

国名	シリア・アラブ共和国
	Syrian Arab Republic

一般指標				
政体	共和制(軍事政権下における)	*1	首都	ダマスカス *1
元首	President Hafiz al-ASAD	*1	主要都市名	ハラブ、ヒムス、イフキフ *1
独立年月日	1946年4月17日	*1	経済活動可人口	4,000千人(1995年) *4
人種(部族)構成	アラブ人90.3%、クルド人、カト人	*1	義務教育年数	6年間(1997年) *5
			初等教育就学率	93.0%(1994年) *5
言語・公用語	アラビア語	*1	初等教育終了率	% (年) *6
宗教	スンニ回教74%、他回教16%、キリスト教	*1	識字率	70.8%(1995年) *7
国連加盟	1945年10月	*2	人口密度	84.81人/Km ² (1996年) *1
世銀加盟	1961年11月	*3	人口増加率	3.4%(1996年) *1
IMF加盟		*3	平均寿命	平均67.13 男65.94 女68.38 *1
面積	185.18千Km ²	*1	5歳児未満死亡率	34/1000(1996年) *7
人口	15,608.648千人(1996年)	*1	カロリー供給量	3,295.0 cal/日/人(1995年) *7

経済指標				
通貨単位	シリア・ポンド	*1	貿易量	(1997年) *8
為替(1US\$)	1US\$=11.23 (1998年06月)	*8	輸入	5,380.0百万ドル *8
会計年度	1月~12月	*1	輸出	3,916.0百万ドル *8
国家予算	(1995年)	*9	輸入カバー率	月(年) *11
歳入	11,670.6百万ドル	*9	主要輸出品目	石油、農産物、繊維(1994年) *1
歳出	12,646.5百万ドル	*9	主要輸入品目	食品、機械、金属製品、繊維(1994年) *1
国際収支	311.00百万ドル(1997年)	*9	日本への輸出	37.2百万ドル(1997年) *11
ODA受取額	225.00百万ドル(1996年)	*7	日本からの輸入	195.1百万ドル(1997年) *11
国内総生産(GDP)	16,783.00百万ドル(1995年)	*4		
一人当たりGNP	1,120.0ドル(1995年)	*4	外貨準備総額	百万ドル() *8
GDP産業別構成	農業 % (年) *4		対外債務残高	254.0百万ドル(1996年) *10
	鉱工業 % (年)		対外債務返済率	3.8%(1996年) *10
	サービス業 % (年)		インフレ率	10.0%(1995年) *7
産業別雇用	農業 33.0%(1990年) *7			
	鉱工業 24.0%(1990年)			
	サービス業43.0%(1990年)		国家開発計画	*12
経済成長率	7.4%(1995年) *4			

気象(-1961~1990年平均)		場所: Damascus											(標高 720 m)	
月	1	2	3	4	5	6	7	8	9	10	11	12	平均 / 計	
最高気温	12.0	14.0	18.0	24.0	29.0	33.0	36.0	37.0	33.0	27.0	19.0	13.0	24.6℃	*13
最低気温	2.0	4.0	6.0	9.0	13.0	16.0	18.0	18.0	16.0	12.0	8.0	4.0	10.5℃	*13
平均気温	6.2	8.0	11.2	15.7	20.4	24.6	26.6	26.2	23.3	18.5	12.3	7.5	16.7℃	*14
降水量	43	43	8	13	3	0	0	0	18	10	41	41	220 mm	*13
雨期乾期						乾	乾	乾	乾	乾				

*1 CIA World Fact Book 1997-1998

*2 Member States of United Nations

*3 The World Bank Public Information Center, International Financial Statistics Yearbook 1998

*4 World Development Report 1997

*5 UNESCO Statistical Yearbook 1997

*6 Status and Trends 1997

*7 Human Development Report 1998

*8 International Financial Statistics August 1998

*9 International Financial Statistics Yearbook 1997

*10 Global Development Finance 1998

*11 世界の国一覽表 1998年版

*12 最新世界各國要覽 98年版

*13 The Times Book World Weather Guide, Update Edition

*14 理科年表, 国立天文台(1997)

国名	シリア・アラブ共和国
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項目	年度	1993	1994	1995	1996
技術協力		2,892.93	3,087.67	3,256.28	3,461.48
無償資金協力		2,244.22	2,456.48	2,796.65	2,606.79
有償資金協力		3,939.97	4,352.21	3,878.11	3,025.02
総額		9,077.12	9,896.36	9,931.04	9,093.29

*15

項目	年度	1993	1994	1995	1996
技術協力		5.60	8.57	14.63	19.38
無償資金協力		3.05	16.53	17.60	12.64
有償資金協力		67.60	304.93	90.03	2.84
総額		76.25	330.03	122.26	34.86

