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

Date	Akedo Mission Leader	Tanaka Coordinator	Group-A		Group-B		Group-C		Group-D		Group-E		
			T. Inoue Utility (Gas, Water)	K. Inoue Utility (Electricity)	Hosokawa Market Study	Ose Financial & Economical Analysis, Implementation Plan	Kojitani Port and Port Facility	Kawaharada Plant Layout	Hidaka Project Planning	Oshima Environmental Assessment	Sako Raw Materials, Direct Reduction Plant	Kawakami Steel making Technology	Hamanaka Rolling Technology
Feb. 12 (Thu)	Lv. Japan for Oman												
13 (Fri)													
14 (Sat)	AM : Embassy of Japan				PM : Steering Committee - Explanation & Discussion of Inception Report - Question on Fundamental Matters								
15 (Sun)	Join to Gr.-B & E	Arrangement of Schedule	Ministry of Commerce and Industry		12~14 p.m. : Ministry of Commerce and Industry / Dr.Faisal, Adviser		Ministry of Commerce and Industry		Ministry of Commerce and Industry		12~14 p.m. : Ministry of Commerce and Industry Dr.Faisal, Adviser		
16 (Mon)	Join to Gr.-A	Join to Gr.-A and then to Gr.-D, 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		Ministry of Commerce and Industry		9 am : Ministry of Communication Mr.Hassan Sulaiman, Director of Port Affairs and Mr.K.Kudo, Adviser		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		
17 (Tue)	Join to Gr.-C	Join to Gr.-B and then to Gr.-E, and arrangement of schedule	10 am : Ministry of Electric and Water / Eng. Mohamad Redha, Director General of Electric		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 of Municipalities & Environment / Ms Fatima 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	
18 (Wed)	Join to Gr.- E	Arrangement of schedule and join to Gr.-E	Ministry of Commerce and Industry		10 am : Ministry of Finance Mr. Raj, Taxation Dept. 12:30 p.m. : Central Bank of Oman Mr. Ali Hamdan, Director of Statistic & Information Dept.		Ministry of Communication Mr.Kudo & Mr.Oyadomari, JICA Experts / Ministry of Commerce and Industry		Caledonian Technical College		12:30 p.m. : Ministry of Commerce and Industry Dr. Hamed Ali-Dhahab, Director General and Dr. Faisal, Adviser		

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

Date	Akedo Mission Leader	Tanaka Coordinator	Group-A T. Inoue Utility (Gas, Water)	Group-A K. Inoue Utility (Electricity)	Group-B Hosokawa Market Study	Group-B Ose Financial & Economical Analysis, Implementation Plan	Group-C Kojitani Port and Port Facility	Group-C Kawaharada Plant Layout	Group-D Hidaka Project Planning	Group-D Oshima Environmental Assessment	Group-E Sako Raw Materials, Direct Reduction Plant	Group-E Kawakami Steel making Technology	Group-E Hamanaka Rolling Technology
Feb. 19 (Thu)	Data Arrangement												
20 (Fri)	Move from Muscat to Salalah												
21 (Sat)	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 Industrial Development / other 3 persons of Salalah Branch MOC Port Raysut / Mr. Abdullah B.S.A. QADER, Acting GM Directorate General of Port & Maritime Affairs / Mr. Hassan B.A. Fadal, Director of Engineering & Maintenance, Port Raysut of MOC												
22 (Sun)	Join to Gr.-A	Arrangement of Schedule	MOOG Salalah Branch Salalah Sanitary Drainage Service/Mr.Barik S. A. Rawas, AGM / Mr.Yusri A.H. Hamid, Project Adviser		MOCI Salalah / Mr.Sami Al-Zubaidi, Director of Industry		Ministry of Housing / Mr.Ahmed A. Alhabshi, Director of Planning & Survey / Mr.Abdul M. Jabali, Tower Planner		MOCI Salalah / Mr.Mohamed Ramadhan, Head of Industrial Development		MOCI Salalah - Mineral Section / Mr.Kahlid A. Bamkhlif, GM of Mineral / Mr.Mohammed I. Kahlif, Geologist		
		Join to Gr.-A	Raysut Cement Co./Mr.Said B.A. Al-Rawas, Managing Director				MOC Port & Maritime Affairs / Port Raysut Han-Padron / Eng. Jack Fernandez		Raysut Cement Co./Mr.Said B.A. Al-Rawas,Managing Director				
23 (Mon)	Join to Gr.-A	Join to Gr.-A and arrangement of schedule	MOEW Salalah / Mr.Ahmed S.S.Massan, Director of Transmission & Distribution / Mr.Mamoun A.Taweel, Chief Engineer / Mr.Abdul R. A. Al-Ibrahim, Engineer Head of Project Section		Hamdan Trading Group Mr.Thomas Jacob, Supervisor		MOC Port & Maritime Affairs Port Raysut		Department of Salalah Airport		MOCI Mineral Section Limestone Resources		
24 (Tue)	Join to Gr.-A and then to Gr.-E	Join to Gr.-A and then to Gr.-E	Office of the Minister & Governorate of Dhofar Province / Eng.Ghali B.A.Al-Mashali, Director General, Water Supply & Transport Mr. Said Al-Shanfali, Director of Water Supply Dept. / Salalah Sanitary Drainage Service Co./Mr. Mohamed A.A. Younis, Technical Adviser /H.E.Abdullah Aqeel, Chairman of Dhofar Municipality		MOCI Salalah Branch Move to Muscat		MOC Port & Maritime Affairs Port Raysut		Environment/Governorate of Dhofar / Mr.Salim M.A.B.Saeed, Director General / Mr.Fayez Bataunch, Senior Inspector Water and Waste Pollution Ministry of Health / Mr.Salim H.Ba-Alim / High Institute of Administrative and Technical Services / Ms Thaniyan B.B.M.Al-Ahazal, GM / Mr.Mohammad A.A.Matarneh, Dy. Managing Quality Control		ASSAG ADDHABI TRADING CO. MR.OMAR M. FADHIL, MD SHANFARI AND PARTNERS CO. Mr.Ahmed B.A.M. Al-Shaikh, MD H.E.Musallam B.A.Al-Busaidi, Minister of the State and Governor of Dhofar	
25 (Wed)	Join to Gr.-E	Join to Gr.-E	Office of the Minister & Governorate of Dhofar Province / Mr.Ali A.A.Shanfli, Dy. Director Dept. of Technical MOCI Salalah Branch / Wrap-up Meeting		MOCI Muscat / Mr.Salah Abdullah, Duty Exemption of Export		Same as Gr.-E		Ministry of Education / Ministry of Housing/ MOCI Salalah Branch / Wrap-up Meeting		MOC Port & Maritime Affairs / Mr.Abdullah B.S.A.Qader/Mr.Hassan B.A.Fadal, Director of Eng'g & Maintenance MOCI Salalah Branch / Wrap-up Meeting		
26 (Thu)	Move from Salalah to Muscat												

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

Date	Akedo Mission Leader	Tanaka Coordinator	Group-A		Group-B		Group-C		Group-D		Group-E		
			T. Inoue Utility (Gas, Water)	K. Inoue Utility (Electricity)	Hosokawa Market Study	Ose Financial & Economical Analysis, Implementation Plan	Kojitani Port and Port Facility	Kawaharada Plant Layout	Hidaka Project Planning	Oshima Environmental Assessment	Sako Raw Materials, Direct Reduction Plant	Kawakami Steel making Technology	Hamanaka Rolling Technology
Feb. 27 (Fri)	Data Arrangement												
28 (Sat)	Embassy of Japan (leader, Ose & Tanaka)				Steering Committee ; Report of Investigation at Salalah and Site Location & Basic Concept of Steel Complex								
Mar 1 (Sun)	Sohar Industrial Estate / Mr.Hamad Bin Salem Al-Mahdali, Estate Director / Mr.Ahmed Nasser Al Bulushi, Supervisor and Majis Jetty Sohar Municipality / Sheik Ahmed Bin Abdullah Al Kendy, Wali of Sohar												
2 (Mon)	Oman Mining Company LLC / Mr.Ali Said Abdullah Al-Waily, Acting General Manager Dewan Sohar Office / Mr.Abdul Nabi Ahmed Al-Baloushi						Sharq Sohar Steel Rolling Mills LLC / Mr.Sundeep Rao						
3 (Tue)	Join to Gr.-A	Join to Gr.-B	Chubrah Poer Station & Desalination Plant / Mr.Ribhi Hamdan, Plant Manager / Mr.P.K.Mukejie, Chief Chemical		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 Gr.-E		Ministry of Communication Mr.Kudo, Adviser to the Minister		Same as Gr.-A		Oman Metal / Eng.Nidal Ahmed, GM Bilad Oman / Mr.Gassam Souli, GM		
4 (Wed)	Join to Gr.-E	Join to Gr.-B	Ministry of Oil & Gas / Mr.Adnan Ali Al-Mudailwy, Director General of Gas/Mr.Suleiman S. Al Balishi, Dy Director General of Gas & Petroleum Industry/ Mr.Adnan Dhafer, Adviser Gas Project Mr.P.C.Den Reijer, Government Gas Study Team Leader AEG/1PDO / Mr.K.J.Pascoe, 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/Mr.Hussain 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.Barclay, Regional Quantity Supervisor Galfar Engineering & Contracting LLC / Mr.Salem Saeed Hamed Al Fannab Al Araimi, Chairman Mr.A. Nushad, Business Development Manager		Ministry of Regional Municipality & Environment / Mr.Leaszek Kuczynski		Oman Metal / Mr.Govindarajan, GM Al Mutahidha Transport/Mr.George Carr, GM Elco Industrial Trading / Mr.Eustace Luis, Chief Executive		
5 (Thu)	Data Arrangement	Data Arrangement	Data Arrangement		Suhail & Saud Bahwan Building Materials LLC / Mr.Ajay Agarwal, GM Oman Cans / Mr.Murtadha Jaffer, Chairman / Mr.A. Hadi, Manager		Same as Gr.-B		United Engineering Services / Mr.Sri Ram, Senior Engineer		Same as Gr.-D		
6 (Fri)	Data Arrangement												

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

Date	Akedo Mission Leader	Tanaka Coordinator	Group-A T. Inoue Utility (Gas, Water)	Group-A K. Inoue Utility (Electricity)	Group-B Hosokawa Market Study	Group-B Ose Financial & Economical Analysis, Implementation Plan	Group-C Kojitani Port and Port Facility	Group-C Kawaharada Plant Layout	Group-D Hidaka Project Planning	Group-D Oshima Environmental Assessment	Group-E Sako Raw Materials, Direct Reduction Plant	Group-E Kawakami Steel making Technology	Group-E Hamanaka Rolling Technology
Mar 7 (Sat)	MOCI		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.		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	Draw-up of Draft Progress Report										
9 (Mon)	Same as Gr.-A / H.E.Yousuf Bin Alawi Bin Abdullah, Minister of Foreign Affairs with Japanese Ambassador & First Secretary		H.E. Maqbool Bin Ali Sultan, Minister of MOCI/Dr.Hamed H. Al-Dhahab, Director General of Industry, MOCI / Dr.Faisal M. Elamir, Adviser of MOCI and others		Same as Leader		Same as Gr.-A						
	Draw-up of Final Progress Report												
10 (Tue)	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		Same as Leader Same as Gr.-A		Draw-up of Final Progress Report				Same as Gr.-A Leave from Oman		
11 (Wed)	Steering Committee / Presentation of Progress Report										Arrive at Japan		
12 (Thu)	Data Arrangement												
13 (Fri)	Data Arrangement												
14 (Sat)	Steering Committee / Signing on Minutes of Meeting												
15 (Sun)	Embassy of Japan / Leave from Oman												

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

Date	Akedo Mission Leader	Tanaka Coordinator	Group-A		Group-B		Group-C		Group-D		Group-E		
			T. Inoue Utility (Gas, Water)	K. Inoue Utility (Electricity)	Hosokawa Market Study	Ose Financial & Economical Analysis, Implementation Plan	Kojitani Port and Port Facility	Kawaharada Plant Layout	Hidaka Project Planning	Oshima Environmental Assessment	Sako Raw Materials, Direct Reduction Plant	Kawakami Steel making Technology	Hamanaka Rolling Technology
June 23 (Tue)	Lv. Japan Arr. Oman												
24 (Wed)	9 am : Embassy of Japan		11 am : Ministry of Commerce and Industry - Explanation and discussion of the Schedule and Interim Report										
25 (Thu)	Data Collection										Lv. Japan Ar. Oman		
26 (Fri)	Data Arrangement and Preparation for Steering Committee												
27 (Sat)	9 am : Steering Committee - Explanation and Discussion of Interim Report and Methodology for Site Selection												
28 (Sun)	Join to Gr.-E		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/1 PDO		MOCI		Ministry of Communications Mr.Jamal T. Aziz, Director General of Port & Maritime Affairs, Mr.Khalid Mirza, Mr.H.Sasajima, Adviser		Ministry of Regional Municipality and Environment Mr.Leazek Kuczynski		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		
29 (Wed)	11 am : Mr. Alawi, Minister of Foreign Affairs MOCI		Ministry of Electricity and Water Mr.Mohamad Redha Hassan, Director General of Electricity		MOCI Dr.Faisal	Same as Leader MOCI/Dr.Faisal	MOC / Mr.H.Sasajima, JICA Adviser		Same as Gr.-E		SPECO (Scrap Processing & Earthmoving Co. LLC.) Mr.Ullas		

