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FINAL REPORT

CONGRUITY ANALYSIS OF INVESTMENT COSTS FOR THE KUTRILIN CHEMICAL PLANT

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based on the work of
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* This document has been produced without formal editing

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1 - INTRODUCTION

This report is an analysis of the congruity of the planned investment costs (ACCI) for a rehabilitation and modernisation of the fine chemical plant KUTRILIN in Zagreb in the Republic of Croatia.

As Italy has agreed, in principle, to grant a soft loan of

Lit. 5,626,472,000

for that rehabilitation and modernisation (the KUTRILIN Project) an offerfor the purchase of the planned equipment was submitted to the Ministry of foreign Affairs of Italy by the engineering company BALDO & C.srl. of Milano, Italy.

UNIDO was requested by the Ministry of Foreign Affairs of Italy to perform the ACCI in order to proceed with the loan procedure.

The requested analysis was conducted with due regard to the TERMS OF REFERENCE described hereunder, during November/December 1994.

2 - BACKGROUND

Due to the political and economic changes in Croatia it became necessary for the Croatian industry to adapt its production program and the quality of their products to international standards.

This became also true for the chemical industry and especially for the companies specialized in the production of fine chemicals.

KUTRILIN, a company producing fine chemicals, was established in 1930 as a private enterprise. In 1964 the company was nationalized and combined with CHROMOS.

While the chemicals produced in the beginning were intermediates for the textile and leather industry the company developed into a producer of fine chemicals, not only for the textile and leather industry but also for the detergent, paper and cellulose industry, for the rubber, the petroleum, the sugar industry and also for the construction industry.

In 1991 the total amount of all chemicals produced by KUTRILIN amounted to 18,000 t, whereby KUTRILIN became the largest producer of fine chemicals. But, in 1993 the production activities had to be reduced due to the political upheaval in the former Yugoslavian Countries. The political changes caused also a reduction of the former 'domestic ' market which consequently led to a production of 5632 t only, in 1993 with a corresponding turnover amounting ti the equivalent of about 11,000,000 DM including an export portion of 620,000 DM.

At the same time, KUTRILIN imported raw materials and intermediate chemicals with a value of approximately 2,000,000 DM.

The asset value of KUTRILIN is estimated to be about 20,000,000 DM according to their own calculation.

As it became evident that with the existing equipment KUTRILIN could no longer be competitive in regard of

- product quality as too many impurities are co-produced especially with the sulphonation equipment, and in regard of the
- productivity as the producible amounts of products are not yet of an economical order of magnitude and in regard of the
- environment as the waste water must be treated to fulfil the requiremnets

KUTRILIN was embarking in a rehabilitation program with the purpose of improving its production program and the quality of its products, simultaneously taking care of its waste water problems.

But there was no real chance for the realization of this modernization program due to a severe shortage of hard currencies until until the Italian Government decided to grant an export credit for the financing of the foreign portion of the investment program. Of course, this credit has to be used for the purchase of Italian equipment.

Based on its vast experience, KUTRILIN has designed the necessary equipment for future production requirements and has retained the services of the Italian engineering company BALDO & C. srl. of Milano for engineering, procurement, supply and supervision of the construction of the new equipment in the new plant while KUTRILIN started and completed the civil enineering and construction work necessary for the new equipment.

After the engineering was completed by BALDO the application documents for the soft loan were submitted by BALDO to the Ministry of Foreign Affairs of Italy.

In due course the Ministry has requested UNIDO to perform an analysis of the Congruity of the Investment Cost (ACCI) with the purpose to finalize the procedure and to prepare the basis for a decision on the approval of the application for a soft loan.

3 - TERMS OF REFERENCE

3.1- Background:

Evaluate the investment costs of a chemical plant for the production of CHROMOS-KUTRILIN in Croatia.