*16

	贈与 (1)	有償資金協力 (2)	政府開発援助 (ODA) (1)+(2)=(3)	その他政府資金 及び 民間資金 (4)	経済協力総額 (3)+(4)
二国間援助 (主要供与国)	63.50	6.70	70.20		70.20
1. 日本	32.00	2.90	34.90		34.90
2. ドイツ	13.50	5.50	19.00		19.00
3. フランス	14.10	-1.00	13.10		13.10
4. スウェーデン	2.00	0.00	2.00		2.00
多国間援助 (主要援助機関)	47.20	9.40	56.60		56.60
1. UNRWA					
2. CEC					
その他	4.70	93.80	98.50		98.50
合計	115.40	109.90	225.30		225.30

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技術	関係各省庁→総理府企画庁→企画大臣
無償	
協力隊	

*15 Japan's ODA Annual Report 1997

*16 Geographical Distribution of Financial Flows to Aid Recipients 1992-1996

*17 国別協力情報(JICA)

資料 5-A-1 1964年-2003年のエネルギー需要の傾向と予測

1964年 - 2003年のエネルギー需要の傾向と予測

Year	Installed MW	Production peak GWh	Capacity GWh	Demand GWh	Population Inhabitants	kWh/Capita	Load Shedding
1964	0	0	0	370	5154	72	
1965	171	0	0	415	5325	78	
1966	180	0	0	443	5500	81	
1967	175	0	0	450	5680	79	
1968	173	0	0	498	5866	85	
1969	264	0	0	593	6059	98	
1970	267	174	174	777	6257	124	
1971	164	175	175	914	6467	141	
1972	285	190	190	1051	6684	157	
1973	274	192	192	1010	6908	146	
1974	675	255	255	1132	7140	159	
1975	755	292	292	1353	7380	183	
1976	984	302	302	1628	7627	213	
1977	1134	390	390	2009	7883	255	
1978	1502	511	511	2440	8148	299	
1979	1673	635	635	3114	8421	370	
1980	1715	770	770	3637	8704	418	
1981	1710	876	876	4378	9046	484	
1982	1875	1090	1090	5515	9298	572	
1983	2040	1132	1132	6219	9611	647	
1984	2047	1318	1318	6855	9934	690	
1985	2047	1355	1420	8132	10267	792	292
1986	2047	1294	1460	8747	10612	824	953
1987	2556	1430	1550	9034	10969	824	787
1988	3074	1648	1650	9485	11338	837	128
1989	3194	1870	1980	10597	11719	904	436
1990	3268	1928	1986	11475	12116	947	140
1991	3268	2028	2032	12331	12529	984	249
1992	3243	1982	2405	13339	12958	1029	940
1993	3443	2032	2578	13917	13393	1039	1521
1994	3843	2470	2600	14953	13844	1080	253
1995	5008	2740	2740	16500	14315	1153	
1996	5543	3004	3004	17800	14795	1203	
1997	6638	3295	3295	19300	15290	1262	
1998	7238	3614	3614	20900	15583	1323	
1999	7238	3963	3963	22600	16082	1384	
2000	7238	4350	4350	24500	16,596	1452	
2001	7238	4619	4619	26300	17,128	1508	
2002	7238	4917	4917	28000	17,675	1554	
2003	7238	5234	5234	29800	18,241	1601	

