NO.3

PROJECT: EL-DIKHEILA PROJECT (JICA RECOMM:FSCAL) (08:YEAR)

COST ACCOUNTING FOR ELECTRIC ARC FURNACE PLANT

COST ELEMENT		TOTAL AMOUNT REQUIREMENT (UNIT)	UNIT COST	TOTAL AMOUNT	PER TON CONSUMPTION	PER TON COST PER TON OF PROJECT
INTERMEDIATE PRODUCTS	MOLTEN STEEL	810000.000 TON	229.858	185374.943		-
MAJOR RAW MATERIALS	SPONGE IRON	715000.000 TON	97.349	69604.624	0.88272	85.932
	SCRAP	219994.000 TON	215.650	47442.133	0.27160	58.571
	FE-MN	4860.000 TON	628.040	3052.274	0.00600	3.768
	FE-SI	4050.000 TON	819.710	3319.825	0.00500	4.099
AUXILIARY RAW MATERIALS	BURNT LIME	60760.000 TON	32.858	1996.446	0.07501	2.465
	FLUORITE	1620.000 TON	350.240	567.389	0.00200	0.700
	AL	405.000 TON	2182.740	884.010	0.00050	1.091
	COKE BREEZE	3240.000 TON	201.490	652.828	0.00400	0.806
SCRAP	SCRAP	8100.000 TON	215.650	1746.765	0.01000	2.156
LN-GAS	NATURAL GAS	1620000.000 M3	0.031	50.544	2.00000	0.062
POWER	POWER	567000000.000 KWH	0.038	21546.000	700.00000	26.600
WATER	MAKE UP WATER	2754000.000 M3	0.474	1305.396	3.40000	1.612
OXYGEN	OXYGEN	1620000.000 NM3	0.078	126.360	2.00000	0.156
OPERATING EXPENDABLES	ELECTRODE	4050.000 TON	3342.840	13538.502	0.00500	16.714
	REFRACTORIES	0.000 US.DL	0.000	12384.900	0.00000	15.290
	OTHERS	0.000 US.DL	0.000	4544.100	0.00000	5.610
COMPRESSED AIR	COMPRESSED AIR	12150000.000 M3	0.006	72.900	15.00000	0.090
INTRA-MILL TRANSPORTATION	INT.TRANSPORT.	478480.000 TON	1.222	584.703	0.59072	0.722
WAGES	WAGES	231.000 M/Y	4936.000	1140.216	0.00029	1.408
BENEFITS	BENEFITS	231.000	1283.360	296.456	0.00029	0.366
MAINTENANCE	MAINTENANCE	0.000 US.DL	0.000	3625.000	0.00000	4.475
FACTORY OVERHEAD COST	FACT.OVHD.COST	231.000	1675.770	387.103	0.00029	0.478

NO.3

PROJECT: EL-DIKHEILA PROJECT (JICA RECOMM:ESCAL) (08:YEAR)

C O S T A C C O U N T I N G F O R CONTINUOUS CASTING P L A N T

COST ELEMENT		TOTAL AMOUNT REQUIREMENT (UNIT)	UNIT COST	TOTAL AMOUNT	PER TON CONSUMPTION	PER TON COST PER TON OF PROJECT
INTERMEDIATE PRODUCTS	BILLET	769500.000 TON	249.933	192323.326		
FINISHED PRODUCTS	BILLET	0.000 TON	0.000	0.000		
MAJOR RAW MATERIALS	MOLTEN STEEL	810000.000 TON	228.858	185374.943	1.05263	240.903
SCRAP	SCRAP	32011.200 TON	215.650	6903.215	0.04160	8.971
LN-GAS	NATURAL GAS	3078000.000 M3	0.031	96.034	4.00000	0.125
POWER	POWER	15390000.000 KWH	0.038	584.820	20.00000	0.760
WATER	MAKE UP WATER	1000350.000 M3	0.474	474.166	1.30000	0.616
OXYGEN	OXYGEN	1231200.000 NM3	0.078	96.034	1.60000	0.125
NITROGEN	NITROGEN	169290.000 NM3	0.078	13.205	0.22000	0.017
OPERATING EXPENDABLES	REFRACTORIES	0.000 US.DL	0.000	2593.215	0.00000	3.370
	OTHERS	0.000 US.DL	0.000	4101.435	0.00000	5.330
COMPRESSED AIR	COMPRESSED AIR	19237500.000 M3	0.006	115.425	25.00000	0.150
INTRA-MILL TRANSPORTATION	INT.TRANSPORT.	8000.000 TON	1.222	9.776	0.01040	0.013
OTHER (VARIABLE OPE.COST)	OTHERS	0.000 US.DL	0.000	2162.295	0.00000	2.810
WAGES	WAGES	227.000 M/Y	4936.000	1120.472	0.00029	1.456
BENEFITS	BENEFITS	227.000	1283.360	291.323	0.00029	0.379
MAINTENANCE	MAINTENANCE	0.000 US.DL	0.000	1813.000	0.00000	2.356
FACTORY OVERHEAD COST	FACT.OVHD.COST	227.000	1675.770	380.400	0.00029	0.494

NO.3

PROJECT: EL-DIKHEILA PROJECT (JICA RECOMM:FSCAL) (09:YEAR)

C O S T A C C O U N T I N G F O R ROLLING MILL P L A N T

COST ELEMENT		TOTAL AMOUNT REQUIREMENT (UNIT)	UNIT COST	TOTAL AMOUNT	PER TON CONSUMPTION	PER TON COST PER TON OF PROJECT
FINISHED PRODUCTS	BAR & ROD	723330.000 TON	282.409	204275.089		
MAJOR RAW MATERIALS	BILLET	769500.000 TON	249.933	192323.326	1.06383	265.886
SCRAP	SCRAP	38481.156 TON	215.650	8298.461	0.05320	11.473
LN-GAS	NATURAL GAS	25316550.000 M3	0.031	789.876	35.00000	1.092
INGOT MOLDS & ROLLS	ROLL	0.000 US.DL	0.000	2133.823	0.00000	2.950
POWER	POWER	90416250.000 KWH	0.038	3435.817	125.00000	4.750
WATER	MAKE UP WATER	940329.000 M3	0.474	445.716	1.30000	0.616
OPERATING EXPENDABLES	OTHERS	0.000 US.DL	0.000	2943.953	0.00000	4.070
COMPRESSED AIR	COMPRESSED AIR	10849950.000 M3	0.006	65.100	15.00000	0.090
INTRA-MILL TRANSPORTATION	INT.TRANSPORT.	731000.000 TON	1.222	893.282	1.01060	1.235
OTHER (VARIABLE OPE.COST)		0.000	0.000	247.942	0.00000	0.343
		0.000	0.000	19.747	0.00000	0.027
WAGES	WAGES	397.000 M/Y	4936.000	1959.592	0.00055	2.709
BENEFITS	BENEFITS	397.000	1283.360	509.494	0.00055	0.704
MAINTENANCE	MAINTENANCE	0.000 US.DL	0.000	6103.000	0.00000	8.437
FACTORY OVERHEAD COST	FACT.OVHD.COST	397.000	1675.770	665.281	0.00055	0.920
OTHER (FIXED OPE.COST)	OTHERS	0.000 US.DL	0.000	37.600	0.00000	0.052

NO.1

PROJECT: EL-DIKHEILA PROJECT (JICA RECOMM:ESCAL) (05:YEAR)

C O S T A C C O U N T I N G F O R CONTINUOUS CASTING P L A N T

MATERIALS 374680.000 OUT PUT 355960.000 YIELD 95.00

COST ELEMENT		TOTAL AMOUNT REQUIREMENT	(UNIT)	UNIT COST (DL)	TOTAL AMOUNT (1000DL)	PER TON CONSUMPTION	COST PER TON OF PRODUCT (DL)
MATERIALS	MAJOR RAW MATERIALS	374680.000	TON	247.098	92582.634	1.0526	260.093
	AUXILIARY RAW MATERIALS	0.000		0.000	0.000	0.0000	0.000
	*** TOTAL	374680.000	TON		92582.634	1.0526	260.093
BY-PRODUCTS		0.000		0.000	0.000	0.0000	0.000
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	SCRAP	14807.936	TON	-215.650	-3193.331	0.0416	-8.971
	*** TOTAL	14807.936	TON		-3193.331	0.0416	-8.971
VARIABLE OPE. COST	FUELS NATURAL GAS	1423840.000	M3	0.031	44.424	4.0000	0.125
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	*** SUB TOTAL	1423840.000	M3		44.424	4.0000	0.125
	INGOT MOLDS & ROLLS	0.000		0.000	0.000	0.0000	0.000
	POWER	7119200.000	KWH	0.038	270.530	20.0000	0.760
	WATER	462748.000	M3	0.474	219.343	1.3000	0.616
	OXYGEN	569536.000	NM3	0.078	44.424	1.6000	0.125
	NITROGEN	78311.200	NM3	0.078	6.108	0.2200	0.017
	OPERATING EXPENDABLES	0.000	US.DL	0.000	3096.852	0.0000	8.700
	COMPRESSED AIR	8899000.000	M3	0.006	53.394	25.0000	0.150
	INTRA-MILL TRANSPORTATION	3900.000	TON	2.371	9.247	0.0110	0.026
	OTHERS	0.000	US.DL	0.000	1000.248	0.0000	2.810
	*** TOTAL				4744.569		13.329
*** VARIABLE COST					94133.871		264.451
FIXED OPE. COST	EMPLOYEES WAGES	227.000	M/Y	4936.000	1120.472	0.0006	3.148
	BENEFITS	227.000	#####	1283.360	291.323	0.0006	0.818
	*** SUB TOTAL				1411.795		3.966
	MAINTENANCE	0.000	US.DL	0.000	1813.000	0.0000	5.093
	SPECIAL RESERVE FOR REPAIR	0.000		0.000	0.000	0.0000	0.000
	DEPRECIATION CHARGES	0.000		0.000	0.000	0.0000	0.000
	TAXES AND LEVIES	0.000		0.000	0.000	0.0000	0.000
	FACTORY OVERHEAD COST	227.000	#####	1715.280	389.369	0.0006	1.094
	OTHERS	0.000		0.000	0.000	0.0000	0.000
		0.000		0.000	0.000	0.0000	0.000
	*** TOTAL				3614.163		10.153
FULL PRODUCTION COST					97748.034		274.604

