court or must be with
076	Fuel system	1 set	Puel system is consisting of main
0,0	t act 55 500 m	'	storage tank, dry tank, oil transfer
			pump and fuel oil filter and fuel
			· -
			քսութ.
PW08	Supervisory control and	1 set	Supervisory and control panels and
11100	relay panel		centralized monitoring system.
PW09	Fire protection system	1 set	
PWIO	Telephone system	1 set	
PWH	Air conditioning system	I set	
PW12	Cables and Materials	l set	Cables & sub materials for 33kV.
	l	ļ <u>.</u>	6.6kV and other, and cable tray
PW13	Maintenance tools	l set	
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Appendix A6-7-1 Equipment List of Utilities

No.	Equipment	Q'ty		Specification
UT-01	Natural Gas Receiving Station			
UT-0101	Piping with accessories	i lot	Capa. :	66,000 Nm'/h
UT-02	Air Separation Plant and Air Compression Plant			
UT-0201	Air Compressor	1 set	Type: Capa:: Discharge Turndown mechanism: Code & standard: Noise level:	Isothermal centrifugal compressor 43,600 Nm'/h 28 kg/cm² Inlet guide vane API-672
UT-0202	Air Pre-purification System MS Adsorber with electric heater	l set	Type:	Approx.95d8 at 1m distance from machine side. Molecular sieves 13X and aluminum get
UT-0203	Cryogenic Air Separation Unit (Cold box) Including: 1-Main Heat Exchanger 1-Sub cooler 1-Main condenser 1-Rectifier column (Upper & lower)	1 set	Туре:	Outdoor, self-standing, packaged type.
UT-0204	Vessels and Equipment outside Cold Box 1-Blow down tank 1-MS silencer 1-O2 blow off silencer	1 set		
UT-0205	Expansion Turbine	1 set	Type: Breaking system: Turn down operation:	Skid mounted low temperature turbo expander system Packaged single stage, radial-flow reaction type Booster compressor Inlet variable nozzle
UT-0206	Cryogenic Process Pump 2-Liquid oxygen pump (capa:9,000 NmYh) (Delivery pressure:25 kg/cm²) 2-Liquid nitrogen pump (capa:3,000 NmYh) (Delivery pressure:11 kg/cm²)	I set		
UT-0207	LOX, LIN Tank and Vaporizer 1-Liquid oxygen tank (45m') 1-Liquid nitrogen tank (30m') 1-Liquid oxygen vaporizer (capa: 9,000 Nm'/h) 1-Liquid nitrogen tank (capa: 3,000Nm'/h)	1 set	Туре:	Cylindrical, horizontal, vacuum perlite insulation

No.	Equipment	Q'ty		Specification	
UT-0208	Cooling Water System	1 set	T		
	2-Circulation water pump				
	(capa: 600m/h)		1		
	1-Heat exchanger				
	(Type: plate, titanium)		1		
	1-Water basin		}		
	1-Chemical dosing unit				
UT-0209	Piping valves and accessories	1 set			
UT-0210	Instruments	l set			
UT-0211	Electrical Equipment	1 set			
UT-0221	Air Compressor with Suction Air Filter	3			
			Type :	Centrifugal	
			Сара. ;	5,000Nm/h, 7 kgt/cm ² G	
UT-0222	Air Receiving Tank	1		-	
	1		Material:	CS	
	1		Type :	Vertical	
			Capa.:	30 m'	
UT-0223	Hoist Crane	1			
			Material:	CS .	
	1		Туре :	Electric Overhead Crane	
			Сара. :	5 tons, Lift 10 m	
UT-0224	p'-t	1 lot	1	Span 12 m	
U 1-0224	Piping	1 104		•	
UT-0225	Electrical Equipment	1 lot			
UT-0226	Instruments	1 lot			
UT-0227	Wiring Materials	1 lot			

No.	Equipment	Q'ty		Specification
UT-II	Raw Water Receiving Station	-		
	and Fire Hydrant System			
UT-1101	Raw Water Basin	ı		
01-1101	Raw Water basin		Material:	RC
				Rectangular
			1.0	-
107 1103	NASI - Wasa Gunala Basa	2	Capa.	3,000m
UT-1102	Make-up Water Supply Pump	2	Material:	CI/CS
			1	Centrifugal
			1 7 7	
			Capa. :	200m7h x 40 m
1170 1100	TN:	2		
UT-1103	Fire pump	Z	Material:	CI/CS
			Туре :	Centrifugal
EVE 1104	115	•	Capa. :	250mVh x 85 m
UT-1104	Jockey Pump	2	N. E. a. a. ala. la	CVCS
]		Material:	
			Type :	Centrifugal
			Capa. :	20m¼h x 50 m
UT-1105	Fire Diesel Pump	1		auce
	<u> </u>		Material:	CVCS
			Type :	Centrifugal
			Capa. :	250m/h x85 m
			Diesel:	Enclosure Type
			Engine	Automatic Electrical
				Starting System
UT-1106	Pressure Tank	1		
			Material:	CS
			Type :	Cylindrical
11			Capa. :	10m'
UT-1107	Hydrant With Hose Box	1 lot		
UT-1108	Piping with Necessary	l lot		
UT-12	Water Treatment Station - I			
	(SMP)			
UT-1201	ICW Heat Exchangers for EAF, LF and SMP	3		
	Lr and SMP		Material:	Titanium
	l ⁻		Туре :	Plate, 1 pass
	•		Capa.	1,900 m'/h
			Heat transfer area:	1,900 m/n - 000 m²
UT-1202	Hot Water Basin	1		. 300 tu
0, 1, 0,	The water passing	•	Material:	RC
			Type :	Rectangular
			Сара	
UT-1203	ICW Supply Pump for BAF and	4		1,300m'
0. 1005	LF	•		
			Material:	CVCS
			Type :	Centrifugal
	1		Capa. :	1,900m7h x 55 m
UT-1204	Diesel Pump for EAF and LF	l		
			Material:	CVCS
			Type :	Centrifugal
			Capa. :	1,700 m/h x 40 m
			Diesel	Enclosure Type
	1		Engine :	Automatic Electrical
	1			Starting System
			Engine :	

UT-1206 Ch Inc I-C I-S I-S I-F UT-1207 Pig UT-13 W UT-1301 IC	nemical Dosing System cluding: Corrosion Inhibitor Scale Inhibitor Slime Inhibitor pH Control ping with Necessary ater Treatment Station - 1 CO CW Heat Exchanger for CC	l set	Type : Capa. :	RC Cylindrical 300m', 35m High Titanium Plate, I pass
UT-1206 Ch Inc I-0 I-5 I-5 I-7 UT-1207 Pig UT-13 W (C) UT-1301 IC	nemical Dosing System cluding: Corrosion Inhibitor Scale Inhibitor Slime Inhibitor pH Control ping with Necessary ater Treatment Station - 1 C) CW Heat Exchanger for CC	i lot	Type : Capa. : Material: Type : Capa. :	Cylindrical 300m ³ , 35m High Titanium Plate, I pass
UT-1207 Pip UT-13 W UT-1301 IC	cluding: Corrosion Inhibitor Scale Inhibitor Slime Inhibitor pH Control ping with Necessary ater Treatment Station - 1 C) CW Heat Exchanger for CC	i lot	Type : Capa. : Material: Type : Capa. :	Cylindrical 300m ³ , 35m High Titanium Plate, I pass
UT-1207 Pip UT-13 W UT-1301 IC	cluding: Corrosion Inhibitor Scale Inhibitor Slime Inhibitor pH Control ping with Necessary ater Treatment Station - 1 C) CW Heat Exchanger for CC	i lot	Material: Type : Capa. :	Titanium Plate, I pass
UT-1207 Pig UT-13 W. (C) UT-1301 IC	cluding: Corrosion Inhibitor Scale Inhibitor Slime Inhibitor pH Control ping with Necessary ater Treatment Station - 1 C) CW Heat Exchanger for CC	i lot	Material: Type : Capa. :	Titanium Plate, I pass
UT-1207 Pig UT-13 W. (C) UT-1301 IC	cluding: Corrosion Inhibitor Scale Inhibitor Slime Inhibitor pH Control ping with Necessary ater Treatment Station - 1 C) CW Heat Exchanger for CC	i lot	Type : Capa. :	Plate, 1 pass
UT-1207 Pip UT-13 W UT-1301 IC	Corrosion Inhibitor Scale Inhibitor Slime Inhibitor pH Control ping with Necessary ater Treatment Station - 1 C) W Heat Exchanger for CC	i	Type : Capa. :	Plate, 1 pass
UT-1207 Pig UT-13 W UT-1301 IC	Scale Inhibitor Slime Inhibitor pH Control ping with Necessary ater Treatment Station - 1 C) :W Heat Exchanger for CC	i	Type : Capa. :	Plate, 1 pass
UT-1207 Pig UT-13 W UT-1301 IC	Slime Inhibitor pH Control ping with Necessary ater Treatment Station - 1 C) CW Heat Exchanger for CC	i	Type : Capa. :	Plate, 1 pass
UT-1207 Pig UT-13 W (C) UT-1301 IC	pH Control ping with Necessary ater Treatment Station - 1 'C') 'W Heat Exchanger for CC	i	Type : Capa. :	Plate, 1 pass
UT-1207 Pip UT-13 W (C) UT-1301 IC	ping with Necessary ater Treatment Station - 1 C) CW Heat Exchanger for CC	i	Type : Capa. :	Plate, 1 pass
UT-1301 IC	ater Treatment Station - 1 °C) °W Heat Exchanger for CC	i	Type : Capa. :	Plate, 1 pass
UT-13 W. (C) UT-1301 IC	ater Treatment Station - 1 °C) °W Heat Exchanger for CC	i	Type : Capa. :	Plate, 1 pass
UT-1301 (C	°C) :W Heat Exchanger for CC		Type : Capa. :	Plate, 1 pass
UT-1301 IC	W Heat Exchanger for CC		Type : Capa. :	Plate, 1 pass
	·		Type : Capa. :	Plate, 1 pass
UT-1302 He	ot Water Basin	1	Type : Capa. :	Plate, 1 pass
UT-1302 Ho	ot Water Basin	1	Capa. :	·
UT-1302 He	ot Water Basin			. 445 34
UT-1302 He	of Water Basin	1		1,363 m/h
01-1302	et trait pasiii		ricac canster area.	570 m ³
:			Material:	RC
	1		Type :	Rectangular
l	ļ		Capa.	
UT-1303 IC	CW Supply Pump for CC	4	Сара.	150m'
014503	or supply tump for ee	7	Material:	CVCS
i			Туре :	Centrifugal
			Capa. :	-
			Capa.	500m/h x 90m
UT-1304 Di	iesel Pump for CC	1		
		•	Material:	CI/CS
			Туре :	Centrifugal
Ì			Сара. :	300 m³/h x 40 m
			Diesel	Enclosure Type
			Engine :	Automatic Electrical
1			Langence ,	Starting System
UT-1305 Pi	iping with Necessary	1 lot		
A	ceessories			
ļ		-		
UT-1306 D	CW Heat Exchangers for CC			
			Material:	Titanium
ì			Type :	Plate, 1 pass
			Capa. :	1,440 mVh
			Heat transfer area:	² 780 m²
UT-1307 C	Told Water Basin for CC	· 1		
			Material:	RC
			Type :	Rectangular
			Capa. :	300m³
UT-1308 D	CW Supply Pump for CC pray and Mach. Cooling	4	1	
	gray and Maco. Cooming		Material:	CVCS
1		1	Type :	Centrifugal
		1	Capa. :	500 m/h x 105 m
UT-1309 S	Sedimentation Basin	1		200 HAR X 102 B
			Material:	RC
			Type :	Rectangular
			Capa. :	980m'