Source: PEEGT

資料 5-A-2 発電設備容量、出力および確定発電能力

発電所設備容量、出力および確定発電能力

	Name of Power Station	Type of Unit	Year of Comm.	Installed Cap. (MW)	Capabil (MW)	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1	Gas Turbine	1	GT	1975/76	280	-	-	-	-	-	-	-	-	-	-	-
2	Hydro		HT		21	-	-	-	-	-	-	-	-	-	-	-
3	Thawra	1		1074/76/77	800	450	450	450	450	450	450	450	450	450	450	450
4	Katine	1	ST	1969	30	24	24	24	-	-	-	-	-	-	-	-
		2	ST	1969	30	24	24	24	-	-	-	-	-	-	-	-
		3	ST	1969	30	17	17	17	-	-	-	-	-	-	-	-
		4	ST	1981	64	55	55	55	55	55	55	55	55	55	55	55
5	Mehardch	1	ST	1979	150	135	135	135	135	135	135	135	135	135	135	135
		2	ST	1979	150	134	134	134	134	134	134	134	134	134	134	134
		3	ST	1987	165	156	156	156	156	156	156	156	156	156	156	156
		4	ST	1988	165	157	157	157	157	157	157	157	157	157	157	157
		1	ST	1987	30	30	30	30	30	30	30	30	30	30	30	30
6	Banias	1	ST	1982	170	150	150	150	150	150	150	150	150	150	150	150
		2	ST	1983	170	150	150	150	150	150	150	150	150	150	150	150
		3	ST	1989	170	160	160	160	160	160	160	160	160	160	160	160
		4	ST	1989	170	160	160	160	160	160	160	160	160	160	160	160
		1	ST	1989	30	30	30	30	30	30	30	30	30	30	30	30
7	Baath		HT	1988	75	19	19	19	19	19	19	19	19	19	19	
8	Swedieh	1	GT	1988/89	175	150	150	150	150	150	150	150	150	150	150	
9	Thaym	1	GT	1989/90	105	90	90	90	90	90	90	90	90	90	90	
10	Ref. Homs	1	ST		64	57	57	57	57	57	57	57	57	57	57	
11	Ref. Banias	1	ST		48	42	42	42	42	42	42	42	42	42	42	
12	Swedieh (SPC)	1	GT		120	-	-	-	-	-	-	-	-	-	-	
13	Tishren	1	ST	1993	200	200	200	200	200	200	200	200	200	200	200	
		2	ST	1994	200	200	-	200	200	200	200	200	200	200	200	
		3	GT	1994	100	100	-	100	100	100	100	100	100	100	100	
		4	GT	1994	100	100	-	100	100	100	100	100	100	100	100	
14	Al Naareye	1	GT	1995	100	100	-	100	100	100	100	100	100	100	100	
		2	GT	1995	100	100	-	100	100	100	100	100	100	100	100	
		3	GT	1995	100	100	-	100	100	100	100	100	100	100	100	
15	Jandar CC	1	GT	1994	100	100	-	100	100	100	100	100	100	100	100	
		2	GT	1994	100	100	-	100	100	100	100	100	100	100	100	
		3	GT	1995	100	100	-	100	100	100	100	100	100	100	100	
		4	GT	1995	100	100	-	100	100	100	100	100	100	100	100	
		5	ST	1995	100	100	-	100	100	100	100	100	100	100	100	
		6	ST	1995	100	100	-	100	100	100	100	100	100	100	100	
16	Tishren Dam	1	HT	1977	105	100	-	-	-	-	100	100	100	100	100	
		2	HT	1977	105	100	-	-	-	-	100	100	100	100	100	
		3	HT	1977	105	100	-	-	-	-	100	100	100	100	100	
		4	HT	1977	105	100	-	-	-	-	100	100	100	100	100	
		5	HT	1988	105	100	-	-	-	-	100	100	100	100	100	
		6	HT	1988	105	100	-	-	-	-	100	100	100	100	100	
17	Al Zara (*)	1	ST	1998	300	300	-	-	-	-	-	300	300	300	300	
		2	ST	1999	300	300	-	-	-	-	-	300	300	300	300	
18	Zezon	1	GT	1996	100	100	-	-	-	100	100	100	100	100	100	
		2	GT	1996	100	100	-	-	-	100	100	100	100	100	100	
		3	GT	1996	100	100	-	-	-	100	100	100	100	100	100	
19	Aleppo	1	ST	1977	200	200	-	-	-	-	200	200	200	200	200	
		2	ST	1977	200	200	-	-	-	-	200	200	200	200	200	
		3	ST	1977	200	200	-	-	-	-	200	200	200	200	200	
		4	ST	1998	200	200	-	-	-	-	-	200	200	200	200	
		5	ST	1998	200	200	-	-	-	-	-	200	200	200	200	
Total (Capability)A				6941	6190	2390	3290	3625	3925	4925	5825	6125	6125	6125	6125	
Generating unit to be deducted from the capacity (B=a+b+c)					600	390	460	460	460	460	600	600	600	600	600	
a. Biggest unit					300	300	200	200	200	200	300	300	300	300	300	
b. Second biggest unit					200	200	160	160	160	160	200	200	200	200	200	
c. One gas turbine unit					100	100	30	100	100	100	100	100	100	100	100	
Firm capacity (C = A - B)						5590	2000	2830	3165	3455	4465	5225	5525	5525	5525	
Installed capacity					6941		2991	3891	4291	4591	5591	6491	6791	6791	6791	

Source: MOE/PBEGT

(*) The number of units and the capacity will be changed to 3 x 200 MW

BOILER PALNT RECOMMENDED OVERHAUL INSPECTION WORKS

資料 5-B-1 ボイラおよび付属装置

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
1. Boiler pressure part	1) Open manhole and visually inspect for indications of corrosion, deposits on the internal surfaces and examine for tightness and integrity of the drum internals. a) Disassembling drum internals. b) Without disassembling drum internals. 2) Remove dust and sludge from drum inside. 3) Check damage on glass of water level gauge. 4) Inspect visually for any indication of corrosion, crack or damage on U-bolt. 5) Replace the manhole gaskets.	○	○	○	Dye penetrant and/or magnetic particle technique shall be used in major overhaul and further investigation on suspective part.
		○	○	○	
		○	○	○	
		○	○	○	
		○	○	○	
2. Furnace wall	1) Set scaffold inside the furnace and check scale deposit on fireside of tube, crack on weld, corrosion, deformation swelling of tube for; a) Burner zone and bottom b) Total furnace	○	○	○	Inspect the critical area
		○	○	○	