NO.1

PROJECT: EL-DIKHEILA PROJECT (JICA RECOMM:ESCAL) (05:YEAR)

C O S T A C C O U N T I N G F O R ROLLING MILL P L A N T

MATERIALS 245960.000 OUT PUT 231200.000 YIELD 94.00

COST ELEMENT		TOTAL AMOUNT REQUIREMENT (UNIT)		TOTAL AMOUNT UNIT COST (DL)	TOTAL AMOUNT (10000L)	PER TON CONSUMPTION	PER TON COST PER TON OF PRODUCT (DL)
MATERIALS	MAJOR RAW MATERIALS	245960.000	TON	274.604	67541.596	1.0638	292.135
	AUXILIARY RAW MATERIALS	0.000		0.000	0.000	0.0000	0.000
	*** TOTAL	245960.000	TON		67541.596	1.0638	292.135
BY-PRODUCTS		0.000		0.000	0.000	0.0000	0.000
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	SCRAP	12299.840	TON	-215.650	-2652.460	0.0532	-11.473
	*** TOTAL	12299.840	TON		-2652.460	0.0532	-11.473
VARIABLE OPE. COST	FUELS NATURAL GAS	8092000.000	M3	0.031	252.470	35.0000	1.092
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	*** SUB TOTAL	8092000.000	M3		252.470	35.0000	1.092
	INGOT MOLDS & ROLLS	0.000	US.DL	0.000	682.040	0.0000	2.950
	POWER	28900000.000	KWH	0.038	1098.200	125.0000	4.750
	WATER	300560.000	M3	0.474	142.465	1.3000	0.616
	OXYGEN	0.000		0.000	0.000	0.0000	0.000
	NITROGEN	0.000		0.000	0.000	0.0000	0.000
	OPERATING EXPENDABLES	0.000	US.DL	0.000	940.984	0.0000	4.070
	COMPRESSED AIR	3468000.000	M3	0.006	20.808	15.0000	0.090
	INTRA-MILL TRANSPORTATION	234700.000	TON	2.371	554.103	1.0108	2.397
	OTHERS	0.000	#####	0.000	92.277	0.0000	0.399
	*** TOTAL				3783.347		16.364
*** VARIABLE COST					68672.483		297.026
FIXED OPE. COST	EMPLOYEES WAGES	375.000	M/Y	4936.000	1851.000	0.0016	8.006
	BENEFITS	375.000	#####	1283.360	481.260	0.0016	2.082
	*** SUB TOTAL				2332.260		10.088
	MAINTENANCE	0.000	US.DL	0.000	4577.000	0.0000	19.797
	SPECIAL RESERVE FOR REPAIR	0.000		0.000	0.000	0.0000	0.000
	DEPRECIATION CHARGES	0.000		0.000	0.000	0.0000	0.000
	TAXES AND LEVIES	0.000		0.000	0.000	0.0000	0.000
	FACTORY OVERHEAD COST	375.000	#####	1715.280	643.230	0.0016	2.782
	OTHERS	0.000	US.DL	0.000	37.600	0.0000	0.163
		0.000		0.000	0.000	0.0000	0.000
		0.000		0.000	0.000	0.0000	0.000
	*** TOTAL				7590.090		32.829
FULL PRODUCTION COST					76262.573		329.855

NO.1

PROJECT: EL-DIKHEILA PROJECT (JICA RECOMM:ESCAL) (06:YEAR)

C O S T A C C O U N T I N G F O R CONTINUOUS CASTING P L A N T

MATERIALS	OUT PUT	YIELD
753352.700	715690.000	95.00

COST ELEMENT		TOTAL AMOUNT REQUIREMENT (UNIT)		UNIT COST (DL)	TOTAL AMOUNT (1000DL)	PER TON CONSUMPTION	PER TON COST PER TON OF PRODUCT (DL)
MATERIALS	MAJOR RAW MATERIALS	753352.700	TON	232.009	174784.487	1.0526	244.218
	AUXILIARY RAW MATERIALS	0.000		0.000	0.000	0.0000	0.000
	*** TOTAL	753352.700	TON		174784.487	1.0526	244.218
BY-PRODUCTS		0.000		0.000	0.000	0.0000	0.000
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	SCRAP	29772.704	TON	-215.650	-6420.484	0.0416	-8.971
	*** TOTAL	29772.704	TON		-6420.484	0.0416	-8.971
VARIABLE OPE. COST	FUELS NATURAL GAS	2862760.000	M3	0.031	89.318	4.0000	0.125
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	*** SUB TOTAL	2862760.000	M3		89.318	4.0000	0.125
	INGOT MOLDS & ROLLS	0.000		0.000	0.000	0.0000	0.000
	POWER	14313800.000	KWH	0.038	543.924	20.0000	0.760
	WATER	930397.000	M3	0.474	441.008	1.3000	0.616
	OXYGEN	1145104.000	NM3	0.078	89.318	1.6000	0.125
	NITROGEN	157451.800	NM3	0.078	12.281	0.2200	0.017
	OPERATING EXPENDABLES	0.000	US.DL	0.000	6226.503	0.0000	8.700
	COMPRESSED AIR	17892250.000	M3	0.006	107.353	25.0000	0.150
	INTRA-MILL TRANSPORTATION	7600.000	TON	1.374	10.442	0.0106	0.015
	OTHERS	0.000	US.DL	0.000	2011.089	0.0000	2.810
	*** TOTAL				9531.238		13.318
*** VARIABLE COST					177895.242		248.565
FIXED OPE. COST	EMPLOYEES WAGES	227.000	M/Y	4936.000	1120.472	0.0003	1.566
	BENEFITS	227.000	#####	1283.360	291.323	0.0003	0.407
	*** SUB TOTAL				1411.795		1.973
	MAINTENANCE	0.000	US.DL	0.000	1813.000	0.0000	2.533
	SPECIAL RESERVE FOR REPAIR	0.000		0.000	0.000	0.0000	0.000
	DEPRECIATION CHARGES	0.000		0.000	0.000	0.0000	0.000
	TAXES AND LEVIES	0.000		0.000	0.000	0.0000	0.000
	FACTORY OVERHEAD COST	227.000	#####	1675.770	380.400	0.0003	0.532
	OTHERS	0.000		0.000	0.000	0.0000	0.000
		0.000		0.000	0.000	0.0000	0.000
		0.000		0.000	0.000	0.0000	0.000
	*** TOTAL				3605.195		5.037
FULL PRODUCTION COST					181500.436		253.602

NO.1

PROJECT: EL-DIKHEILA PROJECT (JICA RECOMM:ESCAL) (06:YEAR)

COST ACCOUNTING FOR ROLLING MILL PLANT

MATERIALS 639200.000 OUT PUT 600850.000 YIELD 94.00

COST ELEMENT		TOTAL AMOUNT REQUIREMENT	(UNIT)	UNIT COST (DL)	TOTAL AMOUNT (1000DL)	PER TON CONSUMPTION	PER TON COST PER TON OF PRODUCT (DL)
MATERIALS	MAJOR RAW MATERIALS	639200.000	TON	253.602	162102.417	1.0638	269.788
	AUXILIARY RAW MATERIALS	0.000		0.000	0.000	0.0000	0.000
	*** TOTAL	639200.000	TON		162102.417	1.0638	269.788
BY-PRODUCTS		0.000		0.000	0.000	0.0000	0.000
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	SCRAP	31965.220	TON	-215.650	-6893.300	0.0532	-11.473
	*** TOTAL	31965.220	TON		-6893.300	0.0532	-11.473
VARIABLE OPE. COST	FUELS NATURAL GAS	21029750.000	M3	0.031	656.128	35.0000	1.092
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	*** SUB TOTAL	21029750.000	M3		656.128	35.0000	1.092
	INGOT MOLDS & ROLLS	0.000	US.DL	0.000	1772.507	0.0000	2.950
	POWER	75106250.000	KWH	0.038	2854.037	125.0000	4.750
	WATER	781105.000	M3	0.474	370.244	1.3000	0.616
	OXYGEN	0.000		0.000	0.000	0.0000	0.000
	NITROGEN	0.000		0.000	0.000	0.0000	0.000
	OPERATING EXPENDABLES	0.000	US.DL	0.000	2445.459	0.0000	4.070
	COMPRESSED AIR	9012750.000	M3	0.006	54.076	15.0000	0.090
	INTRA-MILL TRANSPORTATION	607200.000	TON	1.374	834.293	1.0106	1.389
	OTHERS	0.000	#####	0.000	224.669	0.0000	0.374
	*** TOTAL				9211.414		15.331
*** VARIABLE COST					164420.532		273.647
FIXED OPE. COST	EMPLOYEES WAGES	397.000	M/Y	4936.000	1959.592	0.0007	3.261
	BENEFITS	397.000	#####	1283.360	509.494	0.0007	0.848
	*** SUB TOTAL				2469.086		4.109
	MAINTENANCE	0.000	US.DL	0.000	6103.000	0.0000	10.157
	SPECIAL RESERVE FOR REPAIR	0.000		0.000	0.000	0.0000	0.000
	DEPRECIATION CHARGES	0.000		0.000	0.000	0.0000	0.000
	TAXES AND LEVIES	0.000		0.000	0.000	0.0000	0.000
	FACTORY OVERHEAD COST	397.000	#####	1675.770	665.281	0.0007	1.107
	OTHERS	0.000	US.DL	0.000	37.600	0.0000	0.063
		0.000		0.000	0.000	0.0000	0.000
		0.000		0.000	0.000	0.0000	0.000
	*** TOTAL				9274.967		15.436
FULL PRODUCTION COST					173695.498		289.083