No.	Equipment	Q'ty	I	Specification
UT-1310	Sludge Remover for Sedimentation Basin	i		
	Sedifichance Dayor		Material:	CS
	1		Туре :	Gantry Crane with
				Grab Bucket
UT-1311	Studge Pump	4		
			Material:	CVCr-C1
	1		Type :	Submersible
			Capa: :	30m/h x 15 m
UT-1312	Oil Skimmer	4		
			Material:	CS
	i I		Type	Mop Skimmer
			Capa :	IOm'/h
UT-1313	Floating Pump	4		
			Material:	CI
			Type :	Scum Skimmer
UT-1314	Filter Feed Pump for CC	2		CUCO
			Material:	CVCS
	1		Type :	Centrifugal
	D	4	Сара. :	1,500m7h x 25m
UT-1315	Pressure Filter	4	Material:	CS, Anthracite/Sand
			Type :	Vertical
			Capa.	
UT-1316	Backwash Blower	2	Capa.	450m/h
01-1310	Dackwash blowti		Material:	CVCS
			Type :	Rotary
			Capa:	15.2m/min. x 7000mmAq.
UT-1317	Lub, Oil Pump for Blower	3		15.201 Atta. X POOUBIBAQ.
01 10.,			Material:	CI/CS
	1		Type :	Gear / Lub. Oil Cooler
			Capa. :	0.5mVh x 3 kgf/cm²
UT-1318	Backwash Pump	3		Vizitive & egiven
			Material:	CVCS
			Type :	Centrifugal
			Capa. :	1,370 m³/h x 25m
UT-1319	Backwash Water Storage Basin	1		
	1		Material:	RC
			Type :	Rectangular
	1 .		Capa. :	330m'
UT-11320	Backwash Water Transfer Pump	2		
	1		Material:	CVCt-Cl
	1		Type :	Centrifugal
			Capa, ;	110mVh x 20m
UT-1321	Studge Drying Bed	2		no.
			Material:	RC Restaurates
			Type :	Rectangular
UT-1322	Sludge Pit Pump	2	Capa. :	15m²
01-1322	Sugar tur touth	*	Material:	Cl/Cr-Cl
		1	Type :	Submersible
1			Capa. :	
UT-1323	Separated Oil Pit	2	-upa.	60m ³ /h x 15m
1 21-1323	orpanies on a te		Material:	RC
1				
			Type :	Rectangular

No.	Equipment	Q'ιy	,	Specification
	Coagulation Tank with Agitator	1		
[Material:	RC/SS
			Туре	Rectangular
			Capa. :	5m3
UT-1325	Thickener	1		
			Material:	RC, CS/Tar Epoxy
1			Type :	Rectangular
1	<u> </u>			Center Shaft
				Sludge Scraper
			P. Committee of the com	with Electrical Lifting
			,	Device
UT-1326	Thickener Sludge Pump	2		
	 			CI/Ct-CI
	!			Centrifugal
			Capa.:	5m½ x 15m
UT-1327	Chemical Injection facilities	1 lot	l	
				PB
			la"	Vertical
117 1330	Dining with Management	1 1-4	Сара. :	4m'
UT-1328	Piping with Necessary Water Treatment Station - 2	1 lot		
01-14	(BRM)			
UT-1401	ICW Heat Exchangers for BRM	1		
01-1401	Test Exchangers for Brave	•	Material:	Titagium
			1 '	Plate, 1 pass
1			Capa. :	1,000 mVh
	[[Heat transfer area:	104 m3
UT-1402	Hot Water Basin	1		127 th
1			Material:	RC .
1			· ·	Rectangular
			Capa. :	250m'
UT-1403	ICW Supply Pump for BRM	2		
1			Material:	CI/CS
			Type :	Centrifugal
			Capa.:	1,000m7h x 45m
UT-1404	Diesel Pump for BRM	1		·
			Material:	CI/CS
			Туре :	Centrifugal
			Capa. : Diesel	150 m/h x 40 m
			Engine :	Enclosure Type Automatic Electrical
			toukue .	Starting System
UT-1405	Chemical Dosing System	i set	1	Same and a barren
07.1403	Including:	1 301		
-	1-Corrosion Inhibitor		ļ	
	1-Scale Inhibitor		1	
	1-Slime Inhibitor			
UT-1406	DCW Heat Exchangers for BRM	1		
			Material:	Titanium
		i	Туре:	Plate, 1 pass
ĺ			Capa. :	1,200 mVh
			Heat transfer area:	430 m²
UT-1407	Cold Water Basin for BRM	I	i	
			Material:	RC
			Type:	Rectangular
	1		Capa. :	300m³

No.	Equipment	Q'ty		Specification
UT-1408	DCW Supply Pump for BRM	2		ONIOS
			Material:	CVCS
			Type :	Centrilugal
1100 1400	Re time and an Design		Capa. :	1,200 m/h x 45 m
UT-1409	Sedimentation Basin	1	Material:	RC
			Type :	Rectangular
			Capa. :	•
UT-1410	Sludge Remover for	ŧ		840m'
	Sedimentation Basin	•	1	
			Material:	CS
			Type :	Gantry Crane with Grab Bucket
UT-1411	Sludge Pump	4	Ì	Grad Bucket
01-1411	Single Lamb	4	Material:	Cl/Cr-Cl
			Type :	Submersible
		1	Capa. :	30m'/h x 15 m
UT-1412	Oil Skimmer	4	1	50m/n x 15 m
			Material:	CS
			Туре :	Mop Skimmer
			Capa.:	10m'/h
UT-1413	Floating Pump	4	-	
			Material:	Cl
			Туре :	Scum Skimmer
UT-1414	Filter Feed Pump for BRM	2	1	
	1		Material:	CI/CS
			Type :	Centrifugal
UT-1415	Pressure Filter	4	Capa. :	1,200 m/h x 25m
01-1415	riessure Piner	7	Material:	CS, Andwacite/Sand
			Type :	Vertical
			Capa. :	380m'/h
UT-1416	Backwash Blower	2		360R7II
	1		Material:	CVCS
			Туре :	Rotary
			Capa. :	12.6m/min. x 7000mmAq.
UT-1417	Lub. Oil Pump for Blower	2		
			Material:	CVCS
	1		Туре :	Gear / Lub. Oil Cooler
155 1410	Destaura D		Capa. :	0.5m ³ /h x 3 kgf/cm ³
UT-1418	Backwash Pump	2	Material:	CHCC
			Type :	CI/CS Centrifugal
			Сара. :	-
UT-1419	Backwash Water Storage Basin	l 1	Capa.	1,130 m/h x 25m
	Duck trains trains overage basis		Material:	RC
			Турс :	Rectangular
		1	Capa. :	270m*
UT-1420	Backwash Water Transfer Pump	2	1	ETVIIL
			Material:	CI/Cr-Cl
	1	1	Туре :	Centrifugal
		[Capa. :	100m'/h x 20m
UT-1421	Sludge Drying Bed	2		
		ĺ	Material:	RC
			Type :	Rectangular
l	1	l .	Capa.:	15m*

No.	Equipment State 1940	Q'ty 2		Specification
UT-1422	Sludge Pit Pump	- 1	Material:	Cl/Cr-Cl
			Type:	Submersible
			Capa. :	60m'/h x 15m
UT-1423	Separated Oil Pit	2		OOM/A X TOR
			Material:	RC
			Туре :	Rectangular
			Capa:	9m¹
UT-1424	Coagulation Tank with Agitator	1		-m
			Material:	RC/SS
			Type :	Rectangular
			Capa. :	5m'
UT-1425	Thickener	1		
			Material:	RC, CS/Tar Fpoxy
			Туре :	Rectangular
				Center Shaft
				Sludge Scraper
				with Electrical Lifting Device
UT-1426	Thickener Studge Purnp	2		1 zevice
01-1470	Thickener Studge Point	Z	Material:	Cl/Cr-Ci
			Type:	Centrifugal
			Capa. :	Sm/h x 15m
UT-1427	Chemical Injection facilities	l lot	Cupu.	3m7n x 13m
	Including:			
	1-Biocide Injection			
	1-pH Control			
	1-Polymer Injection			
			ł	
UT-1428	Piping with Necessary Accessories	1 lot		
UT-15	Sea Water Intake System-I			
01-17	Sea Wheel Hanke System?			
UT-1501	Stop Log Gate	2 set		;
UT-1502	Bar Screen	1	Type :	Flat bar grid with rake
			Capa.	25,000 m'/h
			Max. mesh size:	150 mm
	1			
UT-1503	Rotary Screen	1	Material:	Steel with cathodic protection
			Type :	Drum with debris conveyer
			Capa. ;	25,000 m/h
			Max. head loss:	0.3 m
			Max. mesh size:	5 mm
115 1606	Circulation 6	_	.	ONGHO
UT-1504	Circulation Pump	3	Material:	CVSUS
			Type :	Vertical, mixed flow
			Capa. :	12,500 m³/h
UT-1505	Electric Chlorinator	1	Type:	Electrolysis
04/1303	enceate emormator	'	Capa:	125 kg/h as Cla
			Material:	Ti, Pt plated
				· • • • • • • • • • • • • • • • • • • •
UT-1506	Electrical Equipment	1 set		
	Including:]		
	t-Transformer, operation panels,]		
	1	1	1	