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

Date	Akedo Mission Leader	Tanaka Coordinator	Group-A T. Inoue Utility (Gas, Water)	Group-A K. Inoue Utility (Electricity)	Group-B Hosokawa Market Study	Group-B Ose Financial & Economical Analysis, Implementation Plan	Group-C Kojitani Port and Port Facility	Group-C Kawaharada Plant Layout	Group-D Hidaka Project Planning	Group-D Oshima Environmental Assessment	Group-E Sako Raw Materials, Direct Reduction Plant	Group-E Kawakami Steel making Technology	Group-E Hamanaka Rolling Technology
Jun. 30 (Tue)	Same as Gr. - B, C, D		Sohar / Planned Port Area, Planned Site Area, Wadi Jizzi Power Station / Mr. Manny Arquero, Head of Wadi Jizzi P/S		Sohar/Planned Port Area, Planned Site Area/Sohar Industrial Estate, Mr. Hamd B. Salem Al-Mahdali, Estate Director, Mr. Abdulqader Salem Al-Bulushi,Civil Engineer,Mr.Ahamad Nasser,in charge of Industry and Mr.Sulaiman,in charge of Tourism,MOCI Sohar Branch						Sohar / Limestone Deposit with Mr. Ahmed Nasser, Geologist of MOCI Oman Mining Company / Mr. Farah A. Ismail, Foreman of Mobile Crusher		
July 1 (Wed)	Join to Gr.-E	Same as Gr.-C	Sohar Fishery Development of Ministry of Agriculture and Fishing/Mr. Yaquob Al Ghassany, Director,Mr.Ali Al Jami,Technician of Fishery Tools / Sohar Development Office, Mr.Saleh A.A. Hashme,D.G.,Mr.Mohmed A.A.Kishri, Director of Water,Mr.Khadeem A.Omarani		Al Mutahidha 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 Director/ Taisei Corporation, Mr.Takeda, GM of Site Office, Mr.Furukawa, Adm.. Mgr.		Same as Gr.-B	Same as Gr.-C	MOCI / Dr. H. Dhahab, D. G. of Industry, Dr. Faisal, Technical Adviser		
2 (Thu)	Data arrangement												
3 (Fri)	Move from Muscat to Salalah				Data arrangement		Move from Muscat to Salalah						
4 (Sat)	Meeting at MOCI Salalah Branch : Mr. Abdullah N. Al-Ghassani, Director General / Mr. Abudlaziz Awad Al-Ghassani, Acting Director General / Mr. Taher A. Ibrahim, Adviser Mr. Sami Al-Zubaidi, Director of Industry / Mr. Mohamed Ramadhan, Head of Industrial Development and other 2 persons of MOCI Salalah Branch				MOCI Muscat		Meeting at MOCI Salalah Branch : Mr. Abdullah N. Al-Ghassani, Director General / Mr. Abudlaziz Awad Al-Ghassani, Acting Director General / Mr. Taher A. Ibrahim, Adviser Mr. Sami Al-Zubaidi, Director of Industry / Mr. Mohamed Ramadhan, Head of Industrial Development and other 2 persons of MOCI Salalah Branch						
	Join to Gr.-C		Salalah Sanitary Drainage Service Co./Mr. B. S. A. A. Al-Rawas, Acting GM, Mr. 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, General Manager		Join to Gr.-C		
5 (Sun)	Join to Gr.-A		MOEW Salalah Branch / Mr.Said Omar Al-Abadi, Generation Director		MOCI Muscat		HAN-PADORON ASSOCIATES / MR.G. Lloyd, Asst. Resident Engineer		Salalah Technical Industrial College / Mr.Hasa M. Tantawi, Director, Dr.Ayman Al-Maaitah, Head of Engineering Dept.		MOCI Salalah Mineral Department / Mr.Khalid M. Rawas, Director of Quaries, Mr.Mohammad Ishaq Khalifa, Geologist		
	MOCI Salalah/Wrap-up Meeting		Move from Salalah to Muscat				MOCI Salalah / Wrap-up Meeting				Move from Salalah to Muscat		
6 (Mon)	MOCI / Dr. H. Dhahab, D.G. of Industry Join to Gr.-C		Join to Gr.-D		Join to Gr.-C		Ministry of Housing/Mr.Ali M.Al-Maznadi, Director General of Town Planning Survey, MOC/Mr.Hassan Slaiman, Mr.H.Sasajima, JICA Expert		MOCI/Mr.Nabil Mubarak, Ministry of Regional Municipality and Environment/Mr.Salim A.H. Al-Jufaili, Head of Marine Pollution Section		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)

Date	Akedo Mission Leader	Tanaka Coordinator	Group-A		Group-B		Group-C		Group-D		Group-E		
			T. Inoue Utility (Gas, Water)	K. Inoue Utility (Electricity)	Hosokawa Market Study	Ose Financial & Economical Analysis, Implementation Plan	Kojitani Port and Port Facility	Kawaharada Plant Layout	Hidaka Project Planning	Oshima Environmental Assessment	Sako Raw Materials, Direct Reduction Plant	Kawakami Steelmaking Technology	Hamanaka Rolling Technology
July 7 (Tue)	Data arrangement / Draw-up of Minutes of Meeting / Draw-up of Progress Report II												
8 (Wed)	Mr. Ali Masoud Al-Sunaidy, Undersecretary of MOCI Steering Committee / Signing on Minutes of Meeting												
9 (Thu)	Draw-up of Progress Report II												
10 (Fri)	Draw-up of Progress Report II												
11 (Sat)	Minister of Communications / H.E. Salim bin Abdullah al Ghazali Presentation of Progress Report II to Steering Committee		Presentation of Progress Report II to Steering Committee		Same as Leader		Presentation of Progress Report II to Steering Committee						
12 (Sun)	Embassy of Japan						Leave from Oman						
13 (Mon)	Arrive at Japan												

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

	Date	Mr. Akedo Leader	(Mr. Ose) (Financial & Economical Analysis, Implementation Plan)	(Mr. Tanaka) (Technical Coordinator)
1	Sept. 1 (Tue)	Leave Japan Arrive in Oman		
2	2 (Wed)	8:00 Embassy of Japan 9:00 Steering Committee - Explanation & Discussion of Site Evaluation Report		
3	3 (Thu)	Ministry of Communications / H.E. Salim b.A. al Ghazali, Minister, Mr. Jamal Aziz, Director General of Port & Maritime, Mr.Khalid Mirza, Engineer of Port Affairs, Mr. H.Sasajima, Adviser to the Minister, JICA Expert		
4	4 (Fri)			
5	5 (Sat)	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 & Petrol Production, Mr. Adnan A. Al-Mudailwi, Gas & Petroleum Industry Ministry of Foreign Affairs / H.E. Yousuf B. Alawi B. Abdullah, Minister, Mr. H. B. Nasser B. Mansoor Al Tobi, Chief of Asian Department, Mr. Awadi B. B. B. M. Al Shanfari, Chief of Economic & Technical Cooperation		
6	6 (Sun)	Steering Committee - Discussion of Site Evaluation Report and Signing on MOM H. H. Mohammed B. Al Zubair B. Ali, 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, Dr. Hamed H. Al-Dhahab, Director General of Industry, Mr. Nabil M. Al-Mukhaini, Economic Researcher of Industry Embassy of Japan Leave Oman		
7	7 (Mon)	Arrive in Japan		

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

	Date	Mr. Akedo Leader	(Mr. Ose) (Financial & Economical Analysis, Implementation Plan)	(Mr. Tanaka) (Technical Coordinator)
1	Sept. 1 (Tue)	Leave Japan Arrive in Oman		
2	2 (Wed)	8:00 Embassy of Japan 9:00 Steering Committee - Explanation & Discussion of Site Evaluation Report		
3	3 (Thu)	Ministry of Communications / H.E. Salim b.A. al Ghazali, Minister, Mr. Jamal Aziz, Director General of Port & Maritime, Mr.Khalid Mirza, Engineer of Port Affairs, Mr. H.Sasajima, Adviser to the Minister, JICA Expert		
4	4 (Fri)			
5	5 (Sat)	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 & Petrol Production, Mr. Adnan A. Al-Mudailwi, Gas & Petroleum Industry Ministry of Foreign Affairs / H.E. Yousuf B. Alawi B. Abdullah, Minister, Mr. H. B. Nasser B. Mansoor Al Tobi, Chief of Asian Department, Mr. Awadi B. B. B. M. Al Shanfari, Chief of Economic & Technical Cooperation		
6	6 (Sun)	Steering Committee - Discussion of Site Evaluation Report and Signing on MOM H. H. Mohammed B. Al Zubair B. Ali, 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, Dr. Hamed H. Al-Dhahab, Director General of Industry, Mr. Nabil M. Al-Mukhaini, Economic Researcher of Industry Embassy of Japan Leave Oman		
7	7 (Mon)	Arrive in Japan		

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

	Date	Mr.Akedo Leader	Mr.Hosokawa Market Study	Mr.Ose Financial & Economical Analysis, Implementation Plan	Mr.T.Inoue Utilities (Natural gas, Water)	Mr.Kojitani Port and Port Facilities	Mr.Hidaka Plant Management	Mr.Tanaka Coordinator
1	Dec. 15 (Tue)	Leave Japan			Arrive in Oman			
2	16 (Wed)	9 am Embassy of Japan						
		10 am Steering Committee - Explanation & Discussion of Draft Final Report						
3	17 (Thu)	Preparation for Discussion of Draft Final Report						
5	19 (Sat)	Steering Committee - Discussion of Draft Final Report						
6	20 (Sun)	Ministry of Regional Municipalities and Environment			Ministry of National Economy			
		Ministry of Foreign Affairs / H.E. Yousuf B. Alawi B. Abdullah, Minister and Others						
7	21 (Mon)	Ministry of Oil & Gas / H.E. Dr. Mohammad B. Hamad B. Saif al Rumhi, Minister						
8	22 (Tue)	Steering Committee (Ministry of Commerce and Industries) - Signing on MOM				Embassy of Japan		Leave Oman
9	23 (Wed)	Arrive in Japan						

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

1. Steel Products

Semi-finished			Billet. Bloom. Slab
Finished	Long products	Bar & wire rod	Bar. Wire rod. Wire
		Section	Wide-flange beam. Angle. Channel. Steel sheet pile
		Other	Rail. Rail accessories
	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
Asia	South Asia	Pakistan, India, Sri Lanka, Bangladesh
	ASEAN5	Thailand, Malaysia, Indonesia, Singapore, Philippines
	Other Asia	China, Japan, R. Korea, Taiwan, Viet 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 Zealand

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 *
Steel fabricator	Plates	700 - 1,400
	Sections	1,000 - 2,000
	Pipes	200 - 400
	Bars	100 - 200
	Total	2,000 - 4,000
Steel furniture	Cold sheets	2,000
	Pipes	300
	Total	2,300 (70%)
Steel fencing	Wire rods	3,000
	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
1988 Constant Prices	GDP	5,990	10,232	21,914
	Petroleum Sector	1,822	2,697	4,164
	Industrial Sector	866	2,459	6,355
	Construction Sector	379	983	2,191
Current Prices	GDP	6,806	12,189	28,378
	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	7.1%	1.075
GDP	6.6%	

Appendix A4-4-1 半製品市場について

半製品市場は非常に特殊である。その市場は採算性、安定性が少ないことに特徴がある。これらの要因は、以下の通りである。

1. 近年の、世界の鉄鋼業の一般的特徴
   - 鉄鋼業の設備の一貫化（上流から下流まで、鉄源から鉄鋼最終製品まで）の広まり
     上流部門の高熱操業で要求される安定操業
     付加価値の高い「最終製品」への生産販売指向
     半製品は上流工程にあり「最終製品」と比べ付加価値の低い製品
   - 鉄鋼製品は世界的に典型的な貿易財で要求される厳しいコスト競争力

2. 半製品貿易の特殊性
   - 数量、価格とも不安定な市場で、特に価格的には低価格傾向が強い
   - 世界的に鉄鋼業の一貫化が一般化することにより市場の成長性は大きくない。
   - 不況下の一貫メーカーが上流部門の操業率を維持するため、限界利益内の半製品を、市場を求めてスポット的に輸出する、供給サイドによってリードされる貿易。

3. 半製品貿易の成立条件
   - 購入側の条件
     一貫メーカーでは、上流工程と下流工程の、生産能力のアンバランスの存在（下流＞上流）
     単圧ミルでは、その原料として採算性に見合うこと。
   - 供給側の条件
     一貫メーカーでは、上流工程と下流工程の、生産能力のアンバランスの存在（下流＜上流）

4. 半製品の安定輸出の成立条件
   - 鉄鉱石、エネルギーのような主要な原料において絶対的な供給側のコスト競争力を持つこと
   - 特殊仕様品質において供給者と購入者双方の共通メリットの享受できる長期契約
   - このどちらかの条件を満たす例は、現実には非常に希。