NO.1

PROJECT: FL-DIKHEILA PROJECT (JICA RECOMM:ESCAL) (07:YEAR)

C O S T A C C O U N T I N G F O R CONTINUOUS CASTING P L A N T

MATERIALS 810000.000 OUT PUT 769500.000 YIELD 95.00

COST ELEMENT		TOTAL AMOUNT REQUIREMENT	(UNIT)	UNIT COST (DL)	TOTAL AMOUNT (1000DL)	PER TON CONSUMPTION	PER TON COST PER TON OF PRODUCT (DL)
MATERIALS	MAJOR RAW MATERIALS	810000.000	TON	229.621	185993.402	1.0526	241.707
	AUXILIARY RAW MATERIALS	0.000		0.000	0.000	0.0000	0.000
	*** TOTAL	810000.000	TON		185993.402	1.0526	241.707
BY-PRODUCTS		0.000		0.000	0.000	0.0000	0.000
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	SCRAP	32011.200	TON	-215.650	-6903.215	0.0416	-8.971
	*** TOTAL	32011.200	TON		-6903.215	0.0416	-8.971
VARIABLE OPE. COST	FUELS NATURAL GAS	3078000.000	M3	0.031	96.034	4.0000	0.125
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	*** SUB TOTAL	3078000.000	M3		96.034	4.0000	0.125
	INGOT MOLDS & ROLLS	0.000		0.000	0.000	0.0000	0.000
	POWER	15390000.000	KWH	0.038	584.820	20.0000	0.760
	WATER	1000350.000	M3	0.474	474.166	1.3000	0.616
	OXYGEN	1231200.000	NM3	0.078	96.034	1.6000	0.125
	NITROGEN	169290.000	NM3	0.078	13.205	0.2200	0.017
	OPERATING EXPENDABLES	0.000	US.DL	0.000	6694.650	0.0000	8.700
	COMPRESSED AIR	19237500.000	M3	0.006	115.425	25.0000	0.150
	INTRA-MILL TRANSPORTATION	8000.000	TON	1.222	9.776	0.0104	0.013
	OTHERS	0.000	US.DL	0.000	2162.295	0.0000	2.810
	*** TOTAL				10246.404		13.316
*** VARIABLE COST					189336.590		246.051
FIXED OPE. COST	EMPLOYEES WAGES	227.000	M/Y	4936.000	1120.472	0.0003	1.456
	BENEFITS	227.000	#####	1283.360	291.323	0.0003	0.379
	*** SUB TOTAL				1411.795		1.835
	MAINTENANCE	0.000	US.DL	0.000	1813.000	0.0000	2.356
	SPECIAL RESERVE FOR REPAIR	0.000		0.000	0.000	0.0000	0.000
	DEPRECIATION CHARGES	0.000		0.000	0.000	0.0000	0.000
	TAXES AND LEVIES	0.000		0.000	0.000	0.0000	0.000
	FACTORY OVERHEAD COST	227.000	#####	1675.770	380.400	0.0003	0.494
	OTHERS	0.000		0.000	0.000	0.0000	0.000
		0.000		0.000	0.000	0.0000	0.000
		0.000		0.000	0.000	0.0000	0.000
	*** TOTAL				3605.195		4.685
FULL PRODUCTION COST					192941.785		250.737

NO.1

PROJECT: EL-DIKHEILA PROJECT (JICA RECOMM:ESCAL) (07:YEAR)

COST ACCOUNTING FOR ROLLING MILL PLANT

MATERIALS 769500.000 OUT PUT 723330.000 YIELD 94.00

COST ELEMENT		TOTAL AMOUNT REQUIREMENT	(UNIT)	UNIT COST (DL)	TOTAL AMOUNT (1000DL)	PER TON CONSUMPTION	COST PER TON OF PRODUCT (DL)
MATERIALS	MAJOR RAW MATERIALS	769500.000	TON	250.737	192941.785	1.0638	266.741
	AUXILIARY RAW MATERIALS	0.000		0.000	0.000	0.0000	0.000
	*** TOTAL	769500.000	TON		192941.785	1.0638	266.741
BY-PRODUCTS		0.000		0.000	0.000	0.0000	0.000
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	SCRAP	38481.156	TON	-215.650	-8298.461	0.0532	-11.473
	*** TOTAL	38481.156	TON		-8298.461	0.0532	-11.473
VARIABLE OPE. COST	FUELS NATURAL GAS	25316550.000	M3	0.031	789.876	35.0000	1.092
	OTHERS	0.000		0.000	0.000	0.0000	0.000
	*** SUB TOTAL	25316550.000	M3		789.876	35.0000	1.092
	INGOT MOLDS & ROLLS	0.000	US.DL	0.000	2133.823	0.0000	2.950
	POWER	90416250.000	KWH	0.038	3435.817	125.0000	4.750
	WATER	940329.000	M3	0.474	445.716	1.3000	0.616
	OXYGEN	0.000		0.000	0.000	0.0000	0.000
	NITROGEN	0.000		0.000	0.000	0.0000	0.000
	OPERATING EXPENDABLES	0.000	US.DL	0.000	2943.953	0.0000	4.070
	COMPRESSED AIR	10849950.000	M3	0.006	65.100	15.0000	0.090
	INTRA-MILL TRANSPORTATION	731000.000	TON	1.222	893.282	1.0106	1.235
	OTHERS	0.000	#####	0.000	267.689	0.0000	0.370
	*** TOTAL				10975.257		15.173
*** VARIABLE COST					195618.581		270.442
FIXED OPE. COST	EMPLOYEES WAGES	397.000	M/Y	4936.000	1959.592	0.0005	2.709
	BENEFITS	397.000	#####	1283.360	509.494	0.0005	0.704
	*** SUB TOTAL				2469.086		3.413
	MAINTENANCE	0.000	US.DL	0.000	6103.000	0.0000	8.437
	SPECIAL RESERVE FOR REPAIR	0.000		0.000	0.000	0.0000	0.000
	DEPRECIATION CHARGES	0.000		0.000	0.000	0.0000	0.000
	TAXES AND LEVIES	0.000		0.000	0.000	0.0000	0.000
	FACTORY OVERHEAD COST	397.000	#####	1675.770	665.281	0.0005	0.920
	OTHERS	0.000	US.DL	0.000	37.600	0.0000	0.052
		0.000		0.000	0.000	0.0000	0.000
		0.000		0.000	0.000	0.0000	0.000
	*** TOTAL				9274.967		12.823
FULL PRODUCTION COST					204893.548		283.264

APPENDIX - 1 Ore Stockyard & Material Handling System

1. Outline of Study

The stockyard of iron oxide (pellets and/or lump ore) is located at the area of El Dikheila mineral port and separated at a little distance from Steel Plant. However, in order to maintain the continuous and regular operation of the direct reduction plant, the material handling system of iron oxide from the stockyard is suggested to be controlled over and operated under the operating management of the direct reduction plant. For this purpose, the specifications and estimated cost of the facilities, starting from the yard reclaimer and ending at the tripper conveyor on the day-bin in the direct reduction plant within the battery limits of Steel Plant are described in this paper.

2. Operation Plan

Refer to the attached drawing No. JICA APPEN-01.
The ore stockpiles are two lines, i.e. 660 m and 720 m long each and having the same section of 35 m wide and 8.2 m high, and can be accommodated four kinds of iron oxide stockpiles with the total capacity of 300,000 tons.
Material handling system consists of Reclaimer, BC-1

Belt Conveyor, BC-2 Belt Conveyor, BC-3 Belt Conveyor, BC-4 Belt Conveyor, BC-5 Tripper Conveyor and other miscellaneous facilities. The capacity of this system is 500 t/h and operated for 7,500 hours per year. For reference, estimated cost of consumables is also described in this paper.

Note: For doubling the capacity of this system, the additional stockpiles with ore along conveyor, ore reclaimer and ore tripper will be needed, however the conveyor system BC-2 thru BC-5 is designed to handle the double capacity by changing the gear reducer and motor of each conveyor in order to get the speed of belt doubled.

