

**BOSNIA AND HERZEGOVINA
FEDERATION OF BOSNIA AND HERZEGOVINA
TUZLA - PODRINJE CANTON**

MUNICIPALITY	TUZLA
Organization form (Secretariat, Bureau, Sector, sim.)	Board of reconstruction and construction
Responsible	Hasan Bečirević
Number of employees and qualification	100 - Employees; 70% High school, Higher school and Secondary school
Telephone / Fax	31 242; 32 804; fax 238 290

EQUIPMENT	
Premises m2	400 m2
Computer	computer center
Other equipment	Project Bureau Equipments

CURRENT PROBLEMS - INVESTMENT PRIORITIES			
No.	SECTOR	(E)isting - (N)ew firms in DEM	
EDUCATION			
1.	Repair of primary schools : Mramor, Lipnica , Gornja Tuzla, Breške, Obodnica, Avdibašići, B.Malta, Pasci, Husino, Miladije, Kreka, Jala	E	2.040.000
2.	Secodary schools : Medical, Chemical, Grammar, Machine and traffic communications, Civil Engineering, Mining, Electro-technical and Secondary Handcraft school	E	5.000.000
HEALTH			
1.	Ambulances: Gornja Tuzla , Simin Han, Kovači, Mramor, Husino, Pasci, Slavinovići, Kiseljak, Par Selo, Morančani, Lipnica, Previle, Bukinje, Dokanj and Breške	E	253.000
INFRASTRUCTURE			
1.	Repair of streets, glides and signal signs	E	5.683.405
2.	Repair of Public Transport Company	E	22.321.590
3.	Water supply: zones of sinking, connecting installa..on Mosnik, Grabovica, Mandići, Paša Bunar, Šićki Brod, Automatic control system	E	5.668.460
4.	Water supply of new sources: Power Plant Tuzla, Sprečko Polje 4th phase, Modrac lake	E	47.400.000
5.	Heating: Paša Bunar, Dragodol, Dom omladine, Oktobarska, Reconstruction of Pow. Plant Tuzla fourth wing	N	5.390.000
6.	Repair of Public lightening	E	1.527.801
7.	Municipal services	E	1.527.801
8.	Sewage network: filtering of waste water and new sewage network installation	N	46.500.000
9.	Sewage System: city reconstruction, repair of dispose connections	E	2.770.000
TOTAL:			144.689.256

**BOSNIA AND HERZEGOVINA
FEDERATION OF BOSNIA AND HERZEGOVINA
TUZLA - PODRINJE CANTON**

MUNICIPALITY	ZVORNIK
Organization form (Secretariat, Bureau, Sector, sim.)	Secretariat of Economy, Development and Reconstruction
Responsible	Muaz Latifović
Number of employees and qualification	7 - Employees; 4 Higher school; 3 Secondary school
Telephone / Fax	637 - 311; 631 - 302

EQUIPMENT	
Premises m2	30 m2
Computer	PC 486
Other equipment	-

CURRENT PROBLEMS - INVESTMENTS PRIORITIES			
No.	SECTOR	(E)xisting - (N)ew firms in DEM	
INDUSTRY AND ENTERPRISE			
1.	Primary wood processing		200.000
2.	Fruit and vegetable processing (Project in realization)		xxx
3.			
4.			
5.			
EDUCATION			
1.	Secondary school building		xxx
2.	Equipment needed for Primary school		xxx
3.			
4.			
5.			
HEALTH			
1.	Finalisation works on "Dom zavlja " (Public Health Building)		xxx
2.			
3.			
4.			
5.			
INFRASTRUCTURE			
1.	Main road Kalesija - Sapna		12.000.000
2.	Water - supply for whole Municipality		3.000.000
3.	Secondary PTT network		670.000
4.			
5.			
OTHER SECTORS			
1.	Repair of housing objects		12.000.000
2.			
3.			
4.			
TOTAL:			27.870.000

**BOSNIA AND HERZEGOVINA
FEDERATION OF BOSNIA AND HERZEGOVINA
TUZLA - PODRINJE CANTON**

MUNICIPALITY	ŽIVINICE
Organization form (Secretariat, Bureau, Sector, sim.)	Institution for planning, reconstruction, development and enterprise
Responsible	Mevludin Mahmutbegović
Number of employees and qualification	25 - Employees; 10 High school, 13 Secondary school, 2 Primary school
Telephone / Fax	774-210 fax 772-033

EQUIPMENT	
Premises m2	226 m2
Computer	2 x PC 286
Other equipment	2 official cars

CURRENT PROBLEMS - INVESTMENT PRIORITIES			
No.	SECTOR	(E)xisting - (N)ew firms in DEM	
INDUSTRY AND ENTERPRISE			
1.	ŠIP "KONJUH" Živinice	E	2.000.000
2.	DD "Bosnatex"	E	1.500.000
3.	DJL "RPX NIŠIĆ"	E	180.000
4.	DJL "FEROCIN"	E	300.000
5.	DJL "JAM-HOLZ"	E	221.900
EDUCATION			
1.	Primary school "TUPKOVIĆI"	E	170.000
2.	Primary school "PRILUK"	E	60.000
3.	Primary school "ŽIVINICE GORNJE"	E	120.000
4.	Primary school "SVOJAT"	E	50.000
5.	Primary school "BALIĆI" G.Višća	N	200.000
HEALTH			
1.	Dom zdravlja I (Public Health Building) Živinice	E	195.000
2.	Dom zdravlja II (Public Health Building) Živinice	N	350.000
3.	Regional ambulance Bašigovci	E	20.000
4.	Regional ambulance Donja Lukavica	E	30.000
5.	Regional ambulance Balići	E	30.000
INFRASTRUCTURE			
1.	Tower's water - tank	N	2.800.000
2.	Regulation of the river Oskova - Živinice	N	10.500.000
3.	Change of regional road R-455a Živinice route direction	N	820.000
4.	Waterworks I i II Dubrave Gornje and Donje	N	720.000
5.	Waterworks "Bašigovci" Bašigovci	E	60.000
OTHER SECTORS			
1.	Communities Club Donje Dubrave	E	240.000
2.	Rekultivation of land P.K. Bašigovci	N	650.000
3.	Horizontal and vertical signalisation - Živinice	N	60.000
4.	Heating of the town Živinice	N	10.200.000
5.	Sport hall Živinice	N	3.000.000
TOTAL:			34.476.000

SODASO holding Tuzla
Bosnia and Herzegovina

P R O G R A M M E

**Of Revitalization of Polyurethane Chemistry Within the
Framework of the SODASO holding**

(Extract)

Tuzla, May in 1997

I. INTRODUCTION

1.1. BASIC DATA ON "SODASO"-holding d.d. TUZLA

SODASO was founded in the year 1970 through the integration of the producers of brine, salt and solid sodas the industrial production traditions of which was longer than one hundred years.

SODASO represents one of the greatest subjects of the economy of Bosnia and Herzegovina. In 1992 the value of assets amounted to more than billion DEM and the total income was over 600 million DEM. The production capacities utilization degree at the factories of SODASO reached 96 % in 1991.

The activity of SODASO in the broadest sense of the word covers the production and processing of salt and sodas, the sector of polyurethane chemistry, the production of detergents and of a range of other products in the processing chemistry field.

The Soda Ash Factory Lukavac at Lukavac was built by SOLVAY CONCERN in 1894 and currently sodas are produced under the Solvay procedure.

The production of polyols for flexible and rigid polyurethane foams started in 1976 under the technology of ICI, England, complete with using the ICI trade-mark.

The production of toluene di-isocyanate, with which the production of the components for the production of polyurethanes is rounded off, is based upon the technology and equipment supplied by the Japanese firm MITSUI.

The Detergents Plant DITA was put into operation in 1977 with the production of detergents under the technology of MIRA LANZA, Italy, using also their trade marks.

Many years of the salt water exploitation in the area of Tuzla resulted in severe environmental effects and damages as a consequence of the terrain sinking. In 1986 started the construction of a new salt mine TETIMA, planned upon the technology of controlled solution mining.

Currently the construction of this new facility is in its final phase.

Since the middle of the year 1991 the business system SODASO has been running business as a holding with ten enterprises :

SALT MINE TUŠANJ, TUZLA

SALT FACTORY, TUZLA

POLIHEM, TUZLA

ISOCYANATE CHEMISTRY, TUZLA

DITA, TUZLA

POLIROND, ORAŠJE

HEMOPRODUKT, DOBOJ

HEMIJA, MODRIČA

PROGRES, Kladanj

KARTONAŽA, TOJŠIĆI

INSTITUTE OF CHEMICAL ENGINEERING, TUZLA

SODASO as the bearer of the chemical industry development in Bosnia and Herzegovina, bases the guarantee of its existence and perspective upon :

- one hundred years old tradition in production of salt and sodas (acquired through the experience and know-how)
- reliable and high quality raw materials and energy resources
- proved world quality of its products
- well set production and development strategies concepts
- well-established personnel basis.

The SODASO development concept is defined in two fields :

- Programmes which set in motion the existing facilities and technologies together with a group of programmes of development nature existing at the enterprises which are within the SODASO framework
- Programmes securing a stable long-range production : (restart and completion of the Salt Mine TETIMA construction, construction of a new electrolysis plant based upon the membrane technology)

SODASO holding and its member companies can immediately offer in the market the following goods:

- various types of detergents, shampoos, cleaning agents and cosmetics;
- various grades of salt and seasonings based upon salt;
- thermomelttable linings for footwear;
- various kinds of cardboard packaging.

In addition, and after restarting the production at the factories, which are currently out of operation, SODASO can offer :

- various types of polyols and PUR systems;
- various types of solid sodas;
- toluene di-isocyanate;
- sodium chlorate and sodium hypochlorite.

Transfer of technologies in the fields of the production of salt, sodas and detergents. both independently or in co-operation.

1.2. MARKET POSITION OF SODASO HOLDING

In the year 1990 SODASO holding realized the exports in the amount of 69.06 million US \$, mostly, about 90 % of the exports, to the Western Europe countries, and the minor part to the Eastern Europe countries markets. As the partner- countries emerge Germany, Italy, France, Holland, Bulgaria, Hungary, Turkey and Russia.

In the same year SODASO holding realized the imports of 21.56 million US \$, also mostly from the Western European countries, as the exporting countries emerging Italy, Germany, Holland, Bulgaria and Russia.

Contemplating the situation from the current perspective the major part of the realized sales in the year 1990 would be exports to Slovenia and Croatia, as the countries of the highest share in the realized sales of the SODASO holding at present, while the imports

structure would not be changed in many respects due to the fact that SODASO holding production is based on the local raw materials.

During the years until the aggression on the Republic of Bosnia and Herzegovina, SODASO holding based its appearance in the foreign markets on the business co-operation with its strategical partners : "COPECHIM" Switzerland and "TELMA" Italy. It was through these two companies that SODASO holding carried out most of its export-import activities in the already above mentioned import-export markets.

2. STRATEGY OF THE POLYURETHANE CHEMISTRY PRODUCTION REVITALIZATION WITHIN THE SODASO FRAMEWORK

The basic interest of SODA

2.1. To restart the production at those factories which have secured markets for their goods and which require minimum financial funds from the investment point of view (POLIHEM - polyols production).

2.2. To restart the production also at the factories which will round the SODASO Polyurethane Programme (Isocyanate Chemistry) and create the conditions for the maximum utilization of the local resources, salt deposit, power (Salt Electrolysis).

2.3. To revitalize the development function within the SODASO framework (Institute of Chemical Engineering - Institut za hemijsko inženjerstvo).

Rough scheme of the SODASO holding development strategy is outlined in Annex No.1.

2.1. REVITALIZATION OF THE PRODUCTION OF POLYOLS IN POLYURETHANE CHEMISTRY

2.1.1. IDENTIFICATION DATA

NAME OF THE FIRM .	"SODASO"-holding Polyurethane Chemistry "POLIHEM" Tuzla
LEGAL STATUS OF THE FIRM :	Joint Stock Company
OWNERSHIP :	40.69 % State Capital 23.87 % Joint Stock Capital of the Firm "SODASO" 33.44 % Joint Stock Capital of the workers
PROJECT TITLE :	Investment Programme to Restart the Production at DD "POLIHEM" Tuzla
IMPLEMENTATION TERM :	90 days

INVESTMENT LEGAL FORM :	Joint Venture (eventually credit relationship)
INVESTMENT AMOUNT :	5,700,000.- DEM out of which 4.700.000.- DEM for the programme for the production restart 1.000.000.- DEM for the "SODASO" Development Centre in the Chemical Engineering field
NUMBER OF NEW EMPLOYEES :	408 workers
TOTAL INCOME :	46.194.750.- DEM in the year 1997 77.123.000.- DEM in the year 1998
AMOUNT OF THE INVESTMENTS DONE SO FAR :	4.000.000.-DEM out of which 2.000.000.-DEM own financial funds and 2.000.000.-DEM credits

2.1.2. EMPLOYMENT

It is planned to employ through the implementation of the investment programme the additional 390 workers who are currently at home "on waiting" because the factories are out of operation, and all of them were the workers of this enterprise. In addition, it is planned to employ about 80 highly skilled personnel from outside. That would amount to totally 408 additionally employed workers.

2.1.3. ECOLOGY ASPECT OF THE INVESTMENT

The Investment Programme provides for the reconstruction - repairs of the existing items of equipment at different plants of DD "Polihem". As regards the question of the ecological aspect of the production, it is solved through the technically-technological production process at these factories up to the level requested by such a production. Within the basic production technological solution framework or as a result of the previous construction of separate facilities (mercury removal, chlorinated compounds removal and the like) the liquid waste streams purification level allows for them to be accepted by the facility for the biological treatment of waste waters.

2.1.4. NET CREDIT LIQUIDITY**IN DEM**

ITEM DESCRIPTION	1996	1997	1998
A. INCOMES			
1. Total Incomes	-	46,194,750	77,123,000
2. Credits and Joint Ventures	7,700,000	-	-
	7,700,000	46,194,750	77,123,000
B. EXPENDITURES			
1. Investment	6,700,000	-	-
2. Material Costs of Raw Materials		17,869,068	30,037,356
3. Gross Salaries in Production		3,636,400	6,144,000
4. Power, Steam and Water		8,003,930	12,789,590
5. Other Direct Production Costs		1,388,000	1,647,000
6. Administrative Costs		1,260,000	2,100,000
7. Commercial Function Costs		453,600	756,000
8. Interests on Credits		361,332	243,707
9. Depreciation		6,771,000	7,608,500
10. Miscellaneous Business Running Costs		1,549,200	1,835,000
TOTALLY	6,700,000	41,42,30	63,61,153
C. GROSS PROFIT (A - B)		4,852,200	13,61,847
D. Tax on Profit 36 %		1,746,799	5,026,265
E. NET PROFIT		3,105,421	8,35,582
INVESTMENT PROFITABILITY RATE		6.72 %	11.59 %

2.1.5. MARKET

POLIHEM is the sole producer of polyols in Bosnia and Herzegovina and in the states formed in the territory of the former Yugoslavia. Polyol has a very wide application in the furniture, automobile, refrigerating appliances, footwear, dyes and lacquers industries. Other products (hydrochloric acid, sodium hydroxide and hypochlorite) are used in power generating industry, leather, paper and aluminum oxide industries, in metal processing, etc.

The investment Programme to start the production at POLIHEM provides for the total products sales value to amount to 45.9 million DEM in the year 1997 (out of which 87 % in exports) and to 76.8 million DEM in the year 1998 (out of which 88 % in exports).

The products would be exported to Germany, Italy, Croatia, Slovenia, Serbia, Macedonia and Monte Negro.

The positive difference between exports and imports would amount to about 40 million DEM in the year 1997 and to 68 million DEM in the year 1998.

The marketing of the finished products by quantities, values and the markets is presented in the following Table :

Ord. No.	MARKET PRODUCT DESIGNATION	MEA- SURE- MENT UNIT	QUANTITY		PRICE IN DEM	VALUE	
			1997	1998		1997	1998
A.	MARKET OF BOSNIA AND HERZEGOVINA					6,176,280	9,150,000
1	Industrial Salt	t	3,800	7,000	180	684,000	1,260,000
2	Na-hydroxide	t	4,600	8,300	450	2,070,000	3,735,000
3	HCl	t	11,800	13,300	150	1,770,000	1,995,000
4	Na-hypochlorite	t	1,556	2,000	130	202,230	260,000
5	Polyols	t	500	500	2,000	1,000,000	1,000,000
6	PUR Systems	t	150	300	3,000	450,000	900,000
B.	MARKET OF THE FORMER YUGOSLAVIA (Slovenia, Croatia, Serbia, Macedonia, Monte Negro)					25,905,000	38,134,300
1	Industrial Salt	t	7,600	20,210	180	1,368,000	3,637,800
2	Na-hydroxide	t	11,000	18,070	450	4,950,000	8,131,500
3	HCl	t	12,560	15 100	150	1,884,000	2,265 000
4	Na-hypochlorite	t	13,900	15,000	130	1,807,000	1,950,000
5	Na-chlorate	t	3,000	3,000	750	2,250,000	2,250,000
6	Polyols	t	5,038	5,900	2,000	10,076,000	11,800,000
7.	PUR Systems	t	1,190	2,700	3,000	3,570,000	8,100,000
C.	MARKET OF EUROPE (Germany, Italy)					13,860,000	29,540,000
1	Na-chlorate	t	-	1,000	650	-	650,000
2.	Polyols	t	7,700	16,030	1,800	13,860,000	28,890,000
	TOTALLY					45,941,280	76,824,300

2.2.1. REVITALIZATION OF THE TDI PRODUCTION

By starting up the toluene di-isocyanate (TDI) producing plant, the polyurethane raw materials production within the SODASO framework would be rounded.

The toluene di-isocyanate producing plant was put into operation in the year 1983. The plant was constructed based upon the credit arrangements (commodity credit and financial credit) with the Japanese firm MITSUBISHI CHEMICALS, INC. which is the bearer of the basic technology. The plant design capacity amounts to 18,000 tons/year of TDI 80/20, and as the by-product emerges 33 % HCl (hydrochloric acid) in the quantity of 50,000 tons/year. In accordance with the commercial requirements it is possible to produce up to 10,000 tons/year of isocyanate systems. The production of toluene di-isocyanate represents a set of separate technological procedures-plants resulting eventually in the final product-TDI in a synchronized production. The starting-up of this production would be of multiple significance for Bosnia and Herzegovina :

- This production is fully export oriented. The positive foreign currency balance at the capacity of 80 % amounts to 40 million DEM.
- The repayment of the debt from the factory construction period would be made possible.
- 400 workers would be employed directly in the production, while in the relating activities (transportation, factory maintenance, equipment manufacture, power generation, services, and the like) considerable higher number of workers would be employed.