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

No.	Equipment	Q'ty	Specification
MH01	Transport Conveyor		
0101	Belt conveyor	1	2000 t/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		
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	1	500 t/h
0206	Diverter	1	
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	
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	
0121	Cooling gas mist eliminator	1	
DR02	Heat Recovery & Combustion System		
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	1	Centrifugal type
0207	Auxiliary burner	1 lot	Premix type

No.	Equipment	Q'ty	Specification
DR03	Flue Gas System		
0301	Ejector stack	1	
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	Seal gas refrigerant dryer	1	
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	Oxide storage bin	3	2000 tons, each
0602	Oxide storage bin discharge feeder	3	400 t/h
0603	Oxide storage bin discharge conveyor	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	Middle size oxide feed bin	1	
0609	Feed bin discharge feeder	1	

No.	Equipment	Q'ty	Specification
0606	Oxide fines reject conveyor	1	
0607	Middle size oxide belt conveyor	1	
0608	Middle size oxide feed bin	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	
DR07	Product Handling System		
0701	Furnace discharge feeder	1	
0702	Furnace discharge conveyor	1	
0703	Product transfer conveyor	1	
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	1	500 t/h
DR08	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

No.	Equipment	Q'ty	Specification
DR09	Non-process Service		
0901	Instrument air unit	1	
0902	Plant air unit	1	
DR99	Spare Parts and Consumable		
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 lot	(1) Scrap bucket:2 sets - 70 t scrap charge - Clam shell type
SM012	DRI and Additives Handling Facilities		
SM01210	DRI/lime storage system	1 lot	(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 m^3 storage capacity (7) Lime storage bin: 1 set x 2 EAF - 200 m^3 storage capacity

No.	Equipment	Q'ty	Specification
SM01220	DRI/lime feeding system into EAF	1 lot	(1) DRI weighing conveyor: 2 sets x 2 EAF - 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 EAF - 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/LF 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 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 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

No.	Equipment	Q'ty	Specification
SM01260	LF charging system	1 lot	(1) No.1 LF 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	EBT 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 1) Ladle stand: 2 sets 2) Hydraulic units - For ladle valve station: 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

No.	Equipment	Q'ty	Specification
SM02	Electric Arc Furnace Facilities		
SM021	Electric Arc 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
SM022	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 (8) Temperature measuring device: 1 set x 2 EAF

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 EAF (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 ℃/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 aisle
SM053	Transfer car	1 lot	(1) EAF Ladle transfer car with weigher: 2 sets - 250 t transportation capacity (2) LF Ladle transfer car: 2 sets - 250 t transportation capacity (3) 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	1 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 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 set x 2 F'ce (5) High current DC aluminum bus assembly: 1 lot (6) Water cooled cable: 1 lot (7) LV motor starting panel, thyristor control panel, furnace control panel, protective relay panel, etc.: 1 lot - Protection: IP2X (8) Local operation panel: 1 lot - Protection: IP2X/IP4X (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 Facilities	1 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 (Cont'd)	Fume Extraction System (Cont'd)		(4) Main fan motor: 2 sets - 6,600 V, 50 Hz - Insulation: Class F - Protection: IP54 (5) Control panel: 1 set - Protection: IP2X (6) Local operation panel: 1 lot - Protection: IP2X/IP4X
SM067	Handling Facilities	1 lot	(1) LV motor starting panel: 1 lot - Protection: IP2X (2) Control and local operation panel: 1 lot - For DRI and additives handling facilities, ladle handling facilities - Protection: IP2X/IP4X
SM068 SM06810	Information System 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 x 1 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 - 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 2) 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 1) Color CCD camera: 2 sets 2) Four split screen color monitor: 1 set - 21-inch size 3) Four split screen controller: 1 set
SM069	Common Electrical	1 lot	(1) Power supply to cranes and jib cranes: 1 lot (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 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	1 lot	Consists of (1) Tundish repairing (2) Mold and segment maintenance equipment
SM073	Information system	1 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 1) Mold cooling water system 2) Secondary spray cooling water system 3) Machine cooling water system (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 (2) Step-down power transformer: 1 set (3) LV power distribution panel (4) Control panel: 1 set (5) Control desk: 1 set (6) Local operation box: 1 set (7) Sensor: 1 set (8) Instrumentation: 1 set

No.	Equipment	Q'ty	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	Q'ty	Specification
RM01	BILLET REHEATING SECTION		
RM0101	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: - Oil hydraulic system - Combustion blower - Head tank for emergency water, etc.
RM0104	Furnace Duct and Piping	1 lot	
RM0105	Billet Charging and Transfer Facilities	1 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		
0201.01	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 mm dia. x 400 mm barrel Including (for each stand): - Rolls - Roll 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 - 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	1	Type: 2-high vertical/liftable type mill stand, driven individually by a mill motor Roll size: 380 mm dia. x 700 mm barrel Including: - Rolls - Sole plates with stand clamping and lifting device - Spindle support - Mill spindles - Gear unit with coupling, etc.
0202.02	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.
0202.03	No.14 Stand	1	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.
0203.02	No.16A, 16B & No.18A, 18B Stand	4	Type: 2-high horizontal/shiftable 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 device - Spindle support - Mill spindles - Gear unit with coupling, etc.
0203.03	No.17A & No.17B Stand	2	Type: 2-high vertical/liftable 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 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	Flying Shear and Splitting Unit		
0205.01	No.1 Crop and Cobble Shear	1	Type: Rotary knife type, driven by motor Including: - Crop chute
0205.02	No.2 Crop and Cobble Shear	2	Type: Rotary knife type, driven by motor Including: - Chopping shear & crop chute
0205.03	Dividing Shear	2	Type: Rotary knife type, driven by motor
0205.04	No.1 Splitting Unit	1	Type: Split roller type, driven by motor
0205.05	No.2 Splitting Unit	2	Type: Split roller type, driven by motor

No.	Equipment	Q'ty	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	
0206.04	Stand Tilter for intermediate mill and finishing mill	1	
0206.05	Portable Hydraulic Pump Unit	1	
0206.06	Roll Neck Bearing Heater	1	
RM03	COOLING AND CUTTING SECTION		
RM0301	Run-in Guiding Equipment		
0301.01	Run-in Guide Trough with mechanical brake	2 sets	
0301.02	Line Selector	3	
0301.03	No.1 Pinch Roller	3	
0301.04	No.2 Pinch Roller	8	
0301.05	Run-in Roller Table and Lifter	2 sets	
RM0302	Cooling Bed		
0302.01	Cooling Bed	2	Type: Motor driven walking beam type Length: Approx. 110 m Width: Approx. 6 m
0302.02	Bar Aligning Roller Table	2	
0302.03	Bar Collecting Device	2	
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: - Crop chute - Blade changing device
0304.02	Cold Shear Roller Table	2	
0304.03	Shear Gauge	2	Measuring range: Approx. 3.5 m to 13 m

No.	Equipment	Q'ty	Specification
RM04	BAR FINISHING SECTION		
RM0401	Traversing Facilities	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	Bundling Facilities		
0402.01	Small bundling machine	12	
0402.02	Support frame for small bundling machine(Support	2 sets	
0402.03	Bundle former	8	
0402.04	Large bundling equipment	6	
0402.05	Traveling car for large bundling machine	4	
RM0403	Product Delivery Facilities	2 sets	Consisting of: - Collecting roller table - Bundling roller table - Bar weighing equipment - Shipping roller table - Shipping traverser - Shipping conveyor
RM0404	Irregular 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	UTILITY		
RM0501	Oil Lubrication System		
0501.01	No.1 Oil Lubrication System	1 set	For roughing & intermediate mill trains
0501.02	No.2 Oil Lubrication System	1 set	For Finishing mill train
0501.03	No.3 Oil Lubrication System	1 set	For cooling bed section
0501.04	Interconnecting Piping	1 lot	For oil lubrication system
RM0502	Oil Hydraulic System		
0502.01	No.1 Oil Hydraulic System	1 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	1 set	For bar finishing section
0503.04	Interconnecting Piping	1 lot	For grease lubrication system
RM0504	Oil Cellar Accessories		
0504.01	Exhaust Fan for oil cellar	3	
0504.02	Drainage Pump for oil cellar	3	
RM06	PLANT SUPPORTING FACILITIES		
RM0601	Roll Shop Equipment		
0601.01	Roll Lathe	2	
0601.02	Lathe for general use	1	
0601.03	Guide Roller Lathe	1	
0601.04	Universal Tool Grinding Machine	1	
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	1	
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	1	
0602.02	Transfer car for irregular bar	1	
0602.03	Transfer car product yard	1	
RM0603	Crane and Hoist		
0603.01	OHT crane for mill yard (1)	1	Capacity: 20/10 t
0603.02	OHT crane for mill yard (2)	1	Capacity: 10 t
0603.03	OHT crane for mill yard (3)	1	Capacity: 5 t
0603.04	OHT crane for bar product yard (1)	4	Capacity: 10 t with lifting magnet attachments
0603.05	OHT crane for bar product yard (2)	6	Capacity: 10 t with lifting magnet attachments
0603.06	Hoist for roll shop (1)	1	Capacity: 12 t
0603.07	Hoist for roll shop (2)	1	Capacity: 5 t
0603.08	OHT crane for billet yard	3	Capacity: 20 t with lifting magnet and/or claw attachments
0603.09	OHT crane for furnace entry yard	1	Capacity: 3 t

No.	Equipment	Q'ty	Specification
RM0604	Water Circulation Equipment		
0604.01	Return Water Pump for indirect cooling	2	One as standby
0604.02	Emergency Water Pump	1	
0604.03	Scale Pit Pump	2	One as standby
0604.04	Scale Handling Crane	1	
RM07	ELECTRICAL EQUIPMENT		
RM0701	Power Receiving and Distribution System	1 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	1 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 - VVVF 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 control panels/posts - Local safety switch boxes - Sensors - Solenoid valve control boards, etc.
RM0704	Computer system	1 set	For Level-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.	Equipment	Q'ty	Specification
RM0706	Lighting and Socket Outlet System	1 lot	Consisting of: - Lighting transformer and distribution board - Lighting fixture - Socket outlet and switch, etc.
RM0707	Communication System	1 lot	Consisting of: - Paging system - Closed circuit TV system - Mill 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	
0801.05	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	
0801.11	Changing Roll Stand (for No.17 Stand)	2 sets	
RM0802	Changing Roll Chock		Including one set of roll neck bearings for each changing chock.
0802.01	Changing Roll Chock (for No.9 & No.11 Stand)	2 sets	
0802.02	Changing Roll Chock (for No.10 Stand)	1 set	
0802.03	Changing Roll Chock (for No.12 & No.13 Stand)	2 sets	For horizontal stand
0802.04	Changing Roll Chock (for No.12 & No.13 Stand)	2 sets	For vertical stand
0802.05	Changing Roll Chock (for No.14 Stand)	1 set	
0802.06	Changing Roll Chock (for No.15 Stand)	2 sets	For horizontal stand
0802.07	Changing Roll Chock (for No.15 Stand)	2 sets	For vertical stand

No.	Equipment	Q'ty	Specification
0802.08	Changing Roll Chock (for No.16 & No.18 Stand)	4 sets	
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	1 lot	
0901.02	Installation Liner	1 lot	
0901.03	Safety Cover	1 lot	
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	1 lot	
RM1002	Spare Mill Entry and Delivery Guides	1 lot	
RM1003	Spare Parts	1 lot	
RM1004	Consumables	1 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	
0102	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
LC02	Lime Calcining Plant		
0201	Limestone storage bin	1	
0202	Vibrating feeder	1	60 t/h
0203	Single deck screen	1	60 t/h
0204	Belt conveyor	1	60 t/h
0205	Scale hopper	1	
0206	Vibrating feeder	1	60 t/h
0207	Belt conveyor	1	60 t/h
0208	Calcining kiln	1	Shaft kiln type, 160 t/d
0209	Belt conveyor	1	10 t/h
0210	Fines hopper	1	
LC03	Product Handling System		
0301	Belt conveyor	1	20 t/h
0302	Damper	1	20 t/h
0303	Belt conveyor	1	20 t/h
0304	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 t/h
0309	Screw conveyor	1	3 t/h
0310	Chain conveyor	1	3 t/h
0311	Cushion hopper	1	15 t
0312	Screw conveyor	1	3 t/h

No.	Equipment	Q'ty	Specification
0313	Briquetting machine	1	2.5 t/h
0314	Belt conveyor	1	20 t/h
0315	Product bin	1	
0316	Vibrating feeder	1	200 t/h
0317	Belt conveyor	1	200 t/h
0318	Conveyor scale	1	200 t/h
0319	OHT hoist crane	1	5 t
0320	Dust collector	1	Bag type
0321	Bag filter	4	
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	
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	
0560	Instrumental miscellaneous	1 set	