3. Equipment Specifications

Item No.	Q'ty	Description
1	1	RECLAIMER
		Type: Wheel-excavating
		Capacity: 500 t/h
		Travelling range: 720 m
		Length of boom conveyor: 43 m
		Diameter of wheel: 6 m
		Accessories: 1 lot - Rail and stoppers without sleepers
		1 lot - Cabtyre cable

Item No.	Q'ty	Description
2	1	BC-1 BELT CONVEYOR Type: 30° x 3 rollers, stringer frame Capacity: 500 t/h Belt width: 900 mm Horizontal length: 764 m
3	1	BC-2 BELT CONVEYOR Type: 30° x 3 rollers, gallery frame Capacity: 500 t/h Belt width: 900 mm Horizontal length: 373 m
4	1	TRAMP IRON REMOVER Type: Continuous removing
5	1	METAL DETECTOR Type: Induced coil
6	1	BC-3 BELT CONVEYOR Type: 30° x 3 rollers, gallery frame Capacity: 500 t/h Belt width: 900 mm Horizontal length: 401.5 m

Item No.	Q'ty	Description
7	1	BC-4 BELT CONVEYOR Type: 30° x 3 rollers, gallery frame Capacity: 500 t/h Belt width: 900 mm Horizontal length: 56.5 m
8	1	CONVEYOR SCALE Type: Load cell Capacity: 130 ton/h - 1,300 t/h
9	1	BC-5 TRIPPER CONVEYOR Type: 30° x 3 rollers, gallery frame Capacity: 500 t/h Belt width: 900 mm Horizontal lenght: 49 m
10	5	DUST COLLECTORS Service: For loading points Type: Bag filter
11	1 set	ELECTRICAL EQUIPMENT
12	1 set	WIRING MATERIAL

4. Estimated Cost of the Equipment

The estimated cost for the material handling system is

as below:

Description		Cost (US$)
(1)	Permanent equipment, Items 1 thru 12 mentioned in Article 3 EQUIPMENT SPECIFICATIONS, based on CIF El Dikheila	10,450,000
(2)	Construction	3,850,000
	Total:	14,300,000

5. Estimated Cost of Consumables

The annual estimated cost of consumables for the material handling system will be as below:

Description		Cost per Annum (US$)
(1)	Electric Power	30,000
(2)	Spare Parts	150,000
(3)	Lubricants	10,000
	Total:	190,000

3RD ANGLE PROJECTION

N

STEEL MAKING SHOP

DIRECT REDUCTION PLANT

SANITARY WASTE TREATMENT

BASE POINT "C"

BC-2 BELT CONVEYOR

IRON OXIDE PELLETS / IRON ORE STOCK YARD

BASE POINT "B"

BELT CONVEYORS (BY OTHERS)

RECLAIMER

STACKER (BY OTHERS)

BC-1 BELT CONVEYOR

ORE QUAY

BASE POINT "A"

UNLOADER (BY OTHERS)

BASE POINT "D"

BASE POINT "E"

BASE POINT "F"

40,000

265,000

170,000

500,000

60,000

260,000

765,000

NOTE

EQUIPMENT SHOWN BY TWO-DOT CHAIN LINE IS FOR FUTURE EXPANSION.

AP. - 6

EL DIKHEILA PROJECT

GENERAL LAYOUT OF STOCK PILES AND MATERIAL HANDLING SYSTEM

DATE : APR. 1979	SCALE : 1/4000	DWG.NO. JICA-APPEN-01

APPENDIX - 2 Gas Transmission System

1. Outline of Study

The General Organization For Industrialization (GOFI) has issued a report about this gas transmission system. The report has been reviewed especially from the viewpoint of the mechanical design and the estimation in accordance with the memorandum dated March 16, 1979.

2. Comments

2.1 Mechanical Design

In general, the report is satisfactory. However, the following points shall be mentioned:

(1) Flow and Pipe Diameter

In the report (Section 1, page 1/4), the Weymouth flow equation is shown as

$$Q=433.5\frac{Tb}{Pb}\left(\frac{P_1^2 - P_2^2}{GTLZ}\right)^{0.05} \times D^{2.667}$$

however, "0.05" in the above equation seems to be a misprint, but should be "0.5".

(2) Line Pipe - Material Specifications

Regarding the chemical composition of the pipe

material (Section 1, page 1/5), only carbon, manganese, sulfur and phosphorus are mentioned. However, in addition to the above components, the silica content should be considered. Furthermore it is desirable that carbon content be lower than the shown figure. The above components should be restricted in order to avoid thermal fracture during welding.

The chemical properties are examined on the assumption that the H_2S content in the natural gas is max. 75 ppm and in this case, the recommendable figures for the chemical composition of the pipe material are as follows:

Carbon:	Max.	0.20%
Manganese:	Max.	1.25%
Sulfur:	Max.	0.05%
Phosphorus:	Max.	0.04%
Silica:	Max.	0.35%

But, if the H_2S level becomes higher in excess of 75 ppm, it possibly seems that the pipe material shall be corroded because of H_2S, and then the chemical properties shall have to be examined again.

(3) Carbon Equivalent

In the report (Section 1, page 1/5), it is stated that the carbon equivalent using the formula $C\% + \frac{Mn}{6}\%$ shall not be greater than 0.45%, based on a check analysis. However, it is desirable that the carbon equivalent is lower than 0.44%, calculated by the following formula:

$$C\% + \frac{Mn}{6}\% + \frac{Si}{24}\% + \frac{Ni}{40}\% + \frac{Cr}{5}\% + \frac{Mo}{4}\% + \frac{V}{14}\%$$

2.2 Estimation

The estimation of this gas transmission system has been reviewed on the basis of the other similar project. In consequence, the following comments shall be pointed.

(1) Material Cost of Pipeline

The pipeline material cost was estimated in October, 1978, however, it seems 10 - 20% cheaper. The costs of the other items are based on the pipeline material cost, and so this affects total cost of this project. It is recommendable to check the pipeline material cost in detail again.

(2) Control Instrument and Telemetry Equipment

In the cost estimation of this project, the cost of the control instrument and the telemetry equipment is mentioned as 70% of pipeline material cost.

It is impossible to judge that "70%" is reasonable or not reasonable, since the detail specifications of the control instrument and telemetry equipment are not received. However, judging from the other similar project, "70%" seems higher.

APPENDIX - 3 Memoranda

Memoranda of March 16 and June 25, 1979 signed between the Special Committee of the Arab Republic of Egypt and the Feasibility Study Mission despatched by JICA are attached herewith.

Cairo, March 16,1979

Memorandum

The JICA mission to conduct the feasibility study for the El Dikheila Integrated Steel Plant Project has completed the survey and investigations of local conditions in Egypt which was undertook during the period of March 2 to March 16,1979 with the full support and assistance of the Egyptian Special Committee.

During the stay of the JICA Mission in Egypt they held several meetings for gathering informations with the following authorities :-

a) Governmental authorities

- Ministry of Planning
- National Planning Institute
- Ministry of Economy and Economic Cooperation (Investment Authorties)
- Ministry of Petroleum
- Ministry of Electricity
- Ministry of Housing
- Electricity authorities in Alexandria
- Water Authorities in Alexandria

b) Steel Production and Refractory Companies :

- Egyptian Iron and Steel Co.
- Delta Steel Mill Co.
- National Metal Co.
- Egyptian Copper Works Co. in Alexandria.

16/III/79

16/3/79

c) Civil Contracting Companies :

- Arab Contractors Co.
- Speco Co.

d) Steel Construction Company :

- Steelco Co.

e) Mechanical and Electrical Erection Companies :

- Arisco Co.
- Arab Contractors Co.

f) Construction Sites :

- Refractory Plant in Helwan
- Fertilizer Plant in Abu - Qir

g) Technicel Training Centers :

- Training Center in Alexandria.

Also the JICA mission held meetings with the representatives of the World Bank Mr. J. Jaffe and Mr. D. Cerpio to review the assumptions to be used in the FS.

The JICA mission and the Egyptian Special Committee have agreed that the besic data and assumptions to be used for the feasibility study shall be as listed in the attached documents.

THE EGYPTIAN SPECIAL COMITTEE

16/III/79

BY ABDEL AZIZ KAMAL

TITLE CHAIRMAN

THE JICA FEASIBILITY STUDY MISSION FOR EL DIKHEILA INTEGRATED STEEL PLANT

16/3/79

BY TOSHIKATSU SUZUKI

TITLE SUB LEADER

CONTENTS

ATTACHMENTS :

1. Minutes of Wrap-up Meeting held on March 3,1979.
2. Lists of documents submitted from SC to JICA mission (attached herein) (No.1 to No. 18).
3. Lists of documents submitted from SC to JICA mission (delivered separately).

16/3/79 16/3/79

I. CONCEPT

A. This Feasibility Study (F.S.) is to perform studies regarding Integrated Steel Works (the Works) to be located at El-Dikheila.

B. The main concept of the project is to produce some 700-800,000 tons per year of wire rods and rebars by using the route of the direct reduction process. The feasibility study will determine the most suitable number and capacity of the different units and equipment.

C. Main production equipment to be installed in the Works :

- Direct Reduction Plant.
- Steel making plant (Electric Arc process and continuous casting Billet machines).
- Bar and rod mills.

Above equipment shall be designed so as to be most suitable to achieve the production level mentioned in item B. above.

Besides, we shall study and report on the supporting facilities for above main equipment such as :

- Lime calcining plant.
- Oxygen plant.
- Electric distribution system.
- Transportation facilities.
- Maintenance shop.
- Others.

D. The JICA FS report will comprise all the studies stated in the letter of Feb. 6, 1979 addressed to H.E. the Minister of Foreign Affairs of Japan, and it will also include the studies for the following points :

a) Outlook for the steel industry in Egypt, the present situation and prospects for future and the need of a new integrated steel plant for production of rebars.

b) The market study will include the possiblity for export.

c) The F.S study will be for integrated steel plant for a final product of 723 000 tons of rebars at the first stage and for a future second stage for doubling the final production.