2.2.2. CONSTRUCTION OF A NEW ELECTROLYSIS PLANT WITHIN THE SODASO FRAMEWORK

The concept of the polyurethane chemistry development within the SODASO framework implies the production of chlorine and alkalis by means of the salt electrolysis.

The existing electrolysis is based upon the mercury technology and is obsolete in terms of both technology and ecology. The future development of SODASO in the fields of the polyurethane chemistry will require the construction of a new electrolysis plant which will exert multiple effects upon the total economy of Bosnia and Herzegovina.

- Chlorine consumption on the spot is secured (for the production of polyols and TDI)
- The market for the alkalis is secured
- The production of new products based upon chlorine is made possible
- Consumption of energy (technological steam, electric power) is secured, which results in improved utilization of the existing power generating capacity in the immediate vicinity.

2.3. SODASO DEVELOPMENT PROGRAMME IN THE FIELD OF POLYURETHANES

SODASO, as the bearer of the chemical industry in Bosnia and Herzegovina, has performed its scientific, research and development activities through the "Institute of Chemical Engineering - Institut za hemijsko inženjerstvo" within the framework of which a special role has been played by the "Institute for Polyurethanes".

In order to make it possible to SODASO to revitalize the existing production and realized the development concept set forth, it is necessary to form a separate agency which would be concerned with the designing of the SODASO holding development goals and strategies.

The Implementation agency would unite the specialists of the Institute of Chemical Engineering - Institut za hemijsko inženjerstvo, Development Sectors from the SODASO member companies, as well as the engaged world experts in the individual fields of activity.

The schematic diagram of the Implementation Agency functioning is given in Annex No. 2.

In the field of the Polyurethane Chemistry revitalization and development SODASO defined the basic programmes which would be implemented through the Agency.

1. Programme for the construction of the Chloralkali electrolysis plant
2. Revitalization of the production of Isocyanates
3. Programme for the construction of the plant for the synthesis of polyethers for the non-urethane application
4. Programme for the construction of the plant for the polyurethane prepolymers.

The programmes for the revitalization and development in accordance with the programmes from each of the member companies would be prepared also for other SODASO member companies.

To establish the Agency and develop the above mentioned programmes it is necessary to secure the initial financial funds in the amount of 1,000,000 DEM.

3. CONCLUSION

The basic goal of the investment programme for the start-up of the enterprise DD POLIHEM Tuzla is to activate the assets in the value of above 70 million DEM, to stop its further destruction, to create the conditions for the existence of 750 workers and to achieve enviable financial results (investment profitability rate during the first year of operation amounts to 6.72 %, and during the second year of operation to 11.59 %).

It is planned to employ the addition 408 workers as a result of the programme implementation (out of which 390 workers who are currently at home "on waiting" because the plants are out of operation). Out of the total number of workers who would be additionally employed, 268 workers are demobilized soldiers.

In terms of ecology the products of DD "Polihem" Tuzla, as well as the raw materials which are used in the production, are very hazardous (especially from the inflammability point of view). However, the planned investment into the repairs and replacements of the items of equipment which have become worn out, will reduce significantly the possibility of incidents in terms of ecology and reduce it down to the level which existed prior to the war condition.

More than 85 % of the value of the production would be marketed in exports, both on the markets of the former Yugoslavia, and on the markets of Europe. The exports would amount to about 40 million in the year 1997 in case that the revitalization programme started on 01.10.1996 and the polyols production on 01.01.1997, and to 68 million DEM in the year 1998. The positive difference between exports and imports would amount to 25 million DEM in the year 1997, and to 43 million DEM in the year 1998, what would result also in the improved foreign currency balance of Bosnia and Herzegovina with the neighbouring states and with the European countries.

The financial funds necessary to start the production do not include the investments planned to be invested into the operating capital, since it is planned to secure the major part of the necessary raw materials and reprocurement materials from imports through compensation arrangements, as was successfully done before the war.

In addition to all the significant advantages of this programme, it is necessary to point out that the products of DD POLIHEM Tuzla are necessary for a normal reproduction of a range of other industrial branches in Bosnia and Herzegovina (such as are : electrical power generating industry, production of aluminum oxide, furniture, footwear, refrigerating appliances, automobiles, building industry, and of other branches).

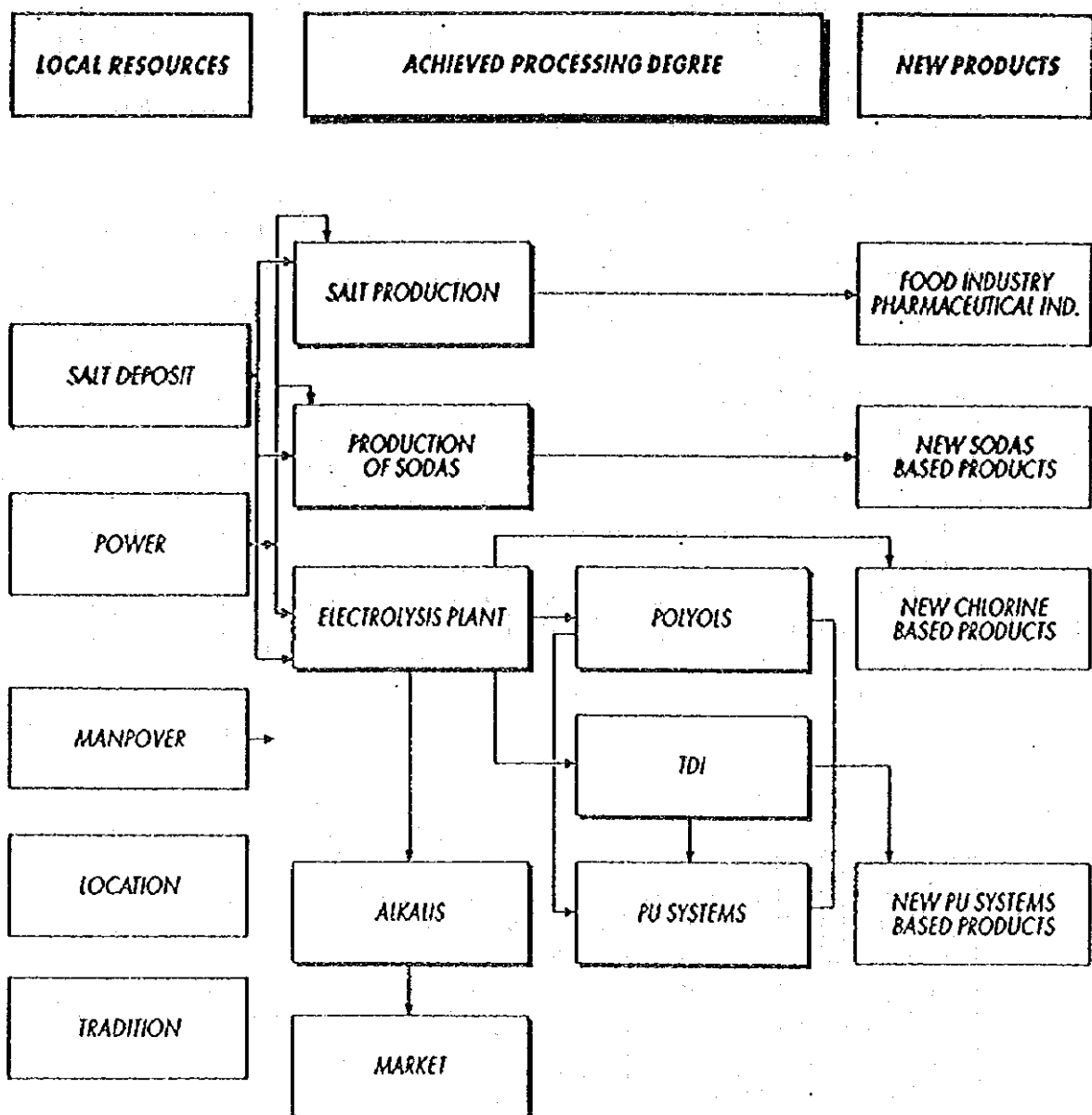
In addition, a significant raw material basis for the establishment of smaller plants for the polyurethanes processing , as very attractive and highly profitable production programmes, is created.

The implementation of this programme creates favourable conditions for the revitalization of the production also at other enterprises within the SODASO holding framework (particularly of Isocyanate Chemistry and Salt Mine and Brine Wells Tuzla), as well as the revitalization and the development of other activities in the field of the narrower and broader social community (particularly in the field of transportation, commerce, power generation and of other branches).

The basic prerequisite for the implementation of this programme is the opening of the communication, especially of the railway connections on the relations Tuzla-Vinkovci; Tuzla-Zvornik and Tuzla-Doboj. It is realistic to expect that it will soon be secured for these communications to be passable.

SCHEME OF AN OVERALL DEVELOPMENT STRATEGY OF SODASO

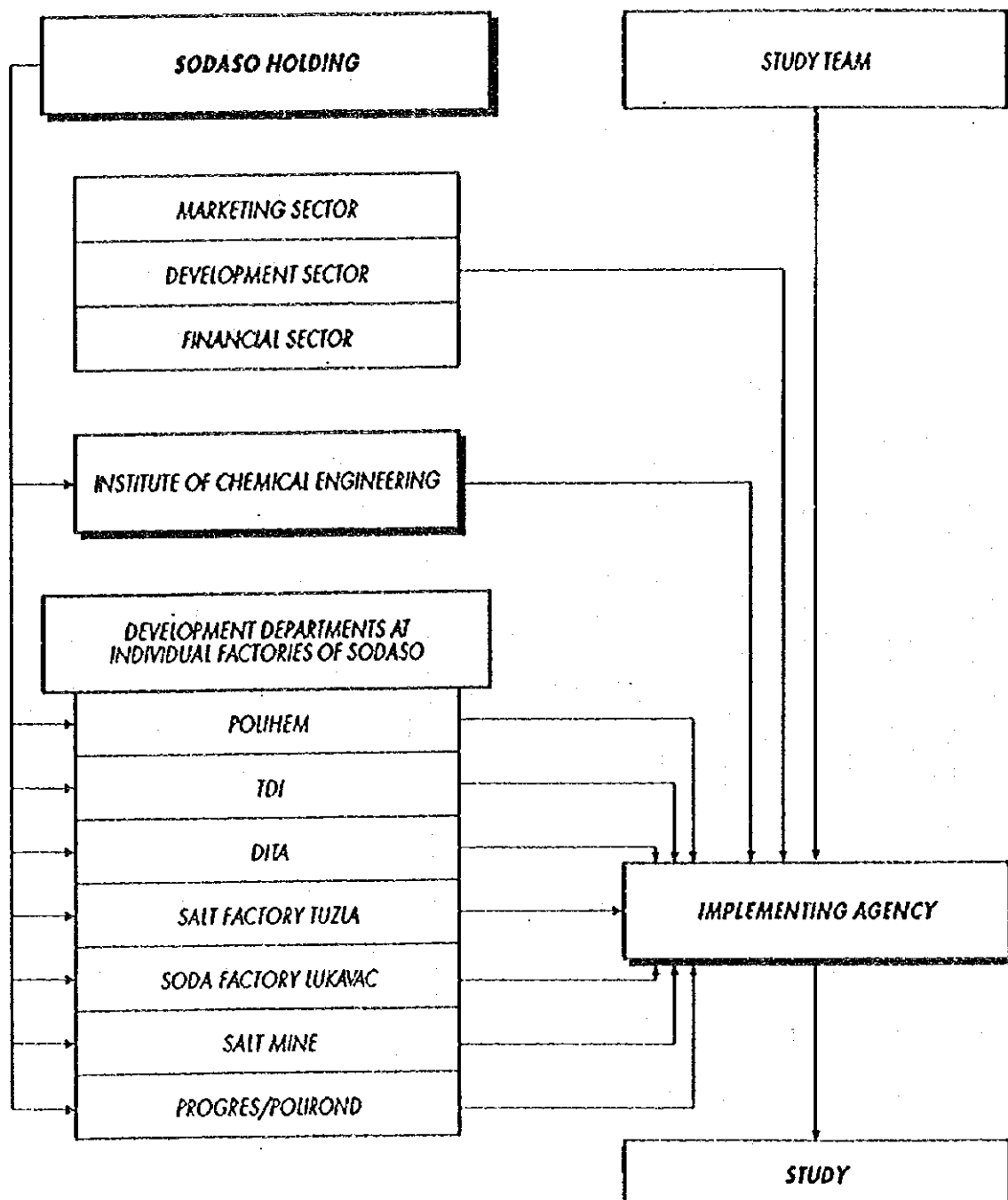
(annex 1)



IMPLEMENTATION AGENCY

PROPOSED ORGANIZATION SCHEME

(annex 2)



SODASO holding Tuzla
Bosnia i Hercegovina

DP POLIURETANSKA HEMIJA POLIHEM
TUZLA
Optimization Service

TECHNICAL INFORMATION
OF POLYOLS PRODUCTION

Tuzla, February 1997

INTRODUCTION

The TECHNICAL INFORMATION refers to the plant capacity of approximately 20 000 tons/year of polyols.

The term "Polyols" refers to the family of polyether compounds which are in high percentage share used as a raw material in the production of polyurethanes.

There is a range of polyols of various molecular weights (from 100 - 5 000) and their application differs, depending on their molecular weight.

The process given in this TECHNICAL INFORMATION refers to the production of polyols having the molecular weights from 3000 to 5250 which are used in the production of the rigid and flexible foams.

The plant itself is designed in such a way that it is possible to manufacture the polyols indicated in the given specification, being necessary to note that the production of certain types of polyols does not require to use all the items of equipment provided for by the design.

1. TECHNICAL DESCRIPTION OF THE PROCESS AND THE PLANT

The technological polyols production process incorporates the following technological operations :

- Storage of raw materials
- Reactor system
- Polyols purification system
- Filtrate sediment recovery
- Polyols storage
- Waste waters treatment

The production of polyols is intermittent and takes place in two independent lines.

The basic difference in the production of various types of polyols is based on different time intervals of ethylene oxide addition and the total amount of added ethylene oxide, respectively.

Both lines are fed from the common raw materials storage, while each of the lines has its own storage of the finished product, polyether.

1.1. STORAGE OF RAW MATERIALS

The basic raw materials for the production of polyols of these types are : glycerin, potassium hydroxide, ethylene oxide and propylene oxide.

This system comprises reception, transfer, storage and transportation of the basic raw materials.

Glycerin delivered by a railway tank-car is transferred by means of a rotary pump into the storage tank. The storage tank has such capacity which secures undisturbed reception of one railway tank-car and a sufficient reserve for 20 days of operation. The storage tank is insulated and equipped with an agitator, steam heating coil and a device for the automatic maintenance of the required temperature of glycerine.

From this storage tank glycerine is pumped to the initial solution vessel.

The potassium hydroxide solution is transferred from the railway tank-car by means of a centrifugal pump into the potassium hydroxide storage tank. This storage tank is also provided with a steam heater and a control loop which maintains the required temperature inside the storage tank. From the storage tank the 50 % KOH solution is fed into the initial solution vessel.

The initial solution vessel is also steam heated, and the temperature is maintained via an built-in control loop.

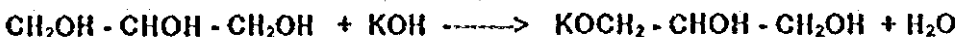
Ethylene oxide is taken from the railway tank-car into the storage tank from where it is pumped to the ethylene oxide break vessel.

Propylene oxide is pumped from the storage tanks into the receiver vessel, and from there it is fed under control into the reactor tank no. 1.

1.2. REACTOR SYSTEM

From the storage tank glycerine is transported into the initial solution vessel into which 50 % KOH solution is introduced. The ratio of the KOH quantity and of the added glycerine depends on the type of polyol, desired. The initial solution vessel is heated indirectly via a coil installed inside.

Glycerine reacts with the alkalis into glycerine oxide in which reaction one part of water is formed according to the following reaction :



Water formed is removed by means of an ejector vacuum system which consists of a barometric condenser and steam nozzles.

From the initial solution vessel the solution is sent to the reactor tank no. 1 under the nitrogen pressure.

Propylene oxide is pumped from the storage tank into the receiver tank, and from there it is introduced into the reactor tank no. 1 under the controlled conditions.

The reactor tank no. 1 is a vertical vessel equipped with an agitator. Due to the higher temperature of the reactor batch the reagents are cooled via an external heat exchanger. Cooling water is used as the cooling medium.

After the addition of the required quantity of propylene oxide and the completion of the reaction, the batch of the oxypropylated glycerine is transferred into the reactor tank no. 2.

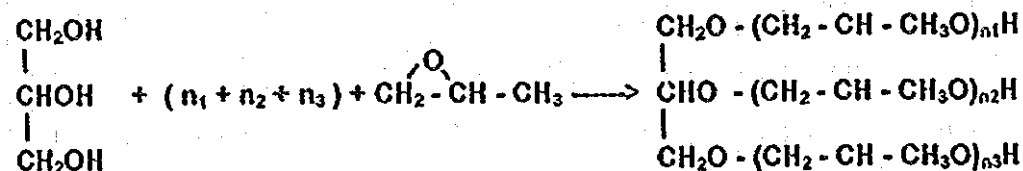
The reagents dosing, temperature control and pressure maintenance in the reactor tank no. 2 are carried out through the automatic control via the built-in control loops.

From the reactor tank no. 1 polyether is pumped into the reactor tank no. 2 and then propylene oxide or ethylene oxide are introduced, depending on whether ethoxylated polyether is produced. Ethylene oxide is transported from the storage tank into the reactor tank no. 2 by means of a centrifugal pump.

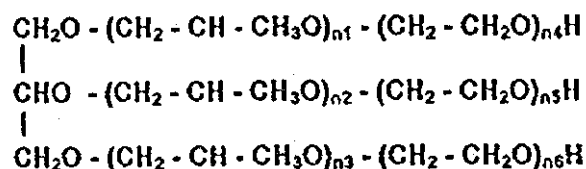
In addition to the controlled flows, and the controlled propylene oxide to ethylene oxide ratio, respectively, it is necessary to maintain a constant temperature for a certain time interval of the reaction, which depends on the type of polyol which is being produced in the reactor, in order to complete the polymerization reaction in the reactor tank no. 2.

The average duration of one batch amounts to 10 hours. After the batch has been completed the polyether produced is taken into the purification system in order to remove the residual propylene oxide.