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)		145kV,1250A, 25kA,2cycle Oil-hydraulic operation/ SF6 gas insulated
	2) Disconnect switch (DS)	4	145kV,1250A, 25kA(1 sec.) Motor operation / motor
012	Main and feeder bus bar	1 set	
	1) Main bus bar		Double bus bar type 145kV 1250A, 25kA (1 sec.)
	2) Feeder bus bar		Single bus bar type 145kV 1250A, 25kA (1 sec.)
013	PT	2 sets	
	1) Disconnect switch		145kV, 1250A, 25kA (1 sec.) Manual operation
	2) PT		132/$\sqrt{3}$kV : 110/$\sqrt{3}$V : 110/3V
014	Transformer feeder unit	4 sets	
	1) Circuit breaker (CB)		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
015	Auxiliary devices	1 set	
	1) Local control panel		
	2) Gas monitoring device		
PW02	132/33 kV power transformer		
021	132/33 kV 3-phase on-load tap changer	2 sets	
	1)Type		Oil immersed outdoor use
	2)Capacity		80/110 MVA at ONAN/ONAF
	3)Rated voltage		3-phase 50Hz, 132/33 kV
	4)Primary taps		132kV+12% to -21% (1.5% tapping) On-load tap changer
	5)Connection		Yyd5
	Primary		Wye (Solid grounding neutral)
	Secondary		Wye (100A resistor grounding neutral)
	Tertiary		Delta (30MVA) with two external terminals closed outside the transformer
	6)Oil preservation		Diaphram type
	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	2 sets	
	1)Type		Oil immersed outdoor use
	2)Capacity		110 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		Yyd5
	Primary		Wye (Solid grounding neutral)
	Secondary		Wye (100A resistor grounding neutral)
	Tertiary		Delta with two external terminals closed outside the transformer
	6)Oil preservation		Diaphram type
	7)Accessories		
	DS, LA, Buchholz relay		
	8)Fire fighting equipment		
	Water pressure tank		
	Air compressor		
PW03	33 kV switchgears		
031	Neutral grounding resistor(NGR)	4 sets	
	1)NGR		33/√3kV,100A,190 ohm,10sec.
	2)DS		36kV,400A manual operation
032	Main panel	4 sets	
	1)VCB		36kV,2400A, 25kA, Motor spring charger operation
033	Bus tie panel	2 sets	36kV,2400A, 25kA, Motor spring charger operation
	1)VCB		
034	Feeder panel including spare	19 sets	
	1)VCB		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	4 sets	
	1)GCB		36kV, 1250A, 25kA Motor spring charge operation
PW04	Static var compensator (SVC) & power factor compensator	2 sets	
	1) High impedance transformer		28MVA
	2) Thyristor equipment		28MVA
	3) Auxiliary control panel 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	1set	(including one spare)
	1) Type		Oil immersed outdoor use
	2) Capacity		30/36MVA at ONAN/ONAF
	3) Rated voltage		3-phase 50Hz 33/6.6kV
	4) Primary taps		34.5/33.75/32.25/31.5kV at full cap.
	5) Connection		Dy11
	Primary / Secondary		Delta/Wye (10A resistor grounding neutral)
	6) Oil preservation		Diaphram type
PW06	6.6 kV switchgears		
061	NGR panel		
	1) NGR	1 set	6.6/√3kV, 10A, 38 ohm continuous
	2) DS		Single phase type 7.2kV 100A manual operation

No.	Equipment	Quantity	Specification
062	Main panel 1)VCB	1set	 7.2kV 2000A, 40kA Motor spring charge operation
063	Feeder panel 1)VCB	10 sets	 7.2kV, 1250A, 40kA Motor spring charge operation
064	GPT and LA 1)GPT 2)LA	1 set	 3-phase resin molded type 6.6kV : 110V : 110/3V Zinc oxide type 8.4kV, 10kA
065	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, Dy11 Nitrogen sealed
066	Static capacitor unit 1)Static capacitor type 2)Capacity 3)Series reactor with discharging coil	1 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 resistor : 10A continuous
073	Distribution panels 1)6.6 kV main switchgears 2)VCB 3)ES 4)6.6 kV feeder switchgears 5)Exciter panel 6)GPT cubicle 7)380 V distribution panel 8)NGR panel	2 sets 8 sets 2 sets	 7.2kV, 1250A, 40kA Motor spring charge operation 7.2kV manual operation Vacuum contractor 7.2kV, 450A 6.6/$\sqrt{3}$kV, 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 4)Air compressor		300 litter
075	Cooling system		Closed cooling system in two circuit arrangement for each engine and is equipped with cooling tower, jacket water pump and cooler water pump.
076	Fuel system	1 set	Fuel system is consisting of main storage tank, dry tank, oil transfer pump and fuel oil filter and fuel pump.
PW08	Supervisory control and relay panel	1 set	Supervisory and control panels and centralized monitoring system.
PW09	Fire protection system	1 set	
PW10	Telephone system	1 set	
PW11	Air conditioning system	1 set	
PW12	Cables and Materials	1 set	Cables & sub materials for 33kV, 6.6kV and other, and cable tray
PW13	Maintenance tools	1 set	

Appendix A6-7-1 Equipment List of Utilities

No.	Equipment	Q'ty	Specification	
UT-01	Natural Gas Receiving Station			
			Capa. :	66,000 Nm³/h
UT-0101	Piping with accessories	1 lot		
UT-02	Air Separation Plant and Air Compression Plant			
UT-0201	Air Compressor	1 set	Type :	Isothermal centrifugal compressor
			Capa. :	43,600 Nm³/h
			Discharge	28 kg/cm²
			Turndown mechanism:	Inlet guide vane
			Code & standard:	API-672
			Noise level:	Approx.95dB at 1m distance from machine side.
UT-0202	Air Pre-purification System	1 set		
	MS Adsorber with electric heater		Type:	Molecular sieves 13X and aluminum gel
UT-0203	Cryogenic Air Separation Unit (Cold box)	1 set	Type:	Outdoor, self-standing, packaged type.
	Including:			
	1-Main Heat Exchanger			
	1-Sub cooler			
	1-Main condenser			
	1-Rectifier column			
	(Upper & lower)			
UT-0204	Vessels and Equipment outside Cold Box	1 set		
	1-Blow down tank			
	1-MS silencer			
	1-O2 blow off silencer			
UT-0205	Expansion Turbine	1 set	Type:	Skid mounted low temperature turbo expander system
				Packaged single stage, radial-flow reaction type
			Breaking system:	Booster compressor
			Turn down operation:	Inlet variable nozzle
UT-0206	Cryogenic Process Pump	1 set		
	2-Liquid oxygen pump			
	(capa:9,000 Nm³/h)			
	(Delivery pressure:25 kg/cm²)			
	2-Liquid nitrogen pump			
	(capa:3,000 Nm³/h)			
	(Delivery pressure:11 kg/cm²)			
UT-0207	LOX, LIN Tank and Vaporizer	1 set	Type:	Cylindrical, horizontal, vacuum perlite insulation
	1-Liquid oxygen tank			
	(45m³)			
	1-Liquid nitrogen tank			
	(30m³)			
	1-Liquid oxygen vaporizer			
	(capa: 9,000 Nm³/h)			
	1-Liquid nitrogen tank			
	(capa: 3,000Nm³/h)			

No.	Equipment	Q'ty	Specification
UT-0208	Cooling Water System 2-Circulation water pump (capa: 600m³/h) 1-Heat exchanger (Type: plate, titanium) 1-Water basin 1-Chemical dosing unit	1 set	
UT-0209	Piping valves and accessories	1 set	
UT-0210	Instruments	1 set	
UT-0211	Electrical Equipment	1 set	
UT-0221	Air Compressor with Suction Air Filter	3	Type : Centrifugal Capa. : 5,000Nm³/h, 7 kgf/cm²G
UT-0222	Air Receiving Tank	1	Material: CS Type : Vertical Capa. : 30 m³
UT-0223	Hoist Crane	1	Material: CS Type : Electric Overhead Crane Capa. : 5 tons, Lift 10 m Span 12 m
UT-0224	Piping	1 lot	
UT-0225	Electrical Equipment	1 lot	
UT-0226	Instruments	1 lot	
UT-0227	Wiring Materials	1 lot	

No.	Equipment	Q'ty	Specification
UT-11	Raw Water Receiving Station and Fire Hydrant System		
UT-1101	Raw Water Basin	1	Material: RC Type : Rectangular Capa. : 3,000m³
UT-1102	Make-up Water Supply Pump	2	Material: CI/CS Type : Centrifugal Capa. : 200m³/h x 40 m
UT-1103	Fire pump	2	Material: CI/CS Type : Centrifugal Capa. : 250m³/h x 85 m
UT-1104	Jockey Pump	2	Material: CI/CS Type : Centrifugal Capa. : 20m³/h x 50 m
UT-1105	Fire Diesel Pump	1	Material: CI/CS Type : Centrifugal Capa. : 250m³/h x85 m Diesel : Enclosure Type Engine : Automatic Electrical Starting System
UT-1106	Pressure Tank	1	Material: CS Type : Cylindrical Capa. : 10m³
UT-1107	Hydrant With Hose Box	1 lot	
UT-1108	Piping with Necessary	1 lot	
UT-12	Water Treatment Station - 1 (SMP)		
UT-1201	ICW Heat Exchangers for EAF, LF and SMP	3	Material: Titanium Type : Plate, 1 pass Capa. : 1,900 m³/h Heat transfer area : 900 m²
UT-1202	Hot Water Basin	1	Material: RC Type : Rectangular Capa. : 1,300m³
UT-1203	ICW Supply Pump for EAF and LF	4	Material: CI/CS Type : Centrifugal Capa. : 1,900m³/h x 55 m
UT-1204	Diesel Pump for EAF and LF	1	Material: CI/CS Type : Centrifugal Capa. : 1,700 m³/h x 40 m Diesel Enclosure Type Engine : Automatic Electrical Starting System

No.	Equipment	Q'ty	Specification
UT-1205	Head Tank	1	
			Material: RC
			Type : Cylindrical
			Capa. : 300m³, 35m High
UT-1206	Chemical Dosing System Including: 1-Corrosion Inhibitor 1-Scale Inhibitor 1-Slime Inhibitor 1-pH Control	1 set	
UT-1207	Piping with Necessary	1 lot	
UT-13	Water Treatment Station - 1 (CC)		
UT-1301	ICW Heat Exchanger for CC	1	
			Material: Titanium
			Type : Plate, 1 pass
			Capa. : 1,363 m³/h
			Heat transfer area : 570 m²
UT-1302	Hot Water Basin	1	
			Material: RC
			Type : Rectangular
			Capa. : 150m³
UT-1303	ICW Supply Pump for CC	4	
			Material: CI/CS
			Type : Centrifugal
			Capa. : 500m³/h x 90m
UT-1304	Diesel Pump for CC	1	
			Material: CI/CS
			Type : Centrifugal
			Capa. : 300 m³/h x 40 m
			Diesel Enclosure Type
			Engine : Automatic Electrical
			Starting System
UT-1305	Piping with Necessary Accessories	1 lot	
UT-1306	DCW Heat Exchangers for CC	1	
			Material: Titanium
			Type : Plate, 1 pass
			Capa. : 1,440 m³/h
			Heat transfer area : 780 m²
UT-1307	Cold Water Basin for CC	1	
			Material: RC
			Type : Rectangular
			Capa. : 300m³
UT-1308	DCW Supply Pump for CC Spray and Mach. Cooling	4	
			Material: CI/CS
			Type : Centrifugal
			Capa. : 500 m³/h x 105 m
UT-1309	Sedimentation Basin	1	
			Material: RC
			Type : Rectangular
			Capa. : 980m³

No.	Equipment	Q'ty	Specification
UT-1310	Sludge Remover for Sedimentation Basin	1	
			Material: CS
			Type : Gantry Crane with Grab Bucket
UT-1311	Sludge Pump	4	
			Material: CI/Cr-CI
			Type : Submersible
			Capa. : 30m³/h x 15 m
UT-1312	Oil Skimmer	4	
			Material: CS
			Type : Mop Skimmer
			Capa. : 10m³/h
UT-1313	Floating Pump	4	
			Material: CI
			Type : Scum Skimmer
UT-1314	Filter Feed Pump for CC	2	
			Material: CI/CS
			Type : Centrifugal
			Capa. : 1,500m³/h x 25m
UT-1315	Pressure Filter	4	
			Material: CS, Anthracite/Sand
			Type : Vertical
			Capa. : 450m³/h
UT-1316	Backwash Blower	2	
			Material: CI/CS
			Type : Rotary
			Capa. : 15.2m³/min. x 7000mmAq.
UT-1317	Lub. Oil Pump for Blower	3	
			Material: CI/CS
			Type : Gear / Lub. Oil Cooler
			Capa. : 0.5m³/h x 3 kgf/cm²
UT-1318	Backwash Pump	3	
			Material: CI/CS
			Type : Centrifugal
			Capa. : 1,370 m³/h x 25m
UT-1319	Backwash Water Storage Basin	1	
			Material: RC
			Type : Rectangular
			Capa. : 330m³
UT-11320	Backwash Water Transfer Pump	2	
			Material: CI/Cr-CI
			Type : Centrifugal
			Capa. : 110m³/h x 20m
UT-1321	Sludge Drying Bed	2	
			Material: RC
			Type : Rectangular
			Capa. : 15m³
UT-1322	Sludge Pit Pump	2	
			Material: CI/Cr-CI
			Type : Submersible
			Capa. : 60m³/h x 15m
UT-1323	Separated Oil Pit	2	
			Material: RC
			Type : Rectangular
			Capa. : 9m³