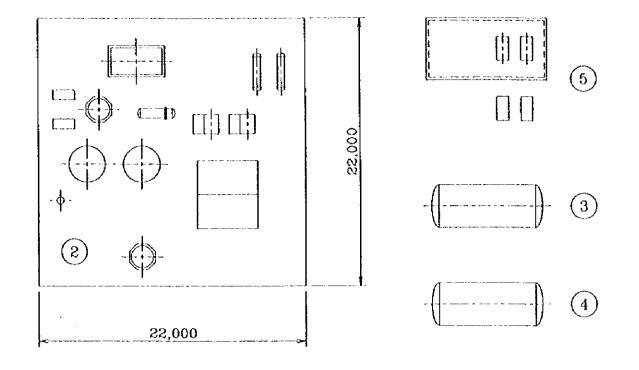
No.	Equipment	Q'ty	<u> </u>	Specification
UT-1507	Instruments	1 set		
UT-16	Sewage Treatment Station			
			Capa. :	500mYday
1070 1 60 6			BODs :	Outlet 20ppm
UT-1601	Rough Screen	1	Material:	cs
			Type :	Bar Screen
UT-1602	Basket	1	7,	
			Material:	SS
			Туре :	5 Mesh
UT-1603	Diffuser for Aerated Grid Chamber	1 lot		
	Chamber		Material:	ABS
]			Type :	Disc
			Capa. :	0.25 m/min. x 5 m
UT-1604	Spray Nozzle for Aerated Grit Chamber	1 lot		
			Material:	ABS
	i_		Capa.:	0.25 m3/min. x 5 m
UT-1605	Gate	1 lot	Material:	PVC
			Type :	Slide Gate
UT-1606	Grit Pump	1	,,,,,	Since Gate
		_	Material:	PVC
			Type :	Air Life
]		Сара. :	6 m'/h x 5 m
UT-1607	Grid Separator	1	J	b o
			Material: Type :	RC Rectangular
UT-1608	Aerated Grid Chamber with	1	1300	Actingum
	Baffle Board	•		no cog: n
			Material: Type :	RC, CS/Tar Epoxy Rectangular
			Capa. :	6 m'
UT-1609	Comminutor	1		om [,]
İ			Material:	CUSCS
			Type :	Control Type
LIT ICIA	Pl C		Capa. :	630 m/day-3,150 m/day
UT-1610	Flow Control Basin	1	Material:	RC
			Type :	Rectangular
]			Capa. :	200 m'
UT-1611	Feed Pump	2		
			Material:	CI
			Туре	Submersible
UT-1612	Diffuser for Flow Control Basin	I lot	Capa:	24 m/h x 5 m
01.1012	Diffuser for Link College Dayle	1100	Material:	ABS
			Type :	Disc
			Capa.	0.25 m/min.
UT-1613	Constant Head Box	-1		
			Material:	CS.
1			Type :	V-Notch Weir
UT-1614	Sludge Storage Basin	1	Capa. :	21 m'/h
	2.000 2.00 M. 2.000	'	Material:	RC
			Type :	Rectangular
			Capa. :	36 m'

No.	Equipment	Q'ty		Specification
UT-1615	Acration Basin	2	Material:	RC
			Type :	Rectangular
			Capa. :	
	man a h de Baria	I lot	Capa.	250 m [*]
UT-1616	Diffuser for Aeration Basin	1 101	Material:	ABS
			L .	Disc
•			Type :	
		•	Capa. :	0.25 m'/min.
UT-1617	Sludge Measuring Box	1	Material:	CS/Tar Epoxy
			1''	V-Notch Weir
	<u> </u>		Type :	
			Capa. :	20 m/h-60 m/h
UT-3618	Sedimentation Basin	ì		
V1-1010		-	Material:	RC
			Туре :	Cylindrical
	1		Сара.	20.8 m²/h
UT-1619	Słudge Return Pump	1		20.0 H 40
01.1013	Shoge Keinin's only	-	Material:	PVC
	1		Type :	Air Lift
			Capa. :	0.35 m/min. x 1.5 mAq
UT-1620	Sludge Collector	i	1	0.33 mmm x 1.3 no tq
01-1020	310age Collected	-	Material:	CS/Tar Epoxy
			Type :	Center Shaft
	1		1.77	With Drive Unit
UT-1621	Spray Pump Pit	1		
01-1021	Siray I ump I i	_	Material:	RC
	1		Type :	Rectangular
	1		Capa :	2 m³
UT-1622	Chlorination Basin	i		2111
01-1022	Chicamateat David	-	Material:	RC
	•		Туре :	Rectangular
			Сара.	5.2 m³
UT-1623	Spray Pump	1	Capa	5.210
01-1023	Shay romp	l •	Material:	CI
		İ	Type :	Submersible with
			Ouick Discharge	
		l	Ĉapa :	12 m/h x 15 m
UT-1624	Blower for Acration	2		12 m/m × 13 m
01-1024	DAGRET FOR TELEVISION		Material:	CI
			Type:	Rotary Type / Silencer
]	Capa.	17.5 m/min. x 4,000 mmAq
UT-1625	Hoist	ĺ 1		17.5 in diam & 45000 insured
01.1023	11503	1	Material:	CS
] .	Type :	Electrical Lifting
		1	- 1	& Traveling
			Capa. :	0.5 ton
UT-1626	Hypochlorite Tank with Agitator			
			Material:	PE, CS/RL
			Type :	Cylindrical
		1	Capa. :	i m'
UT-1627	Hypochlorite Pump	2	Material:	PVC
	i		Type :	Diaphragm
ŧ			Capa. :	3.6 Vh x 10 kg(/cm²

No.	Equipment	Q'ty	Specification		
UT-1628	Surface Water Drain off Pump	2			
	1		Material:	CI	
	1		1ype :	Submersible	
			Capa. :	0.2 m/min. x 4 m	
UT-1629	Hoist for Chemical Storage	1	·	V,EIIIIIIIIII X TIII	
	8		Material:	CS	
			Type :	Electrical Lifting	
			'''	& Traveling	
			Сарэ. :	0.5 ton	
UT-1630	Piping with Necessary	1 lot	Саро.	0.3 ton	
01-1030	Accessories	2 100	ŀ		
UT-1631	Analysis Apparatus	1 lot			
UT-1632	Electrical Equipment for Water	1 lot			
	Treatment Station		1		
F100 1 4 3 3		11.	1		
UT-1633	Instruments for Water Treatment Station	1 lot			
	3143011		İ		
UT-1634	Wiring Materials for Water Treatment Station	Hot	İ		
	Treatment Station]		
UT-20	Yard piping				
UT-2001	Distance it Management	1 lot		Point	Specification
01-2001	Piping with Necessary Accessories	1 101	İ	raping	specification
			Fluids	Materials	Protective coating ,etc.
	1		Potable water	Ductile cast iron	(i) Mortar lining,(o) Polyethylene sleeve
			Sea water	Steel pipe	(i) Tar epoxy, (o) Vitumen with fiber
			Waste water	Steel pipe	(i) Tar epoxy, (o) Vitumen with fiber
			Natural gas	Steel pipe	(c) the opens, (e) the man that
			Oxygen gas	Steel pipe	(i) Acid cleaning
			Nitrogen gas	Steel pipe	to Mela examig
			Plant air	Steel pipe	
			Industrial water	Steel pipe	
			Circulation water	Steel pipe	
			1		ked necessity of cathodic protection
UT-2002	Pipe rack and stanchion	1 lot			
		• • • • •			
	1	1 lot			
UT-2003	Electrical equipment	1 101			
UT-2003	Electrical equipment	1 101			
UT-2003 UT-2004	Electrical equipment	l lot			
UT-2004	Instrumentation	1 lot			
UT-2004	Instrumentation	1 lot			
UT-2004	Instrumentation	1 lot			
UT-2004	Instrumentation	1 lot			
UT-2004 UT-2005	Instrumentation	1 lot			
UT-2004	Instrumentation Auxiliary equipment Initial fill for Consumables	1 lot			
UT-2004 UT-2005	Instrumentation Auxiliary equipment	1 lot			
UT-2004 UT-2005 UT-9800	Instrumentation Auxiliary equipment Initial fill for Consumables Quantity shall be of 6 Months Operation	1 lot			
UT-2004 UT-2005	Instrumentation Auxiliary equipment Initial fill for Consumables Quantity shall be of 6 Months Operation Spare Parts	1 lot			
UT-2004 UT-2005 UT-9800	Instrumentation Auxiliary equipment Initial fill for Consumables Quantity shall be of 6 Months Operation	1 lot 1 lot 1 lot			

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- 1 Air Compressor
- (3) Cold Box
- 3 LOX Tank
- 4 LIN Tank
- 5 Water System
- 6 Electrical Room