The chemistry of the reaction of propylene oxide with glycerine, which results in the production of one type of polyester, can be represented by means of the following chemical equation :



In the case of the other two types of polyether, oxypropylated glycerine is condensed with ethylene oxide and a block of polymers is built, so that the final product has the following formula :



After the completion of the reaction and the formation of a contaminated polyether, the same is taken into the polyol purification system.

1.3. Polyol Purification System

Propylene oxide admixtures, remaining in polyether obtained in this way, are removed in the dehydration tank which is operated under vacuum.

In this way practically all the quantities of available propylene oxide and water present are removed.

After the propylene oxide removal the batch is treated with the aqueous adipinic acid solution and antioxidant.

The adipinic acid solution is prepared in a special vessel from which it is dosed into the dehydration tank.

The base catalyst is linked with the adipinic acid and potassium adipate is formed.

At the end the batch is dehydrated in the dehydration tank under the effect of vacuum.

Separated propylene oxide dissolved in water is taken from the dehydration tank together with water into the waste waters.

1.4. Filtrate Sediment Recovery

After the completion of dehydration, polyether is taken to the filtration. In order to perform it successfully it is necessary to make the previous preparation of the filter product. After filtering the polyether filtrate is taken to another filtration on the preventive filter, and then it is taken into the receiver tank where the quality control of each batch takes place.

If the analysis shows that the batch quality is satisfactory, polyether is taken to the storage of final products.

In case the batch is not satisfactory it is possible to process it once more by adding smaller quantities to those batches which are good or the whole batch will be processed again.

The filter product precipitate contains certain quantities of polyethers, potassium adipate and filteraid. In order to utilize the quantities of polyether present in the filter precipitate, it is recovered.

The recovery is carried out by means of the sodium sulphate aqueous solution which is previously prepared in a tank equipped with an agitator.

After the precipitate treatment by contacting it with the sodium sulphate solution for a certain period of time, the polyether is separated in a separator provided for this, and from there a separated layer of polyether is sent to the receiver tank for this product, and from there it is taken to dehydration.

Sulphate solution is recycled into the process, and the remainders on the filter are, after flushing of sulphate, flushed with water through the nozzles which are built-in inside the filter. Water is drained into the waste stream system.

1.5. Polyol Storage

From the receiver buffer storage, the final product is pumped into the storage tanks of larger volumes. Polyol is cooled during this pumping operation. In the installed heat exchanger polyol is cooled from about 100° down to 35° C and it is stored at this temperature. From the storage tanks it is pumped, as desired, into road tank-cars or

railway-tank cars or it is dosed and poured into drums via an automatic filling line located in the drum filling section.

1.6. Waste Waters Treatment

Waste waters from the production of polyols are contaminated with organics and inorganics. These waters are polluted with minor amounts of dissolved ethylene and propylene oxides which can be present to such an amount that BOD-5 reaches even the value of 300 ppm.

The waste waters comprise in general a discontinued flow resulting from the polyol filtration. This flow, which is joined also by the waste waters flow originating from the plant washing, leakages from pumps and from the individual vessels, are taken into a separate settling tank, from where the waste waters overflow into the process sewage system, then they go into a sump equalization tank, and from there they are taken into the biological treatment plant.

In the sump equalization tank are collected also the waste waters originating from the drum filling station, from the station for the washing of road tank-cars and railway tank-cars and also from the polyol transferring points, via the process and the rainfall sewage system.

2. RAW MATERIALS

The basic raw materials which might occur in the process for the production of polyols of different types are : propylene oxide, ethylene oxide and glycerine.

In addition to the above mentioned raw materials there might occur also the secondary raw materials which are potassium hydroxide, adipic acid, filteraid, sodium sulphate, nitrogen and TOPANOL.

2.1. Propylene Oxide C_3H_6O

Propylene oxide is a colourless liquid of a characteristic odour. Chemically it is very reactive, and its fumes form explosive mixtures with air. This is an intermediate product and its total quantity is consumed in the polyol production. The admixtures are insignificant and are within the range of allowable limits :

Appearance :	Clear liquid free of suspended matters
Distillation range :	It is distilled completely between 34 and 35° C under pressure of 760 mm Hg
Specific gravity :	0.829 - 0.832 (20/20° C)

2.2. Ethylene Oxide CH_2OCH_2

Ethylene oxide, which is used in the production process, should have the following characteristics :

Appearance :	Colourless liquid, free of suspended matters
Residue after evaporation	0.006 % max.
Water	0.05 % max.
Organic chlorides	0.10 % max.
Acidity	0.005 % max.
Colour	15 Hazen units max.
Aldehydes	0.10 % max. as acetaldehyde
Acetylene	250 ppm max.

2.3. Glycerine $\text{CH}_2\text{OH} - \text{CHOH} - \text{CH}_2\text{OH}$

According to the production requirements, and in accordance with JUS Standard, glycerine is included into the group of dynamite glycerol of the following composition

Glycerine	99.0 % min.
Specific Gravity	1.262 g/cm ³ min.
Acidity or alkalinity as Na_2O	0.01 % max.
Ashes	0.025 % max.
Chloride as NaCl	0.01 % max.
Iron	2 ppm max.

2.4. Potassium Hydroxide KOH

In the production process 50 % KOH , having the following quality, is used :

Appearance	50 % solution in water
Total alkalinity	88 - 93 % as NaOH
Na - compounds	2.5 % as NaOH
Chlorides	2 % max
Sulphates	0.05 % max.
Water solubles	0.05 %

2.5. Adipinic Acid $\text{COOH}(\text{CH}_2)_4\text{COOH}$

Adipinic acid, which is added into the dissolution and treatment vessel prior to being added into the dehydration tank, should have the following quality :

Appearance	White crystalline powder
Crystallization point	151.4 °C min.
Volatile matter	0.3 % losses upon heating at 100° C
Iron	5 ppm max.
Ashes	75 ppm max.

2.6. Filteraid

As filteraid in filters is used diatomaceous earth . This is a soft mass of white, greenish, light-brownish to dark colour. It is composed of flight skeletons of died out tiny sea organisms. Only diatomaceous earth free of any other minerals is suitable to be used here. In appearance it resembles to clay or chalk. It is soluble in strong lyes and HF . Its absorbing capacity is 1.5 to 4 times its own weight.

2.6. Sodium Sulphate Na_2SO_4

The filtrate sediment recovery is carried out with the aqueous sodium sulphate solution .Sodium sulphate used for the treatment is of crystalline form, white colour, odourless and of salty-bitter taste. Its specific gravity is 2.671 g/cm³, its molecular weight is 142.05 and its melting point is 888° C. It is obtained by heating sulphuric acid with sodium hydroxide, but it can occur also in nature as the mineral miraballite $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ (Glauber salt).

2.7. Nitrogen N₂

Nitrogen used in the production of polyols should contain maximum 10 ppm of oxygen and should be totally free of CO₂.

2.8. Topanol OC

Topanol is a clear white crystalline powder which produces no dust. Although this is an acid it is poorly soluble in cold water but is well soluble in warm water and methanol.

3. OPERATING REQUIREMENTS

The operating requirements given in the table below are average values which refer to the proposed types of polyols given in this TECHNICAL INFORMATION.

They are given for the basic and auxiliary raw materials, as well as for the energy fluids that occur in the production process.

The operating requirements are given per one ton of produced polyol and they depend on the type of polyol and its percentage share in total production.

Raw Materials	Consumption per one ton	Anticipated operating requirement
Propylene oxide	kg/t	904.00
Ethylene oxide	kg/t	89.00
Glycerine	kg/t	25.40
KOH (100 %)	kg/t	3.40
Adipinic acid	kg/t	4.50
Topanol	kg/t	1.70
Phenothiazine	kg/t	0.026
Filteraid	kg/t	1.70
Technological steam under 12 and 12.5 bars	t/t	1.66
Industrial water	m ³ /t	8.00
Electrical power	kWh/t	110.00
Air for the plant and the instruments	Nm ³ /t	83.00
Nitrogen	Nm ³ /t	50.00

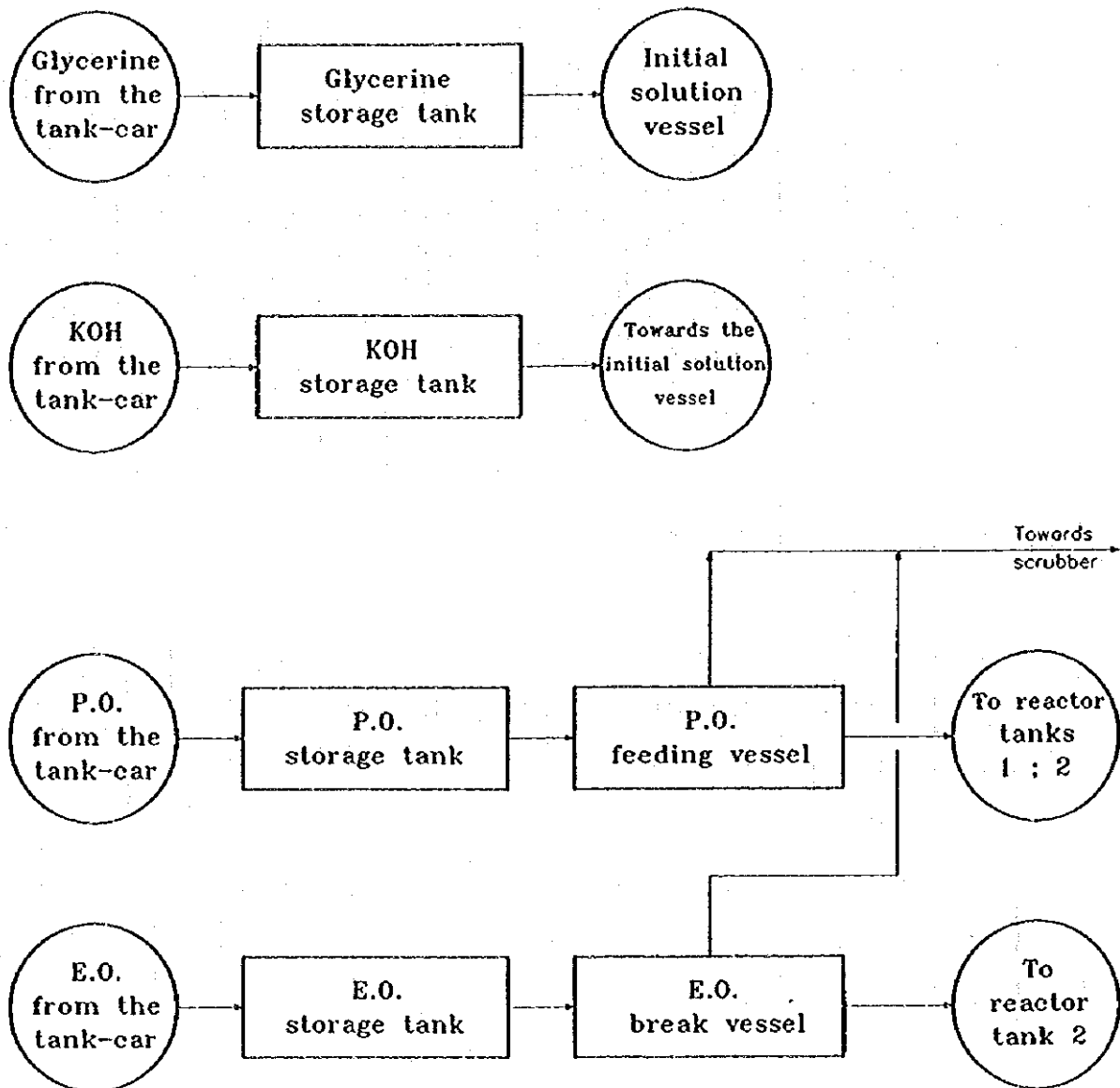
When determining the electric power operating requirements the supply of process and cooling water, air and nitrogen from the common plants, which are accompanying plants in the case of the construction of such a plant, was assumed.

4. PRODUCT QUALITY

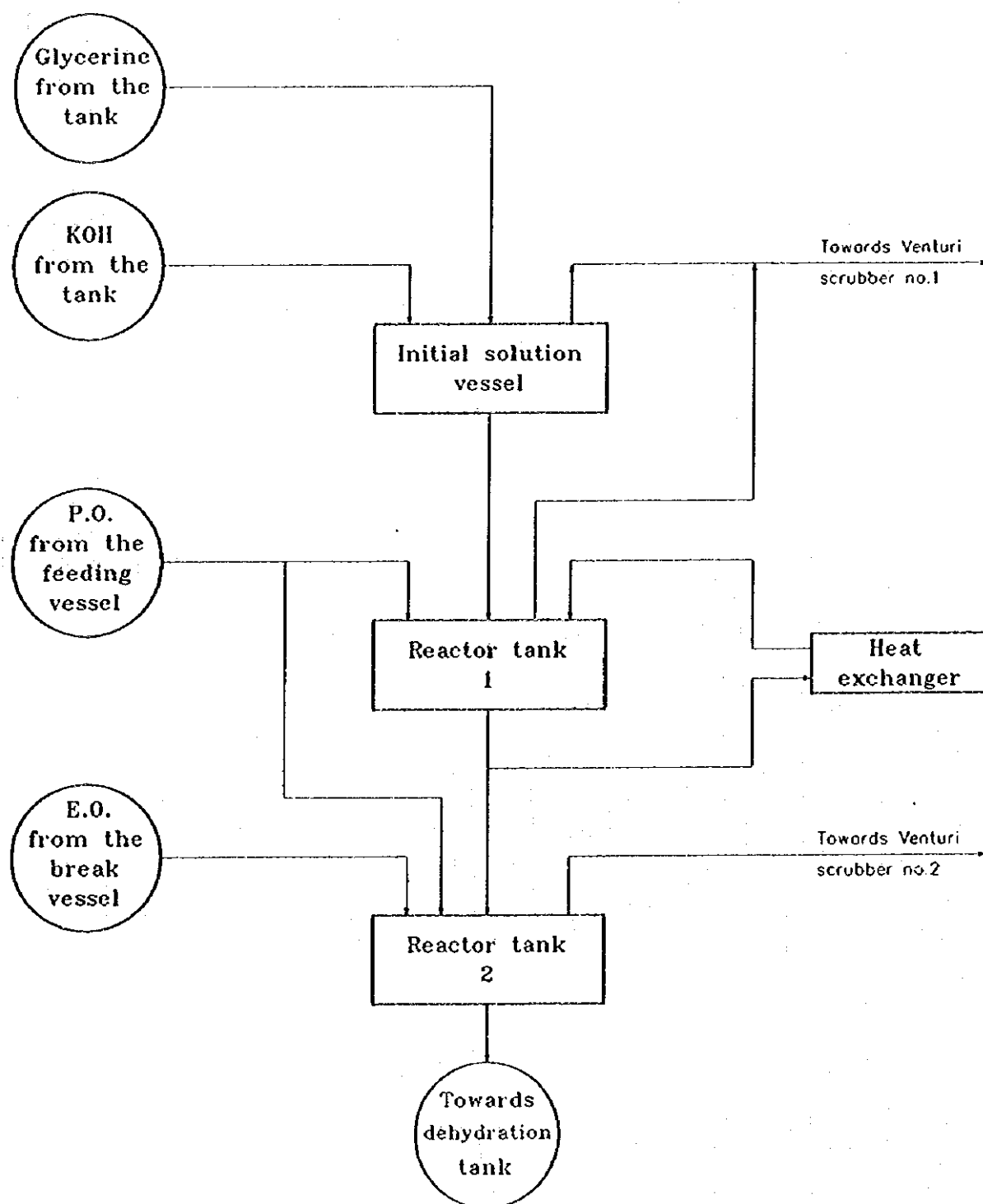
In this TECHNICAL INFORMATION SODASO covered various types of commercial polyols which have the same or even better characteristics than the other commercial products.

In general these are oxypropylated, ethoxylated oxypropylated and ethoxylated propylated glycerine polyethers having the physico-chemical characteristics as are given in the following presentation :

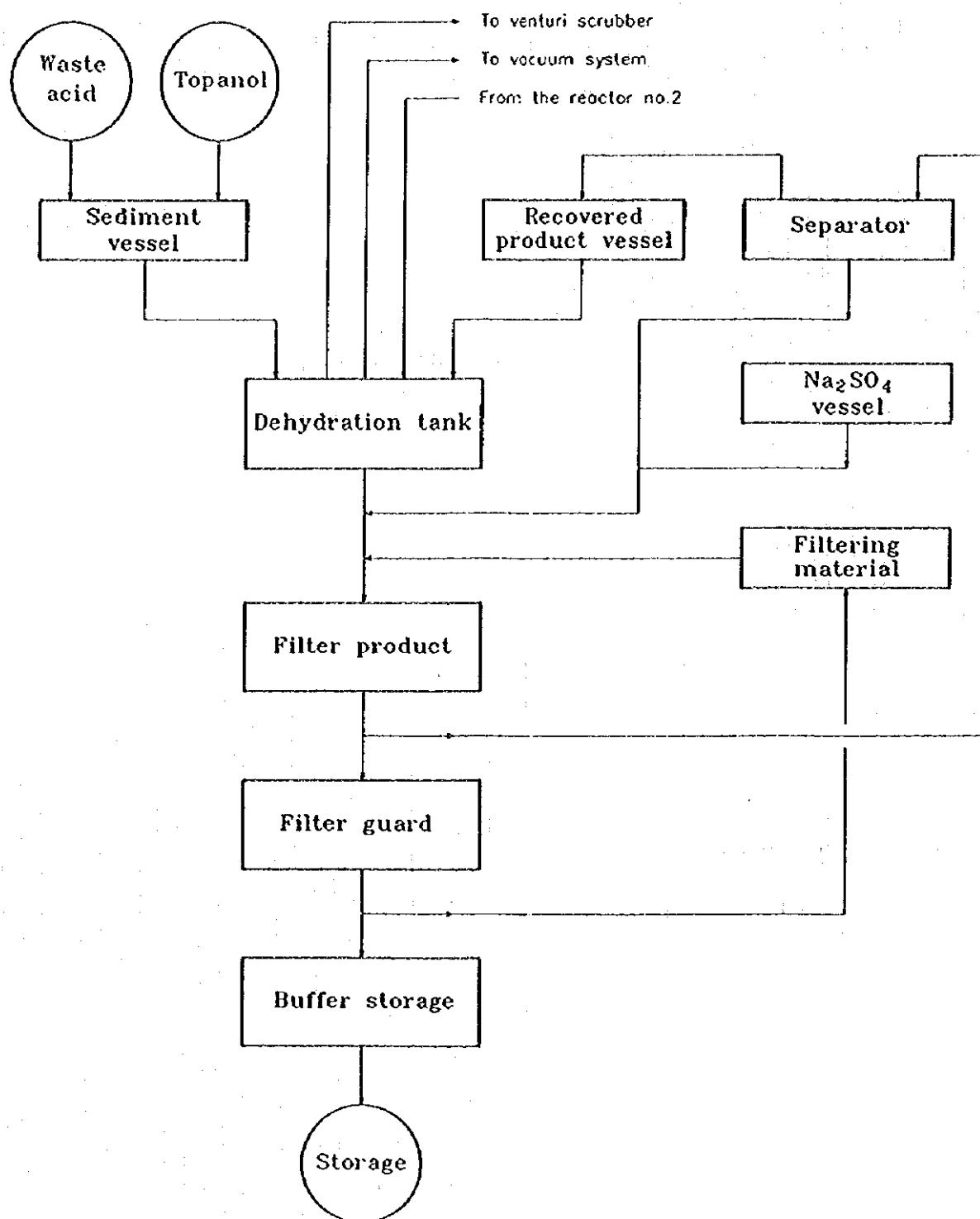
Ord. No.	Characteristics Type of Polyol	OH-value mg KOH/g	Water %	Viscosity at 25°C mPa s	Acidic value mg KOH/g	Colour
1	2	3	4	5	6	7
1.	TPE.3501	46.4 - 49.6	- 01 max	550 - 610	- 0.08	- 50 Hz max
2.	TP-5001	30 - 34	-0.08 max	950 - 1010	- 0.1 max	- 50 Hz max
3.	HP-7240	410 - 440	-01 max	10,000 - 12,000	-0.08 max	Yellow-brown
4.	TP-3980	400 - 440	-01 max	400 - 500	-0.1 max	Clear-yellow
5.	DTPE-4851	28 ± 2	-0.05 max	800 - 920	0.02-0.03	- 50 Hz
6.	TP-5980	260 - 300	-0.1	470 - 530	- 0.1	Clear yellow
7.	TP-3001	54.3 - 57.6	- 0.1	490 - 530	- 0.1	- 50 Hz
8.	TP-3120	530 - 550	- 0.1	550 - 600	- 0.1	Clear yellow
9.	THP-5150	480 - 500	- 0.1	6000 - 7000	- 0.1	Yellowish-brown
10.	OTKA-TEA	450 - 550	- 0.2	2500 - 4500	- 0.1	Brown
11.	PPG-201	530 - 580	- 0.1	100	- 0.1	- 50 Hz
12.	PPG-401	260 - 300	- 0.1	70 - 110	- 0.1	- 50 Hz
13.	PPG-2501	47.4 - 51.6	- 0.1	360 - 450	- 0.1	- 50 Hz