No.	Equipment	Q'ty	Specification
UT-1324	Coagulation Tank with Agitator	1	
			Material: RC/SS
			Type : Rectangular
			Capa. : 5m3
UT-1325	Thickener	1	
			Material: RC, CS/Tar Epoxy
			Type : Rectangular
			Center Shaft
			Sludge Scraper
			with Electrical Lifting
			Device
UT-1326	Thickener Sludge Pump	2	
			Material: CI/Cr-CI
			Type : Centrifugal
			Capa. : 5m³/h x 15m
UT-1327	Chemical Injection facilities	1 lot	
			Material: PE
			Type : Vertical
			Capa. : 4m³
UT-1328	Piping with Necessary	1 lot	
UT-14	Water Treatment Station - 2 (BRM)		
UT-1401	ICW Heat Exchangers for BRM	1	
			Material: Titanium
			Type : Plate, 1 pass
			Capa. : 1,000 m³/h
			Heat transfer area : 194 m²
UT-1402	Hot Water Basin	1	
			Material: RC
			Type : Rectangular
			Capa. : 250m³
UT-1403	ICW Supply Pump for BRM	2	
			Material: CI/CS
			Type : Centrifugal
			Capa. : 1,000m³/h x 45m
UT-1404	Diesel Pump for BRM	1	
			Material: CI/CS
			Type : Centrifugal
			Capa. : 150 m³/h x 40 m
			Diesel Enclosure Type
			Engine : Automatic Electrical
			Starting System
UT-1405	Chemical Dosing System Including: 1-Corrosion Inhibitor 1-Scale Inhibitor 1-Slime Inhibitor	1 set	
UT-1406	DCW Heat Exchangers for BRM	1	
			Material: Titanium
			Type : Plate, 1 pass
			Capa. : 1,200 m³/h
			Heat transfer area : 430 m²
UT-1407	Cold Water Basin for BRM	1	
			Material: RC
			Type : Rectangular
			Capa. : 300m³

No.	Equipment	Q'ty	Specification
UT-1408	DCW Supply Pump for BRM	2	
			Material: CI/CS
			Type : Centrifugal
			Capa. : 1,200 m³/h x 45 m
UT-1409	Sedimentation Basin	1	
			Material: RC
			Type : Rectangular
			Capa. : 840m³
UT-1410	Sludge Remover for Sedimentation Basin	1	
			Material: CS
			Type : Gantry Crane with Grab Bucket
UT-1411	Sludge Pump	4	
			Material: CI/Cr-CI
			Type : Submersible
			Capa. : 30m³/h x 15 m
UT-1412	Oil Skimmer	4	
			Material: CS
			Type : Mop Skimmer
			Capa. : 10m³/h
UT-1413	Floating Pump	4	
			Material: CI
			Type : Scum Skimmer
UT-1414	Filter Feed Pump for BRM	2	
			Material: CI/CS
			Type : Centrifugal
			Capa. : 1,200 m³/h x 25m
UT-1415	Pressure Filter	4	
			Material: CS, Anthracite/Sand
			Type : Vertical
			Capa. : 380m³/h
UT-1416	Backwash Blower	2	
			Material: CI/CS
			Type : Rotary
			Capa. : 12.6m³/min. x 7000mmAq.
UT-1417	Lub. Oil Pump for Blower	2	
			Material: CI/CS
			Type : Gear / Lub. Oil Cooler
			Capa. : 0.5m³/h x 3 kgf/cm²
UT-1418	Backwash Pump	2	
			Material: CI/CS
			Type : Centrifugal
			Capa. : 1,130 m³/h x 25m
UT-1419	Backwash Water Storage Basin	1	
			Material: RC
			Type : Rectangular
			Capa. : 270m³
UT-1420	Backwash Water Transfer Pump	2	
			Material: CI/Cr-CI
			Type : Centrifugal
			Capa. : 100m³/h x 20m
UT-1421	Sludge Drying Bed	2	
			Material: RC
			Type : Rectangular
			Capa. : 15m³

No.	Equipment	Q'ty	Specification
UT-1422	Sludge Pit Pump	2	
			Material: CI/Cr-CI
			Type : Submersible
			Capa. : 60m³/h x 15m
UT-1423	Separated Oil Pit	2	
			Material: RC
			Type : Rectangular
			Capa. : 9m³
UT-1424	Coagulation Tank with Agitator	1	
			Material: RC/SS
			Type : Rectangular
			Capa. : 5m³
UT-1425	Thickener	1	
			Material: RC, CS/Tar Epoxy
			Type : Rectangular Center Shaft Sludge Scraper with Electrical Lifting Device
UT-1426	Thickener Sludge Pump	2	
			Material: CI/Cr-CI
			Type : Centrifugal
			Capa. : 5m³/h x 15m
UT-1427	Chemical Injection facilities Including: 1-Biocide Injection 1-pH Control 1-Polymer Injection	1 lot	
UT-1428	Piping with Necessary Accessories	1 lot	
UT-15	Sea Water Intake System-I		
UT-1501	Stop Log Gate	2 set	
UT-1502	Bar Screen	1	Type : Flat bar grid with rake Capa. : 25,000 m³/h Max. mesh size: 150 mm
UT-1503	Rotary Screen	1	Material: Steel with cathodic protection Type : Drum with debris conveyer Capa. : 25,000 m³/h Max. head loss: 0.3 m Max. mesh size: 5 mm
UT-1504	Circulation Pump	3	Material: CI/SUS Type : Vertical, mixed flow Capa. : 12,500 m³/h
UT-1505	Electric Chlorinator	1	Type: Electrolysis Capa: 125 kg/h as Cl_2 Material: Ti, Pt plated
UT-1506	Electrical Equipment Including: 1-Transformer, operation panels,	1 set	

No.	Equipment	Q'ty	Specification
UT-1507	Instruments	1 set	
UT-16	Sewage Treatment Station		Capa. : 500m³/day BODs : Outlet 20ppm
UT-1601	Rough Screen	1	Material: CS Type : Bar Screen
UT-1602	Basket	1	Material: SS Type : 5 Mesh
UT-1603	Diffuser for Aerated Grid Chamber	1 lot	Material: ABS Type : Disc Capa. : 0.25 m³/min. x 5 m
UT-1604	Spray Nozzle for Aerated Grit Chamber	1 lot	Material: ABS Capa. : 0.25 m3/min. x 5 m
UT-1605	Gate	1 lot	Material: PVC Type : Slide Gate
UT-1606	Grit Pump	1	Material: PVC Type : Air Lift Capa. : 6 m³/h x 5 m
UT-1607	Grid Separator	1	Material: RC Type : Rectangular
UT-1608	Aerated Grid Chamber with Baffle Board	1	Material: RC, CS/Tar Epoxy Type : Rectangular Capa. : 6 m³
UT-1609	Comminutor	1	Material: CI/SCS Type : Control Type Capa. : 630 m³/day-3,150 m³/day
UT-1610	Flow Control Basin	1	Material: RC Type : Rectangular Capa. : 200 m³
UT-1611	Feed Pump	2	Material: CI Type : Submersible Capa. : 24 m³/h x 5 m
UT-1612	Diffuser for Flow Control Basin	1 lot	Material: ABS Type : Disc Capa. : 0.25 m³/min.
UT-1613	Constant Head Box	1	Material: CS Type : V-Notch Weir Capa. : 21 m³/h
UT-1614	Sludge Storage Basin	1	Material: RC Type : Rectangular Capa. : 36 m³

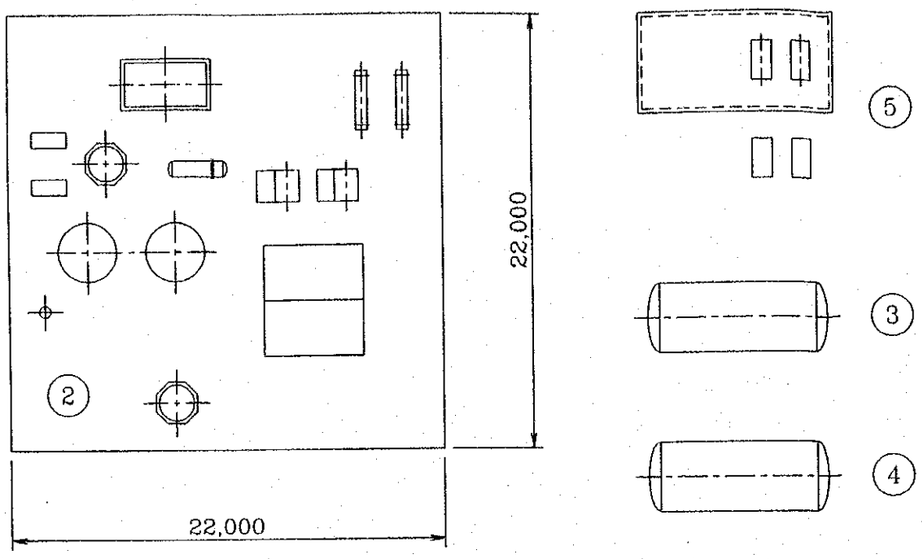
No.	Equipment	Q'ty	Specification
UT-1615	Aeration Basin	2	
			Material: RC
			Type : Rectangular
			Capa. : 250 m³
UT-1616	Diffuser for Aeration Basin	1 lot	
			Material: ABS
			Type : Disc
			Capa. : 0.25 m³/min.
UT-1617	Sludge Measuring Box	1	
			Material: CS/Tar Epoxy
			Type : V-Notch Weir
			Capa. : 20 m³/h-60 m³/h
UT-1618	Sedimentation Basin	1	
			Material: RC
			Type : Cylindrical
			Capa. : 20.8 m³ /h
UT-1619	Sludge Return Pump	1	
			Material: PVC
			Type : Air Lift
			Capa. : 0.35 m³/min. x 1.5 mAq
UT-1620	Sludge Collector	1	
			Material: CS/Tar Epoxy
			Type : Center Shaft With Drive Unit
UT-1621	Spray Pump Pit	1	
			Material: RC
			Type : Rectangular
			Capa. : 2 m³
UT-1622	Chlorination Basin	1	
			Material: RC
			Type : Rectangular
			Capa. : 5.2 m³
UT-1623	Spray Pump	1	
			Material: CI
			Type : Submersible with Quick Discharge Connection
			Capa. : 12 m³/h x 15 m
UT-1624	Blower for Aeration	2	
			Material: CI
			Type : Rotary Type / Silencer
			Capa. : 17.5 m³/min. x 4,000 mmAq
UT-1625	Hoist	1	
			Material: CS
			Type : Electrical Lifting & Traveling
			Capa. : 0.5 ton
UT-1626	Hypochlorite Tank with Agitator	1	
			Material: PE, CS/RL
			Type : Cylindrical
			Capa. : 1 m³
UT-1627	Hypochlorite Pump	2	
			Material: PVC
			Type : Diaphragm
			Capa. : 3.6 l/h x 10 kgf/cm²

No.	Equipment	Q'ty	Specification
UT-1628	Surface Water Drain-off Pump	2	Material: CI Type : Submersible Capa. : 0.2 m³/min. x 4 m
UT-1629	Hoist for Chemical Storage Room	1	Material: CS Type : Electrical Lifting & Traveling Capa. : 0.5 ton
UT-1630	Piping with Necessary Accessories	1 lot	
UT-1631	Analysis Apparatus	1 lot	
UT-1632	Electrical Equipment for Water Treatment Station	1 lot	
UT-1633	Instruments for Water Treatment Station	1 lot	
UT-1634	Wiring Materials for Water Treatment Station	1 lot	
UT-20	Yard piping		
UT-2001	Piping with Necessary Accessories	1 lot	Piping Specification

Fluids	Materials	Protective coating ,etc.
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	
Oxygen gas	Steel pipe	(i) Acid cleaning
Nitrogen gas	Steel pipe	
Plant air	Steel pipe	
Industrial water	Steel pipe	
Circulation water	Steel pipe	

Note: Buried pipe will be checked necessity of cathodic protection

UT-2002	Pipe rack and stanchion	1 lot	
UT-2003	Electrical equipment	1 lot	
UT-2004	Instrumentation	1 lot	
UT-2005	Auxiliary equipment	1 lot	
UT-9800	Initial fill for Consumables Quantity shall be of 6 Months Operation	1 lot	
UT-9900	Spare Parts Quantity shall be of 2 years operation	1 lot	