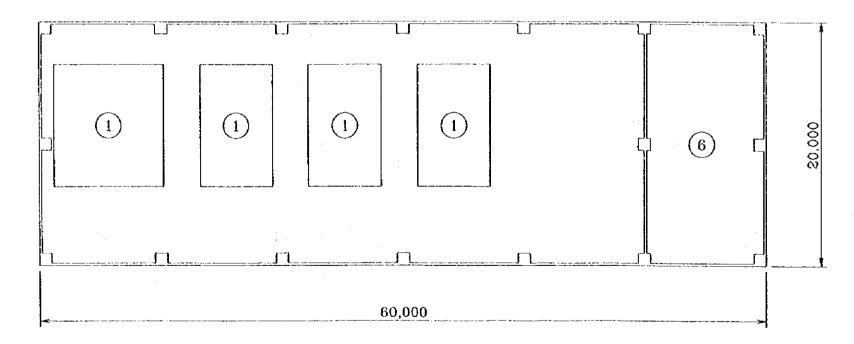


Figure A6-7-1 Layout of Air Separation Plant and Plant Air

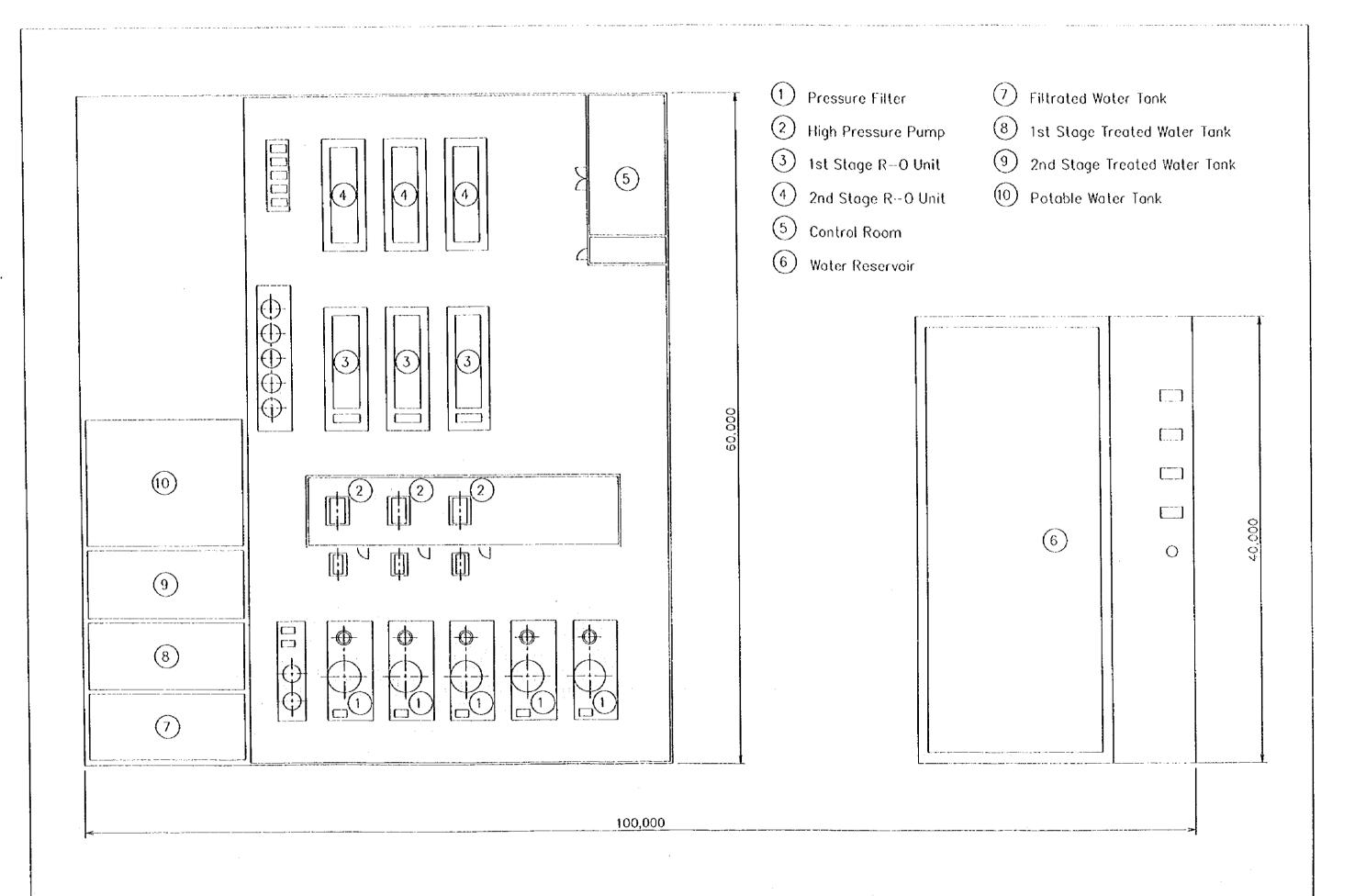
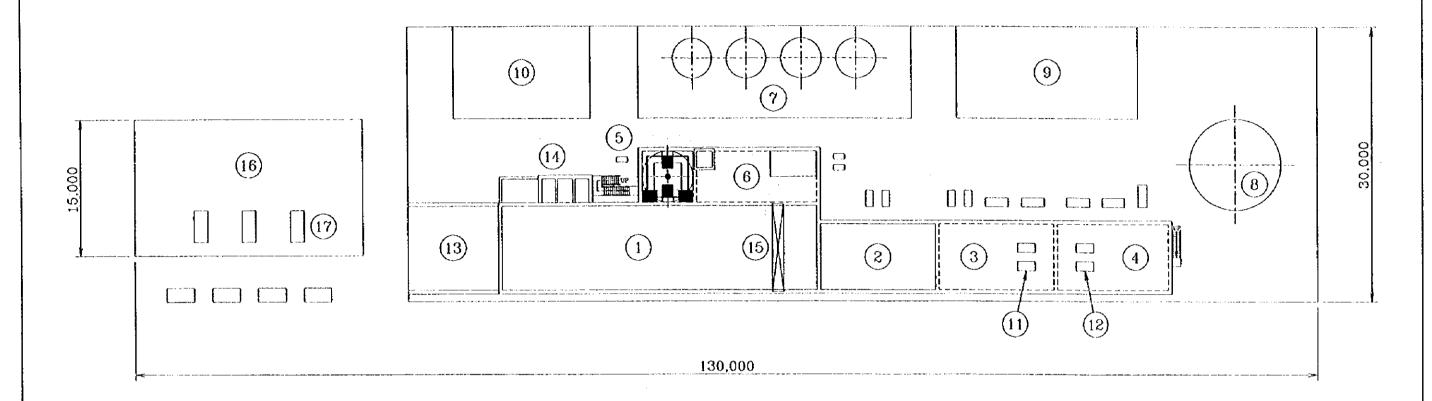


Figure A6-7-2 Layout of Desalination Plant and Raw Water Receiving Station

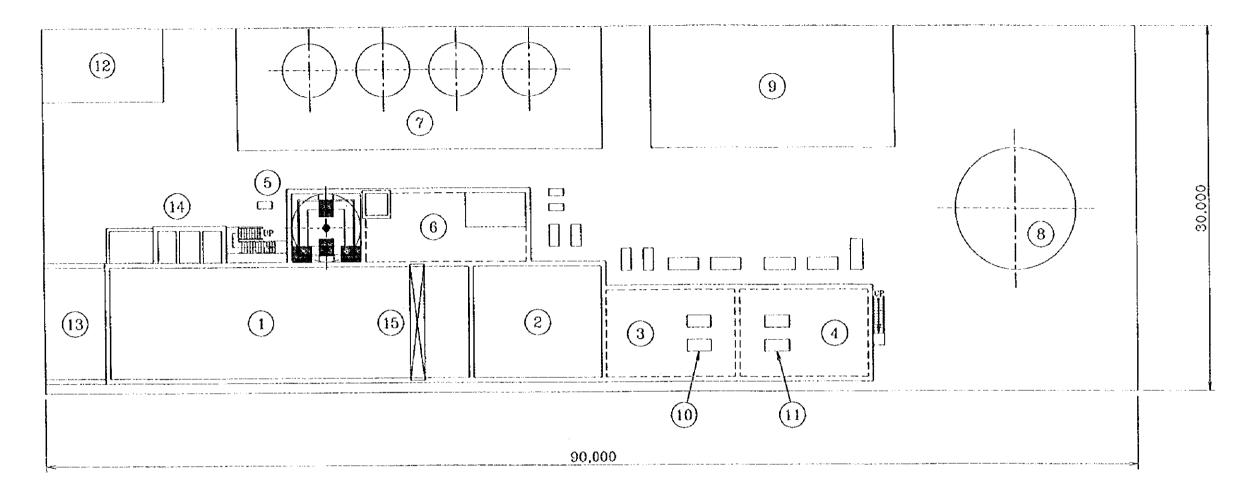


- 1) DCW Settling Basin
- 2 DCW Filter Feed Basin
- (3) DCW Supply Water Basin
- 4 ICW Water Basin (CC)
- 5 Thickener
- (6) DCW Back Washing Pit
- (7) Pressure Filter
- (8) Head Tank

- (9) Electrical Room
- (10) Chemical House
- 11) DCW Heat Exchanger (CC)
- (12) ICW Heat Exchanger (CC)
- (13) Sludge Drying Bed
- (14) Oil Separation Pit
- 15) Bucket Crane

- (16) ICW Water Basin (EAF)
- (17) ICW Heat Exchanger (EAF)

Figure A6-7-3 Layout of Water Treatment Station-I for SMP and CCM



- 1 DCW Settling Basin
- 2 DCW Filter Feed Basin
- 3) DCW Supply Water Basin
- (4) ICW Water Basin
- 5 Thickener
- (6) DCW Back Washing Pit
- 7 Pressure Filter
- (8) Head Tank

- 9 Electrical Room
- 10 DCW Heat Exchanger
- (1) ICW Heat Exchanger
- (12) Chemical House
- (13) Sludge Drying Bed
- (14) Oil Separation Pit
- (15) Bucket Crane