BOILER PLANT

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
3. (continued)	<p>Measurement of tube dimension</p> <p>a) Outer diameter</p> <p>b) Wall thickness</p>	<input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
4. Economizer	<p>1) Inspect visually external surface of tubes and supports for erosion, corrosion, crack in weld, deform for;</p> <p>a) The part easily accessible form manhole opening.</p> <p>b) Suspected areas:</p> <p>c) Complete area</p> <p>2) Measurement of tube dimension</p> <p>a) Outer diameter.</p> <p>b) Wall thickness</p>	<input type="radio"/> <input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
5. Headers	<p>1) Inspect visually for indication of corrosion and abnormal deposits by cutting the</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<p>If furnace bottom header is found to be much</p>

BOILER PLANT

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
	inspection cap.				contaminated, other headers shall be subject to investigation.
5. (continued)	2) Inspect visually outside the headers for crack in weld, corrosion.	<input type="radio"/>	<input type="radio"/>	(Uninsulated header only)	Dye penetrant and/or magnetic particle technique shall be used for major overhaul and further investigation on suspect part.
6. Connecting pipe	1) Inspect visually the exterior of welding joint for crack on selected area. 2) Same as above but with Dye penetrant and/or magnetic particle technique.	<input type="radio"/>	<input type="radio"/>		
7. De-superheater	1) External : Inspect visually on seal weld of support and positioning screws for cracks. 2) Internal : Disassemble the de-superheater spray nozzle for erosion, cracks and inspect the liner for erosion or deformation.	<input type="radio"/>	<input type="radio"/>		Dye penetrant and/or magnetic particle technique shall be used as necessary.

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EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
II. Burner	1. Burner register nozzle	1) Check extent of damage on nozzle	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
	2. Wind box	1) Check on crack	<input type="radio"/>		
	3. Wind box damper	1) Adjustment of damper for proper indication and smooth operation.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
		2) Check on damage and deformation of blade.	<input type="radio"/>		
4. Oil atomizer	1) Check and confirm that the distance between atomizer tip and diffuser is as provided in the Instruction Manual. 2) Check extent of damage on diffuser. 3) Measurement of atomizer gun length and hydraulic pressure test if necessary. 4) Check the integrity of contacting surface		<input type="radio"/>		
			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
			<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

BOILER PLANT

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
	condition on stationary and removable unions. Visual	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
4. (continued)	5) Check the integrity of shoulder bolt and threaded hole on stationary union. Visual 6) Check the integrity of gasket surface.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
5. Burner tilt mechanism	1) Check smooth operation through its range while the nozzles are being observed from inside the furnace.	<input type="radio"/>	<input type="radio"/>		
6. Oil gun retract cylinder	1) Check on proper function and integrity.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
7. Pilot igniter	1) Check igniter horn for damage 2) Check integrity of igniter, spark plug, atomizer, flame detecting rod and clean up the same.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

BOILER PLANT

EQUIPMENT		OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
			MAJOR	MINOR	SIMPLE	
	8. Burner valve	1) Check and lapping on inner valve if necessary.	<input type="radio"/>	<input type="radio"/>		
III. Buckstay and casing	1. Buckstay	1) Check visually on bolts and leveler for damage.	<input type="radio"/>			
	2. Casing	1) Examine outer casing visually for evidence of leakage. If any evidence of leakage or questionable area is found remove outer casing and inspect surface of panel on crack, deformation, damage, etc. 2) Inspect the roof and header enclosures for any indication of crack, deterioration of insulation/refractories. 3) Inspect the casing, seals, support steel within the dead air space beneath the sloping furnace bottom.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
IV. Ducts and Dampers	1. Duct	1) Inspect visually exterior of ducts for any evidence of leakage, damage on insulation and lagging.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

BOILER PLANT

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
	<p>2) Inspect visually interior of ducts including expansion joint for any evidence of corrosion, erosion, crack, etc.</p> <p>3) Inspect visually crack on hanger/lug</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	<p>1) Confirm smooth operation for full span.</p> <p>2) Check the clearance of blade</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Visual inspection on bearing shall be made, if smooth operation is hindered.
V. Boiler Safety Valves and Power Control Valve	<p>1) Safety valve setting</p> <p>2) Disassemble and check for crack, erosion, deformation, damage on various parts. Lapping disc and seat</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
VI. Boiler Auxiliaries	<p>1) EDF, GRF,</p> <p>2) Confirm integrity of fastening bolt</p> <p>3) Check clearance between the inlet cone and wheel shroud.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	Annual replacement of lubricant is recommended.