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

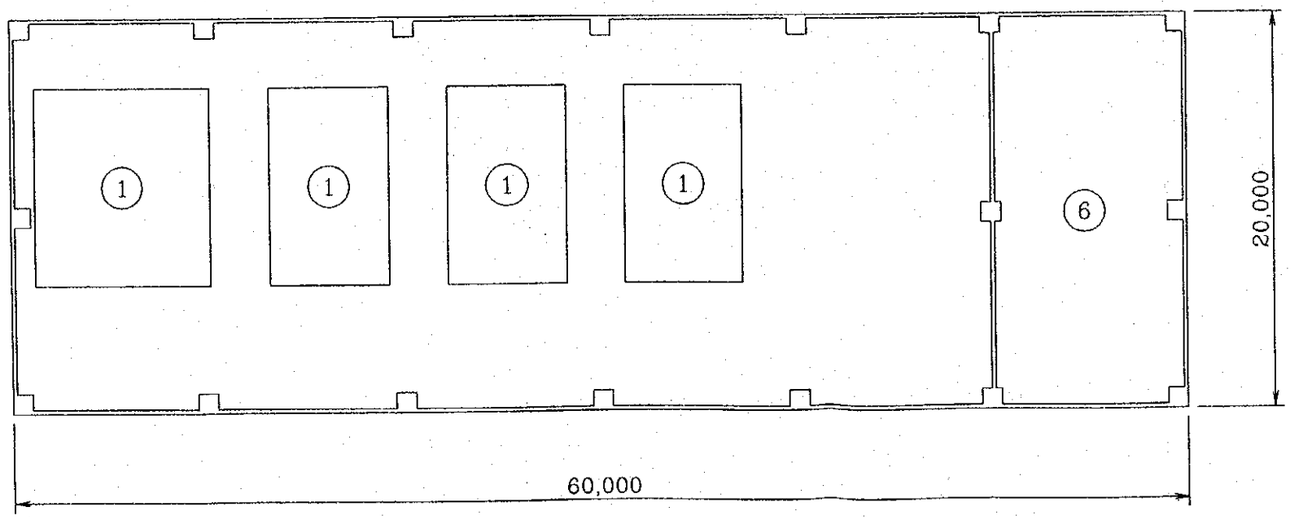


Figure A6-7-1 Layout of Air Separation Plant and Plant Air

S = 1/300

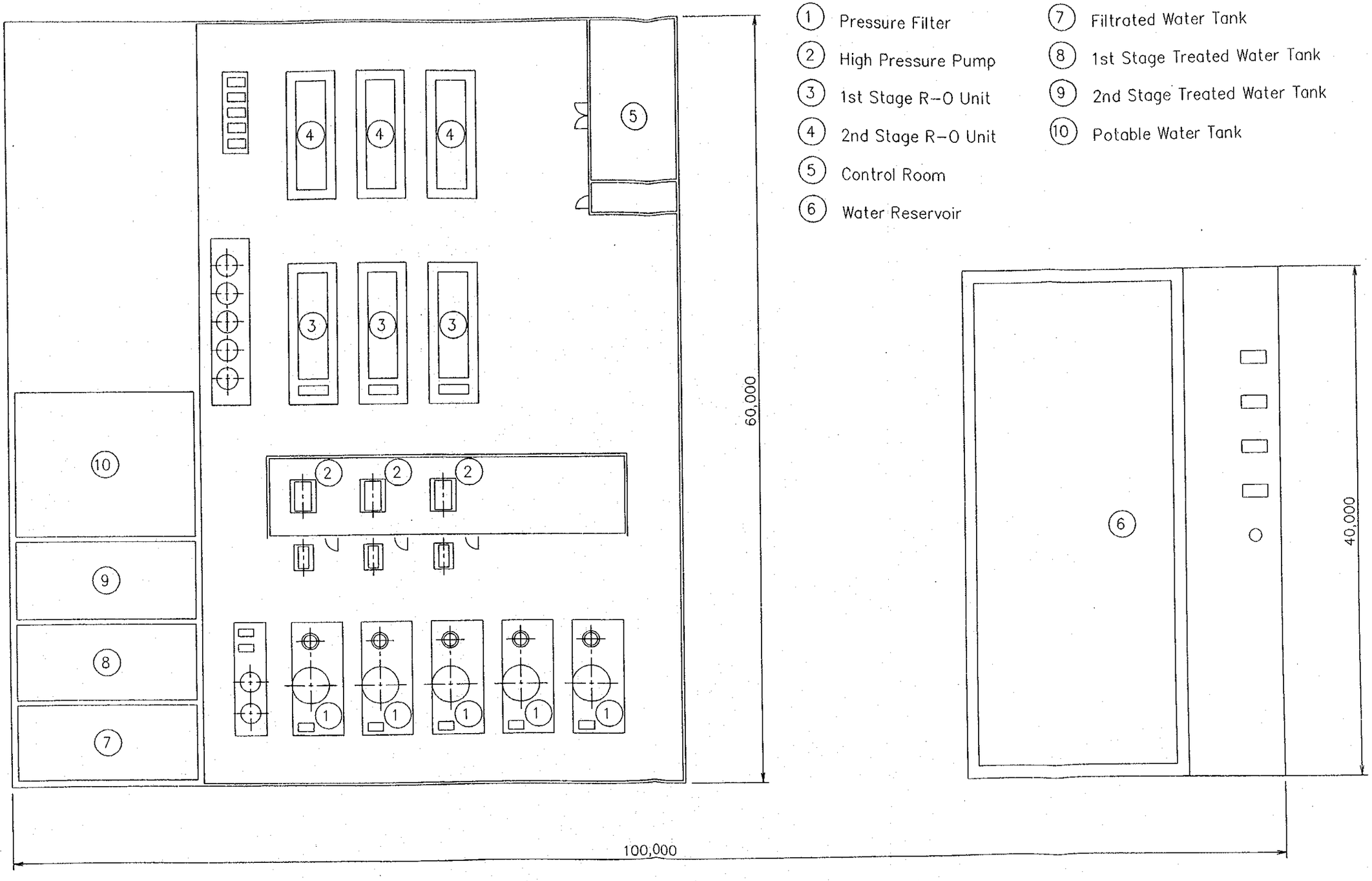


Figure A6-7-2 Layout of Desalination Plant and Raw Water Receiving Station

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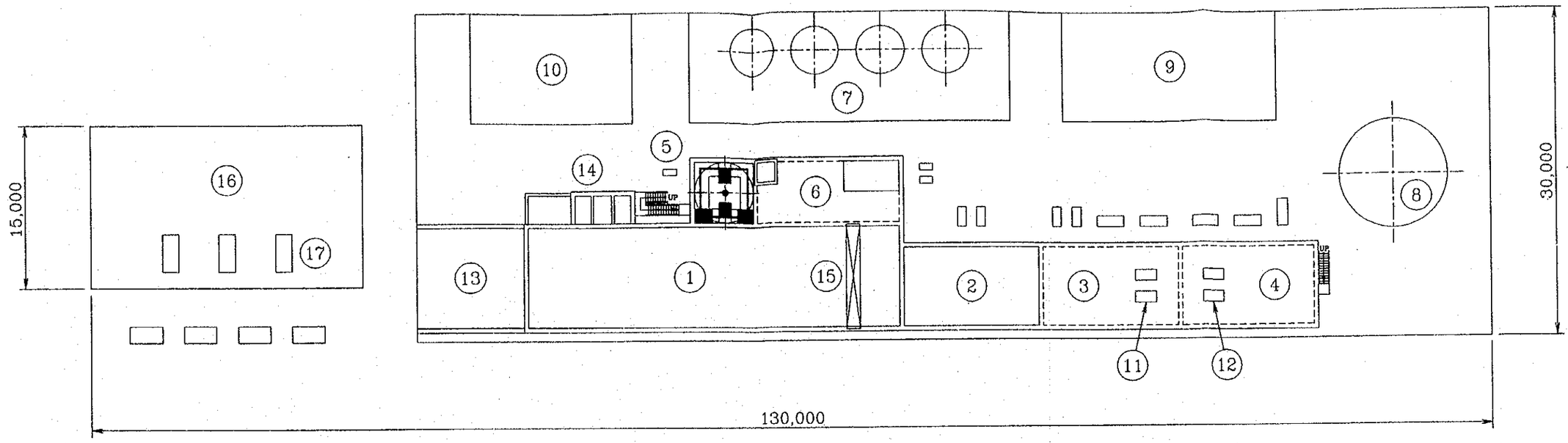
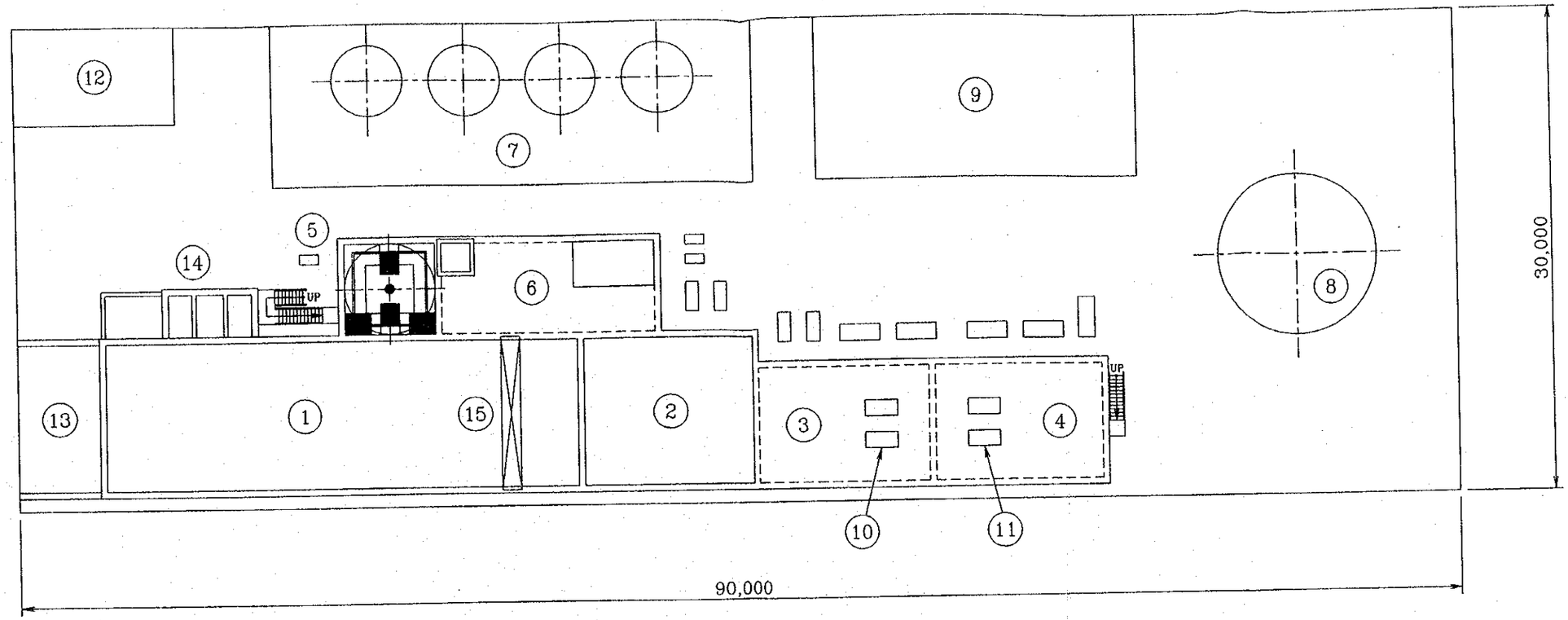


① DCW Settling Basin
② DCW Filter Feed Basin
③ DCW Supply Water Basin
④ ICW Water Basin (CC)
⑤ Thickener
⑥ DCW Back Washing Pit
⑦ Pressure Filter
⑧ Head Tank
⑨ Electrical Room
⑩ Chemical House
⑪ DCW Heat Exchanger (CC)
⑫ ICW Heat Exchanger (CC)
⑬ Sludge Drying Bed
⑭ Oil Separation Pit
⑮ Bucket Crane
⑯ ICW Water Basin (EAF)
⑰ ICW Heat Exchanger (EAF)

Figure A6-7-3 Layout of Water Treatment Station-II 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
11. 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