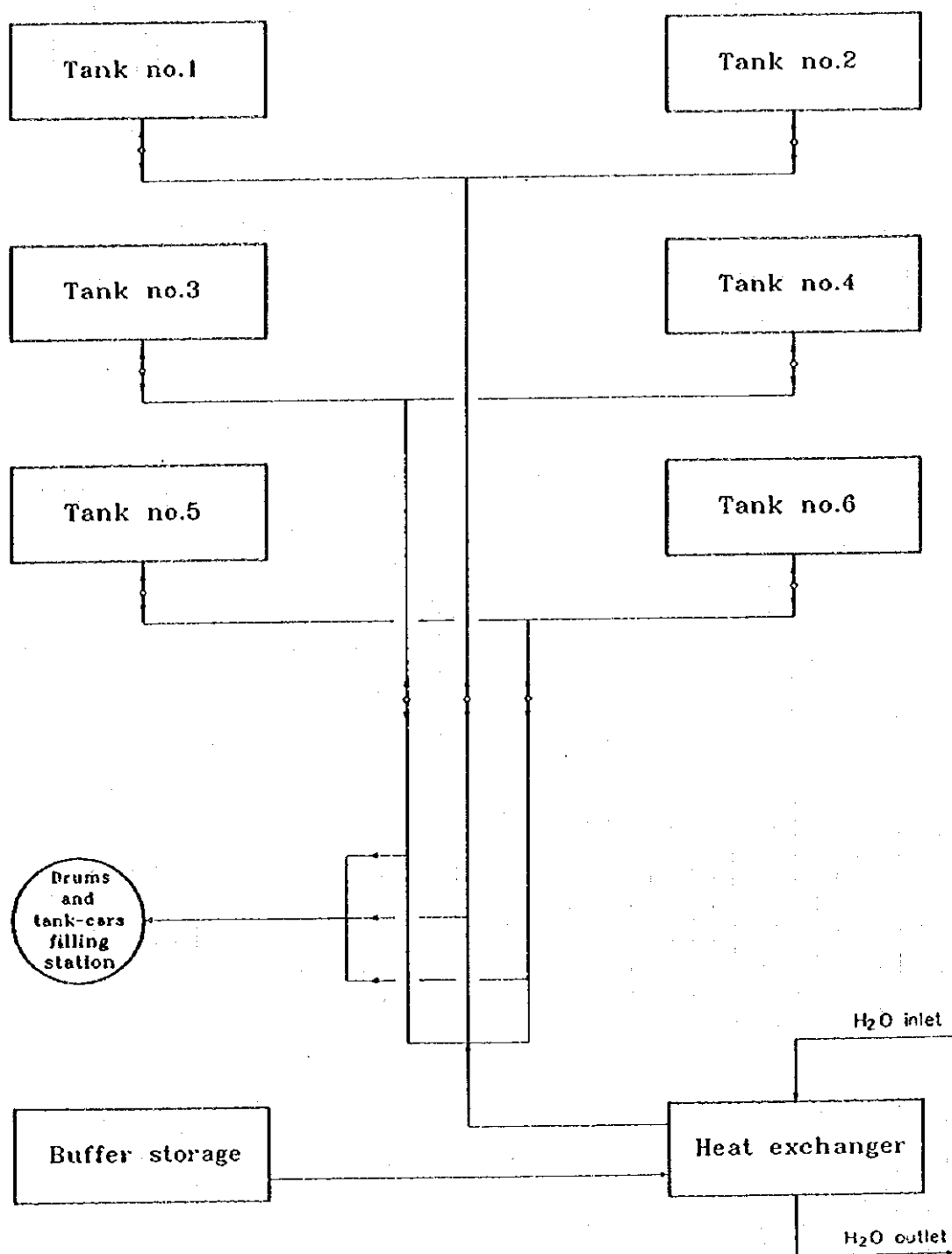
Block Diagram for the Storage of raw materials
for POLYOLS



Block-diagram of the reaction part of POLYOLS



Block-diagram of the Polyol Product Recovery



Block-diagramme for the finished polyol storage

SODASO holding, 75000 Tuzla, Slatina 2, Bosnia and Herzegovina

Company : SODASO holding Rudnik soli Tušanj (Salt Mine Tušanj)	Address : 75000 Tuzla, Hasana Brkića 104
Responsible person : Prof. Dr. Izudin Kešetović	Tel. +387 75 21 24 44 Fax + 387 75 28 13 98
Type of company : Limited Liability Company	Established in : 1886
Ownership : State : 83.55 % Shareholders : 16.45 %	

Basic activity	Rock salt production Brine (salt water) production
References (trade status)	During the year 1991 the production of 2,600 000 m ³ of brine (salt water) and 150,000 tons of rock salt (for the de-icing of roads and the industry) were produced. The only rock salt mine in the former Yugoslavia. Total production was sold in the former Yugoslavia market. Brine (salt water) was marketed within the SODASO holding framework to the producers of salt, soda ash and chlorine

PROJECT : COMPLETION OF THE CONSTRUCTION OF THE SALT MINE TETIMA

Location	Village Tetima, 12 km north-east from Tuzla
Description	The completion of the investment, started prior to the war, as a replacement capacity for the existing Rudnik soli Tušanj. Provision of raw material for the salt-chemical complex through the controlled salt solution mining for the coming 70 years. In addition to the economic significance of the Project, that is, the provision of brine (salt water) for the producers of salt, soda ash and chlorine, in which productions 2,000 workers are employed, the environment aspect of the proposed Project implementation is particularly pronounced. Namely, as a consequence of the uncontrolled salt water pumping (the source of the salt water and Rudnik soli are located in the

	<p>town), the town of Tuzla is subjected to a well-known phenomenon of the terrain sinking. Here we are presenting only some of the terrain sinking consequences :</p> <ul style="list-style-type: none"> - soil sinking in the individual parts of the urbane zone of Tuzla has reached the level of 9.0÷12.0 meters - demolished were 2,700 residential units, and as a consequence of this 15,000 inhabitants had to be moved to other residential units - 137,000 m² of the space of business, administrative and cultural significance were evacuated -the soil sinking covers 650 hectares of land, out of which 220 hectares are in the urbane zone
Product basic data	Saturated brine (salt water)
Production assessment	<p>I Phase : 1,500,000 m³/year</p> <p>II Phase : 2,600,000 m³/year</p>
Demand assessment	1,500,000 m ³ /year for the next three years and 2,600,000 m ³ /year after that period
Investment justification	Replaced is the brine (salt water) production in the already exhausted salt deposit in Tuzla, provided are required quantities of brine (salt water) for the producers of salt, soda ash and chlorine for the coming 70 years. By putting this mine into operation the terrain sinking in the urbane old part of Tuzla will be stopped. About 140 workers would get employed.

Project total value, USD	52,464,702
Financing gap, USD	<p>7,626,600 I Phase</p> <p>1,992,400 II Phase</p> <p>9,619,000 Totally</p>
Participation of company, USD	45,117,650 for the works executed so far

Economic & financial effects	
• Total income, USD	11,470,588 I Phase 16,058,900 II Phase
• Operating cost, USD	9,179,412 I Phase 11,530,665 II Phase
• Investment efficiency, USD	2,291,176 I Phase 4,528,235 II Phase

Investment activation period	18 months I Phase, 6 months II Phase, totally 24 months
Preferable mode of co-operation	Credit, 7,626,600 I Phase 1,992,400 II Phase grace period 4 years, repayment term 12 years, interest rate 4 %

SODASO holding
GENERAL DIRECTOR
Prof. Dr. Izudin Kešetović

SODASO holding, 75000 Tuzla, Slatina 2, Bosnia and Herzegovina

Company :SODASO holding Fabrika soli Tuzla (Salt Factory Tuzla)	Address : 75000 Tuzla, Solanska br.3
Responsible person : Prof. Dr. Izudin Kešetović	Tel. +387 75 21 24 44 Fax + 387 75 28 13 98
Type of company : Limited Liability Company	Established in : 1886
Ownership : State : 34.55 % Shareholders : 65.45 %	

Basic activity	Table salt production
References (trade status)	During the year 1991 Fabrika soli Tuzla produced 210,000 tons of salt, and 240 tons of seasonings for food based on salt. It supplied approximately 75 - 80 % of the demands of the former Yugoslavia for table salt. Total production was fully sold in the territory of the former Yugoslavia.

PROJECT : PROGRAMME FOR THE SALT PRODUCTION START-UP

Location	Fabrika soli Tuzla
Description	It is foreseen for the production line which has been out of operation for 4 years to be brought into the operable (functional) condition. Although the installations were not damaged by the war actions, the equipment is devastated as a result of a long period of being out of operation and it should be renewed or replaced.
Product basic data	Table salt
Production assessment	possibly 150,000 tons/year
Demand assessment	80,000 tons/year
Investment justification	The investment Programme is initiated because it is necessary to provide salt to cover the requirements of the domestic market. At the same time, the actual capacity of the plant is higher and it is necessary to provide also the sales in the foreign markets (former Yugoslavia)

Project total value, USD	3,600,000
Financing gap, USD	3,480,000
Participation of company, USD	120,000

Economic & financial effects	
• Total income, USD	14,117,000
• Operating cost, USD	11,997,000
• Investment efficiency, USD	2,120,000

Investment activation period	6 months
Preferable mode of co-operation	Credit 3,480,000 USD, interest rate 5 %, grace period 1 year

SODASO holding
GENERAL DIRECTOR
Prof. Dr. Izudin Kešetović

SODASO holding, 75000 Tuzla, Slatina 2, Bosnia and Herzegovina

Company : SODASO holding Fabrika soli Tuzla (Salt Factory Tuzla)	Address : 75000 Tuzla, Solanska br.3
Responsible person : Prof. Dr. Izudin Kešetović	Tel. +387 75 21 24 44 Fax + 387 75 28 13 98
Type of company : Limited Liability Company	Established in : 1886
Ownership : State : 34.55 % Shareholders : 65.45 %	

Basic activity	Table salt production
References (trade status)	During the year 1991 Fabrika soli Tuzla produced 210,000 tons of salt, and 240 tons of seasonings for food based on salt. It supplied approximately 75 - 80 % of the demands of the former Yugoslavia for table salt. Total production was fully sold in the territory of the former Yugoslavia.

PROJECT : PROGRAMME FOR THE PRODUCTION OF THE INFUSION SOLUTIONS

Location	Fabrika soli Tuzla
Description	<p>A contemporary plant for the production of infusion solutions will be built. The capacity will be 1,950,000 units/year in the packagings of 0.5 liters each with the operation taking place in one shift.</p> <p>The plant will be jointly built by :</p> <p align="center">BOSNALIJEK Sarajevo FABRIKA SOLI Tuzla SODASO holding Tuzla</p> <p>To this effect the establishment of a joint firm is in the process.</p> <p>By this Project the market of Bosnia and Herzegovina would be almost fully covered, except for some special kinds of the infusion solutions.</p>
Product basic data	Different kinds of infusion solutions (10 - 12 kinds)
Production assessment	1,950,000 units annually of 0.5 liters each

Demand assessment	2,500,000 units/year
Investment justification	It is the matter of a product which is of strategic significance for the state, that is, a specific kind of medicines is involved here. By implementing the Programme almost absolute dependence on the infusion solutions importation is eliminated. New 25 workers would get employed.

Project total value, USD	5,000,000
Financing gap, USD	3,000,000
Participation of company, USD	2,000,000

Economic & financial effects	
• Total income, USD	3,030,000
• Operating cost, USD	2,596,000
• Investment efficiency, USD	434,000

Investment activation period	12 months
Preferable mode of co-operation	Credit 3,000,000 USD, interest rate 4 %, grace period 2 years, repayment term 5 years

SODASO holding
GENERAL DIRECTOR
Prof. Dr. Izudin Kešetović

SODASO holding, 75000 Tuzla, Slatina 2, Bosnia and Herzegovina

Company : SODASO holding, Fabrika soli Tuzla (Salt Factory Tuzla)	Address : 75000 Tuzla, Solanska br. 3
Responsible person : Prof. Dr. Izudin Kešetović	Tel. +387 75 21 24 44 Fax + 387 75 28 13 98
Type of company : Limited Liability Company	Established : in 1886
Ownership : State : 34.55 % Shareholders : 65.45 %	

Basic activity	Production of table and industrial salt
References (trade status)	During the year 1991 Fabrika soli Tuzla produced 210,000 tons of salt, and 240 tons of seasonings for food based on salt. It supplied approximately 75 - 80 % of the demands of the former Yugoslavia for table salt. Total production was fully sold in the territory of the former Yugoslavia.

**PROJECT : PROGRAMME FOR THE PRODUCTION OF SEASONINGS
AND SOUPS**

Location	Fabrika soli Tuzla
Description	To reconstruct the existing line for the production of seasonings and soups, and to increase the capacity up to 1,000 tons /year (from the current 240 tons/year) of the seasonings and to 360 tons/year of soups.
Product basic data	Seasonings for food containing dried vegetables. Cubes for soups and finished thick soups.
Production assessment	1,000 tons/year of the seasonings for food 360 tons/year of soups
Demand assessment	1,500 tons/year of the seasonings for food 400 tons/year of soups

Investment justification	<p>The greatest quantity of the seasonings for food and of the soups consumed in Bosnia and Herzegovina are of imported origine. Both productions were developed at Fabrika soli Tuzla, but equipment is at a very low technical level, although the products are of satisfactory quality. Strategical interest of every country is to have proper food production. The case is the same with our country, although this is only a narrow segment of food articles. By implementing this Project the production of dried vegetables, as well as of the cattle breeding is encouraged too. 35 workers would get employed.</p>
--------------------------	--

Project total value, USD	945,000
Financing gap, USD	887,000
Participation of company, USD	58,000

Economic & financial effects	
• Total income, USD	5,923,305
• Operating cost, USD	5,626,305
• Investment efficiency, USD	297,000

Investment activation period	12 months
Preferable mode of co-operation	Credit, 887,000 USD, grace periods 3 years, repayment term 10 years, interest rate 4 %

SODASO holding
GENERAL DIRECTOR
Prof. Dr. Izudin Kešetović

SODASO holding, 75000 Tuzla, Slatina 2, Bosnia and Herzegovina

Company : SODASO holding, Polihem d.d. (PO)	Address : 75000 Tuzla, Bukinje bb
Responsible person : Prof. Dr. Izudin Kešetović	Tel. +387 75 21 24 44 Fax + 387 75 28 13 98
Type of company : Joint Stock Company in Mixed Property	Established in : 1976
Ownership . 40.69 % state capital ; 23.87 % joint-stock capital of SODASO holding; 33.44 % joint-stock capital of the employed workers	

Basic activity	Production of polyols, PUR-systems, salt, chlorine, alkalis, Na-chlorate
References (trade status)	Prior to the war the only producer of the PU raw materials in the market of the former Yugoslavia. Over 60 % of the production were exported to the markets of the Western and the Eastern Europe.

PROJECT: PRODUCTION START-UP

Location	Federation Bosnia and Herzegovina, Tuzla-Drina Canton, the town of Tuzla	
Description	Start-up of the productions of polyols, chlorine, Na-lye and Na-chlorate, hydrochloric acid	
Product basic data	Designed capacities are : 25,000 tons/year of polyols; 36,000 tons/year of chlorine; 4,000 tons/year of Na-chlorate; 30,000 tons/year of hydrochloric acid	
Production assessment :	<u>Tons/year in the first year</u>	<u>Tons/year in the second year</u>
• Polyols	13,238	22,430
• Na-lye	15,600	26,370
• Hydrochloric acid	24,450	28,400
• Na-chlorate	3,000	4,000
Demand assessment	Over 80 % of the production will be sold in the markets of the former Yugoslavia and of Europe	

Investment justification	<ul style="list-style-type: none"> • Property in the value of 42 million \$ will be activated • Positive foreign currency balance in the first year amounts to 23.5 million \$ • About 800 workers who are currently not working (indirectly significantly more) would be employed
--------------------------	---

Project total value, USD	46,118,000
Financing gap, USD	6,700,000
Participation of company, USD	39,418,000

Economic & financial effects year	The first year	The second
• Total income, USD	27,173,000	45,366,000
• Operating cost, USD	24,319,000	37,154,000
• Investment efficiency, USD	2,854,000	8,212,000

Investment activation period	90 (ninety) days from the beginning of the implementation
Preferable mode of co-operation	Joint Venture (eventually credit)

SODASO holding
GENERAL DIRECTOR
Prof. Dr. Izudin Kešetović

SODASO holding, 75000 Tuzla, Slatina 2, Bosnia and Herzegovina

Company : SODASO holding Polihem d.d. (PO)	Address: 75000 Tuzla, Bukinje bb
Responsible person : Prof. Dr. Izudin Kešetović	Tel. +387 75 21 24 44 Fax + 387 75 28 13 98
Type of company: Joint-Stock Company in Mixed Property	Established in : 1976
Ownership . 40.69 % state capital ; 23.87 % joint-stock capital of SODASO holding; 33.44 % joint-stock capital of the employed workers.	