Figure A6-7-4 Layout of Water Treatment Station-II for BRM

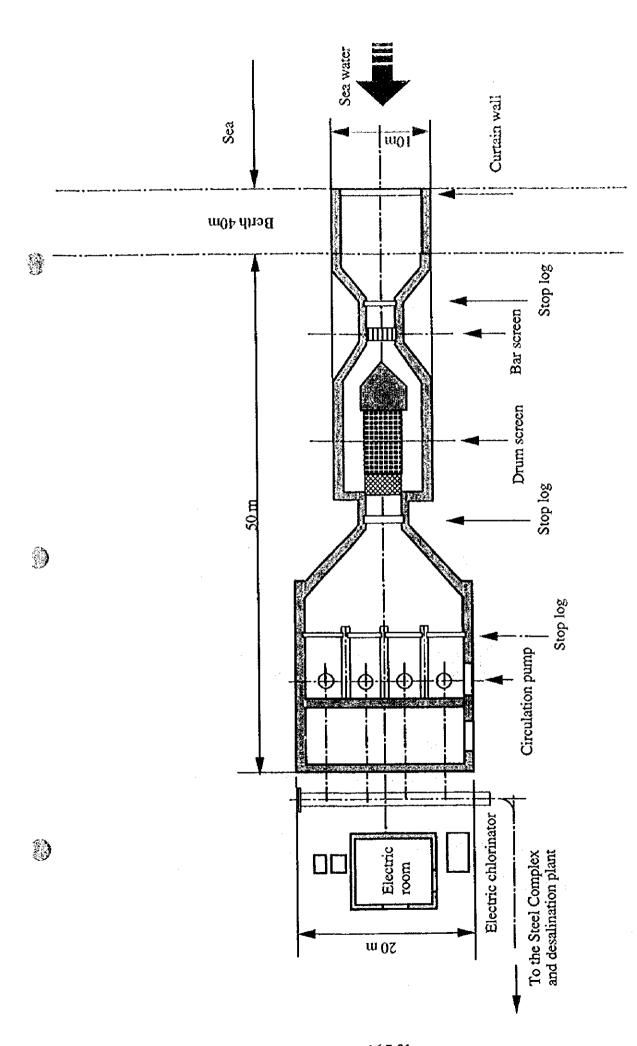


Figure A6-7-5 Layout of Sea Water Intake System-I

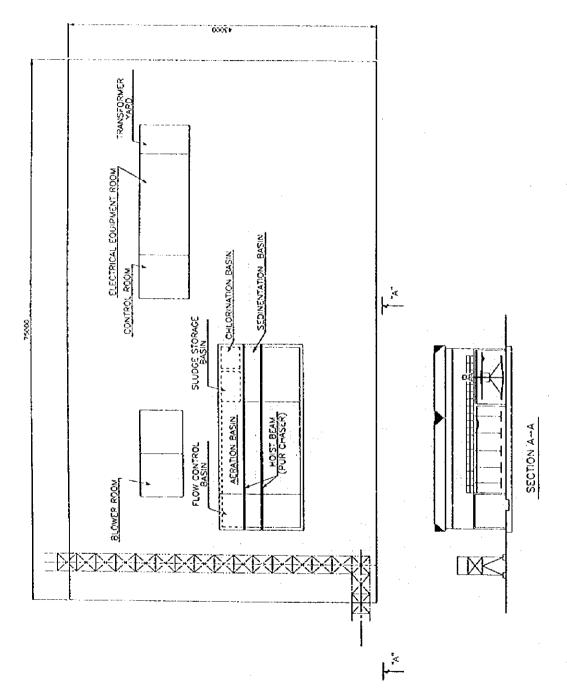


Figure A6-7-6 Layout of Live Sewerage Treatment Station

Appendix A6-8-1 Equipment List of Maintenance Shop

No.	Equipment	Q'ty	Main Specification
MS01	Maintenance shop		
MS011	Machine shop		
MS0111	Lathe	1	Center distance : 1 m
			With accessories
MS0112	Lathe	1	Center distance: 1.5m
			With accessories
MS0113	Lathe	1	Center distance : 3 m
			With accessories
MS0114	Milling machine	1	Vertical type
MS0115	Slotting machine	1	Maximum stroke : 280mm
MS0116	Shaping machine	1	Maximum stroke: 700mm
MS0117	Horizontal boring machine	1	Floor type
	Notes that is a second of the		Spindle size : φ 110mm
MS0118	Radial drilling machine	1	Drilling capacity: 50mm
MS012	Overhaul and assembling shop		
MS0121	Horizontal hydraulic press	ì	Capacity : 200t
MS0122	Testing equipment for hydraulic parts	1	
MS0123	Surface plate	1	Surface size : 1,500x3,000mm
MS013	Steel frame shop		
MS0131	Bending roller machine	1	3 roll type
MS0132	Upright drilling machine	1	Drilling capacity: 40mm
MS0133	Surface plate	1	Surface size : 1,500x3,000mm
MS0134	MIG welding machine	1	Input AC work current: 300A
MS0135	TIG welding machine	1	Input AC work current: 200A
MS0136	AC welder	10	Input AC work current: 300A
MS014	Electrical & instrumental repair shop		
MS0141	Winding machine	1	Repairing capacity: 100kW for DC
			: 200kW for AC
MS0142	Electrical testing equipment	1 set	AC motor test panel
			DC motor test panel
		ļ	Dielectric withstand tester
MS0143	Weight for calibration	1 set	·
MS0144	Heat instruments inspection	1 set	Black body furnace
		<u> </u>	temperature range: 1,000 - 2,000℃

No.	Equipment	Q'ty	Main Specification
MS0145	Meter inspection	l set	Pen oscillograph recorder
			Standard voltage electric current source
			Weight type pressure tester
MS015	Car repair shop		la de la companya de la companya de la companya de la companya de la companya de la companya de la companya de
MS0151	High pressure washing machine	1	High temperature type
MS0152	Double ended grinder	1	Grinding wheel size: 255mm
MS0153	Bench drill	1	Drilling capacity: 22mm
MS0154	Journal jacks	2	Lifting capacity: 10t

No.	Equipment	Q'ty	Main Specification
MS0145	Meter inspection	l set	Pen oscillograph recorder
			Standard voltage electric current source
			Weight type pressure tester
MS015	Car repair shop		:
MS0151	High pressure washing machine	1	High temperature type
MS0152	Double ended grinder	1	Grinding wheel size: 255mm
MS0153	Bench drill	l	Drilling capacity: 22mm
MS0154	Journal jacks	2	Lifting capacity: 10t

Appendix A6-9-1 Equipment List of Analysis and Inspection Facilities

NO.	Equipment	Qʻiy	Specification
Aloi	Analysis Center		
	Abrasive Cut-off Machine	1	Wet cutting type
0102	Automatic Sample Preparation Equipment for	1	
	Quick Analysis		
0103	Double Head Pedestal Grinding Machine	1	
0104	Double Head Pedestal Belt Grinder	1	
0105	Disk Vibrating Mill	1	Batch type
0106	Dust Collector for Grindstone	1	
0107	Vacuum Emission Spectrometer	1	with data processing unit
0108	Fluorescent X-Ray Analyzer	1	with data processing unit and x-ray
			protection
0109	Carbon and Sulphur Determinator	1	
0110	Nitrogen and Oxygen Determinator	1	
0111	Inductively Coupled Plasma Analyzer	1	
0112	Gas Chromatograph	1	
0113	Orsat Gas Analysis Apparatus	1	
0114	Calorimeter	1	Junker's type
0115	Direct Reading Balance	3	Capacity: 200g
		.	Readability: 0.1 mg
0116	Electronic Reading Balance	3	Weighing capa: 2800g x 2 sets,
	/		500g x 1 set
0117	Shakers of Separated Funnel	2	
0118	Water Bath	2	Propeller stirring type
0119	Sand Bath (Hot Plate)	2	
0120	Drying Oven	3	Temp. range: 40 to 300℃
0121	Muffle Furnace	2	Electrically heated type
			Temp.: Max. 1200℃
0122	Annular Electric Furnace	2	
0123	Magnetic Stirrer	2	Reverse & one -way revolution drive
0124	Pure Water Making Apparatus	2	Distillation capa: 1.8 Vh
0125	Ion Regenerator	1	Normal flow rate: 50 l/h
0126	Draft Chamber	3	1

Appendix A6-9-1 Equipment List of Analysis and Inspection Facilities

NO.	Equipment	Q'ty	Specification
A101	Analysis Center		
0101	Abrasive Cut-off Machine	1	Wet cutting type
0102	Automatic Sample Preparation Equipment for	1	
	Quick Analysis		
0103	Double Head Pedestal Grinding Machine	1	
0104	Double Head Pedestal Belt Grinder	<u> </u>	
0105	Disk Vibrating Mill	ı	Batch type
0106	Dust Collector for Grindstone	1	
0107	Vacuum Emission Spectrometer	1	with data processing unit
0108	Fluorescent X-Ray Analyzer	1	with data processing unit and x-ray
			protection
0109	Carbon and Sulphur Determinator	1	
0110	Nitrogen and Oxygen Determinator	1	
0111	Inductively Coupled Plasma Analyzer	1	
0112	Gas Chromatograph	1	
0113	Orsat Gas Analysis Apparatus	1	
0114	Calorimeter	1	Junker's type
0115	Direct Reading Balance	3	Capacity: 200g
			Readability: 0.1mg
0116	Electronic Reading Balance	3	Weighing capa: 2800g x 2 sets,
			500g x 1 set
0117	Shakers of Separated Funnel	2	
0118	Water Bath	2	Propeller stirring type
0119	Sand Bath (Hot Plate)	2	
0120	Drying Oven	3	Temp. range: 40 to 300°C
0121	Muffle Furnace	2	Electrically heated type
			Temp.: Max. 1200°C
0122	Annular Electric Furnace	2	
0123	Magnetic Stirrer	2	Reverse & one -way revolution drive
0124	Pure Water Making Apparatus	2	Distillation capa: 1.8 Vh
0125	Ion Regenerator	1	Normal flow rate: 50 l/h
0126	Draft Chamber	3	