BOILER PLANT

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
	4) Inspect bearing for any indication of damage	<input type="radio"/>	<input type="radio"/>		
2. Air heater	1) Weight measurement for pre-selected cold end elements in two sectors.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
2. (continued)	2) Inspect visually, heating elements for ash deposit and any indication of drain attack by soot blowing.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	3) Inspect visually for any indication of corrosion, crack, damage on soot blowing lance and water washing lance.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	4) Inspect visually for any indication of damage crack, abrasion on seal plate, bearing, rotor, etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	5) Measure clearance on seal plates,	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	6) Inspect visually any indication of abnormality on gear box and air motor	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	8) Inspect visually any indication of gas leak.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
3. Steam air heater	1) Inspect visually element tube for any	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

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EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
4. Miscellaneous fans	<p>inspection of corrosion, wear and leakage.</p> <p>Inspect on casing and impeller for any indication of oil/grease leakage, damage on shaft seal, corrosion, abrasion, crack, etc.</p>	○			
5. Fuel oil pump	<p>1) Alignment check</p> <p>2) Inspect casing and impeller visually for any indication of wear, corrosion, erosion, crack.</p> <p>3) Inspect visually integrity of packing, seal and bearing.</p>	○	○		
6. Fuel oil heater	<p>1) Inspect all flange for any indication of leak and deterioration on gasket.</p> <p>2) Heating element tube shall be withdrawn and inspect visually for indication of corrosion, erosion and wear on tubes and tube plate.</p> <p>3) hydraulic test</p>	○			

BOILER PLANT

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
		<input type="radio"/>			
	4) Overhaul on relief valves				
	7. Fuel oil strainer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	8. Soot blower	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	1) Check effectiveness of cleaning and any tube erosion from soot blowing operation during the internal furnace inspection.				
	2) Investigate nozzle, lance, seal head valve and spring therein, bearing chain, gland packing, seal packing for any indication of erosion, corrosion, wear, crack, damage, etc.				
	1) Check functional module by card tester on functions.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	2) Check operation of voltage relay and power supply interlock as well as calibration on voltmeters of power supply unit.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	3) Check cabinet for dust and dirt for	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
VII. Control and Instrument	1. Burner management system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

BOILER PLANT

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
	<p>cleaning.</p> <p>5) Performance check on solenoid valves, limit switch.</p> <p>6) Internal check on local junction box.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
2. Control drive	<p>1) Check for proper operation for full stroke</p> <p>2) Inspect visually control drive including linkage pin for any indication of wear and abrasion.</p> <p>3) Confirm limit switch and contractor for proper settings.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
3. Control valves	<p>1) Performance check</p> <p>2) Inspect for any indication of erosion, wear and leakage.</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
4. Control element	<p>1) Calibrate on pressure switch, temperature switch, vibration switch, transmitter and</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

BOILER PLANT

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
	controller.				
5. Boiler M.F.T. and Annunciator Check-out	It is advisable to conduct the Boiler M.F.T. and Annunciator Check-out after completion of overhaul of the control system.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
VIII. OTHERS	<p>1. Turbine bypass valve system</p> <p>- Turbine bypass valves</p> <p>1) Disassemble and check for crack, erosion, deformation, damage on various parts.</p> <p>2) Functional check</p> <p>- Oil unit</p> <p>1) Inspect oil pump</p> <p>2) Replace lub. oil</p> <p>3) Perform oil flushing</p> <p>4) Inspect electrical & instrument parts</p>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

BOILER PLANT

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
	5) Functional check	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
2. Emergency diesel generator	1) Clean filters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	2) Replace lub. oil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	3) Inspect & clean the various parts	<input type="radio"/>	*	*	* Depending on operation time
	4) Replace the parts	<input type="radio"/>	*	*	
	5) Inspect & test the protection system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
2. (continued)	6) Perform functional check	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
3. Air compressor Air dryer	1) Clean air filters	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	- Depending on operation time
	2) Replace lub. oil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	3) Inspect & clean the various parts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	4) Replace the parts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	5) Inspect & test the protection system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	6) Perform functional check	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

BOILER PLANT

EQUIPMENT	OVERHAUL / INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
4. Fire fighting system	1) Inspect for crack, damage on whole system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	2) Replace lub. oil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	3) Inspect electrical & instrument parts	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	4) Check protection & ANN system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	5) Perform functional check	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	6) Perform spray test	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
5. Plant water system	1) Inspect internal parts - No foreign material - No loosen bolt & nut - No broken strainer	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	2) Make-up activated carbon, resin, etc.	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	3) Replace lub. oil	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	4) Inspect bearing, mech. seal, etc. of pump & blower	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	5) Check control system	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	
	6) Perform operational check after overhaul	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	