Basic activity	Production of polyols, PUR-systems, salt, chlorine, alkalis, Na-chlorate
References (trade status)	Prior to the war the only producer of the PU raw materials in the market of the former Yugoslavia. Over 60 % of the production were exported to the markets of the Western and the Eastern Europe.

PROJECT : NEW CHLORALKALI ELECTROLYSIS PLANT

Location	Federation Bosnia and Herzegovina, Tuzla-Drina Canton, the town of Tuzla
Description	The new chloralkali electrolysis plant would replace the existing one which is based upon the mercury cell technology
Product basic data	60,000 tons/year of chlorine ; 65,000 tons/year of NaOH ; 30,000 tons/year of HCl ; 2,500 tons/year of hydrogen
Production assessment	According to the above mentioned data
Demand assessment	Chlorine will be consumed locally in the production of polyols, isocyanates and other chlorine based products. Na-lye is intended for the market of the former Yugoslavia. Hydrogen will be consumed in the production of isocyanates.

Investment justification	<p>The following will be provided :</p> <ul style="list-style-type: none"> • Chlorine for the existing capacities, as well as for the new chlorine based products • Consumption of electric power from the existing source of "TE-Tuzla" • Na-lye for the domestic industry (Glinica Zvornik and Glinica Mostar) and for the former Yugoslavia market) • Hydrogen for the existing and expanded productions of isocyanates
--------------------------	--

Project total value, USD	60,000,000
Financing gap, USD	50,000,000
Participation of company, USD	10,000,000

Economic & financial effects	
• Total income, USD	45,000,000
• Operating cost, USD	40,000,000
• Investment efficiency, USD	5,000,000

Investment activation period	Two years
Preferable mode of co-operation	Joint Venture /eventually credit)

SODASO holding
GENERAL DIRECTOR
Prof. Dr. Izudin Kešetović

SODASO holding, 75000 Tuzla, Slatina 2, Bosnia and Herzegovina

Company : SODASO holding Izocijanatna hemija - TDI d.d. (PO) (Isocyanate Chemistry -TDI)	Address : 75000 Tuzla, Bukinje bb
Responsible person : Prof. Dr. Izudin Kešetović	Tel. +387 75 21 24 44 Fax + 387 75 28 13 98
Type of company : Joint-Stock Company in Mixed Property	Established in : 1983
Ownership : 82.6 % state capital ; 17.4 % joint-stock capital of the employed workers.	

Basic activity	Production of toluene di-isocyanate (TDI)
References (trade status)	Prior to the war the only producer of TDI on the former Yugoslavia market. Over 60 % of the production exported to the markets of the Western and the Eastern Europe

PROJECT : PRODUCTION START-UP

Location	Federation Bosnia and Herzegovina, Tuzla-Drina Canton, the town of Tuzla	
Description	To start the production of toluene di-isocyanate (TDI)	
Product basic data	Designed capacity 18,000 tons/year of TDI ; 50,000 tons/year of HCl (by-product)	
Production assessment	<u>Tons/year in the first year</u> 10,800 tons/year	<u>Tons/year in the second year</u> 14,400 tons/year
Demand assessment	Over 90 % of the production will be sold in the markets of the former Yugoslavia	
Investment justification	<ul style="list-style-type: none"> Property in the value of 29.4 million \$ will be activated Positive foreign currency balance at the capacity of 80 % amounts to 23.5 million \$ About 400 workers who are currently not working (indirectly significantly more) would be employed 	

Project total value, USD	36,900,000
Financing gap, USD	7,500,000
Participation of company, USD	29,400,000

Economic & financial effects	The first year	The second year
• Total income, USD	29,235,000	38,985,000
• Operating cost, USD	26,259,000	35,000,000
• Investment efficiency, USD	2,976,000	3,985,000

Investment activation period	10 (ten) months from the beginning of the implementation
Preferable mode of co-operation	Joint Venture (eventually credits)

SODASO holding
GENERAL DIRECTOR
Prof. Dr. Izudin Kešetović

SODASO holding, 75000 Tuzla, Slatina 2, Bosnia and Herzegovina

Company : SODASO holding "DITA" Tuzla	Address : 75000 Tuzla, Bukinje bb
Responsible person : Prof. Dr. Izudin Kešetović	Tel. +387 75 21 24 44 Fax + 387 75 28 13 98
Type of company : Joint Stock Company	Established in : 1977
Ownership : State : 66.9 % Shareholders : 33.1 %	

Basic activity	Production of washing agents
References (trade status)	"DITA" sells its products in the market of Bosnia and Herzegovina and in the markets of the states formed in the territory of the former Yugoslavia

**PROJECT : PROGRAMME FOR THE PRODUCTION OF SOAP,
TOOTH PASTES AND THE CARE COSMETICS**

Location	DITA Tuzla
Description	The Programme covers the production of the washing and toilet soaps, the tooth pastes and the care cosmetics.
Product basic data	The capacity of the production of soaps amounts to 4,000 tons/year, of the tooth pastes to 400 tons/year, and of the care cosmetics to 100 tons/year
Production assessment	The capacity of the production of soaps amounts to 4,000 tons/year, of the tooth pastes to 400 tons/year, and of the care cosmetics to 100 tons/year
Demand assessment	The demand for the soaps amounts to 4,000 tons/year, for the tooth pastes to 400 tons/year, and for the care cosmetics to 100 tons/year
Investment justification	The Programme is justified as it contributes to the expansion of the production capacity of DITA, and the buildings and the infrastructure required for the production are already available.

Project total value, USD	2,850,000
Financing gap, USD	850,000
Participation of company, USD	2,000,000

Economic & financial effects	
• Total income, USD	8,250,000
• Operating cost, USD	7,700,000
• Investment efficiency, USD	550,000

Investment activation period	12 months
Preferable mode of co-operation	Credit 850,000 USD, interest rate 5 %, grace period 1 year

SODASO holding
GENERAL DIRECTOR
Prof. Dr. Izudin Kešetović

SODASO holding, 75000 Tuzla, Slatina 2, Bosnia and Herzegovina

Company : "POLIROND" Orašje	Address : 76270 Orašje 8. ulica br. 42
Responsible person : Prof. Dr. Izudin Kešetović	Tel. +387 75 21 24 44 Fax + 387 75 28 13 98
Type of company : Limited Liability Company	Established in : 1962
Ownership : State : 22.6 % Shareholders : 77.4 %	

Basic activity	Processing of plastic masses
References (trade status)	Buyers of buttons are the ready-made clothing industry and the consumable goods industry. It is planned to sell 80 % of the production in the market of Bosnia and Herzegovina, and to export 20 %, predominantly to the Republic of Croatia..

**PROJECT : PROGRAMME FOR THE RECONSTRUCTION AND
MODERNIZATION OF THE FACTORY FOR THE
PRODUCTION OF BUTTONS**

Location	"POLIROND" Orašje
Description	The basic goal of the Investment Programme for the Reconstruction and Modernization of the Factory for the Production of Buttons at "Polirond" Orašje is to repair the war damages and to replace and modernize the worn-out items of equipment
Product basic data	Capacity of 600,000 "gros" of buttons/year (1 gros = 144 pieces)
Production assessment	600,000 gros/year
Demand assessment	600,000 gros/year
Investment justification	The Investment Programme is justified since the property in the value of about 1 million USD will be activated, 40 workers will get employed (out of which 18 will be newly-employed) and an outstandingly good financial effect will be realized.

Project total value, USD	500,000
Financing gap, USD	200,000
Participation of company, USD	300,000

Economic & financial effects	
• Total income, USD	1,400,000
• Operating cost, USD	1,030,000
• Investment efficiency, USD	370,000

Investment activation period	3 months
Preferable mode of co-operation	Credit 200,000 USD, interest rate 5 %, grace period 1 year

SODASO holding
GENERAL DIRECTOR
Prof. Dr. Izudin Kešetović

SODASO holding, 75000 Tuzla, Slatina 2, Bosnia and Herzegovina

Company : PROGRES d.d.	Address : 75280 Kladanj, Vitalj br. 1.
Responsible person : Prof. Dr. Izudin Kešetović	Tel. +387 75 21 24 44 Fax + 387 75 28 13 98
Type of company : Limited Liability Company	Established in : 1959
Ownership : State : 44.4 % Shareholders : 55.6 %	

Basic activity	Production of heat-adhesive materials for the footwear industry
References (trade status)	Sales in the markets of Bosnia and Herzegovina and of other countries formed in the territory of the former Yugoslavia, exports to Uzbekistan (former USSST)

**PROJECT : PROGRAMME FOR THE PROFLEX PRODUCTION
START-UP**

Location	"PROGRES" Kladanj
Description	The basic goal of the Project is to revitalize and start the production of heat-meltable linings for footwear. It is planned to purchase equipment (heating-cooling devices) and the raw materials required for the production
Product basic data	Capacity of 500,000 m ² of proflex annually
Production assessment	200,000 m ² of proflex annually
Demand assessment	200,000 m ² of proflex annually
Investment justification	The implementation of the Investment Programme is justified because in this way the property 2.7 million USD worth will be activated, the conditions to employ 48 workers will be created and enviable financial result will be achieved. The investment Programme is acceptable from the environment point of view.

Project total value, USD	2,749,800
Financing gap, USD	100,000
Participation of company, USD	2,649,800

Economic & financial effects	
• Total income, USD	1,050,000
• Operating cost, USD	682,000
• Investment efficiency, USD	368,000

Investment activation period	2 months
Preferable mode of co-operation	Credit 3 years, interest rate 5 %, grace period 1 year

SODASO holding
GENERAL DIRECTOR
Prof. Dr. Izudin Kešetović

SODASO HOLDING TUZLA
DD POLIURETANSKA HEMIJA "POLIHEM"
TUZLA

I N F O R M A T I O N
O N C H L O R A L K A L I C O M P L E X

TUZLA, JANUARY IN 1996

INTRODUCTION

The Chloralkali Complex Plants were put on stream in 1976 and the whole period until the outbreak of the war they were continuously in operation with regular annual repairs being done on them. The war acts made it impossible to provide certain raw materials (chlorine, propylene, ethylene, oxide) as well as to dispatch the finished products which resulted in the plants shut down immediately after the beginning of the war actions. Some of the plants, namely those which were connected with the local resources of the input and output goods, were in operation during the war, if necessary.

The key plant of the chloralkali complex is sodium chloride electrolysis plant at which chlorine, sodium hydroxide and sodium hypochlorite are produced. Chlorine, as a dangerous substance, is partly produced at our own electrolysis plant, and 25 000 - 30 000 tons/year were being purchased and imported mostly from ITALY. In view of a constantly growing risk accompanying the chlorine transportation, there is a constant pressure in the European countries to restrict its transportation.

Due to all these facts as well as owing to the condition of the electrolysis plant, the crucial issue for DD Polihem is to construct the electrolysis plant of a satisfying capacity.

BASIC OUTLINE OF THE COMPLEX

The Chloralkali Complex is a series of technological plants the products of which could be sold on the markets to which the complex used to gravitate.

The production programme consisted of the following goods :

Industrial salt production	75,000 tons/year
Sodium chlorate production	4,000 tons/year
Chlorine production	27,000 tons/year
Sodium hydroxide production	30,000 tons/year
Sodium hypochlorite production	14,000 tons/year
Hydrochloric acid production	30,000 tons/year
Propylene oxide production	21,000 tons/year
Polyols production	23,500 tons/year
PUR-Systems production	8,000 tons/year
Calcium Hypochlorite production	Abandoned

In addition to these plants the auxiliary plants for the production of nitrogen and oxygen, for the waste effluents treatment, the cooling water system and the electric power supply system were also constructed.

The complex was constructed in order to convert the salt obtained from the local salt deposits, through chlorine, into more price effective products. In the second development phase the plant for the production of 18,000 tons/year of toluene di-isocyanate and 55,000 tons/year of hydrochloric acid, was constructed.

ESTIMATED TECHNICAL CONDITION OF THE PLANTS

The Chloralkali Complex Plants, except for the salt electrolysis plant, can be ready, subject to minor interventions to being done on them, to be put into operation within a relatively short period of time after the communication blockades have been lifted.

The chloralkali electrolysis is a plant which had been operating with difficulties right from its start-up in 1976. After its revitalization in 1988 until the war it was working continuously producing :

Chlorine	27,000 tons/year
Sodium hydroxide	30,000 tons/year
Hydrochloric acid	30,000 tons/year
Sodium hypochlorite	14,000 tons/year

The plant revitalization was performed to the extent and with the aim to make it run for a period of 4 - 5 years; and within this period a new plant was supposed to be constructed. However, the war interrupted and stopped any further activities.

The problem of this plant can be solved in several ways :

1. To revitalize the chloralkali electrolysis plant to be able to run at 75-80 KA in which case the production would cover :

Chlorine	26,000 - 27,000 t/yr
Sodium hydroxide	28,500 - 30,000 t/yr
Hydrochloric Acid	30,000 t/yr
Sodium Hypochlorite ..	6,000 t/yr

The revitalization covers : cell system, chlorine drying system, chlorine liquefaction, storage and distribution.

It is estimated that the investments into the works required to bring the production to this level would amount to 3 - 3.5 million DEM, and the plant would be in the condition to operate for the following 2 - 3 years, which would with the purchase of 8,000 - 10,000 tons of chlorine, secure full operation of the DD POLIHEN factories.

2. During the period of 2 - 3 years it would be necessary to construct a new chloralkali electrolysis plant with the capacity of 55,000 - 60,000 tons based upon the new membrane technology. The investment would amount to about 50,000,000 DEM. The plant would be constructed on a new location and in a new building.
3. Other plants within DD POLIHEN are technically ready to give, under the condition that they are subjected to regular overhaul, which has not been done since the year 1991, and which should be done, the production achieved prior to the war, which is as follows :

Propylene Oxide	21,000 t/yr
Polyethers	26,000 t/yr
PUR - Systems	5,000 t/yr
Sodium Chlorate	4,000 t/yr
Industrial Salt	80,000 t/yr

On the flow-diagram given in Appendix 1 is presented how the plants are interlinked.

MARKET FOR THE PRODUCTS OF DD POLIHEM

DD Polihem used to sell its products in the market of the former Yugoslavia, in the West European markets (Italy, Germany, Austria, etc.), and in the East European markets (Hungary, Czechoslovakia, Bulgaria) and the Near East countries, respectively.

The value of a month production amounted to 12 - 14 million DEM, out of which the exports accounted for 70 % of the value.

During the war we have kept in touch with all the partners and it is our estimate that our reappearance on the market will be successful.

ELECTROLYSIS PLANT DESCRIPTION

The electrolysis plant was constructed during the period between 1974 and 1976 when it was put on stream. It was supposed to have the following parameters :

Chlorine	36,000 tons/year
Sodium hydroxide	40,000 tons/year
Hypochlorite	6,000 tons/year
Hydrochloric acid	18,000 tons/year

During the first phase of its operation, the plant failed to achieve the design capacity and would yield, instead, only the maximum of

Chlorine	18,000 tons/year
Sodium hydroxide	20,000 tons/year
Hypochlorite	10,000 tons/year
Hydrochloric acid	10,000 tons/year

In 1988 the plant was revitalized and yielded

Chlorine	27,000 tons/year
Sodium hydroxide	30,000 tons/year
Hypochlorite	14,000 tons/year
Hydrochloric acid	<u>30,000 tons/year</u>

The plant consists of a diode rectifier 100 KA and voltage control at the level of 80 - 180 V. Chlorine is produced in the

cells with mercury cathode and metal anodes with the current density of 7.5 KA/m². The number of cells is 36. The chlorine drying is conventional with the sulphuric acid, and the compression and liquefaction are performed by means of the reciprocating two-stage compressors.

NEW CHLORALKALI ELECTROLYSIS BASED ON THE MEMBRANE TECHNOLOGY

In the world chlorine is produced under three commercial technologies : mercury, diaphragm and membrane.

The mercury technology has been abandoned due to the ecological problems, and the diaphragm technology yields sodium hydroxide of unsatisfactory quality.

For the last ten years the plants using the membrane technology have been constructed.

In principle, membrane technology is similar to any chlorine electrolysis, it differs only in additional (secondary) electrolyte purification and in the electrochemical reactor design. In case of the mercury technology, the evolution of chlorine and hydrogen (forming an explosive mixture) in the cell is prevented by the generation of amalgam and its decomposition in the secondary cell. In the case of the diaphragm technology the simultaneous evolution of chlorine and hydrogen is prevented by an asbestos diaphragm. In the case of the membrane technology, the parallel development of hydrogen and chlorine is prevented by a membrane. The membrane is made of perfluorocarbon fabric.

On the flow-diagram given in APPENDIX 2 are presented the basic operations under the membrane technology.

WHAT IS IT THAT WE WANT TO DO

1. To revitalize the existing plant to be capable to operate with 36 cells and to yield :

Chlorine	26.000 - 27.000 t/yr
Sodium hydroxide	28.500 - 30.000 t/yr
Hypochlorite	6.000 tons/year
Hydrochloric acid	up to 30.000 tons/year

The plant would be in operation already during the war and immediately after the end of the war what would make it possible also for the other plants to be in operation.