NO.	Equipment	Q'ty	Specification
0127	Refrigerator	1	
0128	PH Meter	2	
0129	Moisture Tester	1	
0130	Water Testing Meter	1	
0131	Oil Content Analyzer	1	
0132	Water Bath for Viscosimeter	1	
0133	Centrifuge	1	
0134	Interfacial Tensionmeter for oil	1	
0135	Cloud and Pour Point Apparatus	1	
0136	Dropping Point Tester	1	
0137	Sample Transportation System for BAF, CC, LF	1	One-way reversible compressed air
			carrier type
0138	Waste Water Treatment Installation	1	
0139	Glass and Polyethylene Wares	1 lot	
0140	Laboratory Furniture	1 lot	
0141	Automatic Voltage Regulator	1	
0142	Miscellaneous	1 lot	
437703344			
A102	Material Testing Center	•••••	
0201	Polishing Machine	1	
0202	Horizontal Band Saw	1	
0203	Abrasive Cut-off Machine	1	
0204	Welder for Bending Test	1	
0205	Electric Furnace for Weldability Test	1	
0206	Tensile Testing Machine	1	Capacity: Max. 50 tons Full
			automatic type
0207	Mounting Press	11	
0208	Surface Grinder	1	
0209	Universal Testing Machine	1	Vertical, hydraulic loading type
	(for bending test, tensile test)		Capacity: Max. 50 tons
0210	Calibrated Test Block	lset	
0211	Shore Hardness Tester	1	Dial gauge type
0212	Brinell Hardness Tester	11	
0213	Rockwell Hardness Tester	1	

NO.	Equipment	Qʻty	Specification
0127	Refrigerator	1	e han angananan example on exercise and an exercise and
0128	PH Meter	2	COMMENCE AND AND AND AND AND AND AND AND AND AND
0129	Moisture Tester	1	
0130	Water Testing Meter	1	
0131	Oil Content Analyzer	1	
0132	Water Bath for Viscosimeter	1	
0133	Centrifuge	1	
0134	Interfacial Tensionmeter for oil	1	
0135	Cloud and Pour Point Apparatus	1	
0136	Dropping Point Tester	1	
0137	Sample Transportation System for EAF, CC, LF	1	One-way reversible compressed air
			carrier type
0138	Waste Water Treatment Installation	ŀ	
0139	Glass and Polyethylene Wares	1 lot	
0140	Laboratory Furniture	1 lot	
0141	Automatic Voltage Regulator	ì	
0142	Miscellaneous	1 lot	
		,	
AI02	Material Testing Center		
0201	Polishing Machine	1	
	Horizontal Band Saw	1	
0203	Abrasive Cut-off Machine	1	<u> </u>
0204	Welder for Bending Test	1	
0205	Electric Furnace for Weldability Test	1	
0206	Tensile Testing Machine	1	Capacity: Max. 50 tons Full
			automatic type
0207	Mounting Press	1	
0208	Surface Grinder	. 1	
0209	Universal Testing Machine	1	Vertical, hydraulic loading type
	(for bending test, tensile test)	ļ	Capacity: Max. 50 tons
0210	Calibrated Test Block	1set	
0211	Shore Hardness Tester	i	Dial gauge type
0212	Brinell Hardness Tester	1	
0213	Rockwell Hardness Tester	1	

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<u>(</u>;)

NO.	Equipment	Q'ty	Specification
0214	Charpy Impact Tester	1	Capacity: 50 kgf-m
0215	Universal Projector	1	Vertical optical axis type
0216	Optical Metallographic Microscope	1	
0217.	Dark Room Equipment		
0218	Pickling Equipment	1	
0219	Jaw Crusher	1	
0220	Rotary Grind Divider		Cone type
0221	Disk Vibration Mill	1	:
0222	Siever Shaker	1	Square sieve type
0223	Increment Reduction Instrument	1	
0224	Briquette Press	1	Max, load: 50 tons
0225	Specimen Mounting Press	1	Capacity: Max. 5000 Kg
0226	Sample Mixer	1	
0227	Refractory Cutting Machine	. 1	
0228	Refractory Drilling Machine	1	
0229	Refractory Grinding Machine	l	
0230	ISO Type Drum Testing Machine	1	Tumbler tester
0231	Furnace for Refractoriness Test	1	
0232	Compression Testing Equipment	1	
0233	Refractoriness Tester under Load	1	
0234	Thermal Conductivity Tester	1	
0235	Thermal Expansion Tester	1	
0236	Permeability Apparatus	1	
0237	Optical Pyrometer	1	
0238	Laboratory Furniture	1 lot	
0239	Miscellaneous	1 lot	

Appendix A6-10-1 Equipment List of Intra-works Transportation Facilities

No.	Equipment	Q'ty	Specification
TR01	Transportation equipment		
TROTOL	Crawler crane with lifting magnet	2	Crane capacity : 35t
			Listing magnet: 1,300mm type
TR0102	Crawler shovel	4	Bucket capacity : 2m3
TR0103	Wheel shovel	6	Bucket capacity: 1.5m3
TR0104	Forklift	2	Capacity: 1.5t
TR0105	Dump truck	10	Capacity: 14t
TR0106	Flat body truck	2	Capacity : 11t
TR0107	Semi-trailer truck	2	Capacity : 30t
TR0108	Self-loading slug pot carrier	2	Capacity : 60t
TR0109	Power breaker	1	Crawler type, own-weight about 20t
TR0110	Bulldozer	1 1	Own-weight about 16t
TR0111	Crane truck	2	4t capacity with 2t crane
TR0112	Double cab truck	5	It capacity with 6 persons
TR0113	Truck weighing station	3	50t truck scale

Appendix A6-12-1 Foundation and Building List

1. Summary Table 6-12- 1

2. Foundation lists Table 6-12- 2 through Table 6-12-11

3. Building lists Table 6-12-12 through Table 6-12-22

4. Land preparation Table 6-12-23

Table 6-12-1 Foundation and Building List (Summary)

		Foundation				Building		
Valida Valida		Concrete(*)	Pile	Mar	Main Building	Ancilla	Ancillary Building	SS
	Type	(m ²)	(NO)	Typ	Area (m²)	Туре	Area (m²)	(Ton)
a. Raw Material Storage	တ	7,000	•	•	•	RC	147	ı
b. Direct Reduction Plant (DRP)	S, (P)	34,000	240	•		RC, (SS)	3,473	320
c. Steel Making Plant (SMP)	(S), P,(D)	33,000	3,700	SS	18.654	RC, (SS)	3210	7,500
d. Bar Rolling Mill Plant (BRM)	(S), P,(D)	40,000	4,500	88	43,244	RC, (SS)	3.689	4,800
c. Lime Calcining Plant (LCP)	S, (P)	2,100	200		•	RC, (SS)	200	2
f. Electric Power & Distribution Facilities	·-··	12,000	•	RC SC	1,955	RC.	1,440	
e. Utilities	S.(P)	17,960	08	RC(SS)	1,118	RC. (SS)	3391	90%
b. Maintenance Shop	· · · ·	3,600	,	SS	3,960	SS, (RC)	280	420
i, Analysis & Inspection Facilities	sn	906	•	æ	1,750	•	•	1
i. Transportation Facilities in the Steel Complex	S	7,700	•	SS	000'6	RC	*	700
k. Administrative Facilities	S	9059	•	RC	2,000	RC, (SS)	0539	9
Total	•	164,760	9,320	•	84,681	•	22,455	14.520
L Land Preparation		See Table 6-12-23						
Remarks	Concrete(*) in	Concrete(*) includes that of RC type building.	e building.					
Abbreviation	S:Spread Foundation P:Pite Foundation D:Deep Foundation	dution tion ation			SS:Steel Structure RC:Reinforced Concrete Structure	nerete Structur	v	

Remarks	A= 147 M2		A= 5,000 M2					
Type of FDN	ø	w w w w	•	•	•		D:Deep foundation	
Description	a, Electriceal room	a. Stacker foundation b. Reclaimer foundation c. Conveyor foundation d. Junction tower foundation	a. Asphait paving(t=50 mm)	a. Drainage pipe for storm water (RC pipe)	a. Miscellaneous	 	 S.Spread foundation P.Pile foundation	ı
item	1. Foundations for building & structure	2.Foundations for equipment & machinery	3.Koads & paving	4.Drainage system	5.Other		Abrewlation	IAMAKA SAAD

Table 6-12-2 Raw Material Storage Yard

(Foundation List)

(Foundation List)	Table 6-12-3 Direct Reduction Plant (DRP)		
item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Control building b. Ancillary building	ss ss	A= 1,080 M2 A= 1,313 M2
2.Foundations for equipment & machinery	a. Oxide pellet storage bin b. Oxide pellet screen c. Reduction shaft furnace & elevator d. Process & cooling gas compressor c. Air blower f. Reformer, heat recovery system & stack etc. g. Clarifler & thickener h. DRI screen i. DRI screen	୧୯୯୬ ଓ ଓ ଓଟଟ ଓ ଅନ୍ଦର୍ଶ ଓ ଓଡ଼ିଆ	
	k. Dust collector 1. Settling pond m. Cooling tower with pump n. Pipe rack, junction tower etc.	๛๛๛๛	
3.Roads & paving	a. Asphait paving(t=50 mm)	•	A= 15,000 MZ
4.Drainage system	a. Drainage pipe for storm water (RC pipe) b. Sanitary sewage pipe (PVC pipe)	• •	
5.Other	a. Miscellaneous	•	
Abbreviation	S.Spread foundation P.Pile foundation	D.Deep foundation	5