3.2- Purpose:

Carry out a desk evaluation of the project costs, an estimate on price revaluation rates from the date the contract for the provision of the plant was signed (May 1993) till the beginning of operations (August 1996), finally an overall assessment of the congruity of the equipment with respect to the objective of the plant.

3.3- Duties:

The Congruity Analysis of Investment Costs (ACCI) of the C-K project in Croatia will be carried out according to the following requirements:

3.3.1- Evaluate the technical offer of BALDO

3.3.2- The currency

to use in the analysis will be the Italian Lira (Lit). Should some costs be expressed in other currencies, their counter value in Lira will be indicated using the exchange rates of these currencies against the Lira, valid on the reference date.

3.3.3- Reference date.

The reference date is May 1993 which coincides with that stipulated in the equipment supply contract belonging to the investment.

3.3.4- ACCI validity date.

The ACCI will be reissued using information acquired to date - the new ACCI validity date.

3.3.5- Updating.

3.3.6- Variation in investment costs during set up phase.

For each investment category, the foreseeable taxes of a variation in costs for two successive years from the new ACCI validity date will be supplied.

3.3.7- Conditions of supply.
The ACCI should check the supply agreement, taking into consid eration the following conditions:

3.3.7.1- Destination.
The apparatus, listed by category in Annex A to the contract, is intended for a chemical plant for the manufacture of the following products:

a) Raw materials for detergents and cosmetics.

- Dodecenbenzene sulphonic acid with active substance 98 +/-1%
- Olefinic sulphonates
- Alkylether sulphates with dioxane (carcinogenic) below 20 ppm.

3.3.8- Evaluate separately
- Engineering costs for acquisition of equipment,
- Cost of purchase,
- Packaging,
- Transport and Insurance

4 - METHODOLOGY

The offer of the engineering company BALDO served as the basic material for the analysis. The itemized listings of the new equipment and services for the KUTRILIN Project show the prices and costs per item whereas the items were subdivided into 14 groups.

A description of the equipment was included in the offer. Thus, the ACCI could be performed on two levels, on the technological and on the financial level. The technology analysis had to view the chemical processes involved and the equipment to be provided for these chemical processes.

Having tested the congruity of the type and quality and quantity of the equipment the financial analysis had to be done keeping in mind the contract between KUTRILIN and BALDO and price companions, with other suppliers.

Finally, a price and cost updating was performed using estimates from industry and inflation rates for companion purposes and price and cost extrapolations up to mid-1996.

5 - SUMMARY

A desk evaluation of the KUTRILIN PROJECT as proposed by an offer of the engineering company BALDO, Milan was performed with the purpose of producing an analysis of the congruity of the costs of investment (ACCI).

The documentation received with additional confidential inquiries allowed to respond to all points of the Terms of Reference as described in chapter 3, hereabove.

5.1 The Reference Date of the original offer was May 1993.

5.2 Reissuance of the ACCI Validity Date.

The Validity Date of this ACCI was established with December 31st, 1994 as it can be confirmed that the KUTRILIN PROJECT including the BALDO offer and the congruity in due regard to the chemical and equipment technology proposed and in view of the corresponding prices and costs are of a good industrial standard which is also described in Chapter 6 hereunder.

The evaluation was also positive in regard of an environmental analysis taking into consideration the planned Waste Water Treatment Plant. The efficiency of the plant should help to control the emissions of d environmentally damaging chemicals.

5.3 Updating and Variation of investment costs during setup phase:

The updating of the investment costs including the corresponding services has been carried out for the ACCI validity date of December 31st, 1994 and was estimated for an assumed setup phase of 18 months until mid-1996 and is described in more detail in Chapter 6.2.

5.3.1 The Original Offer is shown in ANNEX A with rounded values and with a SUMMARY TABLE.

5.3.2 An update was prepared with industrial estimates for the ACCI Validity Date and is described in Chapter 6.2 and is illustrated in ANNEX B.

5.3.3 For comparison reasons, an update was prepared using inflation numbers, only, also for the ACCI Validity Date and is described in Chapter 6.2 and is shown in ANNEX C.