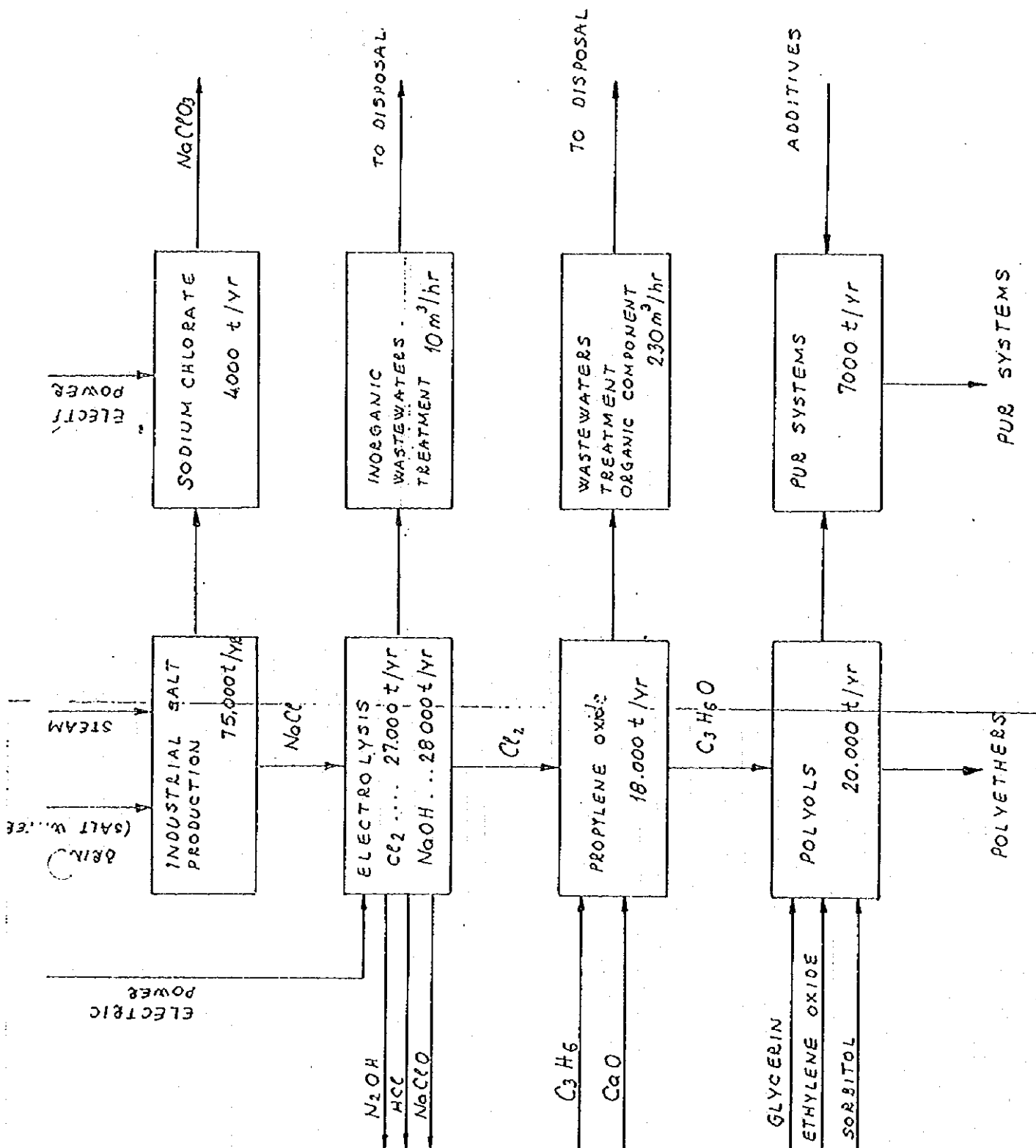
2. To plan and construct the chloralkali electrolysis plant with modern membrane cells and having the following capacity--

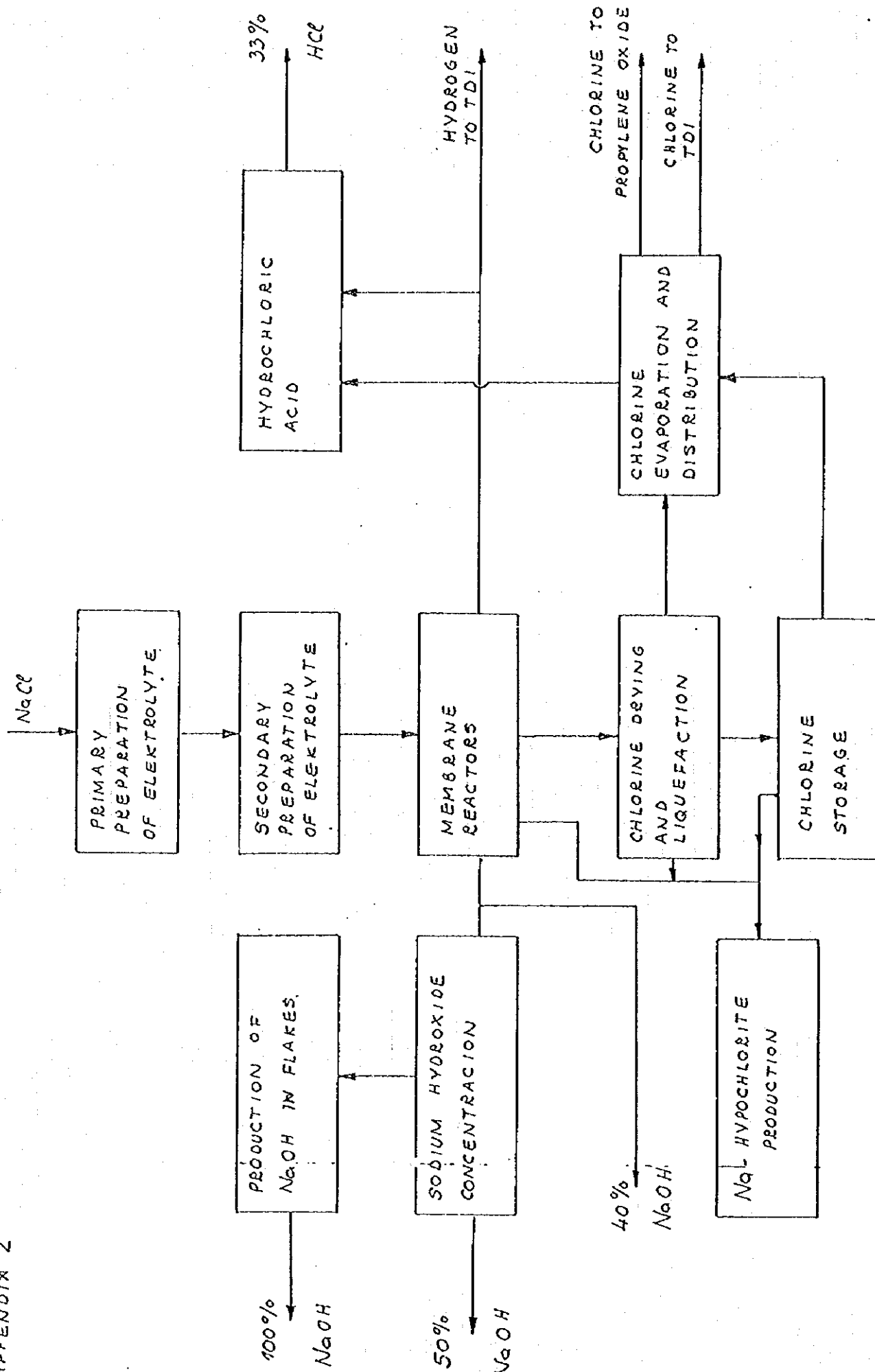
Chlorine	60.000 tons/year
Sodium hydroxide	68.000 tons/year
Hypochlorite	8.000 tons/year
Hydrochloric acid	30.000 tons/year

3. Available resources :
 - industrial salt 75,000 tons/year; additional 30,000 tons/year should be provided. The salt plant capacity must be expanded.
 - electric power - it is available, as well as the infrastructure required for the electric power transmission
 - industrial water, air and nitrogen are available in sufficient quantities
 - building - the space available needs to be adapted
 - personnel - available basic personnel should be organized and a few engineers of each field of specialization should be made familiar with the secrets of the process
 - chlorine consumption is ensured
 - market for sodium hydroxide is ensured
4. Engineering can be provided by several firms in Europe or Japan such as are UHDE - Dortmund, KREBS - Zuerich, DE-NORA - Milan, KOMPRIMO - Amsterdam, LURGI - Frankfurt, ASAHI GLAS - Tokyo, ASAHI CHEMICAL - Tokyo.
5. Estimated investments - 50,000,000 DEM

WHAT IS IT THAT WE GET

1. All the plants would be in operation at full capacity
2. We would avoid the use of mercury in the process
3. By avoiding the chlorine transportation we would reduce the risk of possible accidents.







IZ OBLASTA NA POMOĆA TDI TUZLA
OD U MJEŠOVITOG SVOJINI p. o. TUZLA

75000 TUZLA, Biskupje bb

Telefon: 075/214-441,
212-112, 214-111

Telex: 44-252
Fax: 212-047

VAS ZNAK:

NAS ZNAK: SS/SS 1-14

DATUM: 27.06.1996.

BASIC DATA UPON TOLUENE DIISOCYANATE
MANUFACTURING PLANT-TDI

By construction of toluene diisocyanate-TDI factory, the polyurethane raw material production in the frame of "SODASO" was completed.

(HAK-1 polyol production was put into operation in 1976.)

Toluene diisocyanate manufacturing factory was put into operation in 1983. The factory was constructed based on credit arrangements (goods credit and untied credit) with Japanese company named MITSUI TOATSU CHEMICALS, INC. which was the bearer of the basic technology. Designed capacity of the plant is 18.000 t/y of TDI-80/20 where 33 % HCl (hydrochloric acid) occurs as a by-product in the quantity of 50.000 t/y. In compliance with the commercial necessities, isocyanate systems can be prepared in the quantity up to 10.000 t/y.

Toluene diisocyanate production represents an assembly of separate technologic processes-plants which in a synchronous production bear the final product-TDI.

Starting-up of such a production would have a multiple importance for the Republic of Bosnia and Herzegovina, as follows:

- The production is entirely export oriented one. Positive foreign currency balance with 80 % capacity amounts to 40 million DM.
- Repayment of debts occurred in the period of plant construction would be made possible.
- Approximately 400 workers could get employed directly in production, while the accessory activities (transport, company maintenance, equipment manufacture, energy production, services and the like) would engage considerably higher number of workers.

Restart of this production is specific owing to many reasons:

- Partial start-up of particular plants is not possible to carry on
- Although there was no direct war damages, indirect damages due to corrosion are considerable.
- Spare parts/equipment delivery period and manufacture will require 3-6 months.
- General/overhaul repair of all the plants should be performed.

Financial resources required for the acquisition of new equipment, spare parts, chemicals, filling material, also the procedure of preparing the plant for start-up are estimated to 5,5 million DM.

Working capital covering two-months plant operation should require the provision of about 4,0million DM. Time period required for the purpose of starting-up the plants is 8-10 months.

Herein have been presented only the basic data upon the toluene diisocyanate production which together with HAK-1 polyol production represents a perfect whole.

For any additional information, we are at your disposal.



Technical manager of TDI Tuzla

[Signature]
Bekib Selimović, B. Ss. Techn.)

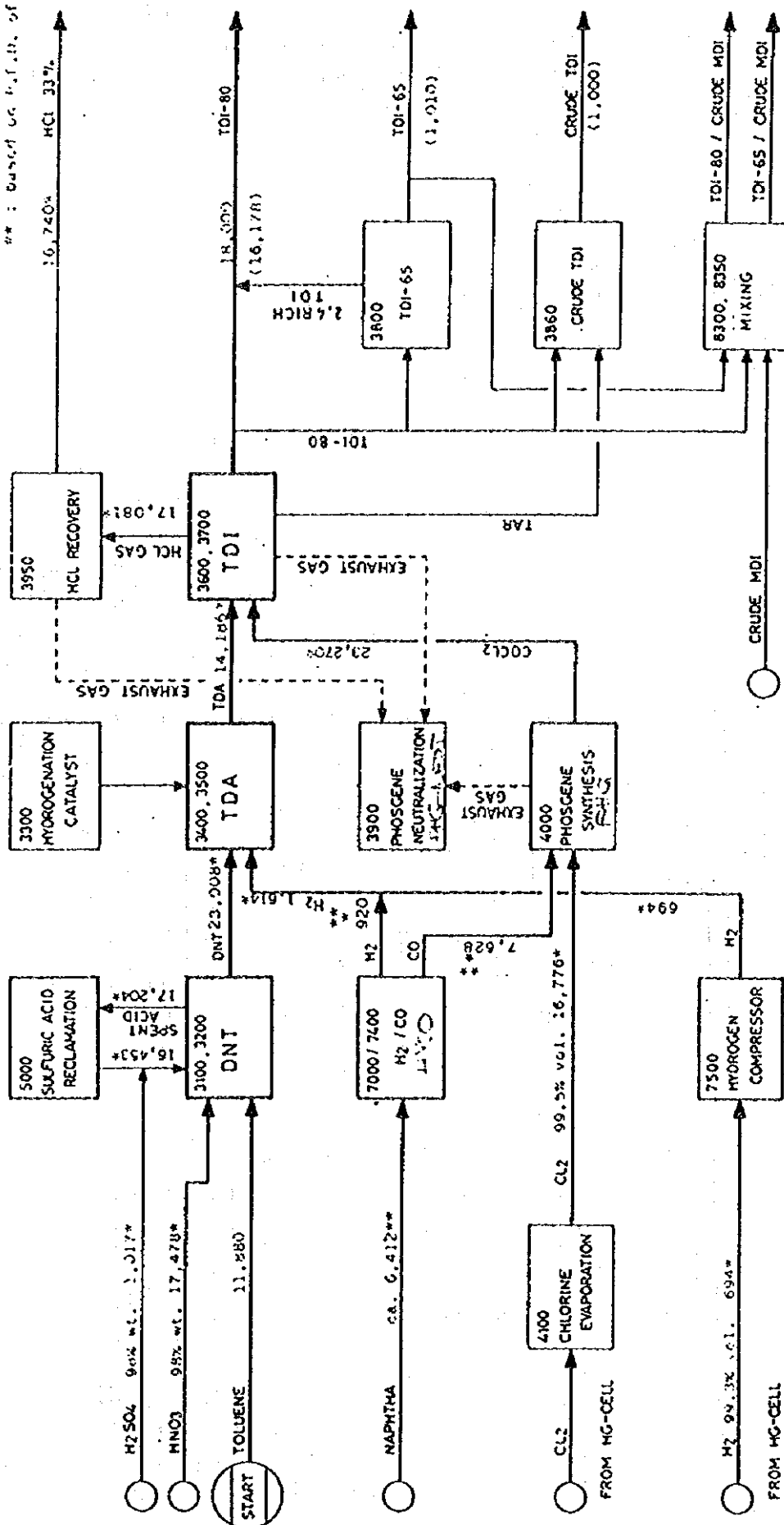
HAK-2 PROJECT
SODA-SO, YUGOSLAVIA

TDI COMPLEX
BLOCK DIAGRAM

indicating main raw materials, intermediates, and products with yearly quantities for 19,000 tons per year of INI-80 production.

UNIT: MATHS TOPIC: PER YEAR
: AS PER

* * * : 0456789 101112 131415



IZOCIJANATNA HEMIJA TDI TUZLA
DD U MJEŠOVITOJ SVOJINI p. o. TUZLA



75000 TUZLA, Bukinje bb

Telefon: 075/214-441,
212-112, 214-111

Telex: 44-252

Fax: 212-047

VAŠ ZNAK:

NAŠ ZNAK:

DATUM:

SUBJECT: DD TDI TUZLA
BUSINESS INFORMATION
SURVEY

- I. TDI ISOCYANATE CHEMISTRY TUZLA is a stock joint company with a total stock capital amounting to 24.686.840 DEM, a part of which in the amount of 3,209.300 DEM refers to a private stock capital (the one to be paid in), the following amount of 493.740 DEM is their stock capital already paid in, while the remaining part of their stock capital amounting to 20,983.000 DEM is in a state ownership. The DD TDI Tuzla stockholders are the workers of the company, their number is about 330. The number of TDI stockholders does not include any outside bodies.

- II. Financial results and the balance sheet on the date of December 31, 1996 were as follows:

Company Performance Balance

1. Incomes	296.200 DEM
2. Expenditures	12,092.800 DEM
3. Deficit	12,389.990 DEM

Balance sheet

4. Fixed assets	129,379.050 DEM
5. Working assets	1,304.280 DEM
6. Total assets	131,043.330 DEM
7. Capital	24,686.840 DEM
8. Long-term credits	68,366.500 DEM
9. Short-term credits	37,989.990 DEM
9.1. Suppliers	1,965.510 DEM
9.2. Interests	31,566.530 DEM
9.3. Others	4,457.950 DEM
10. TOTAL LIABILITIES	131,043.330 DEM

Expenditures (Item No. 2) are mainly consisted of the negative exchange rate differences on long-term credits (Item No. 8) and the interests due on such credits accrued for 1996 fiscal year (i.e. about 5,300.000 DEM out of 31,566.530 DEM which is the total amount of due interests). The amortization is not calculated at all, this because of the standstill of the planets. We hope the negotiations conducted between our Government an London/Paris clubs will result in a write-off a major part of the credits and intersts, which should considerably improve the financial situation, especially with regard to the capital. The deficit recorded in 1996 has been made up by charging the company's own capital.

III. During the war , the number of 135 workers out of 465 employees left the company. Today we are disposing of a major part of skilled personnel who are quite component to resolve the problems of revitalization, production restart issues and the matter of a new personnel education. We are still short of many specialists of a different profile, such as process engineers, chemical engineers, plant chiefs, operators, skilled metalworkers. So, we are now ready to employ newly all those workers whom we need and who were fired by a force of a legal order, because they left the country and went abroad during the war. With their eventual return, we would be able to restart the production easier, and to stabilize it, the step which would give us a possibility to save a considerable mass of financial resources indispensable for the education of a new personnel. Legal provisions pertaining to the employment of workers favour those people who did not leave the country and those who took part in its defence.

IV. The manufacturing plants based on a technology by Japanese company Mitsui Co., Ltd. are designed to have the installed capacity of 18.000 t/y TDI and 55.000 t/y HCL. The production process menagment is organized through fonctionning the following sectors: production sector and services partaining to it, maintenance sector provided with anciliary services and a separate service including safety, environmental protection and fire protection. The basic raw materials used in the production process of this factory and which have to be purchased from a foreign market are as follows:

toluene (312 USD), nitric acid (45 USD), primary benzene (323 USD), liquid cholirine (60 USD), naphtha (130 USD), orthodichloro-benzene (870 USD).

Due to the legally imposed charges, the quoted prices are regularly increased by 30% and the said charges are in a constant increase, compared to the pre-war period, wich is another consequence of the new countries created from the Ex-Yugoslavia; this price rise is also caused by an increase in the transport insurance costs.