TURBINE PLANT RECOMMENDED OVERHAUL INSPECTION WORKS

EQUIPMENT	OVERHAUL/INSPECTION	CATEGORY OF OVERHAUL		REMARKS	
		MAJOR	MINOR		
1. Steam turbine	1. Turbine casings	1) Disassembly of HP & LP outer casings	○		
		2) Disassembly of HP inner casing	○		
		3) Deformation check, etc.	○		
	2. Turbine rotors	1) Overhaul of HP & LP turbine rotors	○		
		2) Inspection of blades	○		
		3) Inspection of clearance (Rotor setting)	○		
		4) Investigation of status of deterioration, etc.	○		
	Main turbine	3. Blade rings	1) Check of the condition of each part	○	
1) Check of the condition of each part			○		
4. Dummy & Gland rings		1) Deterioration check	○		
		1) Inspection of thrust bearing	○	○	
5. Bolts for high temperature zone		2) Inspection of journal bearing	○	○	
		1) Visual inspection	○	○	
6. Bearings		2) Overhaul inspection	○		
		1) Thickness and layer	○		
Main Steam Valves	7. Turning gear device	1) Disassembly of each portion	○		
		2) Overhaul of servomotor	○		
	8. Insulation	1) Disassembly of each portion	○		
		2) Overhaul of servomotor	○		
	1. Main stop valves	1) Disassembly of each portion	○		
		2) Overhaul of servomotor	○		
	2. Governing valves	1) Disassembly of each portion	○		
		2) Overhaul of servomotor	○		
3. Reheat stop valves	1) Disassembly of each portion	○			
	2) Overhaul of servomotor	○			
4. Interceptor valves	1) Disassembly of each portion	○			
	2) Overhaul of servomotor	○			
Control oil system	1. Governor control block including load limiter, main governor, etc.	1) Overhaul	○		
		2) Cleaning and retouching	○		
	2. Main stop valve controller	○			

RECOMMENDED OVERHAUL INSPECTION WORKS

EQUIPMENT	OVERHAUL/INSPECTION	CATEGORY OF OVERHAUL		REMARKS
		MAJOR	MINOR	
3. Protective device 4. EH converters for MSV and GV 5. Multiple orifice block 6. HP oil relief valve 7. Main oil pump and governor impeller 8. Air pilot valve		<input type="radio"/>	<input type="radio"/>	
		<input type="radio"/>		
		<input type="radio"/>	<input type="radio"/>	
		<input type="radio"/>		
		<input type="radio"/>		
		<input type="radio"/>	<input type="radio"/>	
		<input type="radio"/>		
		<input type="radio"/>		
Turbine auxiliaries	1. Oil reservoir	<input type="radio"/>	<input type="radio"/>	
	2. Oil cooler	<input type="radio"/>	<input type="radio"/>	
	3. Oil conditioner	<input type="radio"/>	<input type="radio"/>	
	1. Condenser	<input type="radio"/>	<input type="radio"/>	
2. Heat exchangers	2. Air ejectors	<input type="radio"/>	<input type="radio"/>	
	3. Gland steam condenser	<input type="radio"/>	<input type="radio"/>	
	4. Feed water heaters	<input type="radio"/>	<input type="radio"/>	
	5. Deaerator and storage tank	<input type="radio"/>	<input type="radio"/>	
3. Instruments	1. Control valves	<input type="radio"/>	<input type="radio"/>	
	2. Instrument system	<input type="radio"/>	<input type="radio"/>	
	3. Turbomaster	<input type="radio"/>	<input type="radio"/>	