5.3.4 Assuming a setup phase of 18 months, a further update was performed until mid-1996 using expected inflation rates, only, which could be seen in ANNEX E and

5.3.5 An update was prepared until mid-1996 using actual industry estimates until the ACCI Validity Date and using the same inflation rates as above, for the period of 18 months, thereafter. This alternative is described in Chapter 6.2 and is illustrated in ANNEX D.

5.3.6 A summary of the updates prepared is shown, below:

REVIEW OF TOTAL INVESTMENT COSTS
OF
THE ORIGINAL OFFER AND UPDATED ALTERNATIVES

ANNEX		May 1993	Dec 1994	Jun 1996
A	The Original Offer	5,626		
B	Update with industrial estimates		6,415	
C	Update with inflation numbers, only		6,077	
E	Update with inflation numbers, only			5,376
D	Update with industrial and inflation estimates			6,607

The figures shown are million LIT, rounded.

5.3.7 Discussion of the Review of the Investment Costs alternatives

5.3.7.1 ANNEX A, the Original Offer
is prepared within good industry practice. The prices documented by the offers of the suppliers are usual Italian quotations and compare also to prices of internatonal suppliers of the industrial countries.
To our understanding the prices quoted are rather cautiously calculated due to the weak market situation at the time when the offers had been made.
The original offer contains usual costs for financial, administrative, and packaging, transportation and insurance services and interestingly an item of Profit and Contingency, together.
The financial and administrative costs are fair, the Profit and Contingency item amounts to about 15% and has a disadvantage for BALDO as the profit might easiliy be eaten up if prices increase and if parts of these increases are not covered, contractually and have to be covered by the contingency provision. In such a case, there would be no profit for BALDO.
The values shown under the item Packaging, transportation and insurance amount in total to an average of about 2.2% of the equipment costs. This low figure can only be offered on a lump sum basis from suppliers as they usually have discount arrangements with transportation and insurance companies and they do the packaging in-house at low rates. Any attempt to split these lump sum and to get separate offers from transportation and insurance companies would result in a cost item, at least 2 times the cost included in the original offer.

5.3.7.2 ANNEX B,
an industrial update to end 1994, the new ACCI validity date.

Using the itemized price changes given by industrial suppliers and described in Chapter 6.2 would lead to a price increase from May 1993 to tne end of 1994 of about 15%. This increase is not surprising as the market situation is improving for the industry.
But, if the loan arrangement could be made with the executing bank on a fiduciary basis, then the financing cost would be reduced, if not deleted, at all.

5.3.7.3 ANNEX C,
the update using inflation numbers, only.
The inflation rates applied show that the resulting Price of 6077 million LIT is within the usual contingency limits of an offer.

5.3.7.4 ANNEX D,
the update until 1996 with industry estimates and inflation rates

In this case, the results given for the new ACCI validity date are inflated up to the expected startup in mid-1996. The result is about 20%

higher than the original offer and constitutes the highest costs alternative, analysed in this study.

5.3.7.5 ANNEX E,

the update for mid-1996 using inflation numbers, only.

Compared with the Original offer, the result of this alternative is a modest and reasonable increase and within the contingency limits.

5.3.7.6 CONCLUSION

While it was stated that the ACCI found a positive result on the technological and the financial level, but that the project costs might kept close to the original price of the BALDO offer in case that good negotiations between all parties involved - the Ministry, the executing bank, BALDO and their supplier - and an immediate start of the implemeniation of the project including the timing of the line of credit could establish a slight reduction of the total of the items Financial Costs, Administration Costs, and Profit & Contingency.