(Foundation List)	Table 6-12-4 Steel Making Plant (SMP)	
[tcm	Describaon	Type of Remarks
1.Foundations for building & structure	a. Main building b. Ancillary building	P A= 18.654 M2 P A= 1,070 M2
2.Foundations for equipment & machinery	a. Electric arc furnace (EAF) b. Material handling system c. Ladle furnasee (LF) d. Transfer ear for EAF & LF e. Ladle preheater f. Ladle dryer g. Dedusting system and duct support h. Continuos casting machine & runout table i. Billet cooling bed and transfer car	ት ት ት ት ት ት ት ት ት
3.Pits & culverts	a. Scrap bucket pit b. Scale sluice & scale pit of CCM c. Cable & piping culvert	D&P D&P Sheeting S
4.Slab on grades	a. Electrode stand for EAF &L.F b. Ladle relining station c. Ladle dismanting station d. Mold repairing yard c. Tindish repairing yard	w w w w w
S.Roads & paving	2. Asphalt paving(t=50 mm)	A= 8,000 M2
6.Drainage system	a. Drainage pipe for storm water (RC pipe) b. Sanitary sewage pipe (PVC pipe)	•
7.Otber	a. Miscellapeous	
Abbreviation	S.Spread foundation P.Pile foundation	D:Deep foundation

(Foundation List)	Table 6-12-5 Bar Rolling Mill Plant (BRM)		
ltem	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Maia building b. Ancillary building	ન જ જ	A= 43,244 M2 A= 1,981 M2
2.Foundations for equipment & machinery	a. Billet reversing conveyor! b. Rebeating furnace c. Roughing Mill d. Intermediate Mill e. Finishing Mill f. Flying shears g. Cooling Bed and Cold Shear h. Bar bundling Finishing Facility i. Cold Shear/hnadling Facility for Irregular bar j.Roll shop equipment	ල හේදු ව හ හ හ හ හ හ හ හ	
3.Pits & culverts	a. Scale Sluice and Pit b. Cable pits & culverts	S & P D & P	Sheeting
4.Cellars	a. Oil cellar	D&P	
5.Slab on grades	a. Billet storage yard	S	
6.Roads & paving	a. Asphalt paving(t=50 mm)	•	A= 12,000 M2
7.Drainage system	2, Druinage pipe for storm water (RC pipe) b. Sanitary sewage pipe (PVC pipe)		
8.Other	a. Miscellaneous		
Abbreviation	S:Spread foundation P.Pile foundation	TOTAL D:Deep foundation	ition

LFoundations for building & structure LFoundations for cquipment & machinery LFounda	(Foundation List)	Table 6-12-6 Lime Calcining right (LCr.)		
a. Receiving hopper b. Lime catching kiln c. Lime catching kiln d. Product bin e. Conveyor f. Rejected material pile a. Asphalt paving(r=50 mm) a. Drainage pipe for storm water (RC pipe) b. Sanitary sewage pipe (PVC pipe) a. Miscellaneous	Item	Description	Type of FDN	Remarks
a. Receiving hopper b. Lime calcining kila d. Product bin d. Rejected material pile a. Asphait paving(r=50 mm) a. Drainage pipe for storm water (RC pipe) b. Sanitary sewage pipe (PVC pipe) a. Miscellaneous	1.Foundations for building & structure	a. Control building	w	A= 200 M2
ge system	2.Foundations for equipment & machinery	a. Receiving hopper b. Limestone storage bin c. Lime calcining kila d. Product bia c. Conveyor f. Rejected material pile	ა ა	
ye system	3.Roads & paving	a. Asphalt paving(t=50 mm)	•	A= 2,000 MZ
	4.Drainage system	a. Drainage pipe for storm water (RC pipe) b. Sanitary sewage pipe (PVC pipe)	•	
	5.Other	a. Miscellancous		,
A h hravyston S. Spread foundation P. Pile foundation	Abravistin	S.Spread foundation P.Pile foundation	D: Deep foundation	

(Foundation List)	Table 6-12-7 Electric Power & Distribution Facilities		
Item	Description	Type of EDN	Remarks
1.Foundations for building & structure	a. Main sudstation b. Local substation	ww	A= 1,955 M2 A= 720 M2
2.Foundations for equipment & machinery	a. Transformer b. Pressurized tank c. Cooling tower d. Air filter e. Dummy tank f. Fuel oil tank g. Flicker yard	~ w w w w w	
3.Pits & culverts	2. Cable culverts	SS.	
4.Roads & paving	a. Asphalt paving(t=50 mm)	•	A= 2,000 M2
5.Drainage system	a. Drainage pipe for storm water (RC pipe) b. Sanitary sewage pipe (PVC pipe)		
6.Other	a. Perimeter sence b. Miscellancous	• •	
Abbreviation	S.Spread foundation P. Pile foundation	D:Deep foundation	0
	Z. Z. P. C. C. C. C. C. C. C. C. C. C. C. C. C.		

(Foundation List)	Table 6-12-8 Utilities		
Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Electrical and control room	vs v	A= 1.118 M2
2.Foundations for equipment, vessel and basin etc.	a. Natural gas receiving station b.02 Plant. c. Water Intake and Raw water receiving station d. SMP/RMP Water treatment station -Cold well & cooling tower for CCM & BRM -Hot/cold well & cooling tower for SMP -Coling tower for air compressor -Softened water basin -Heat exchanger -Heat exchanger -Heat dank for SMP & CCM/BRM -Pressure filter -Back washed water basio -Cooling tower -Head tank -Thickener -Sindge storage basin cooling tower -Sindge storage basin for CCM/BRM f. Waste water treatment station b. Drainage pumping station c. Desalination plant f. Desalination plant f. Sea water discharge L. Desalination plant	ა აკა ა ა ა ა ა ა ა ა ა ა ა ა ა ა ა ა ა	* ************************************
3.Roads & paving	a. Asphait paving(=50 mm) Decinate pine for storm water (RC pine)		
4.Drainage system S.Other	b. Sanitary sewage pipe (PVC pipe)	•	
Abbreviation	S.Spread foundation P.Pile foundation	D:Deep foundation	#C

(Foundation LLST)	·		
ltem	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Main building b. Ancillary building	တဟ	A= 1,980 M2 A= 130 M2
2.Foundations for equipment & muchinery	a. Lathe b. Milling & grinding machine c. Press machine	w w w	
3.Slab on grades	a. Ground floor slab of maintenance shop b. Ground floor slab of car repair shop	w w	
4.Roads & paving	a. Asphalt paving (t=50 mm)	•	A= 12,000 M2
S.Drainage system	a. Drainage pipe for storm water (RC pipe) b. Sanitary sewage pipe (PVC pipe)		
6.Other	a, Miscellaneous		
	•••		
	The state of the s	D. Dans de la designation	

Life of Description Life of Structure Laboratory building S 2. Roads & paving Laboratory building Laboratory building S 3. Drainage system Laboratory building Laboratory building Laboratory sewage pipe (PVC pipe) 4. Other Laboratory sewage pipe (PVC pipe) Laboratory sewage pipe (PVC pipe) 4. Other Laboratory sewage pipe (PVC pipe) Laboratory sewage pipe (PVC pipe) 5. Sanitary sewage pipe (PVC pipe) Laboratory	(Foundation List)		T. Co.
a. Asphalt paving(r=50 mm) a. Drainage pipe for storm water (RC pipe) b. Sanitary sewage pipe (PVC pipe) a. Miscellaneous	Item	Description	of of NOX
	1. Foundations for building & structure	a. Laboratory building	S
	2.Roads & paving	a, Asphalt paving(t=50 mm)	•
	3.Drainage system	a, Drainage pipe for storm water (RC pipe)	4
		b. Sanitary sewage pipe (PVC pipe)	k
	4.Other	a. Miscellaneous	•

A= 9,000 M2 A= 95 M2 A= 3,000 M2 Remarks Retaining wall D:Deep foundation Type of o Table 6-12-11 Transportation Facilities in the Steel Complex Description a, Drainage pipe for storm water (RC pipe) S:Spread foundation R:pile foundation b, Sanitary sewage pipe (PVC pipe) a. Ground floor of warchouse a. Scrap yard
b. Limestone storage yard
c. Slug yard
d. Additive storage yard a. Asphalt paving(t=50 mm) a. Main building b. Ancillary building a. Miscellancous a. Truck scale Abbreviation 2. Foundations for equipment & machinery Item 1. Foundations for building & structure 4. Yard Preparation 5.Drainage system 4.Roads & paving (Foundation List) 3.Stab on grades 6.Other

Lable 0-12-12 Kaw Material Storage 1 ard No of No of Dimension Building Total Eaves Structure/Finish Building Story W(m)xL(m) Area(m2) F.Area(m2) Height(m) Structure Roofing Sdim	1 1 7x21 147 4 RC RCS MB	SS:Steel Structure MS:Metal Sheet
(Building List) Item Name of Building	1. Electric room	Abbreviation

(Building List)

Table 6-12-13 Direct Reduction Plant (DRP)

Sq. DX

MS MS MS MS

Structure/Finish Roofing Š 80 Š AS. XIX. Š ΑŠ Structure RC RC B X_C 8 8 S Eaves Height(m) 126 2,160 3 Š ತ್ವ Z Total F.Arca(m2) 1,080 Š 30 ž 3 3 Building Arca(m2) No of Dimension Story W(m)xL(m) 27x40 20x35 15x20 7x12 5x8 7x9 7x9 No of No of Building 2.0xide storage bin building 6.lner gas refrigerant dryer building 7.Chemical dosing station building Item Name of Building 4.Product screen building S.Hydraulic unit building 3. Cas analyzer room 1.Control building

MR

MS :Metal Sheet RCS:Reinforced Concrete Slab

SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick

Abbreviation

(Building List)

Table 6-12-14 Steel Making Plant (SMP)