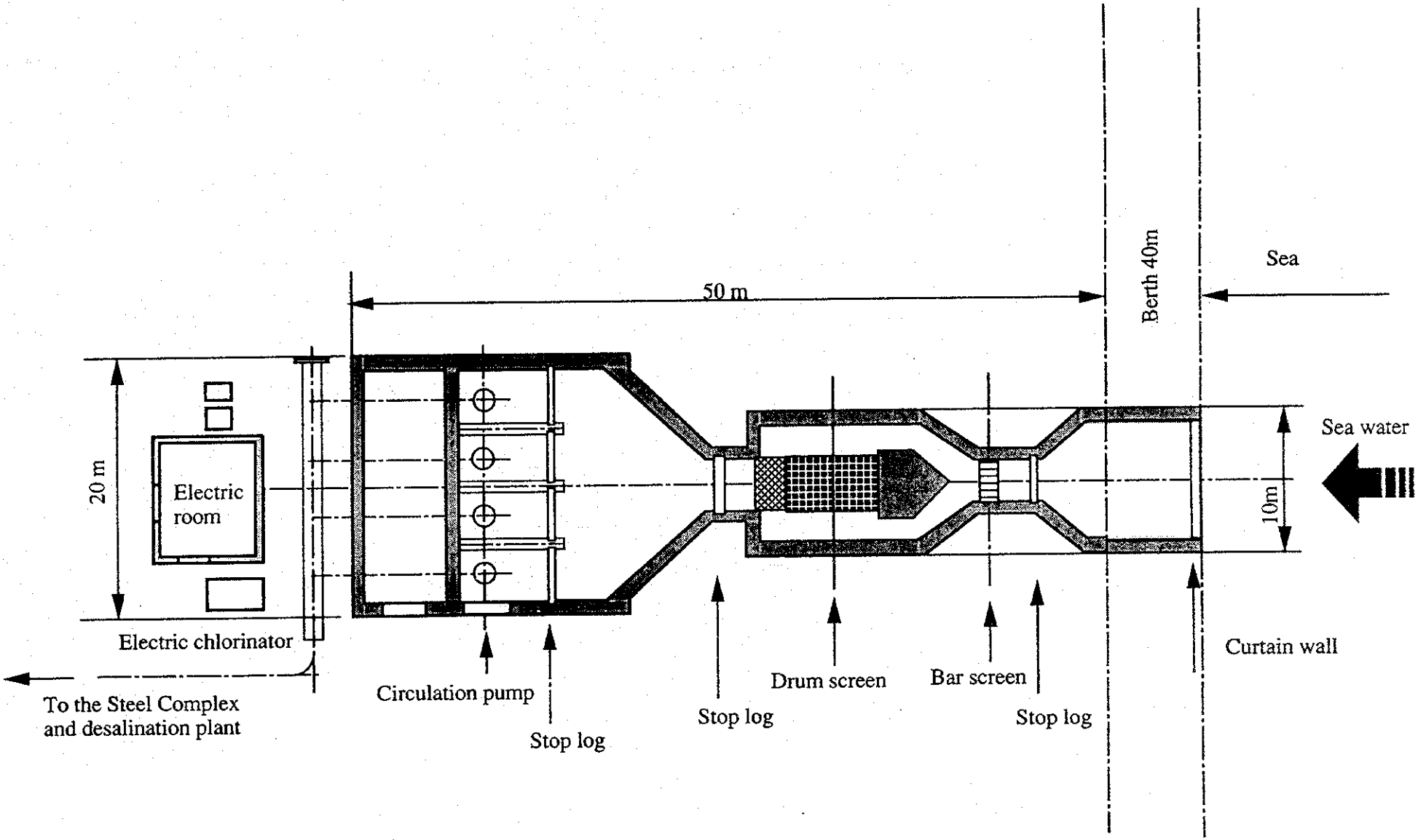


Figure A6-7-5 Layout of Sea Water Intake System-I

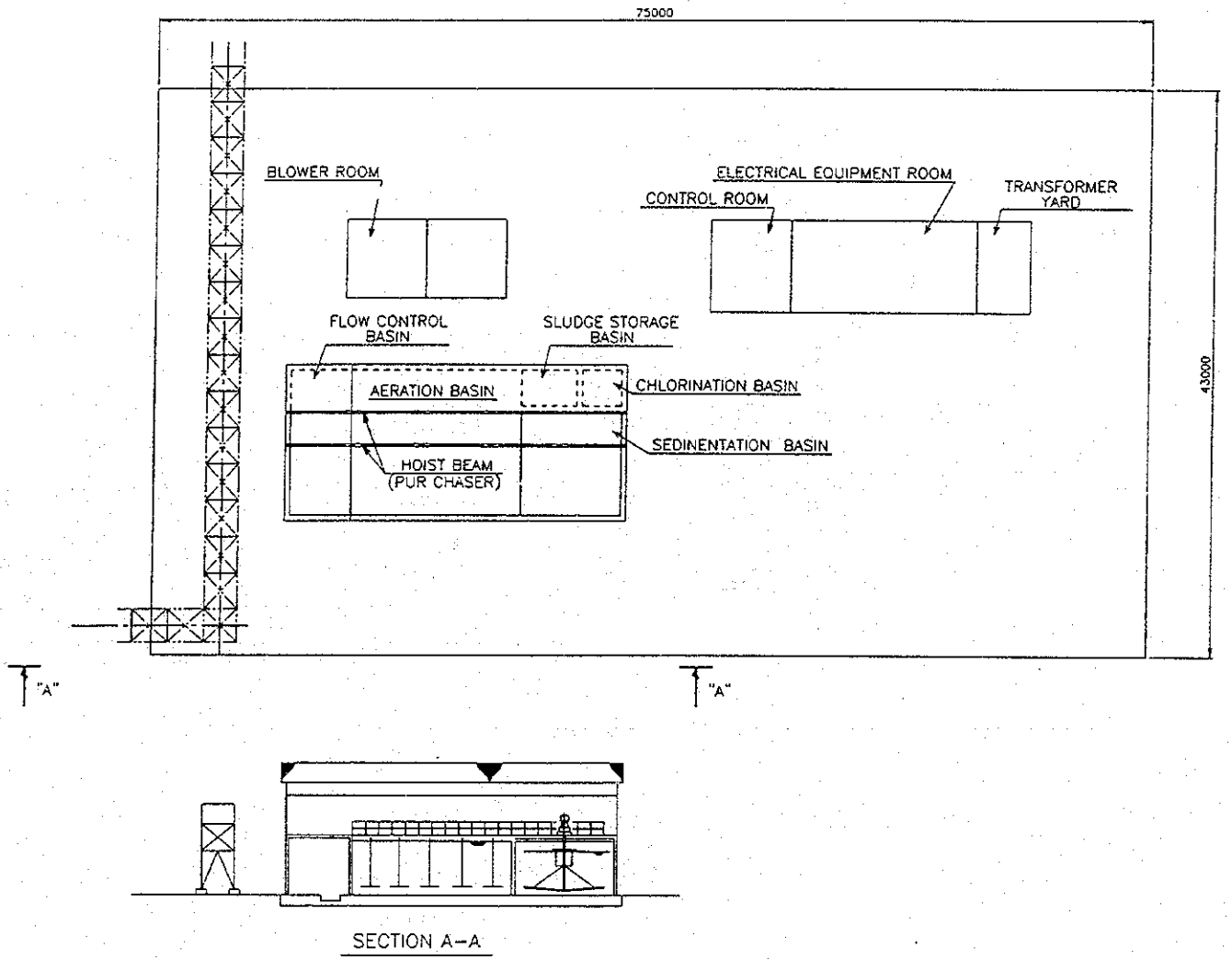


Figure A6-7-6 Layout of Live Sewerage Treatment Station

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 : 1m With accessories
MS0112	Lathe	1	Center distance : 1.5m With accessories
MS0113	Lathe	1	Center distance : 3m 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 Spindle size : ϕ 110mm
MS0118	Radial drilling machine	1	Drilling capacity : 50mm
MS012	Overhaul and assembling shop		
MS0121	Horizontal hydraulic press	1	Capacity : 200t
MS0122	Testing equipment for hydraulic	1	
MS0123	parts	1	Surface size : 1,500x3,000mm
	Surface plate		
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		
MS0141	shop	1	Repairing capacity : 100kW for DC : 200kW for AC
	Winding machine		
MS0142		1 set	
	Electrical testing equipment		AC motor test panel DC motor test panel
MS0143		1 set	Dielectric withstand tester
MS0144	Weight for calibration	1 set	

No.	Equipment	Q'ty	Main Specification
MS0145	Heat instruments inspection Meter inspection	1 set	Black body furnace temperature range : 1,000 - 2,000℃ 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	1	Drilling capacity : 22mm
MS0154	Journal jacks	2	Lifting capacity : 10t

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

NO.	Equipment	Q'ty	Specification
A(01	Analysis Center		
0101	Abrasive Cut-off Machine	1	Wet cutting type
0102	Automatic Sample Preparation Equipment for Quick Analysis	1	
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: 0.1mg
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℃
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 l/h
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 EAF, 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	
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	1	
0208	Surface Grinder	1	
0209	Universal Testing Machine (for bending test, tensile test)	1	Vertical, hydraulic loading type Capacity: Max. 50 tons
0210	Calibrated Test Block	1set	
0211	Shore Hardness Tester	1	Dial gauge type
0212	Brinell Hardness Tester	1	
0213	Rockwell Hardness Tester	1	

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	1	
0218	Pickling Equipment	1	
0219	Jaw Crusher	1	
0220	Rotary Grind Divider	1	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	1	
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		
TR0101	Crawler crane with lifting magnet	2	Crane capacity : 35t Lifting magnet : 1,300mm type
TR0102	Crawler shovel	4	Bucket capacity : $2m^3$
TR0103	Wheel shovel	6	Bucket capacity : $1.5m^3$
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	Own-weight about 16t
TR0111	Crane truck	2	4t capacity with 2t crane
TR0112	Double cab truck	5	1t capacity with 6 persons
TR0113	Truck weighing station	3	50t truck scale

Appendix A6-12-1 Foundation and Building List

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

Facility	Foundation			Building				
				Main Building		Ancillary Building		SS
	Type	Concrete(*) (m^3)	Pile (No)	Type	Area (m^2)	Type	Area (m^2)	(Ton)
a. Raw Material Storage	S	7,000	-	-	-	RC	147	-
b. Direct Reduction Plant (DRP)	S, (P)	34,000	840	-	-	RC, (SS)	3,473	320
c. Steel Making Plant (SMP)	(S), P,(D)	33,000	3,700	SS	18,654	RC, (SS)	3,210	7,500
d. Bar Rolling Mill Plant (BRM)	(S), P,(D)	40,000	4,500	SS	43,244	RC, (SS)	3,689	4,800
e. Lime Calcining Plant (LCP)	S, (P)	2,100	200	-	-	RC, (SS)	200	240
f. Electric Power & Distribution Facilities	S	12,000	-	RC	1,955	RC	1,440	-
g. Utilities	S, (P)	17,960	80	RC(SS)	1,118	RC, (SS)	3,391	500
h. Maintenance Shop	S	3,600	-	SS	3,960	SS, (RC)	280	420
i. Analysis & Inspection Facilities	S	900	-	RC	1,750	-	-	-
j. Transportation Facilities in the Steel Complex	S	7,700	-	SS	9,000	RC	95	700
k. Administrative Facilities	S	6,500	-	RC	5,000	RC, (SS)	6,530	40
Total	-	164,760	9,320	-	84,681	-	22,455	14,520
l. Land Preparation	See Table 6-12-23							
Remarks	Concrete(*) includes that of RC type building.							
Abbreviation	S:Spread Foundation P:Pile Foundation D:Deep Foundation			SS:Steel Structure RC:Reinforced Concrete Structure				

(Foundation List)

Table 6-12-2 Raw Material Storage Yard

Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Electriccal room	S	A= 147 M2
2.Foundations for equipment & machinery	a. Stacker foundation	S	
	b. Reclaimer foundation	S	
	c. Conveyor foundation	S	
	d. Junction tower foundation	S	
3.Roads & paving	a. Asphalt paving(t=50 mm)	-	A= 5,000 M2
4.Drainage system	a. Drainage pipe for storm water (RC pipe)	-	
5.Other	a. Miscellaneous	-	
Abbreviation	S:Spread foundation P:Pile foundation	D:Deep foundation	

(Foundation List)

Table 6-12-3 Direct Reduction Plant (DRP)

Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a.Control building	S	A= 1,080 M2
	b. Ancillary building	S	A= 1,313 M2
2.Foundations for equipment & machinery	a. Oxide pellet storage bin	P	
	b. Oxide pellet screen	P	
	c. Reduction shaft furnace & elevator	P	
	d. Process & cooling gas compressor	S & P	
	e. Air blower	S	
	f. Reformer, heat recovery system & stack etc.	S	
	g. Clarifier & thickener	S	
	h. DRI storage bin	P	
	i. DRI screen	P	
	j. Conveyor	S	
	k. Dust collector	S	
	l. Settling pond	S	
	m. Cooling tower with pump	S	
	n. Pipe rack, junction tower etc.	S	
3.Roads & paving	a. Asphalt paving(t=50 mm)	-	A= 15,000 M2
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	

(Foundation List)

Table 6-12-4 Steel Making Plant (SMP)

Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Main building	P	A= 18,654 M2
	b. Ancillary building	P	A= 1,070 M2
2.Foundations for equipment & machinery	a. Electric arc furnace (EAF)	P	
	b. Material handling system	P	
	c. Ladle furnace (LF)	P	
	d. Transfer car for EAF & LF	P	
	e. Ladle preheater	P	
	f. Ladle dryer	P	
	g. Dedusting system and duct support	P	
	h. Continuos casting machine & runout table	P	
	i. Billet cooling bed and transfer car	P	
3.Pits & culverts	a. Scrap bucket pit	D & P	
	b. Scale sluice & scale pit of CCM	D & P	Sheeting
	c. Cable & piping culvert	S	
4.Slab on grades	a. Electrode stand for EAF &LF	S	
	b. Ladle relining station	S	
	c. Ladle dismantling station	S	
	d. Mold repairing yard	S	
	e. Tindish repairing yard	S	
5.Roads & paving	a. 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.Other	a. Miscellaneous	-	
Abbreviation	S:Spread foundation P:Pile foundation	D:Deep foundation	

(Foundation List)

Table 6-12-5 Bar Rolling Mill Plant (BRM)

Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Main building	P	A= 43,244 M2
	b. Ancillary building	S & P	A= 1,981 M2
2.Foundations for equipment & machinery	a. Billet reversing conveyorl	P	
	b. Reheating furnace	D & P	
	c. Roughing Mill	P	
	d. Intermediate Mill	P	
	e. Finishing Mill	P	
	f. Flying shears	P	
	g. Cooling Bed and Cold Shear	P	
	h. Bar bundling/ Finishing Facility	P	
	i. Cold Shear/hnadling Facility for Irregular bar	P	
	j.Roll shop equipment	P	
3.Pits & culverts	a. Scale Sluice and Pit	S & P	Sheeting
	b. Cable pits & culverts	D & P	
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	a. Drainage pipe for storm water (RC pipe)	-	
	b. Sanitary sewage pipe (PVC pipe)	-	
8.Other	a. Miscellaneous	-	
		TOTAL	
Abbreviation	S:Spread foundation P:Pile foundation	D:Deep foundation	