RECOMMENDED OVERHAUL INSPECTION WORKS

EQUIPMENT	OVERHAUL/INSPECTION	CATEGORY OF OVERHAUL			REMARKS
		MAJOR	MINOR	SIMPLE	
4. Piping	1. Feed water piping	1) Appearance check of paint and lining 2) Deformation check of piping	<input type="radio"/>	<input type="radio"/>	
	2. Main steam piping	1) Appearance check of insulation 2) Appearance check of pipe supports 3) Deformation check of piping	<input type="radio"/>	<input type="radio"/>	
	1. Boiler feed water pumps	1) Inspection of inner parts 2) Check of alignment and coupling 3) Overhaul of oil cooler and oil pump	<input type="radio"/>	<input type="radio"/>	
	2. Hydraulic coupling for BFP	1) Analysis of sample oil 2) Inspection of inner parts 3) Alignment check	<input type="radio"/>	<input type="radio"/>	○
5. Feed water system	3. Boiler feed booster pump	1) Inspection of inner parts 2) Check of alignment and coupling	<input type="radio"/>	<input type="radio"/>	
	4. Condensate pumps	1) Inspection of inner parts 2) Check of alignment and coupling	<input type="radio"/>	<input type="radio"/>	
	5. Water fill-up pump	1) Overhaul and inspection	<input type="radio"/>		
	6. Heater drain pump	1) Overhaul and inspection	<input type="radio"/>	<input type="radio"/>	
	7. Water treatment plant				
	8. Chemical injection equipment				
	1. Circulating water pumps	1) Inspection of inner parts and casing 2) Check of alignment and coupling	<input type="radio"/>	<input type="radio"/>	
	2. Screen wash pump				
6. Circulating water system	3. Ferrous sulphate injection system	1) Overhaul and inspection of injection pump	<input type="radio"/>		
	4. Hypochlorite injection system	1) Overhaul and inspection of injection pump	<input type="radio"/>		
	5. Ball cleaning system	1) Overhaul and inspection of ball re-circulation pump	<input type="radio"/>		

RECOMMENDED OVERHAUL INSPECTION WORKS

EQUIPMENT	OVERHAUL/INSPECTION	CATEGORY OF OVERHAUL		REMARKS
		MAJOR	MINOR	
7. Closed circuit cooling water system	1. Cooling water pumps	○		
		○		
		○	○	○
	2. Cooling water coolers	○	○	○
		○	○	○
8. Air system	3. Seal oil cooler			
	4. Generator H ₂ coolers			
	5. Exciter air cooler			
	1. Instrument air compressor			
	2. Service air compressor			
9. Unit Auxiliary	1. Traveling screens			
	2. Bar screens			
	3. Overhead crane			

BANLIAS-SYRIAN

Major Overhaul / Inspection Time Schedule of Unit #3 Turbin (1week 1day Holiday Schedule)

Work Item	Date						
	Mon	Tue	Wed	Thu	Fri	Sat	Sun
I. T/G Shut Down	-5	-4	-3	-2	-1	0	1
Turning 1st Stage Temp. 150°C							
Remove lagging & insulation							
Dismantle cross-over pipes							
Dismantle Inlet pipe Bolt & Nut							
Preparing of Bolt Heater							
(1) HP/LP Turbine							
Dismantle No. 1, 2, 3, 4 Pedestal							
> No. 1, 2 Brg & Thrust Brg							
> No. 3, 4 Brg							
HP/LP/GEN Coupling Bolts							
Alignment HP/LP/GEN Rotor							
(2) HP-Turbine							
HP-outer Gland Gov. side							
HP-outer Gland Gen. side							
HP-outer Casing							
HP-No. 1B/R, No. 2D/R, No. 3D/R							
HP-No. 1D/R, No. 4B/R, No. 3No. 2B/R							
HP-Inner Gland Gov. side							
HP-Inner Gland Gen. side							
HP-Rotor (Setting)							
HP-Turbine Parts							

RECOMMENDED OVERHAUL INSPECTION WORKS

EQUIPMENT	OVERHAUL/INSPECTION	CATEGORY OF OVERHAUL		REMARKS
		MAJOR	MINOR	
7. Closed circuit cooling water system	1. Cooling water pumps	○		
		○		
		○	○	○
	2. Cooling water coolers	○	○	○
		○	○	○
8. Air system	3. Seal oil cooler			
	4. Generator H ₂ coolers			
	5. Exciter air cooler			
	1. Instrument air compressor			
	2. Service air compressor			
9. Unit Auxiliary	1. Traveling screens			
	2. Bar screens			
	3. Overhead crane			

Date	Mon Tue Wed Thu Fri Sat Sun Mon Tue Wed																																										
	-5	-4	-3	-2	-1	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37
Work Item																																											
(3) LP-Turbine																																											
LP-outer Gland	Dismantle outer Gland																																										
LP-Flow guiding (LP-Casing inside)	Removal Flow guiding																																										
LP-outer Casing	Dismantle upper Casing																																										
LP-No.2 inner Casing																																											
LP-No.1 inner Casing	Dismantle Upper Casing & Blade Ring Lifting The check of Top Clearance																																										
LP-No.1 B/R	Dismantle Bottom casing & Blade Ring																																										
LP-Rotor (Setting)	LP Rotor Setting LP Rotor Lifting Check Bottom Clearance																																										
Turning Gear	Dismantle Turning Gear																																										
LP-Turbine Parts	Cleaning of Rotor & Bearing & Blading inner casing Bolt & Washer etc. (Inspection-PT,UT,DPI & Visual of All The Parts)																																										
(4) Main Valve	Remove Insulation																																										
Main Stop Valve	Dismantle bonnet (RL side) Overhaul each valve																																										
Gov-Valve	Dismantle bonnet (L-4 valve) Overhaul each valve																																										
ICV	Dismantle bonnet (RL-side) Overhaul each valve																																										
RSV	Dismantle bonnet (RL-side) Overhaul each valve																																										
Main Valve Parts	Cleaning of each valve & Bolt, Washer etc. (Inspection-UT,MT,DPI & Visual of A.I The Part Recommendation)																																										