Irem Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Ares(m2)	Total E,Arca(m2)	Eaves Height(m)	Structure	Structure/Finish Roofing	٠,
(Maio Building)	<u>-</u> -								
1.Furnace siste		-	31 x 174	5,394	5,394	42.3	8	MS	
2.DRI nisle		٦,	12 x 159	1,908	1,908	\$0.0 0.00 0.00	88	ž ž	
3.Ladle aisle 4.Castiny aisle			30 x 127	3,810	3,810	34.5	3 83 1	WS	
5.Billet aisle	 .		30 x 103	3,090	3,090	19.0	83	S	
(Ancillary Building)	,								
1.EAF electric & control room	~ .	(4 f		400	009*1	8 Y	RC CR	88	
3.CCM electric & control room		n (4)		35	888	22	8 % C	S ×	
4.Pulpits for EAF 5.Pulpits for CCM		r4 ==		3 3	<u> </u>	9 29	a 8a j	इ.स.	
6.Rest room	··	p-d		50	09	4	X	Š	
Abbreviation		SS:Steel Structure RC:Reinforced Co.	SS:Steel Structure RC:Reinforced Concrete			MS :Metal Sheet RCS:Reinforced Concrete Slab	Concrete Slab		

(Building List)

Table 6-12-15 Bar Rolling Mill Plant (BRM)

Item Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Arca(m2)	Total F,Arca(m2)	Eaves Height(m)	Structure	Structure/Finish Roofing	Siding
(Main Building) 1. Billet Yard		-	38x180	0+8*9	6,840	91	8	WS	S
2.Furnace Yard		 ,	24x36	408	458	2 5	88 8	XX XX	S Y
3.Mill yard			30x213	97,1	6,390	2.5	3 83	Ą	MS
S.Product Yard(1)	r e4	_	20x213	4,260	8,520	11	88	SK ?	S S
6.Product Yard(2) 4.Roll sbop	ct —		30x213 20x157	6,390 3,140	3,140	2 2	88	S S	S S
	•			a : 10,170 1000 and and					
(Ancillary Building)		ei	12x90	1,080	2,160	01	83	MS	WS
2.Electric room (bar finishing)		. —	25x8	200	400	V	88	WS We	S S
3.Pulpit (reheating furnace)	-	~	15x4 15x5	75.	\$7.	ን የጎ	88	W.	Š
S.Pulpit (cooling bed)			15x10	150	150	m	83	MS	S.
6.Pulpit (shipping line)		 -	6x6	× 6	t, 4	m m	88	S X	S S
7. Pulpit (snipping line) 8. Rest room	1	- 11	12x31	372	7	ነተን	183	WS	MS
Abbreviation		SS:Steel Structure RC:Reinforced Co MB:Masonry Bric	SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick			MS :Metal Sheet RCS:Reinforced Concrete Slab	Concrete Slab		

	nish Seding	X. X.	
	Structure/Finish Roofing	S S	
	Structure	&	t Concrete Slab
	Eaves Height(m)	k)	MS :Metal Sheet RCS:Reinforced Concrete Slab
Plant (LCP)	Total E.Arca(m2)	98	
Table 6-12-16 Lime Calcining Plant (LCP)	Building Arca(m2)		
e 6-12-16 Li	Dimension W(m)xL(即)	10x20	SS:Steel Structure RC:Reinforced Concrete MB:Maxonry Brick
Tabl	No of Story		SS:Steel (RC:Rein) MB:Mass
	No of Building		
	Irem Name of Building	장 발	Abbreviation
(Building List)		1.Control building	

Selection **99999** X X B Structure/Finish SSSSSRCS RCS Structure MS:Metal Sheet RCS:Reinforced Concrete Slab RC RC Eaves Height(m)___ Table 6-12-17 Electric Power & Distribution Facilities 2 2 20000 720 88888 720 E.Arca(m2) Total 98 9 88888 Building Arca(m2) SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick Dimension W(m)xL(m) 10x50 13x60 6x30 13x15 15x20 No of Story No of Building Name of Building Abbreviation 1.EAF substation (Load center)
-Switchgear room
-Panel room 3.Control room
4.AC generator and D/E room Ice -Switchgear room
-Panel room
-Wiring room (Local substation) 1.220kv GIS room 2.33kv MCS room -Wiring room 2.BRM substation (Main substation) (Building List)

(Building List)			Table 6-12-18 Utilities	Utilities					
Item Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Arca(m2)	Eaves Height(m)	Structore	Structure/Finish Roofing	Skling
(Electric & control room)	•	•		ger van vide gegvande va					
1.Desalination plant control room 2.02 Plant 3.Sewage treatment Station 4.SMP 5.RMP	ज्ञा क्या क्या क्या क्या 		15x10 20x20 7x24 10x20 10x20	0.00 0.00 0.00 0.00 0.00 0.00 0.00 0.0	6.00 6.00 6.00 6.00 6.00 6.00 6.00 6.00	40444	R R R S C	న్ శన్ న్ స్	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z
(Other building)			٠						
1.Desalination plant Make up house 2.Sewage treatment Plant Blower room 3.Sewage: Sedimantation building 3.O2 Plant Compressor building 4.SMP Chemical house 5 DMP Chemical house			43x38 12x6 11x25 20x60 10x15 6x10	4.64. 4.72. 6.00. 6.00. 6.00.	4.634 27. 27. 27.2 0.2.0 150 0.0	rragrr	8	త నే శుద్ద నే నే త	W W W W W W W W W W W W W W W W W W W
	···		e e						
Abbreviation		SS:Steel Structure RC:Reinforced Co MB:Masonry Bricl	SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick			MS :Metal Sheet RCS:Reinforced Concrete Slab	Concrete Slab		
AA ALLES OF THE PROPERTY OF TH									

(Building List)

Table 6-12-19 Maintenance Shop

Š. S. MAS MAS Structure/Finish Roofing KS WS Š ķ MS:Metal Sheet RCS:Reinforced Concrete Slab **ខ**ខ្ 83 8 Eaves Height(m)_ ដ C 1,980 1,980 នស៊ិនី Total F.Arca(m2) 1,980 1,980 ននន Building Arca(m2)_ Dimension W(m)xL(m) SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick 22x90 22x90 No of Story No of Building Item Name of Building Abbreviation 1.Machine shop & electric repair 1.Transformer room
2.Tool storage room
3.Rest room (Ancillary Building) sbop 2.Assembly shop (Main Building)

No of No of Dimension Building Total Eaves Building Story W(m)XL(m) Area(m2) E.Area(m2) Height(m) Structure 1 2 25x35 875 1,750 8 RC RC SisSteel Structure SSisSteel Structure RC Statioforced Concrete Slab VIR. Managary Review	(Building List)		1	1able 0-12-20	Analysis o	Table 0-12-20 Analysis & Inspection Facilities	cinnes		į	
Abbreviation SixSteel Structure Sixteel Structur	Item Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Arca(m2)	Total EArca(m2)	Eaves Height(m)	Structure	Structure/Finish Roofing	م
SS:Steel Structure RC:Reinforced Concrete WR:Masonry Reick	1.Laboratory		4	25x35	878			ЖC	S,	
SS:Steel Structure RC:Reinforced Concrete WR:Masonry Reick		- · · · · · · · · · · · · · · · · · · ·								
SS:Steel Structure RC:Reinforced Concrete WR:Masonary Rejel										
SS:Steel Structure RC:Reinforced Concrete WR:Masonary Reick										
SS:Steel Structure RC:Reinforced Concrete WR:Masonery Rejel										
SS:Steel Structure RC:Reinforced Concrete WR:Masonary Reick	ALL COLLEGE AND CO									
	Abbreviation		SS:Steel S RC:Reinf MB:Maso	itructure oreed Concrete nry Brick			MS:Metal Sbeet RCS:Reinforced	Coocrete Slab		

(Building List)		Table 6	-12-21 Trans ₎	portation Fac	Table 6-12-21 Transportation Facilities in the Steel Complex	teel Comple	×		
Item Name of Building	No of Ruilding	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Arca(m2)	Eaves Height(m)	Structure	Structure/Finish Roofing	Siding
(Main building)									
I.Warchouse for brick & electrode 2.Warchouse for additive 3.Warchouse for spare parts			30X140 30x80 30x80	2,400 2,400 2,400	4.200 2.400 2.400	ក្នុក្នុ	888	S S S	X X X X X X X X X X X X X X X X X X X
(Ancillary building)	****								
1. Weighing station 2. Warehouse office	£ 1	m m		50	84 & 80 &	च च	82	& &	MS MB

				=					
Abbreviation		SS:Steel Structure RC:Reinforced Con MB:Masonry Brick	SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick		2.56	MS :Metal Sheet RCS:Reinforced	MS :Metal Sheet RCS:Reinforced Concrete Slab		

Table 6-12-22 Administrative Facilities

(Building List)

Med	Jo oN	No of	Dimension	Building	Total	Eaves	Serioture	Structure/Finish Roofing	Siding
Name of Ruiding	Building	Story	W(m)XL(m)	Arca(mz)	F.ATC2(m.4)	Delkayaa			
1		и		2,500	9,000	7.5	SC.	RCS	» S
1.Main office	· -	, =4	30x120	3,600	3,600	4	æ	RCS	MB
2. Training center	·	-	10x25	250	250	**	RC	KC.	MB
3.First Aid			10x20	200	200	4	RC	RCS	MB
4.Security office		. →	10x30	300	300	ĸ	8	MS	WS
6.Site office for DRP SMP -BRM -Maintenance shop	.	# # # # #		180 700 700 600 600	180 700 700 600	ખે જે જે જે	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	న్నొన్న	WB WB WB
7.Parking Area 8.Landscaping					ង ង				
Abbreviation		SS:Steel Structure RC:Reinforced Cot MB:Masonry Brick	SS:Steel Structure RC:Reinforced Concrete MB:Maxonry Brick			MS :Metal Sheet RCS:Reinforced Concrete Slab	Concrete Slab		

Table 6-12-23 Land Preparation

ltem	Description	Reavirement	Remarks
1.Land acquisition		120 ha	
2.Preparation Work	a. Survey b. Soil Investigation	LS LS	
3.Earth Work	a. Levelling	120 ha Dredged soil	
	b. Improvement of subsoil	SI	
4.Road & Drainage	a. Temporary road b. Temporary drainage	នន	
5.Demolition & Relocation Work		প্র	
6.Other	a. Gates	4 units	
	b. Perimeter sence(Brick wall H=3m)	3,800 m	