E. The required area of land for the first and second stage of the plant will be determined after executing the drawings of the different alternative layouts and will be informed to SC as soon as sufficient information on the facilities and equipment has been developed.

II. MARKET STUDY :

A. Production capacity.

Future nominal production capacity of rebar of the existing mills will be as follows :

In year 1983	360 000 Tons.
In year 1990	385 000 Tons.

B. Future production from existing mills.
Production from existing public sector companies in the future shall be postulated upon the actual production records of these companies in the past.

C. Production Record.

Production record of rebar from 1968 to 1978 in each of the companies in each size and in each grade shall be supplied by SC (Special Committee).

D. Import Record.

Import record of rebar from 1968 to 1978 in each size and grade are already obtained by JICA.

E. Product Mix.

1) Grade

The grade breakdown of product from this project shall be as follows :

37 Kg/mm^2	plain bar	50 %.
52 Kg/mm^2	deformed (rib) bar	50 %.

Production of 52 Kg product shall be increased according to the demand trend in the future market.

2) Size Breakdown.

Size breakdown of rebar product which is to be produced in this project shall be postulated based upon the following informations :

a) Size structures of domestic production in past five years from 1974 to 1978.

b) Size structures of imported rebars in past five years from 1974 to 1978.

c) Size breakdown of consumption in past five years from 1974 to 1978.

3) Forms of product from the project.

All the products 10mm. and less in diameter shall be in the form of coil. 13mm. product shall be 20% in coil form and 80% in straight bar form. Products exceeding 13mm. in diameter shall be totally in the form of straight bar.

F. Product Price.

Prepare a recommendation for the selling prices of the products of the project based to the greatest extent possible on the principle of competitiveness with the landed price (without duties) of equivalent imports.

III. RAW MATERIALS

A. Carriers.

Considering the import of pellet and Iron Ore, the FS will consider the availability and edequate size of ships including the usage of big size carriers and the so-called Ore-Oil Carriers in order to minimise the transportation cost.

B. Scrap.

The domestic scraps supply covers only 60-70% of total domestic requirement, besides almost of them are pre-treatment scraps. Therefore it is necessary that all of scraps will be imported to meet the requirement of this Project.

C. Additives.

It is possible that Lime Stone, Calcined Lime, Dolomite, Floursper, Aluminium Metal, Ferro Silicon, and Cokes Breeze would be purchased from donestic market. However, it requires our further investigation on qualities and prices of these materials to give final decision whether or not they are appropriate.

(Data Obtained)

1. Cost of Unloading anf Transportation of Scraps.
2. Price of Raw Materials (1978).
3. Specification (Lime Stone, Calcined Lime, Floursper, Ferro Silicon, Dolomite).

D. Refractories.

At present, Silico-Aluminous Refractories are only produced in Egypt and the Basic and High Grade Refractories are not available. The new plant of the Egyptian Company for Refractories now under construction at Tabbin is expected to supply various kinds of refractories starting the beginning of 1980. The final determination will be done after giving through checking on all the information obtained :

Nomi T.

(Data Obtained)

1. Brouchure of " The Egyptian Company for Refractories" (Existing Plant).
2. Specification and Prices of The New Plant Products.
3. Volume of New Plant Production.
4. Booz,allen and Hamilton study on building materials.

IV. UTILITIES

A. Water

1. Consumption :

Total quantity required for New Steel Plant as make-up will be max. 20 000m^3/day. This figure is preliminary and used for the purpose of survey.

2. Data Obtained :

Data and informations obtained at the office of Alexandria water authority are as follows :

a) Two drinking water reservoirs having the capacity of 2000m^3/ each 4 000m^3/day is already available.

b) Water Authority has the plan to install drinking water pipe line having the capacity of 50 600m^3/d to supply for the industrial area including new steel plant. In around end of 1980 or beginning of 1981.

c) Tabled characteristics of drinking water and raw water written in Arabic was gien by Authority.

d) Water Authority can provide the above drinking water in new steel plant and stated the price of drinking water is 6 P.T/m^3 in 1979 and subject to raising the tarif.

NOTE : SC will check the possibility of the supply of raw water instead of drinking water and its analysis and price per cubic meter.

3. Waste water disposal :

Any particular regulations on this subject is not available at present, however, waste water disposal system will be designed to minimize the enviromental pollution.

B. Natural Gas

1. Natural Gas Consumption :

JICA estimates the maximum consumption of natural gas for El-Dikheila Steel Project to be 45.000Nm^3/h based on 800.000 t/y molten steel production.

Therefore, gas pipeline shall be designed to meet above requirement and JICA will check the design and the estimates of the gas pipeline to meet the above requirement and the second stage.

2. Data Obtained :

a) "Approximate Composition of Sales Gas from Abu Qir" by Egyptian General Petroleum Corporation, Research Department" as per attached.

b) "Tender for Gas Transmission system Abu Qir - Dikheila" made by GOFI.

3. Assumptions and figures to be applied for the feasibility study :

a) Natural Gas Composition.

Data listed in item 2-a above shall be applied unless other wise noted herein.

It is assumed that organic sulfur content shall be less than 2 ppm which is not specified in the data.

b) Pressure of the natural gas to be supplied at the battery limit of the plant shall be.

10 Kg/cm^2 G. $\pm$ 10%

c) Gas Flow Rate : 45 000 Normal m^3/h Max.

d) Gas Price.

The gas is assumed to be supplied with the price of U.S. $ 0.575/mm BTU at the battery limit of the plant site.

C. Electricity :

1. Basic data of electricity required power by El-Dikheila Integrated steel plant (the project) are approximately as follows :

Stage I	Production	800 000 t/y (molten steel)
	Power consumption	850 000 MWH/y
	Max. demand	150 000 KW
	Max. capacity	180 000 KVA in the begining of 1983

2. Power supply and flicker compensation.

a) Following information on electric power source was given by ministry of electricity for power supply and the study of flicker compensation.

- Priority supply of electrical power for the project will be made available from Ameria and Abu Qir substation in 220 KV.
- These systems are connected from Cairo-West and Aswan(500 KV.)

SHORT CIRCUIT CAPACITY :

- Minimum and maximum figures will be sent by telex in a week time.
- Rupturing capacity at present is 5 to 10 GVA and will be 15 GVA in 1983.
- Voltage regulation in 220 KV is $\pm$ 5% for normal use and $\pm$ 10% for emergency.

3. Substation required for the project needs 2 feeders at 220KV or 66KV capacity 180MVA for the first stage in 1983, and the expansion of the project may need 360MVA in future.

   At the same time, ministry of electricity will elaborate study to determine the preference of the above & alternative in 3 weeks time indicating the type of feeding transmission line.

4. Electricity power price per KWH.

   - U.S. cents 1.2 for internal rate of return analysis and U.S. cents 2.4 for economic rate of return analysis to be used.

5. Reactive power required for the project ministry of electricity has asked for reactive power for the project, which will be telexed to IMC within 10 days time.

V. CIVIL & ERECTION WORK

A. Civil Work.

1. Site levelling and earth work

   Site levelling cost shall be elaborated in the FS after deciding the ground levels taking in consideration the most suitable technical and economic solution based on the attached data such as :

   a) Site survey, west of Alexandria (Scale 1 :10,000).

   b) Topographic maps scale 1 : 1,000.

   c) Drawing of El Dikheila port project (alternative 1).

2. Design Basis.

   Design of foundations and structures for estimation of construction cost shall be made on the following basis :

   a) No seismic force shall be considered.

   b) Wind pressure shall be taken 80-100 Kg/m^2.

   c) Soil investigation reports on the site.

3. Procurement of construction materials.

Most of the construction materials required for civil work of this project can be procured from the local market but if procurement in Egypt will have difficulties such materials like steel bars, steel sections and cement shall be procured freely from outside Egypt at international competitive prices.

However it shall be considered that procurment of construction materials from the local market could meet the technical specification.

4. Data for guidance obtained for civil and construction works :

JICA mission acquianted them selves with the major civil and construction contractors in Egypt.

5. Cost estimate of the civil and construction work for the feasibility study will be made considering international prices and/or local prices in Egypt.

8. Mechanical & Electrical Erection (Including piping)work at site.

JICA mission acquianted themselves with the major mechanical and electrical erection contractors in Egypt.

Cost estimation for the mechanical and electrical erection work for the feasibility study will be made considering international prices or local prices in Egypt.

VI. STOCK YARD :

To guarantee the continuous and regular operation of the direct reduction plant, the JV.should have control over and operate the materials hardling facilities specially for iron oxide (pellets and/or lump Ore and scrap).

The FS will develop details of the capacities of the various necessary facilities, starting from the yard reclaimer and finishing at the storage bins inside the battery limits.

Budget estimates of the capital and operating costs of this equipment will be calculated in the FS.

VII. TRANSPORTATION AND STORAGE :

A. Receiving of raw materials (pellet and ore).

1. Port charge for imported raw materials shall be assumed based upon those cost of Alexandria port in 1977.

2. To obtain unit cost of transportation from vessel to raw material stock yard, this FS shall assums the unit cost in case of full capacity operation of the equipment and then calculate the respec tive portion of FS out of this cost.

3. Regarding the transportation within the raw material stock yard or from the yard up to the site,we shall assume the unit cost on condition that all the necessary equipment can be used for the works solely.

4. The unit transportation cost from vessel to the stock yard calculated as above shall be disclosed as an assumption of this FS profit of 10% shall be included in the transportation cost.

5. To assume handling cost in the yard, we shall use the unit price (L.E/m^2y) of the land for stock yard which will be indicated by SC.