Discussing the basic raw materials that were purshased from the local BH market, we could mention the electric power (abou 50 DEM MW/h), process steam (17 DEM /t), industrial water(0.15 DEM /m³), NaOH (400 DEM /t) and to a certain extent primary naphtha and nitric acid purchased from BH Serbian Entity. Raw materials from abroad were imported mainly from the countries of Eastern Europe, Rumania, Bulgaria, Hungary, Czechoslovakia, partially from Serbia, Croatia, Slovenia and Italy.

The factory is by the utilities (electric power / process steam)from the electric power station situated in the nearest vicinity. Today the prices of the said media are considerably higher than

those registered in the pre-war period which is a direct consequence of a low capacity utilization evident in the electronic in the power station operation. A possible price decrease could be expected if the electric power / steam consumers' capacities are put into operation in the forthcoming period.

Tdi manufacturing plants have been in the standstill stage since May, 6, 1992. During the same year, a conservation of the vital parts of equipment was carried out, so even now they are still in a good condition. In spite of all the conservation measures properly carried on, the aggressive media, especially the above acids, remained partially in the system, causing in this way a considerable damage to the plant equipments that were additionally aggravated by a corrosion due to unfavourable atmospheric conditions.

Therefore, considerable financial investments are found out to be indispensable for the purpose of a production restart.

By bringing a plant into a proper condition, also by improving the production process, the conditions for better factory operation will be created, which will inevitably result in a significant decrease of excess situations, characterized in the past by a frequent leakage of harmful materials into running water streams or atmosphere. So, an adequate process control carried on according to the provided flow sheet will give the greatest contribution for the future environmental protection. This also relates to the decrease in crude residue-waste (i.e. tar mixed with TDI traces) normally incinerated in an adequately designed furnace. In addition to this, a future investment shall be required to cover the waste water treatment problem, that is constantly present in the normal plant operation. For the time being, we do not possess any sources of assets required to cover such investment neither have we an adequate environmental protection program.

- V. The major for placing our product were the countries of Western Europe, especially Italy, Germany, Austria and Switzerland, also to some extent the countries of Eastern Europe and Turkey. The export to these countries ranged 8000-12000 t/y of the product. The main European competitors in the TDI production are as follows: BAYER, BASF, MONTEDISON, DOW, etc. In Europe, the existing capacities for the TDI manufacture range within a quantity of about 490.000 t/y. the quality of our product was such as to be highly appreciated by all of the above companies. We consider our product to be highly competitive, so we think we shall not encounter any difficulty in placing it, in case the future production is reset up.

- VI. Commercial relations with foreign partners were mainly carried on through some commercial companies such as TELMA Milano, TELMA Frankfurt, COPECHIM (Switzerland) with which we had a current account relation - raw material purchase and the placement of finished product.

Even today these countries have been interested in the continuation of a business cooperation with our company.

VII. Reconstruction of the manufacturing plants is considered indispensable for solving a production restart issue. The list of capital funds to be invested into the manufacturing plants is following:

-pumps, turbopumps, motors, compressors	822,369 DEM
-heating/cooling equipment	398,871 DEM
-steel/iron pipes and fittings	987,583 DEM
-electronical machines/apparatus (estimation)	500,000 DEM
other machines and specialized equipment	1,690,107 DEM

TOTAL

5.227.287 DEM

The above specification has been done according to the technology by Mitsui/Hitachi who were also the equipment suppliers. What should be noted here is that the corresponding purchasing/assembly costs shall be added to the amounts mentioned above.

For the purpose of the capacity increase and a "bottle neck" removing in hydrogen production (70\$), the additional capital investments in methanol production plant shall be required (the value is ranging about 5,000.000 DEM.) This would cover the provision of the missing quantity of 900 Nm³/h hydrogen (900 Nm³ x 7920h). The relying upon hydrogen supplies from POLIHEM chlor-alkali electrolysis plant during the previous period of TDI plant operation proved to be non-reliable.

The above mentioned capital investment shall have to be increased by the amount to be invested into current assets which shall range 5,000,000 DEM per one 64-days circulation, this with a condition of paying raw materials on delivery, whilst the collection of payments is not earlier than 60 days.

At present, we dispose neither of potential sources of financig nor of any potential investors to carry a privatization on. Plant reconstruction, the erection of an additional methanol plant, equipment testing, operation run-in shall necessarily take about one-year period.

General menager of
DD TDI TUZLA

Enes Mušić, B. Sc. Econ.

"SODASO"HOLDING TUZLA
DD FABRIKA SOLI TUZLA
(SALT FACTORY)
Tuzla,22.06.1997

Questions and answers that will be considered by
Japan Government team for identification of Sodaso
project

1.MANAGEMENT

1.1.Ownership structure

Against balance sheet for 1996 the capital structure per ownership with distribution of not-nominated capital by decision of auditing is as follows:

	AMOUNT IN DEM	STRUCTURE
State capital	34.396.922,-	39,92
Shareholding capital	49.863.781,-	57,87
Capital of HOLDING	1.906.837,-	2,21
<u>TOTAL:</u>	<u>86.166.540,-</u>	<u>100 %</u>

1.2. Accounts payable and receivable against balance sheet for 1996.

	AMOUNT IN DEM
Accounts payable	7.843.920,-
Accounts receivable	5.933.580,-
<u>Balance</u>	<u>1.910.340,-</u>

During 1997/98 the debt to our creditors will be mutually compensated to the amount in which Salt Factory Tuzla is referred to as creditor but at the end negative balance is to be expected in form of debt to 2,5 mil.DEM.

Covering for this negative balance we have in stock of unsold salt that on date 31.05.1997 is 10.872 t.

The problem of salt stock is getting more complex because of slow realization, the result of closed salt market particularly to the state of SR Yugoslavia (Serbia and Montenegro), which in prewar period (before 1992) participated in total salt realization up to 44% respectively 90.000 t.

Due to big stock of salt and deferred payment of sold salt (in average to 45 days from date of invoice issuing) Salt Factory Tuzla has a considerable amount of frozen working assets. Therefore it is necessary to find a credit as soon as possible for the working purpose up to 3 mil. DEM with repayment period of 5 years and Grace period 1 to 2 years. Without this credit Salt Factory will not be able to operate normally because of existing illiquidity.

1.3. Profit and loss account for 1990, 1996 and 1997

	1990	1996	AMOUNT IN DEM Per Programme 1997
Value of sales and other income	107.272.396,	11.939.110,	24.991849
Total expenses	96.451.603,	11.988.200	23.529.100
Profit-loss	10.820.793,	49.090,	1.462.749
from which			
Taxes	6.035.614,	-	526.590
Dividend	1.365.175,	-	-
Nett profit	3.420.004,	-	936.159

By Programme for 1997 in comparison with 1990 considerably lower realization is expected of total income and profit (nett profit) due to lower salt realization, bigger fall of sales prices of salt 1997/90 and higher purchase prices of key raw materials, packing material and energy.

If assumptions from Programme for 1997 are realized financing indicators will be much better in 1997 in comparison with 1996.

1.4. Employment and problems

Conclusive with 20.06.1997 636 workers are employed in Salt Factory Tuzla which has an inadequate personnel structure (qualification, age and sex) indicated in following breakdown:

Employed workers at Salt Factory by actual qualifications:

D.Sc.	1	Secondary school	137
M.Sc.	7	Highly skilled	119
University edu.	40	Skilled	201
Higher edu.	23	Semi-skilled	54
		Not-skilled	54

TOTAL: 636

From total employed persons women labour force is 29.51% or 188.

Qualification structure

1.D.Sc.,M.Sc.,B.Sc.,	7,5%	of total employed number
2.Higher education	3,6%	"
3.Secondary school educ.	21,5%	"
4.Highly skilled	18,7%	"
5.Skilled	31,6%	"
6.Semi-skilled,not-skilled	17%	"

Age of employed workers

Age	Number of workers
From 20 to 30 years	59
31 - 35	86
36 - 40	108
41 - 45	78
46 - 50	115
51 - 55	76
56 - 60	91
Over 60	23
TOTAL:	636

From above indicated details it can be seen that 29,8% from total number of employed are workers over 50 years of age.

Age of other workers:

To 30 years	9,3%	of total number of employed
To 35 "	13,3%	"
To 40 "	17%	"
To 45 "	12%	"
To 50 "	18%	"

After retirement of workers over 50 years of age(190 workers)that is a natural process the conditions will be created for younger workers to be employed in next 5 years.

In addition to inadequate qualification,age and sex structure of employed personnel there are other workers respectively disabled workers.

Total number of disabled workers at Salt Factory Tuzla is 52. There are also 8 workers classified in category of disturbed in psychical-physical growth(mentally retarded,damaged hearing and speech to a certain extent)but able and trained to do simple operations under special conditions at special classes of secondary schools.

Another 7 workers are just under procedure of estimating the working ability by special commission so that number of disabled workers will be increased.

Generally observed this category makes 10% of total number of workers employed.

At Salt Factory Tuzla there is a problem of adequate engagement of disabled workers for proper jobs in comparison to rest workingability, because there are many, in relation to unemployed persons, there are big restrictions regarding the rest working ability(rather great counterindications) and unfavourable working conditions (increased noise,dust,draught,higher temperature,work in shifts etc).

This problem becomes more complex by the fact that at Salt Factory Tuzla there are many workers employed of age over 50 with many health problems causing their absence(longer sick leave)whose working ability is significantly limited-reduced.

Taking into consideration above problems of employed workers at Salt Factory Tuzla the imperative is very soon younger male workers to be employed,for production operations 30 workers and shipment and salt loading 20 workers.

Because of unfavourable qualification structure of employed workers the funds should be provided for training of 100 workers.

- work on computers
- work on measuring-regulation instruments
- work in marketing dept.
- work in legal operations

2. TECHNICAL PART

2.0 INTRODUCTION

Salt Factory Tuzla was founded in 1885 and it is an industrial producer of table salt and industrial salt.

Besides salt there are some other products produced such as sodium sulphate and in field of food, pharmacy and hygiene .

Old production technology was completely changed in 1970 when modern salt factory was built.

Salt production is made at 3 production lines:

- thermal compression evaporation of brine, capacity of 10 t salt/h
- vacuum evaporation of brine, capacity of 10 t salt/h
- vacuum expansion evaporation of main lye, capacity of 5 t salt/h and 1 t sodium sulphate/h

Projected capacity of Salt Factory Tuzla is: 185.000 t salt/year and 7.000 t of sodium sulphate/year.

Due to increased salt consumption in 1989 the plant of salt production was reconstructed operating by principle of brine vacuum evaporation.

This reconstruction resulted the increase of salt production in this production line from 10 to 20 t salt/h.

Total capacity of production was increased to 250.000 t salt/y.

During the war (1992-1995) because of war actions, cut road communications, the sales of salt was not possible and Salt Factory was out of operation for full two years.

Though the production plants had been conserved this two year interruption caused their technical incapacitation.

For restart of vacuum production line and ancillary plants in period from 1995 to 1996 the own funds were invested in amount of 2.300.000 DEM.

However the safe salt production on this production line and ancillary plants has not been fully provided and additional financing funds are therefore required for investment project in amount of 2.500.000 DEM.

After fully restart of this production line the other two lines would be brought to technical readiness.

From the production-ecology point(environment protection) in next period special attention would be paid to technical restart of vacuum-expansion evaporation of main lye plant(production of salt and sodium sulphate).

Required funds for reconstruction of this plant are 2.100.000 DEM.

2.1 Delivery of raw materials,energy,packing material

2.2.Purchase prices

By Programme for 1997 the following costs are expected:

I Raw materials additional mat.	Amount in DEM	Production range	Costs per unit of prod.in DEM
1.Raw materials additional mat.for salt			
1.1.Brine	1.720.000	80.000 t	21,50
1.2.Lye,soda.ash, potassium iodide	595.200	80.000 t	7,44
2.Raw mat.for spice	675.300	300 t	2.251,00
3.Raw mat.for hand washing paste	18.224	30 t	607,47
4.Raw mat.for beef cube	24.790	100.000 pcs	0,25
5.Raw mat.for beef soup	42.586	300.000 pcs	0,14
6.Raw mat.for "Čeke" soup(broth)	91.236	300.000 pcs	0,31
7.Raw mat.for infusion solutions	30.121	46.530 l	0,65
8.Raw mat.for Desol (disinf.agent)	1.330	10.000 l	0,13
II PACKING MATERIAL			
1.Packing for salt	3.604.583	80.000 t	45,06
2. " spice	60.135	300 t	200,45
3. " paste	16.308	30 t	543,60
4. " beef cube	6.975	100.000 pcs	0,07
5. " beef soup	17.250	300.000 pcs	0,06
6. " "Čeke"broth	5.000	300.000 pcs	0,02
7. " solutions	119.295	95.100 bottles	1,25
8. " Desol	3.845	100.000 l	0,38

III Energy

1. Energy for salt

1.1. Steam	2.735.000	80.000	34,20
1.2. Elct. energy	1.111.200	80.000 t	13.89

Raw materials and packing materials are mostly provided from domestic market and a smaller part by import.

2.3 Current production

At the moment the vacuum-evaporation of brine and ancillary plants for preparation of brine and salt finalization are being in operation.

Other two plants are out of operation.

2.4. Installed plants and capacity

Installed capacity of salt production in plant of vacuum brine evaporation is 150.000 t/y but present possibilities are 80.000 t/y, meaning that degree of utilization is only 53%.

2.5. The level of current capacity utilization

From total capacity of salt production (250.000 t/y salt) the current level of capacity utilization in production is about 32%.

2.6. Technical staff of production and maintenance

From total employed workers (636) there are 219 workers engaged in production and 171 on maintenance.

2.7. The measures undertaken for environment protection

The Salt Factory is projected with effective measures of environment protection. At production plant there is a section installed for the main lye processing, station for dedusting fine floating particles of salt dust and waste water is treated before entering the water courses through the system of retention pool.

3. Marketing

3.1. The main market and buyers of products

The main market for sales of our basic product is the market of Serbia, which by 1990 from total physical range of realization 201.991 t salt, was covered by 43% of total marketing of Salt Factory to the market of ex Yugoslavia. According to data from 1990, the structure of sales per market in the area of former Yugoslavia was as follows:

<u>Market</u>	<u>%</u>
-Serbia	43
-Croatia	23
-Slovenija	8
-Bosnia and Herzegovina	18
-Macedonia	7
-Montenegro	1
	<u>100</u>

According to these details we are planing that marketing of 80.000 t salt would be to following markets:

<u>Market</u>	<u>Sales in tons</u>
-Serbia	34.000
-Croatia	18.200
-Slovenija	6.400
-Bosnia and Herzegovina	15.000
-Macedonia	5.600
-Montenegro	800

Sales to the market of Serbia as the strongest market in salt quantity would be made through trade and industrial enterprises from Serbia market in direct arrangements of Salt Factory on base of concluded sales contracts as well as through enterprises from BiH market.

3.2. New competition and participation at the market

As a result of our small sales to the markets of ex Yugoslavia in period from 1992 to 1996 the competition had taken a bigger part of that market.

In addition to domestic producers in the area of Slovenija("Droga"-Portorož),Croatia(Salt works in Pag,Ston and Nin),Yugoslavia(Saltworks in Ulcinj) there is salt from Poland,Slovakia,Austria,Romania,Belorusia,Greece,Tunis and some other countries in smaller quantity.

3.3.Export competition

Starting from the reputation of our company mostly regarding the recognizable quality of our salt,that was generally accepted in the area of ex Yugoslavia,we believe that it would be our greatest advantage in sales of bigger salt quantities in export together with price that we must adjust to the market needs.The sales of our basic product in export we base in highest extent to the market of consumer's consumption(trade) but also in branches of food,bakery and other industry.

3.4. Tariff protection or competition with products from import

In the area of BiH the import of salt should be under control as salt can only be imported by quota regulations. In addition to export our factory can cover 100% BiH market needs and starting from traditional strategic importance of our basic product the import of salt is to be regulated by quota regime in order to protect domestic producer. At markets of ex Yugoslavia the import of salt is free so that bigger quantities of "suspicious" quality of different salts from other countries is possible.

The buyers of ex Yugoslavia markets who are importing salt must pay the duties such as:

Market

Yugoslavia	-19% customs duties -5% excise -0,25% YU DIN-levy(0,07 DM/kg)
Croatia	-1% customs registering
Slovenija	-1% customs registering
Macedonia	-1% customs registering

From above breakdown it can be seen that by abolishing high duties to salt import at Serbia market the assumptions could be made for bigger sales of all kinds of our salt.

4. PLAN OF RECONSTRUCTION

4.1 Target products and production level

Besides the salt production as a basic product there are some other products being produced from the field of food industry (spice additive, beef cubes, soups and broths), pharmacy (infusion solutions for chemotherapy, iodoform and some tableted products), hygiene (hand washing paste, disinfection and cleaning agents etc.).

The production has been made in rather moderate semi-industrial and laboratory conditions and by request of the market.

The objective is to produce by industrial-advanced lines of greater capacity. The activities of making technical and project documentation are just in progress as well as collecting the offers and finding donations and credit for financing.

4.2. Production of spice additive(DO-DO)

The basic idea of this Project is the existing production line of this spice additive to be reconstructed and capacity increased from current 240 t/y to 1.000 t/y.

4.3. Production of soups

The objective is to build a modern line for soup production and increase of capacity from current production to 360 t/y. Total funds for realization of these two production lines are 1.600.000 DEM.

4.4. Infusion solutions and chemodialysis solutions

The basic idea of this Project is the existing production line of capacity 100 bottles/(a 0,5 l)per hour to be increased to 1.000 bottles (a 0,5 l)per hour and 300.000 l/y chemdialysis solutions.

This production could meet the requirements of Bosnia and Herzegovina. The funds for this programme realization are about 2.500.000 DEM.

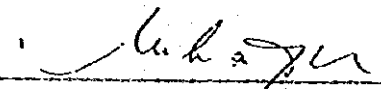
4.5. Hygienic products

For the purchase of modern equipment for production of hygienic articles (paste for washing and cleaning, liquid agent for disinfection and bleaching) 550.000 DEM are required.

4.6. The schedule of reconstruction

Reconstruction schedule of particular programmes will be made later respectively after providing certain financing funds required for their realisation.

DIRECTOR


Nedim Muharemagić, B.Sc. (Technol.)