(Foundation List)

Table 6-12-6 Lime Calcining Plant (LCP)

Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Control building	S	A= 200 M2
2.Foundations for equipment & machinery	a. Receiving hopper	S	
	b. Limestone storage bin	S	
	c. Lime calcining kiln	P	
	d. Product bin	P	
	e. Conveyor	S & P	
	f. Rejected material pile	S	
3.Roads & paving	a. Asphalt paving(t=50 mm)	-	A= 2,000 M2
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	

(Foundation List)

Table 6-12-7 Electric Power & Distribution Facilities

Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Main substation	S	A= 1,955 M2
	b. Local substation	S	A= 720 M2
2.Foundations for equipment & machinery			
	a. Transformer	P	
	b. Pressurized tank	S	
	c. Cooling tower	S	
	d. Air filter	S	
	e. Dummy tank	S	
	f. Fuel oil tank	S	
	g. Flicker yard	S	
3.Pits & culverts	a. Cable culverts	S	
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 fence	-	
	b. Miscellaneous	-	
Abbreviation	S:Spread foundation P:Pile foundation	D:Deep foundation	

(Foundation List)

Table 6-12-8 Utilities

Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Electrical and control room	S	A= 1,118 M2
	b. Other buildings	S	A= 3,391 M2
2.Foundations for equipment, vessel and basin etc.	a. Natural gas receiving station	S	
	b.O2 Plant	S	
	c. Water Intake and Raw water receiving station	D & S	
	d. SMP/RMP Water treatment station	S	
	-Cold well & cooling tower for CCM & BRM		
	-Hot/cold well & cooling tower for SMP		
	-Cooling tower for air compressor		
	-Softened water basin		
	-Heat exchanger		
	-Head tank for SMP & CCM/BRM		
	-Pressure filter		
	-Back washed water basin		
	-Cooling tower		
	-Head tank		
	-Thickener		
	-Sludge storage basin		
	-Sedimentation basin for CCM/BRM		
	f. Waste water treatment station	S	
	g. Sewage water treatment station	S	
	h. Drainage pumping station	S	
	i. Pipe rack	S	
	j. Sea water discharge	D & S	
	k. Desalination plant	S	
3.Roads & paving	a. Asphalt paving(t=50 mm)	-	A= 12,000 M2
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	

(Foundation List)

Table 6-12-9 Maintenance Shop

Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Main building	S	A= 1,980 M2
	b. Ancillary building	S	A= 130 M2
2.Foundations for equipment & machinery	a. Lathe	S	
	b. Milling & grinding machine	S	
	c. Press machine	S	
3.Slab on grades	a. Ground floor slab of maintenance shop	S	
	b. Ground floor slab of car repair shop	S	
4.Roads & paving	a. Asphalt paving (t=50 mm)	-	A= 12,000 M2
5.Drainage system	a. Drainage pipe for storm water (RC pipe)	-	
	b. Sanitary sewage pipe (PVC pipe)	-	
6.Other	a. Miscellaneous	-	
Abbreviation	S:Spread foundation P:Pile foundation	D:Deep foundation	

(Foundation List)

Table 6-12-10 Analysis & Inspection Facilities

Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Laboratory building	S	A= 875 M2
2.Roads & paving	a. Asphalt paving(t=50 mm)	-	A= 1,000 M2
3.Drainage system	a. Drainage pipe for storm water (RC pipe)	-	
	b. Sanitary sewage pipe (PVC pipe)	-	
4.Other	a. Miscellaneous	-	
Abbreviation	S:Spread foundation P:Pile foundation	D:Deep foundation	

(Foundation List)

Table 6-12-11 Transportation Facilities in the Steel Complex

Item	Description	Type of FDN	Remarks
1.Foundations for building & structure	a. Main building	S	A= 9,000 M2
	b. Ancillary building	S	A= 95 M2
2.Foundations for equipment & machinery	a. Truck scale	S	
3.Slab on grades	a. Ground floor of warehouse	S	
4.Yard Preparation	a. Scrap yard	S	
	b. Limestone storage yard	S	
	c. Slag yard	S	Retaining wall
	d. Additive storage yard	S	
4.Roads & paving	a. Asphalt paving(t=50 mm)	-	A= 3,000 M2
5.Drainage system	a. Drainage pipe for storm water (RC pipe)	-	
	b. Sanitary sewage pipe (PVC pipe)	-	
6.Other	a. Miscellaneous	-	
Abbreviation	S:Spread foundation P:pile foundation	D:Deep foundation	

(Building List)

Table 6-12-12 Raw Material storage Yard

Item / Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish		
							Structure	Roofing	Siding
1. Electric room	1	1	7 x 21	147	147	4	RC	RCS	MB
Abbreviation	SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick					MS :Metal Sheet RCS:Reinforced Concrete Slab			

(Building List)

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

Item Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish Structure	Roofing	Siding
1.Control building	1	2	27x40	1,080	2,160	8	RC	RCS	MB
2.Oxide storage bin building	1	1	20x35	700	700	24	SS	MS	MS
3.Gas analyzer room	1	1	5x8	40	40	4	SS	MS	MS
4.Product screen building	1	1	15x20	300	300	9	SS	MS	MS
5.Hydraulic unit building	1	1	7x12	84	84	5	RC	RCS	MB
6.Iner gas refrigerant dryer building	1	1	7x9	63	63	4	SS	MS	MS
7.Chemical dosing station building	1	2	7x9	63	126	8	RC	RCS	MB

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

(Building List)

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

Item / Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish: Structure	Structure/Finish: Roofing	Structure/Finish: Siding
(Main Building)									
1.Furnace aisle	1	1	31 x 174	5,394	5,394	42.3	SS	MS	MS
2.DRI aisle	1	1	12 x 159	1,908	1,908	50.0	SS	MS	MS
3.Ladle aisle	1	1	28 x 159	4,452	4,452	39.0	SS	MS	MS
4.Casting aisle	1	1	30 x 127	3,810	3,810	34.5	SS	MS	MS
5.Billet aisle	1	1	30 x 103	3,090	3,090	19.0	SS	MS	MS
(Ancillary Building)									
1.EAF electric & control room	2	2		400	1,600	18	RC	RCS	RC
2.LF electric & control room	1	3		200	500	15	RC	RCS	RC
3.CCM electric & control room	1	2		150	300	10	RC	RCS	RC
4.Pulpits for EAF	2	2		150	600	18	SS	MS	RC
5.Pulpits for CCM	1	1		150	150	18	SS	MS	RC
6.Rest room	3	1		20	60	4	RC	MS	MB
Abbreviation	SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick						MS :Metal Sheet RCS:Reinforced 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 Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish Structure	Roofing	Siding
(Main Building)									
1.Billet Yard	1	1	38x180	6,840	6,840	16	SS	MS	MS
2.Furnace Yard	1	1	24x36	864	864	16	SS	MS	MS
3.Mill yard	1	1	30x157	4,710	4,710	17	SS	MS	MS
4.Cooling bed and Cold Shear Yard	1	1	30x213	6,390	6,390	17	SS	MS	MS
5.Product Yard(1)	2	1	20x213	4,260	8,520	17	SS	MS	MS
6.Product Yard(2)	2	1	30x213	6,390	12,780	17	SS	MS	MS
4.Roll shop	1	1	20x157	3,140	3,140	16	SS	MS	MS
(Ancillary Building)									
1.Electric room (main)	1	2	12x90	1,080	2,160	10	SS	MS	MS
2.Electric room (bar finishing)	2	1	25x8	200	400	5	SS	MS	MS
3.Pulpit (reheating furnace)	1	1	12x4	48	48	3	SS	MS	MS
4.Pulpit (main)	1	1	15x5	75	75	3	SS	MS	MS
5.Pulpit (cooling bed)	1	1	15x10	150	150	3	SS	MS	MS
6.Pulpit (shipping line)	2	1	6x6	36	72	3	SS	MS	MS
7.Pulpit (shipping line)	2	1	4x5	20	40	3	SS	MS	MS
8.Rest room	1	2	12x31	372	744	3	SS	MS	MS

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

(Building List)

Table 6-12-16 Lime Calcining Plant (LCP)

Item Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish Structure	Roofing	Siding
1.Control building	1	1	10x20	200	200	5	RC	RCS	MB
Abbreviation	SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick						MS :Metal Sheet RCS:Reinforced Concrete Slab		

(Building List)

Table 6-12-17 Electric Power & Distribution Facilities

Item Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish Structure	Roofing	Siding
(Main substation)									
1.220kv GIS room	1	1	10x50	500	500	10	RC	RCS	MB
2.33kv MCS room	1	1	13x60	780	780	5	RC	RCS	MB
	1	1	6x30	180	180	5	RC	RCS	MB
3.Control room	1	1	13x15	195	195	5	RC	RCS	MB
4.AC generator and D/E room	1	1	15x20	300	300	5	RC	RCS	MB
(Local substation)									
1.EAF substation (Load center)	1	2		360	720	10	RC	RCS	MB
-Switchgear room									
-Panel room									
-Wiring room									
2.BRM substation	1	2		360	720	10	RC	RCS	MB
-Switchgear room									
-Panel room									
-Wiring room									

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

(Building List)

Table 6-12-18 Utilities

Item / Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish: Structure	Roofing	Siding
(Electric & control room)									
1.Desalination plant control room	1	1	15x10	150	150	4	RC	RCS	MB
2.O2 Plant	1	1	20x20	400	400	10	SS	MS	MB
3.Sewage treatment Station	1	1	7x24	168	168	4	RC	RCS	MB
4.SMP	1	1	10x20	200	200	4	RC	RCS	MB
5.RMP	1	1	10x20	200	200	4	RC	RCS	MB
(Other building)									
1.Desalination plant Make up house	1	1	43x38	1,634	1,634	7	SS	MS	MS
2.Sewage treatment Plant Blower room	1	1	12x6	72	72	7	RC	RCS	MB
3.Sewage: Sedimantation building	1	1	11x25	275	275	9	SS	MS	MS
3.O2 Plant Compressor building	1	1	20x60	1,200	1,200	10	RC	RCS	MB
4.SMP Chemical house	1	1	10x15	150	150	7	RC	RCS	MB
5.RMP Chemical house	1	1	6x10	60	60	7	RC	RCS	MB

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

(Building List)

Table 6-12-19 Maintenance Shop

Item Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish Structure	Roofing	Siding
(Main Building)									
1.Machine shop & electric repair shop	1	1	22x90	1,980	1,980	12	SS	MS	MS
2.Assembly shop	1	1	22x90	1,980	1,980	12	SS	MS	MS
(Ancillary Building)									
1.Transformer room	1	1		30	30	4	SS	MS	MS
2.Tool storage room	3	1		50	150	4	SS	MS	MS
3.Rest room	2	1		50	100	4	RC	RCS	MB
Abbreviation	SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick						MS :Metal Sheet RCS:Reinforced Concrete Slab		

(Building List)

Table 6-12-20 Analysis & Inspection Facilities

Item Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish		
							Structure	Roofing	Siding
1.Laboratory	1	2	25x35	875	1,750	8	RC	RCS	MB
Abbreviation	SS:Steel Structure RC:Reinforced Concrete MB:Masonry Brick					MS :Metal Sheet RCS:Reinforced Concrete Slab			

(Building List)

Table 6-12-21 Transportation Facilities in the Steel Complex

Item Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish Structure	Roofing	Siding
(Main building)									
1.Warehouse for brick & electrode	1	1	30X140	4,200	4,200	12	SS	MS	MB
2.Warehouse for additive	1	1	30x80	2,400	2,400	12	SS	MS	MB
3.Warehouse for spare parts	1	1	30x80	2,400	2,400	12	SS	MS	MB
(Ancillary building)									
1.Weighing station	3	1		15	45	4	SS	MS	MS
2.Warehouse office	1	1		50	50	4	RC	RCS	MB

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

(Building List)

Table 6-12-22 Administrative Facilities

Item / Name of Building	No of Building	No of Story	Dimension W(m)xL(m)	Building Area(m2)	Total F.Area(m2)	Eaves Height(m)	Structure/Finish: Structure	Roofing	Siding
1.Main office	1	2		2,500	5,000	7.5	RC	RCS	RC
2.Training center	1	1	30x120	3,600	3,600	4	RC	RCS	MB
3.First Aid	1	1	10x25	250	250	4	RC	RCS	MB
4.Security office	1	1	10x20	200	200	4	RC	RCS	MB
5.Fire station	1	1	10x30	300	300	5	SS	MS	MS
6.Site office for									
-DRP	1	1		180	180	4	RC	RCS	MB
-SMP	1	1		700	700	4	RC	RCS	MB
-BRM	1	1		700	700	4	RC	RCS	MB
-Maintenance shop	1	1		600	600	4	RC	RCS	MB
7.Parking Area					LS				
8.Landscaping					LS				

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

Table 6-12-23 Land Preparation

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