B. Receiving of Scraps :

Cost of transportation shall be calculated in the same way as above pellet and ore, assuming berths and temporary stock yard for scraps are available at new El-Dikheila Port.

C. Regarding the functional specification required for the port facilities (for example dimension of ore vessel, capacity of stock yard, capacity of conveyor to the site and capacity of unloading etc..) and quantities of raw materials to be imported shall be stated in the FS report.

D. Pellet and ore shall not be stocked within the site except in case of emmergency.

E. Waste brick and slag etc shall be disposed in the dump site outside the works site free of charge.

F. Product despatch yard shall be of the capacity of 3 weeks of production.

(This has been assumed in accordance with the present distribution & mechanisem in Egypt and actual situation of existing steel mills in Egypt, although it should be of 15 days capacity max. from our experience and standard.)

G. Transportation of finished products :

Delivery condition of finished products shall be, like the other existing steel mill here in Egypt free on board trucks at the works despatch yard. So all the transportation cost outside the works shall be borne by buyers and shall be excluded from this FS.

H. Roads :

Roads outside the works shall be assumed to be suitable enough for the vechicles for transportations of both incoming raw materials and outgoing finished products. Anyhow the FS will show the intensity of traffic due to the plant and numbers of vechicles shall be estimated.

I. Railways :

There will be a railway spur for the finished product shipment. Locomotive service will be supplied by the Railway Authority.

J. Transportation cost of general cargo and raw materials of domestic origin shall be calculated according to the data of "Port Expenses", "cost of transportation by trucks, " Transportation by barges" and "Railway Transportation" which were all supplied to us by IMC.

Refer attached data Nos. 6/7/8/9.

VIII. FINANCIAL STUDY :

A. Cost and financial accounting shall be performed principally in accordance with Egyptian standard accounting system.

B. Taxes shall be calculated in accordance with Egyptian regulations.

1. Incentives shall be given in accordance with Law 43/1974 and its amendments.

2. The base case shall be the one which postulates 5 years tax holiday stated in Law 43 and without custom duties.

Minutes of warp up meeting held between all members of JICA F.S. team and Special Committee members at 15.00 on March 3, 1979

1. Mr. Kishida, leader of JICA team requested Special Committee to confirm the expected incentives for the project by Egyptian government on the following points :

   1) Incentive for corporate tax.

   2) " " custom duty tax for both machines , equipment and raw materials.

   3) " " terms and conditions of lease of land.

   4) " " construction schedule of New El-Dikheila Port and its charge for using.

   Special Committee replied as follows :

   1) Corporate tax or any other tax will be controlled by law No. 43 (1974) and its ammendment law No.32 (1977) which specify as follows :

      . first 5 years : exempted from corporate tax.

      . additional 3 years : Governmental Committe may accept postponement of max. 3 years additional depending upon the situation of J.V. after first 5years.

   2) Re. custom duty : Custom duties for equipment and for raw materials can be exempted if Ministry of Finance and other related Ministries approve it after reviewing on following conditions :-

      a. New technology for Egypt.

      b. Reconstructions or development to create new society here.

      c. Profitability during first one year is not sufficient.

From above point of view, the J.V. may easily get approval.

3) Other incentives :

(a) There will be no problem about the products distribution because all products of the new project will be consumed in Egypt. There will be also no problem at all about pricing policy for the same reason.

(b) J.V. will be free from governmental restrictions such as for employment of labor, board number and share of employee, etc.. because it is of private sector company.

(c) Regarding cost of utilities such as gas,electricity,port facility and transportation, incentives shall be got after negotiations with related ministries or authorities.

2. Regarding priority of this project :

Top priority is already given to the project by Egyptian government, you can know this from the fact that Mr. Sharkas of Min. of Industry has joined this Special Committee.

Egyptian government wants to realize this project as soon as possible in order to minimize import of reinforcing steel bar.

3. Pricing of products by J.V. : (JICA mission)

This F.S., shall do utmost to estimate production cost of this project. However F.S. will be carried out under the assumption that the price of products will be got after necessary profit will added to production cost.

(Special Committee)

Actual pricing for reinforcing bar has been as follows :-

- Upto May, 1978 L.E140/Ton of base size
- From July, 1978 L.E165 /Ton -"" -
- From January, 1979 L.E. 195/Ton -""-

(Actual price for producer
& LE 180 /ton and balance
LE 15 /ton is absorbed by Min. of Housing to adjust difference between import price and local one for construction of governmental infrastructure .

4. Raw materials such as iron ore and oxide pellet :

There will be no restriction for procurement of raw material provided that it is got by international competitive bidding.

There are some long term contracts for raw materials even at present.

For the D.R. project, Iron ore and Oxide pellet was considered to be imported from more than one source and transport should be very competitive.

5. Regarding the price or pricing mechanism of utilities by related ministries or authorities. Special Committee will arrange meetings with such parties so that F.S. team may obtain certian idea during its stay here.

6. (Mr. Kamal)

Steel structure for construction of Helwan Steel Complex has been manufactured locally to the extent of 90 % of total.

There are three major steel fabricators, METALCO, STEELCO and IRON AND STEEL Co. and their capacity is considerably big. Also we can request expansion of their suppliability if necessary.

ATTACHMENT- 3

(Delivered Separately)

List of Documents submitted from IMC to JICA Mission

1. Data and Drawings listed in the Attachment - 2, No. 17.

2. Geodetic Coordination for site and altitudes due to M.S.L dated 14.3.1979.

3. Basic Data of the Execution Organization For the Iron and Steel Complex.

   1) Price Lists of Materials and Construction Works in A.R.E. Nov. 1976 (March, 1977).

   2) Technical Specifications For Designing (March, 77)

   3) Local Building and Industrial Materials and Products Specifications (March, 1977)

4. El-Dikheila Port Project Master Plan.

   Volume 1. Proposed Layouts Year 2000.

   Part 0 : Introduction and Summary.

   1 Forecast Traffic.

   2 General Conception of the Port.

   3 Site Conditions.

   4 Alternative Layouts and Proposed Solutions.

5. El-Dikheila Port Project :

Volume 2 : Master Plan for Year 2000 - Phase 1.

Part 0 : Introduction and Summary.

1 : Master Plan for Year 2000.

2 : Master Plan for Phase One.

3 : General Organization Construction Cost Estimates.

4 : Feasibility Study.

Appendix Quantitive Estimates.

6. Drawings :

1) El-Dikheila Port Project Final Design of Mineral Jetty and Breake Water Marine Works 4 Working drawings.

2) El-Dikheila Port Project.

Volume 2 Master Plan for Year 2000 Phase One.

7. OTHERS

1. Supplementary Report.

2. Phase I Report.

3. Phase I Report.

4. Summary Report.

5. Flat Product Production A Strategic Study of The Egyptian Metallurgical Industry Phase III Report No. 1.

6. A Study of Hot Rolled Flat Products A Strategic Study of The Egyptian Metallurgical Industry Phase III Report No. 2

7. A Study of Ductlle Iron Pipe Production in Egypt A Strategic Study of The Egyptian Metallurgical Industry Phase III Report No. 3

8. Study of Rolling Mill Roll Production in Egypt A Strategic Study of The Egyptian Metallurgica Industry Phase III Report No. 4

9. - Ditto - Report No. 5

10. A Study of Special Steel Production in Egypt A Strategic Study of The Egyptian Metallurgical Industry Phase III Report No. 6

11. A Study of Cold Rolling of Steel Strip A Strategic Study of The Egyptian Metallurgical Industry Phase III Report No. 7

12. A Study of Steel Plant Manufacture in Egypt A Strategic Study of The Egyptian Metallurgical Industry Phase III Report No. 8

13. A Strategic Study of The Egyptian Metallurgical Industry - Final Report.

14. Replies to Comments on Final Report.

15. Strategic Study for Building Materials and Ceramics, Stage III Vol. 1.2

16. Strategic Planning Study for Engineering Industries, Report No. 1, 2, 3, 4.

17. LAW 43 and it's Ammendment.

18. Basic Data.

19. Social Insurance in A. R. E.

20. Application Form for Investment in A. R. E.

21. Tender for Gas Transmission System Abu-Qir - Dikheila.

22. Reviewed cost estimate for Abu-Qir/ Dekheila Gas Pipeline Project - October 1978.

23. Iron and Steel Works In Helwan - Expansion Detailed Project Report Volume 1 Part 1.

24. - Ditto - Part 2.

MEMORANDUM

On the meeting between SC and JICA in Cairo, from 20 to 25 June, 1979, concerning the presentation by JICA of the draft feasibility study, names of the members attached herewith as Annex 1.

During this meeting, JICA representatives presented the draft Feasibility Study, and SC representatives raised several points for discussion and/or clarification.attached herewith as Annex 2.

The following summarises these points and the agreements reached concerning them :

1. General :

1.1. JICA confirmed that the consumption, production and efficiency figures and rates given in the FS are based on actual practice in Japan and also their experience in similar plants outside Japan. This also indicated that suppliers guarantee figures will generally be lower than those given in the F.S.

JICA also indicated that they expect suppliers guarantee figures to be attained within one year of start up, while the figures given in the FS would be attained within two years of start up.

1.2. Concerning the degree of accuracy applied in FS, JICA stated that the following accuracies apply relative to present value :

Total capital	± 10%
Construction Cost	± 15%
Production Cost	± 7 to 10%

2. Market :

2.1. It was agreed that JICA would include in the F.S. additional back-up results of the correlation analysis described in the draft F.S.