"SODASO" - HOLDING
D I T A - Shareholders' Company
T U Z L A
Tuzla, June 24, 1997

Phone: 075/281-009, Fax: 075/281-048, 075/281-399

SODASO HOLDING
T U Z L A
Dr. Esad Žunić

RE: VISIT OF JAPANESE GOVERNMENT TEAM TO SODASO HOLDING
Information on the company

INFORMATION ON THE COMPANY

Company Name: SODASO HOLDING, DD D I T A T U Z L A
Address: Huzinskih rudara bb Tuzla
Phone: 281-009 fax: 281-399
Contact person: Mirza Proić
Position held: General Manager
Register number of the Company: 01075705
Legal status: Shareholders' Company with Mixed Proprietorship
Country of origin: Bosnia

1. MANAGEMENT

-Ownership.....current shareholders

OWNERSHIP STRUCTURE (%)

- Government 65
- Shareholders 30.4
- SODASO Holding 3.8

- Balance Sheet....Assets and Liabilities

According to the Balance Sheet on December 31, 1996, Assets
and Liabilities are as follows:

	DEM
I. TOTAL ASSETS	30,077,330.-
1. Land.....	844,310.-
2. Buildings.....	20,867,280.-
3. Equipment.....	389,400.-
4. Cash.....	780,690.-
5. Accounts Receivable.....	1,490,730.-
6. Raw materials and packagings on the stock.....	4,364,080.-
7. Finished products on the stock.....	1,218,630.-

II. TOTAL LIABILITIES.....30,077,330.-

1. Equity.....27,314,490.-
2. Long-term loans.....263,830.-
3. Accounts Payable.....1,816,140.-
4. Other short-term liabilities.....575,430.-
5. Advanced Payments.....107,440.-

- Income Statement for 1998.

DEM

I. INCOMES.....8,430,088.-

1. Income from sales.....7,379,705.-
2. Income from services.....103,843.-
3. Income from goods/materials.....228,439.-
4. Income from financing.....652,836.-
5. Other direct incomes.....65,265.-

II. COSTS.....8,410,503.-

1. Costs of products sold.....7,981,773.-
2. Purchasing value of products/materials sold.....148,276.-
3. Other costs of services sold.....6,597.-
4. Costs of financing.....183,672.-
5. Other direct costs.....90,185.-

- Situation and regulations in employment

Employees on May 31, 1997

Total:	450 employees
- working	294 "
- on leave	57 "
- on sick leave	99 "

B & H legislation system includes regulations in employment (employing new staff, their transfer from one position to another, rights and obligations of the employees, and termination of employment). Companies do not sign contracts with employees, they are employed for unlimited period of time, until their retirement, and the employment can be terminated if an employee trespasses the rules, according to the prescribed procedure. An employment can be terminated if there is no longer necessity for an employee, but it is a 2 years long procedure.

2. TECHNICAL ASPECT

- Delivery of raw materials and their prices.

"Dita's" production is primarily based on raw materials that originate from Slovenia, Croatia, and West European countries. This means that most of purchasing businesses are also import business, which involve: foreign supplier, forwarder, carrier, customs, bank (for bank guarantee and payment), and if necessary also the competent ministries. The list of materials purchased is given below:

IMPORT OF RAW MATERIALS, PACKAGINGS AND SPARE PARTS IN 1996

- DEM -

No.	I T E M	UNIT	QUANTITY	Average Purchasing	
				Price	VALUE
1.	Na-TPP	t	637.30	1,250	796,625.00
2.	Na-TPP- granulated	t	39.82	1,750	69,690.00
3.	Na-preborate	t	520.32	1,038	540,091.34
4.	DESA	t	133.08	1,569	208,858.77
5.	Fatty acids	t	154.95	1,155	178,967.25
6.	Na-silicate-liquid	t	397.97	342	136,131.10
7.	Na-silicate-solid	t	87.25	480	41,880.00
8.	TEXAPON N 70 (73% LES)	t	48.82	2,670	130,349.40
9.	ETOPON (23% LES)	t	8.00	1,200	9,600.00
10.	OPTICAL BRIGHTENERS	t	3.38	20,962	70,851.70
11.	PERFUMES	t	4.00	25,544	102,174.00
12.	TELAIN k-88	t	9.72	2,875	27,945.00
13.	ZEOLITE	t	189.03	709	134,003.96
14.	Calcinated soda	t	359.40	350	125,790.00
15.	NONIONICS (LOTENSOL AT11)	t	39.85	2,128	84,800.80
16.	CMC	t	35.00	2,828	98,982.50
17.	DISOLVIN	t	11.00	4,428	48,709.00
18.	FORMALIN	t	3.00	1,320	3,960.00
19.	Isopropyl alcohol	t	1.43	3,350	4,790.50
20.	Glycerin	t	2.00	4,536	9,072.00
21.	DEHIDOL	t	0.42	4,820	2,024.40
22.	Anti-foaming agent	t	1.00	4,878	4,878.00
23.	Paper glue	t	2.80	1,860	5,208.00
24.	Cardboard boxes 3/1	pcs	50,000	0.73	36,735.00
25.	PE wrap	t	8.073	3,018	18,327.30
26.	PE bags 3/1	pcs	246,850	0.10	25,879.80
27.	PE bags 18/1	pcs	53,400	0.25	13,350.00
28.	PE bottles	pcs	178,632	0.29	52,306.44
29.	Spare parts				42,162.23
30.	Machine for wrapping	pcs	1	34,480	34,480.00
TOTAL:					3,058,603.49

Note: The import of raw materials, packing and spare parts refer to annual production of 4.307 t realized in 1996.

- Energy supplies

DITA's main supplier of electricity, industrial steam, industrial water) is the power plant "Tuzla" in Tuzla, and there are no problems for the time being.

Price of energy supplies in 1997 in DEM (Projection)

	Powder plant	Liquid plant
Total cost of energy	951,526	101,120
Price of energy/ton	88.93	54.36

- Current activities of the Company

Sector: Industry

The Company deals with the production of powder and liquid cleaners for consumers and industry. The nominal capacity of the plant is:

40,000 t a year of washing powders
12,000 t a year of liquids
4,000 t a year of industrial cleaners

In addition to this, the Company manufactures skin care and toilet cosmetics, but this is still in the stage of development. Production capacities for powders, liquids and industrial cleaners are sufficient to satisfy the needs of B & H market for these products, and the remaining part can be marketed abroad.

The production is financed by our own funds, and a very small amount of short-term loans.

- Present capacity utilization rate

Present capacity utilization rate is 15% of the nominal capacity (period January to May 1997)

- Technical staff for production and maintenance

Dita had 623 employees before the war. Now it has 450 employees, 294 working, 57 on leave and 99 on sick leave or absent for other reasons.

All units of the factory lost qualified personnel, but the most difficult problems are the loss of engineers in R&D, foremen in the production, control board operators, workers who maintained equipment for measuring and control and other qualified personnel.

The factory has the necessary personnel for the production, but it needs planning and more activities to improve it.

- Protection of environment

DITA's production is not dangerous and harmful for the environment. It does not pollute air, and it has closed system of water circulation, which means that most of the water used in the production is purified and it returns into the production. DITA does all the necessary measurements and controls the application of regulations in this area.

3. MARKETING ASPECT

- Major market and buyers

"Dita" is a manufacturer of washing powders and cleaners for households and industry. It was second largest plant for the production of cleaners in the former Yugoslavia, the first being "Saponia" Osijek (Croatia).

Our market covered the whole territory of the former Yugoslavia with the same sales strategy.

Only promotion varied a little. Purchasers were large regional distribution centres, very inert, and they eliminated competition by regional division among themselves.

Today, a year and a half after the end of the war, if we look at it from political aspect, our markets can be divided into primary, secondary and marginal:

PRIMARY:	Bosnia and Herzegovina
SECONDARY:	Croatia, Slovenia, Macedonia and Turkey
MARGINAL:	The Federal Republic of Yugoslavia and other countries of South-East Europe and Asia Minor and West European countries.

Our markets can also be divided from the point of view of level of development:

PRIMARY:	Bosnia and Herzegovina, The Federal Republic of Yugoslavia and Macedonia.
SECONDARY:	Croatia, Slovenia, Turkey
MARGINAL:	South-East Europe, West Europe

Regarding the satisfaction of requirements, the position in these markets must be:

PRIMARY markets:	variety of production programmes in quality, price, promotion and sales strategies
SECONDARY markets:	variety of production programmes
MARGINAL markets:	offer the products which can compete in these markets

Main features of primary and secondary markets are:

- no research and review of the situation in the market;
 - regulations in the field of sales not clearly defined and very changeable
 - minor purchasers, great possibility of their change of activities;
 - interests of purchasers - traders not defined or in most cases defined as short-term and quick acquisition of profit;
 - purchasing power of consumers reduced by almost 70% in comparison with pre-war situation, without tendency of improvement.
- Competition and market share

"Dita" is the only manufacturer of washing powders in Bosnia and Herzegovina.

Before the war some other companies in Bosnia, such as "Saniteks" from Velika Kladuša and "Astro" from Sarajevo also produced shampoos and other toiletries, but their market share was unimportant.

"Dita's" market share in the former Yugoslavia was 22-24%, and in Bosnia and Herzegovina it was 23-26%.

According to our current estimations, our market share in Bosnia and Herzegovina in 1997 is 44% (January to May), and in Croatia and Slovenia it is marginal.

We estimate that our competitive power in the market of Bosnia and Herzegovina is even larger than 44%, if we bare in mind that the import of some washing powders is illegal (without custom tax and formalities and without other taxes).

- Competition in the export market

We are competitive in the export markets in the following aspects:

- quality of products;
- cheap and good staff;
- manufacturer's price of goods.

We are not competitive in export markets in the following aspects:

- design of packing;
- sales strategies and policy;
- low productivity;
- high taxes and other charges;
- lack of working capital.

- Government protection and the competition from import

Government protection does not exist and cleaners and washing powders can be imported freely.

There is no protection even with regards to the interest of consumers.

Competition from import is very strong and all the advantages of the competition are given above in the paragraph describing disadvantages of our company.

4. PLAN OF RECONSTRUCTION

- Target products and production capacity

The company is now in a new economic environment, on a highly competitive market which now attracted numerous famous international manufacturers of washing powders.

Laundry washing powders programme is still the major part of Dita's production and sales programme, but the improvement of the existing and introduction of new products will ensure Dita's presence in various market segments: in the segment of high quality washing powders and in the segment of cheaper products.

In order to ensure our market position, we must constantly work on the expansion of our production range, and we have already started it in 1997: bleach and hydrochloric acid for consumer market.

We estimate that our production will increase with the increase of market share to 12-15,000 tons in 1997/98.

- Change of raw materials and energy suppliers

Market of raw materials offers possibilities to improve our situation. The prices of raw materials show a slight growth in comparison with 1996, so we have to search for new possibilities in competition and search for alternative substitutes.

Regarding energy supplies, these changes will not reflect in the change of suppliers (power plant in Tuzla for steam and electricity) but in the decrease of consumption and cost of transport of steam and water.

- Production equipment which needs improvement and reconstruction

"DITA" needs favourable loan arrangements for reconstruction and modernization of production line of washing powders, which is the major production line in order to improve the quality of finished products and make this company's brands competitive in export markets.

a) the first stage started in 1996, and it includes the following:

- introduction of computer controlled production
- two wrapping machines
- laboratory equipment
- equipment to measure the moisture in washing powder

These things were done with short-term loans from the Bank for reconstruction and development of B & H, credit from the manufacturer of equipment and our own funds in the amount of DEM 266,111.

The items that belonged to this stage and were not realized are:

- direct steam-pipe from Tuzla power plant
- purchase and repairs of forklifts
- repairs of warehouse and compressor station

b) Second stage includes a more comprehensive reconstruction of the existing washing powder plant both in production and packing stage:

- normal washing powders plant (spray-dry system in the existing tower) with the capacity of 8.5 t/h, addition of ethoxylate in the post-addition stage.

- production of compact or concentrated washing powders as a combination of spray-dry (tower) and spray-mix (dry mixing), with the capacity of 16 ma/h.

- production of compact or concentrated washing powders by spray-mix (dry mixing) with the capacity of 12 t/h.

Number of work days per year: 260 (5 days a week, three shifts).

Infrastructure provided:

The existing washing powder plant which needs to be reconstructed.

The investment in the reconstruction of washing powder plant is 1,850,000 DEM.

The investment in the introduction of automatic packing of washing powders is 850,000 DEM, which totals 2,700,000 DEM.

- Marketing prospects

We need to develop our Marketing Sector and cooperate with marketing institutions to ensure:

- preparation of marketing plan for the local market for 1997 and the coming years;
- development of new products to satisfy the present requirements of the market and ensure the presence of the company in all segments;
- pricing, distribution and promotion strategies;
- research of export markets to identify the best potential markets and distribution agents.
- prepare the development of new products: toothpaste and toilet soaps, to close the circle of toiletries.

- Potential financial resources

Potential financial resources for the second stage of reconstruction and modernization of washing powder plant are:

- a) loan from Bank for reconstruction and development of B & H
- b) use of loans for development and donations for reconstruction of B & H.
- c) DITA's own funds

The funds for the second stage of reconstruction will be done in several stages.



Manager of DD "DITA"
Francis, B. Sc. Chem Eng.

ASIAN DEVELOPMENT BANK
Manila, Philippines
FAX NO. (63-2) 636-2316, (63-2)636-2335, or (63-2)741-7961 CCITT
GROUP 3 & 2 AUTO
FACSIMILE TRANSMISSION

TO:	Mining and Industrial Development Study Department, JICA	ATTENTION:	Mr. Y. Tsuji Director Planning Division
FAX NO.:	81-3-5352-5328	COUNTRY:	Japan
TEL. NO.:	01-3-5352-5281		
COPY:	INRM	ATTENTION:	Mr. A. Guha Project Implementation Officer
FAX NO.:	91-11-463-6175		
ORIGINATOR:	Hiroshi Nakajima Project Engineer	DEPT./OFFICE:	IWD/IWEN
		APPROVED BY:	J. E. Rockett Manager, IWEN
DATE:	04 February 1998	PAGE 1 OF:	3
If not received clearly, please call (63-2) 711-3851; 632-6438 or 632-6441 Telex 63587 ADB PN or 40571 ADB PM			

Dear Mr. Tsuji,

Subject: LOAN-IND: GUJARAT POWER SECTOR DEVELOPMENT PROGRAM
- JICA's Development Study (Technical Assistance) for Profit Centers of GEB

We appreciate JICA's co-operation to assist GEB in association with Bank's operation in Gujarat. The attached is the final memorandum on JICA's Development Study assistance (the Study) for GEB based on the wrap-up meeting in New Delhi on 27 January 1998. We also understand that the final scope of work of the Study is subject to the approval of the Government of Japan.

Yours sincerely,

J. E. Rockett
 J. E. Rockett
 Manager, IWEN

cc: S. Chander, D. Graczyk, M. Okamoto, H. Kobayashi
 IWEN-File (Evelyn P.)

**Draft Memorandum of JICA's Development Study
to the Two Profit Centers
(Rajkot and Kheda)**

1. A mission of Japan International Cooperation Agency (JICA) visited Gujarat from 15 to 28 January 1998. The JICA mission met and discussed with concerned officials of the Government of Gujarat (GOG) and Gujarat Electricity Board (GEB) regarding the status of distribution system of GEB and outline of scope of their Development Study (the Study). The JICA's mission indicated its satisfaction on overall engineering capability of GEB distribution organization. The JICA's mission also confirmed possible scope of work of the Study through a field survey on Kheda distribution circle as well as technical discussions with GEB officials. JICA also indicated that the proposed Study is provision of consultancy services similar to the Bank's Technical Assistance (TA). Therefore, the Study will be undertaken prior to the effectiveness of the Bank's proposed Loan for GEB. The following general understanding on the proposed JICA's Study and its relations with the Bank's Technical Assistance and proposed Loan are subject to the approval of the Government of Japan.

2. The scope of work of the Study will cover the technical and institutional measures to improve distribution system of the two distribution circles (Rajkot and Kheda) of GEB. The proposed Study of JICA will be oriented for technical and engineering aspects of operational procedure and management of the two distribution circles as profit centers. The outline of scope of work of the Study is indicated below.

- i) surveys and analysis on the existing system, planning, design, construction, operation and maintenance (O&M), and human resource management of two distribution circles (Rajkot and Kheda) of GEB, if necessary, including GEB's organization-wide policies and standards on these matters.
- ii) recommendations on the followings based on the above surveys and analysis to reduce distribution losses and to improve system reliability and customer satisfaction:
 - a) system planning criteria/standards as well as design criteria/standards of distribution system, equipment, and materials.
 - b) operation and maintenance (O&M) policies/guidelines on distribution system in addition to business procedures of construction and supervision of construction.
 - c) logistics (communication, mobilization, special tools) for construction, and O&M.
 - d) computer systems for planning, design, construction, and O&M.
 - e) human resource management of distribution circles of GEB in accordance with the above recommendations.

iii) Design and assistance for installation of the recommended distribution systems for selected areas as model distribution systems. Such areas will be selected from urban, industrial, and rural areas of the two districts respectively.

iv) Confirmation on the performance of the installed model distribution systems and, if necessary, revise the recommendations described in ii) above based on the results of the model distribution systems.

v) Finalizing investment planning for the two distribution circles with the priorities of the measures proposed by JICA in association with GEB. Submission of the final report of the Study.

3. JICA will complete the items i) and ii) above within six months after commencement of the Study. The items iii) to v) will be subsequently completed within one year. As requested by GOG officials, JICA will submit to GEB an interim report for GEB's review during the Study period, most probably after completion of items i) and ii). GEB may immediately apply measures which can be implemented without any risks and any substantial investment. Based on the result of the interim report, GOG may also request further JICA's assistance under different types of JICA's assistance to fully implement the JICA's recommendations. However, such further JICA's assistance is subject to the effectiveness of the proposed Bank's Loan and progress of power sector reform of GOG.

4. Under the proposed Bank's Loan, \$45 million is allocated to the three districts, Rajkot, Kheda, Mhesana for their 11 and 0.4 kV distribution systems. Engineering support system comprising mobilization, communication, and maintenance tools (\$10 million) will be also provided to Rajkot and Kheda in addition to financial management system (\$ 8 million). GEB will commence expansion of distribution system under their Ninth Plan using about 30 percent of the above allocated fund for 11 and 0.4 kV distribution network because of urgent necessity of their installation. The remaining fund will be utilized for the model distribution systems recommended by JICA and the final investment plan based on the JICA's Study. The necessary local expenses for the installation of the model distribution systems (Item iii) will be born by JICA or GEB.

5. JICA will field its appraisal mission of the Study in May 1998. The consultancy services will be commenced in August or September 1998. The total duration of the proposed Study will be one and a half years.