工程表

NO. ITEM	KEY SCHEDULE	DATE		TYPE-PRINCIPAL ITEM	QUANTITY	APPROVAL		CONTRACTOR
		DATE	DATE			DATE	DATE	
1	EMERGENCY DIESEL GENERATOR	1	1	1	1	1	1	1
2	CLEANING OF FILTER	2	2	2	2	2	2	2
3	REPLACEMENT OF LUBRICANT OIL	3	3	3	3	3	3	3
4	INSPECTION	4	4	4	4	4	4	4
5	REPLACEMENT OF PARTS	5	5	5	5	5	5	5
6	TESTING AND ADJUSTMENT	6	6	6	6	6	6	6
7	AIR COMPRESSOR & AIR DRYER	7	7	7	7	7	7	7
8	CLEANING OF AIR FILTER	8	8	8	8	8	8	8
9	REPLACEMENT OF PARTS	9	9	9	9	9	9	9
10	REPLACEMENT OF LUBRICANT OIL	10	10	10	10	10	10	10
11	FUNCTIONAL CHECK	11	11	11	11	11	11	11
12	FIRE FIGHTING SYSTEM	12	12	12	12	12	12	12
13	VISUAL INSPECTION	13	13	13	13	13	13	13
14	REPLACEMENT OF LUBRICANT OIL	14	14	14	14	14	14	14
15	FUNCTION TEST	15	15	15	15	15	15	15
16	SPRAY TEST	16	16	16	16	16	16	16
17	PRETREATMENT SYSTEM	17	17	17	17	17	17	17
18	INSPECTION OF CLARIFIER	18	18	18	18	18	18	18
19	SAND FILTERS & ACTIVATED CARBON FILTERS	19	19	19	19	19	19	19
20	MAKE-UP OF SAND & ACTIVATED CARBON	20	20	20	20	20	20	20
21	CHECKING OF PUMP BEARING	21	21	21	21	21	21	21
22	DEMINERALIZATION SYSTEM	22	22	22	22	22	22	22
23	INSPECTION OF FAN EXCHANGERS & DECAUSIRRES	23	23	23	23	23	23	23
24	MAKE-UP OF RESIN	24	24	24	24	24	24	24
25	CHECKING OF PUMP & BLOWER BEARING	25	25	25	25	25	25	25
26	WASTE WATER TREATMENT PLANT	26	26	26	26	26	26	26
27	VISUAL INSPECTION	27	27	27	27	27	27	27
28	CHECKING OF PUMP & BLOWER BEARING	28	28	28	28	28	28	28
29	AISC SYSTEM	29	29	29	29	29	29	29
30	CLEANING	30	30	30	30	30	30	30
31	CHECKING OF POWER SUPPLY	31	31	31	31	31	31	31
32	MODULE CHECK	32	32	32	32	32	32	32
33	CHECK & CALIBRATION OF LOCAL EQUIPMENT	33	33	33	33	33	33	33
34	FUNCTIONAL CHECK	34	34	34	34	34	34	34
35	OPERATIONAL CHECK	35	35	35	35	35	35	35
36	CONTROL DRIVE	36	36	36	36	36	36	36
37	CLEANING	37	37	37	37	37	37	37
38	VISUAL INSPECTION	38	38	38	38	38	38	38
39	LUBRICATION OF DRIVE SHAFT	39	39	39	39	39	39	39
40	ADJUSTMENT AND CALIBRATION OF POSITIONER AND DRIVE	40	40	40	40	40	40	40
41	FUNCTIONAL CHECK	41	41	41	41	41	41	41
42	CONTROL VALVE	42	42	42	42	42	42	42
43	CLEANING	43	43	43	43	43	43	43
44	VISUAL INSPECTION	44	44	44	44	44	44	44
45	ADJUSTMENT AND CALIBRATION	45	45	45	45	45	45	45
46	FUNCTIONAL CHECK	46	46	46	46	46	46	46
47	LOCAL INSTRUMENT	47	47	47	47	47	47	47
48	CLEANING	48	48	48	48	48	48	48
49	VISUAL INSPECTION	49	49	49	49	49	49	49
50	CALIBRATION	50	50	50	50	50	50	50

LEGEND:
 ◇: BILER HYDROSTATIC TEST
 ○: BILER FIRING
 ◊: TURBINE START-UP
 ○: SYNCHRONIZATION

ENGINEERING SCHEDULE NO. 001 REV