2.2. At the request of SC, JICA agreed to apply an alternative product mix for the rolling mills, whereby the total requirements of Egypt of wire rods of 6mm and 8mm would be produced, and to calculate the financial results of the project in such a case. In this case, it will be necessary to take into consideration a basic price for r/c bars and the size extras for each diameter. SC further requested JICA to attempt to establish a mathematical formula which would enable it to calculate the effect of any other change in product mix.

3. Project Implementation :

3.1. Concerningthe assumptions and basis taken by JICA in determining the project implementation schedule, JICA stated that it applied the following assumptions :

- Procurement shall be on the basis of international bidding and in packages of plant units.

  Increase of the number of packages has the tendency to increase the time of implementation, although this is not always the rule.

- Construction should be carried out by the smallest number of contractors, preferably one but not more than three.

- A coeffecient has been applied to the project which is 1.4 to 1.5 relative to a coefficient of 1 for conditions in Japan.

3.2. JICA stated that the critical areas of project implementation are the site preparation which is scheduled to proceed parallel with construction work, and the rolling mills.

3.3. JICA further explained that "Bill of Quantities Contract" method shall be considered for the implementation phase.

4. Learning Curve :

JICA stated that the learning curve is based on the assumption that the design capacity shall be reached after one year of start up and that this capacity will be exceeded and shall reach the F.S. figures after two years from start up.

JICA further stated that the most important factors in achieving the rated results are the skill of the workers and the efficiency of maintenance.

Concerning the relationship between production volume and financial results of the project, JICA explained that the break-even point of the project is at the production level of 504,000 tons per year of rolled products.

5. Direct Reduction :

Concerning the various points raised with respect to the direct reduction plant, JICA indicated the following :

5.1. The capital cost estimate is based on present prices in Japan for the unit included in the F.S.

5.2. The area assigned for the direct reduction plant would be sufficient for an HYL plant.

5.3. It has been agreed that liquid steel cost estimates shall be given when using sponge iron produced by the HYL process at two alternative degrees of metalization, viz. 91% and 85%. These calculations shall be based on the most recent published figures.

5.4. One reformer is contemplated, having, a reforming capacity sufficient for the production of 700,000 tons per year of sponge iron.

5.5. The gas desulphurization unit proposed is quite adequate with respect to the comparatively low sulphur content of the gas and constitutes a small portion of both the capital cost and operating cost.

5.6 A logic system exists, the data is recorded and fed back to control the operation. The details shall be given by the supplier.

5.7. As regards the choice of a second 600,000 tons module for expansion instead of a 400,000 tons module, JICA stated that the reasons are to acheive spare part interchangeability, reduction of scrap imports, to make available a certain amount of sponge iron for sale to other local steel plants and, in general, for flexibility of operation.

5.8. Passivation will not be necessary in the case of sale of sponge iron locally. The cost of passivation is estimated at approximately by 9 US dollars per ton.

6. Steel Making Unit And Lime Calcining Plant :

As regards the points raised concerning these plants, JICA stated the following :

6.1. The method to be used for charging lime into EAF and the possibility of doing it by pneumatic means shall be further studied and determined during the basic engineering stage. The same applies to carburizing agents.

6.2. Ladle life is given in the F.S. as being 35 to 38 heats, it is hoped that in practice it will reach 50 heats per lining.

The lower parts of the ladle lining and the lining at the slag line will be either zircon or high alumina bricks, the rest will be schamotte. It is foreseen that the ladle lining will undergo two repairs before complete relining.

6.3. The tundish shall be heated , due to the small diameter of the nozzles, cold tundish practice is not recommended.

6.4. Gamma ray level indicator shall be used in the continuous casting machines.

SC stated that it would prefer a system not using connecting cables, such as the infra - red type indicator.

6.5. Billet cutting shall be done by mechanical shears and not by gas cutting, the FS shall be corrected accordingly.

6.6. The shaft kiln, equipped with steam lance burners and charged with washed lime stone will produce lime of comparative quality to that produced in a rotary kiln. Moreover, the energy consumption and capital investment in the case of the shaft furnace provided in the FS are less compared to rotary kilns.

6.7. Lime stone is washed to remove adhering clay, which interferes with the calcination process.

6.8. In case of a major shut down of the lime calcining kiln for relining, which is estimated to take 10 days, there will be a deficit of lime equivalent to five day's requirements. This problem will be further examined at a later stage to find a solution, including the possibility of providing two smaller kilns instead of one kiln or providing additional storage silos.

6.9. On the question of EAF capacity, SC stated that if the furnace capacity were increased to 100 or 110 tons, the steel plant after expansion would have four furnaces only, which would constitute an optimum number of furnaces and an easily scheduled operation.
Furthermore, SC stated that 4 strand continuous casting machines have been sucessfully used for casting heats of 100 to 130 tons into 130 mm square billets in a casting time of 100 minutes per heat.
JICA stated that the solution given in the FS is safer and provides more assurance of trouble free operation and agrees with Japanese experience.

They further indicated that in the case of larger furnaces the problem of flicker will be more serious.

6.10. The material flow sheets indicating the sponge iron : scrap ratios for the expansion shall be revised and corrected.

6.11. More information concerning the ITV system, such as the number and location of monitors, shall be given.

7. Rolling Mills :

7.1 JICA mentioned that the net operating time for the three parts of the mill according to the anticipated product mix in 1986 is as follows:

- Reheating furnace, roughing and intermediate mill: 497 h/month (max. capacity 508 h month).

- Rod finishing stand : 394 h/month .
- Bar finishing stand : 103 h/month .

7.2. JICA agreed to include in the F.S., the impact of adding, from the beginning two complete mills with reheating, roughing and intermediate stands; on the possible product mix, manpower and operating hours/ number of shifts for both rolling mills.

7.3. Regarding SC view of the necessity of having 4 bending stations to meet the local market requirements of 1 ton coils, JICA claimed that according to their discussions with the ministry of housing most of the latter requirements can be 2 ton Coils, more bending stations can be added in the engineering phase.

7.4. JICA stated that straightening & cutting lines for coils of 6 - 13 m.m. diameter rebars is usually done in site by small portable units.

7.5. JICA promised to study & include in their F.S. the addition of bar-bending facility incorporated with the rolling mill.

8. Transportation

SC raised the question of transport problems within the general area of the plant which would reflect directly on plant operation, specially after the extensive and heavy road transport to be expected serving Dekheila harbour, the plant and the area west of Alexandria. Further study is to be made on this point in the basic engineering phase - and due consideration shall be given to the suggestions of moving the products and limestone by railroad.

9. Site Levelling and Lay-out :

9.1 JICA agreed to submit in the final report two alternatives for site levelling one based on m.s.l. + 7 m and the other on m.s.l. 9 m. Project cost estimate will remaine on the basis of m.s.l. + 7 m.

9.2 JICA stressed the fact that the available area for the plant is satisfactory even for phase II.

9.3 JICA agreed to the suggested location for the dump - area near the plant on the Maryout Lake to be used for dumping slag and wastes to arise during operation.

10. Electricity :

10.1 JICA agreed to include necessary fire alarm and fighting systems for electrical equipment and to be connected to the electric control dispatching centre, using telemetry for monitoring and controlling the distribution of electric power, according to JICA's experience.

10.2 JICA agreed to re-calculate the cost of production on the basis of 2.4 ¢ / k.w.h. in their final report as a base case.

11. Water System :

JICA agreed to indicate the efficiency of the cooling system in the F.S. and indicated that in the worst case a water temp. of 32-33 °C will be reached after cooling. SC mentioned the importance of the water temperature and its consistency for the rolls' life and that this point should be taken in consideration.

12. Capital Cost :

12.1 JICA stated that the information asked for by SC regarding details of capital cost estimates broken down into local and foreign currency, as attached in Annex 3, will be included in the F.S.

12.2 JICA agreed to calculate the capital cost estimate based on current prices by the application of the following escalation rates :

	1979	1980	1981 onwards
Egypt	15 %	12 %	9 %
Worldwide	7 %	7 %	7 %

13. Financing Plan :

JICA agrees to prepare a revised financing plan based on the esculation of capital costs, and taking into consideration maximising export/ bilateral credit accordingly, and to specifically include expenditures such as interest during construction and permanent working capital as part of the project cost, and finance them through long term loans and equity as against short term loans as proposed in the draft F.S.

14. Financial Analysis :

JICA agrees to prepare a set of financial statements in current terms through project start up and in constant terms thereafter.
This will be in line with the escalated capital costs.

15. Production Cost :

JICA will provide a break down of the production cost into local and foreign currency. It will also provide a break-down of the following cost elements into their main components :

- Auxilliary raw materials.
- Operating expendibles.
- SC clarified that the exemption of custom duties stipulated under law 43 and its amendments are meant for capital equipment only. All imported material for operation will be subject to current custom tarriffs.

16. Sensitivity Analysis :

JICA agreed to calculate the effect on the internal rate of return for the following assumptions :

- Increase in capital cost by 10%, 15% and 20%.
- Increase in production cost by 5%, 10% and 15%,
- Descrease in sales revenue by 5% and 10%.
- The delay by one year in the start-up of production and the amount of total investement increase.

17. Technical Assistance :

SC requested and JICA agreed to include in the FS details of JICA's proposals regarding training and Management Services. Group for the first 6 years of operation giving number and caliber of personnel and relative cost.

18. Conclusion :

JICA confirmed that all the clarifications and the additional data, whether those already given above or requested by SC, as indicated above, shall be incorporated into the F.S., with

the exception of items 6.1, 6.8, 7.3 and 8, for which it is stated that the additional data and/or information shall be made available during stages followings the F.S.

SC expressed its appreciation for the high standard and quality of the work done on the draft F.S, especially considering the short time during which it was carried out.

THE EGYPTIAN SPECIAL COMMITTEE

25/VI/1979

BY ABDEL AZIZ KAMAL

TITLE : PRESIDENT (SC)

THE JICA FEASIBILITY STUDY MISSION FOR EL DIKHEILA INTEGRATED STEEL PLANT

BY TOSHIKATSU SUZUKI

TITLE : LEADER

ANNEX 1.

MEMBERS OF JICA MISSION : (In the period 20 - 25 June, 1979)

-	Mr. T. SUZUKI	Leader (NKK)
-	Mr. N. FUKUBAYASHI	Government Official (JICA)
-	Mr. H. SAKO	(KSL)
-	Mr. Y. MIYAWAKI	(NKK)
-	Mr. T. YAMAMOTO	(NKK)
-	Mr. H. OHKI	(NKK)

MEMBERS OF SC :

-	ENG. ABDEL AZIZ KAMAL	PRESIDENT SC.
-	ENG. MOHAMED KHATAB	MEMBER OF SC.
-	DR. SAMIR TAHER	LEADER OF SC TECHNICAL GROUP
-	ENG. MOSTAFA K. MANSOUR	STEEL STRUCTURE EXPERT
-	ENG. SHAFIK HAKIM	EXPERT FOR PLANT FACILITIES
-	DR. ABDEL FATAH YOUNIS	STEEL MAKING EXPERT
-	Mr. AHMED ATEF	ECONOMIST
-	ENG. MEDHAT BEKTASH	INDUSTRIAL ENGINEER

ANNEX 2.

Points for discussion and/or clarification

Pertaining to F S.

---

1. GENERAL

- FS is based on certain consumption, production and efficiency figures and rates. It is required to clarify whether such figures and rates are design criteria of the equipment and processes or guarantee figures given by suppliers or whether they are parameters proven in actual pratice.

- What would JICA suggest to acheive committed and controlled total capital costs, production cost and profit?

- What is the degree of the accuracy of the F.S estimates applied by JICA ?

2. THE MARKET

- It is requested to provide additional back-up results of the correlation analysis described but not presented in F.S. Also it is requested to determine the product mix and its impact on the configuration and economics of the mill.

3. PROJECT IMPLEMENTATION

- What are the assumptions and basis for fixing the project implementation schedule?
- What are the suggested procurement packages and procedures?;
- What are the suggested implementation packages of the project?;
- What are the critical path items which should be taken in consideration?,
- What action could be done to expedite the implementation?

4. LEARNING CURVE

What are the assumptions and conditions which were taken into consideration when establishing the learning curve for the plant.

5. DIRECT REDUCTION

- Basis of capital cost estimate
- Learning curve
- Is area sufficient for HYL plant if it proves more economical ?
- An estimate of the cost of liquid steel is requested if the HYL process is applied for the production of sponge iron for two alternative degrees of metalization, 91% and 85%.
- Reformer capacity, the need for one or two reformers.
- Basis for choice of gas desulphurization system, economic comparison, capital costs and operating costs.
- Information is required concerning the contemplated controls, logic blocks, operator giudance and data logging.
- For expansion, why choose a unit having a nominal capacity of 600,000 tons when its full production is not utilized ?

  In case of sale of excess sponge iron, is there enough space to install a passivation facility ? What is the estimated cost per ton of passivation ?

6. STEEL MAKING UNIT AND LIME CALCINING PLANT

- Comment on the possibility of introducing lime into the EAF in powder form by blowing.
- The same for carburising materials.
- Comment on steel ladle life, what type and quality of refractories are used.
- Is it foreseen to use cold tundish lining practice ?
- Discuss liquid steel level detector and control system in the mould of the continuous casting machine.
- Why is gas cutting of billets used instead of mechanical shearing?;
- Why was a shaft lime calcining kiln chosen instead of a rotary kiln?
- Why is lime stone to be washed?
- What measures are contemplated to supply the EAFS with lime in case of major repairs on the lime calcining kiln ?
- Comment on the technological and economic consequences of installing 100-110 ton EAF on the project when producing 810,000 tons and 1,225,000 tons of liquid steel per annum.
- What is the spong iron : scrap ratio contemplated for the Alternative plant (Fig. 4-4)?
- Information is required concerning ITV system.

7. ROLLING MILLS

- The time utilization for the rod mill finishing stands and for the bar mill finishing stands is required, each separately.

  Also, the idle time for each while the other is in operation.

- The reason for not producing 6mm. rods inspite of the fact that the rod mill is specifically designed to produce this size, having a ten stand no-twist finishing block capable of a rolling speed of 75 m/sec. The same for 8 mm. rods as from the year 1990.

  An economic calculation and justification is required.

- What would be the technological and financial consequences on the project if the bar mill is completed right from the beginning by adding a reheating furnace and roughing and intermediate stands. What would be the impact of such an addition on the possible product mix and on the man-power and operating hours/ number of shifts for both rolling mills?

- Due to the fact that 1 ton coils will be in greater demand than 2 ton coils, 4 binding stations will be necessary.

- What is the capital cost and operating cost of one high capacity straightening and cutting line for coils of 6mm up to 13mm diameter? What would the capacity of such a

line be in tons per hour for each diameter.?

- A bar binding facility will be required in the bar finishing section.

8. TRANSPORTATION

- Under this heading we are not only concerned with the problem of transportation within the Plant boundaries, but also with the transport problem in the general area of the Plant, which would reflect directly on plant operation.
  - Extensive and very heavy road transport is expected serving Dikheila Harbour, the Plant and the area west of Alexandria.
    It is necessary to give the question of providing adequate roads to serve the Plant special importance, so as to insure free and easy access and good traffic flow in the general area of the Plant.
  - It is noted that transportation of all materials ingoing and outcoming from the Plant (with the exception of iron ore pellets) is carried out by road transport. The number of vehicles is estimated to be 622 vehicle per day, this traffic will be concentrated during seven working hours per day. Such density of road transportation is expected to cause several problems and congestion. More so if we add the transportation to and from Dikheila Harbour and west of Alexandria. It is therefore necessary to do the utmost possible to reduce this density, the following are but two suggestions in this direction:

    a) to move the rolled products stockyards out of the plant boundaries to another site to be chosen south of lake Maryout and served by road, railway and water canal. The production of the plant would be transported out of the rolling mills continuously on a day by day

basis to the stockyard, preferably by railway. From the stockyard outside the Plant boundaries dispatching to purchasers will take place.

b) Lime stone to be transported into the Plant by railway.

9. SITE LEVELLING AND LAYOUT

- It is requested that the level of the plant site be re-examined with view to increasing it above 7 meters and to the maximum feasible, in order to reduce the earth moving volume to the minimum possible.

- Questions related to layout, plant area, dump location, etc, shall be discussed.

10. ELECTRICITY

- It is suggested to include a control dispatching system using telemetry for monitoring and controlling the electric power distribution with connection to the fire detection system.

- Tariffs for power are under study by the Electricity Authority, but in general tariffs should be in line with Authority's revenue requirements to enable it to meet financial convenants agreed to earlier between the Authority and the World Bank.

11. WATER SYSTEM

- It is required to indicate the maximum temperature of the industrial water after the cooling towers. Especially for the water feeding the rod mill for roll cooling.

12. CAPITAL COST

- It is requested to provide back up details to support the capital cost estimates in terms of physical quantities, detailed breakdowns of local currency and foreign exchange expenditures, and assumptions regarding unit cost, etc...

  All figures in the capital costs were presented in constant 1979 terms.

  Appropriate provision for escalation in line with JICA experience to give the capital cost in the current prices.

13. FINANCING PLAN

- In line with the provision for escalation of capital cost, it is requested to prepare a revised financing plan taking into consideration to maximize export/bilateral credit accordingly; and to specifically include expenditures such as

interest during construction and permanent working capital as part of project cost, and finance them thorugh long term loans and equity as against short term loans as proposed in the draft F.S.

14. FINANCIAL ANALYSIS

- In line with escalated capital costs, it is requested to prepare a set of financial statements in current terms through project start up and constant terms thereafter.

15. PRODUCTION COST

- Breakdown of the production cost by local and foreign currency.
- Breakdown of the following production cost elements.
  . Auxiliary raw materils.
  . Operating expandables .

16. SENSITIVITY ANALYSIS:

- The effect on the internal rate of return of the following assumptions :
  . Increase in capital cost by 10%, 15% and 20%.
  . Increase in production cost by 5%, 10% and 15%.
  . Descrease in sales revenue by 5% and 10%.
  . The delay by one year in the start-up of production and the amount of total investement increase.

ANNEX 3.

Information requested by SC as per item 12.1

CIVIL WORK FOR EACH UNIT OF THE PLANT

		Quantities	Cost
1.	Structural steel for buildings		
	- Steel platforms and supports		
2.	Concrete Foundations		
	- Concrete Slabs		
3.	Roofing and Siding		
4.	Site leveling.		

EQUIPMENT FOR EACH UNIT OF THE PLANT

1. Weight of Equipment
2. Foreign Equipment price F.O.B.
   Local non standard equipment price.
3. Piping work - Quantity, price. (inter-plant connection)
4. Cables and wires Quantity, price (inter-plant connection, total price).
5. Spares " , "
6. Cost of Erection
7. Weight of heaviest piece.
8. Ocean freight.