6 - CONGRUITY ANALYSIS (ACCI)

6.1 TECHNICAL ASSESSMENT

6.1.1 Chemical Review

The documentation received allows to enlist the following chemicals and utilities to be used for chemical processes, or for formulations or as starting materials in the KUTRILIN Plant

a) Dodecylbenzene sulphonic acid
b) Olefine sulphonates
c) Alkylether sulphates
d) Melamine formaldehyde condensate
e) Fatty acid esters
f) Polyisobutylene succinimide
g) Polyamines
h) Fatty acid amines
i) Sulphur trioxyde
j) Sulphuric acid
k) Sodiumhydroxide solution
l) Tensilin
m) Steam
n) Water
o) Vacuum
p) Others

In view of the past experience of KUTRILIN as described in the introduction and confirmed in conversation with the head of KUTRILIN's chemical engineering department there is no doubt that KUTRILIN can handle the chemical processes or formulations involved in that plant. In addition, with the proposed equipment they would be in the position to:

- perform research work,
- produce and formulate their usual product slate,
- produce and formulate these products cleaner and more economical and more competitive and also
- produce chemicals and formulate finished products which they have not produced, up to now.

With the design of the multipurpose equipment, as proposed, the KUTRILIN would be able to adapt to changes of market requirements in a flexible way. It would be possible to perform processes and formulations at temperatures up to 220 oC and at pressures up to 6 atm and also under low vacuum pressures.

Thus, KUTRILIN could produce a variety of chemicals, such as fatty acid esters from fatty acids and alcohols and fatty acid amides from fatty acids and amines by heating the raw materials in the proposed reactors until about 200°C and by evaporating the water off.

The process is similar for a melamine formaldehyde condensate, but at much lower temperature.

In addition, it is possible to produce many other formaldehyde condensates in a similar way, in the proposed plant as long as the final products are liquid.

Polyisobutylene (PIB) succinimide is generally produced in a similar process, but additional recirculation and an additional filter would facilitate the production of a good final product.

The group of polyamines mentioned in the list above are starting materials, such as polyethylene-polyamines, which are common raw materials for the production of PIB-succinimides (f.e. diethylene triamines or triethylene tetramines).

If KUTRILIN would once desire to produce these polyamines themselves, the reactors have to be equipped with an external heat exchanger as the reaction heat created during such a process of ethoxylation (using ethylene oxide) has to be removed in a controlled way by an efficient heat exchanger.

6.1.2 Equipment Review

The information received in this regard consisted of

- an equipment list including reactors, pipes, tanks, pumps and
- an equipment scheme with 6 reactors, without storage tanks,
- a short description of a waste water treatment plant,
- a short description of a thin film sulphonation facility.

The main equipment consists of 6 reactors which are summarized in the TABLE: REACTORS, below.

The production process mode is a controlled batch process mode.

All reactors could be used for:

- blending of intermediate chemicals for the production of formulated final products,
- neutralization reactions

  of organic acids with sodium hydroxide solution of applied
- esterification reactions
  if the reactors are equipped with condensers they could be used as it is necessary to remove the resulting reaction water by evaporation.

As it is understood that it is intended to install a process control it will become possible to increase the capacity and the reliability of the production processes. For that purpose, the proposed plant seems to be well equipped. However, most of the valves in the connecting pipelines seem to be operated, manually. But in view of the intended controlled batch process it is recommended to include all valves into the automated control system. It also seems to be planned to produce viscous products, as a few viscosity meters are installed in the system. For the latter case, special attention must be paid to the power of the driving motors of the mixers.

TABLE: REACTORS

Reactors	Heating	Condenser	Volume	Connected inlets to reactors							
			m³	Sulf	Fat Est	D.F.A	Block p	NaOH	Raw M.	DBS	PE
R-101	Steam	No	10	-	+	+	+	+	+	-	-
R-102	Oil	Yes	6,3	+	-	-	-	+	+	-	-
R-103	Oil	Yes	3	-	-	-	-	+	+	+	-
R-104	Steam	No	10	-	-	-	-	+	+	+	+
R-105	Oil	Yes	6,3	+	-	-	+	+	+	+	-
R-106	Steam	No	6,3	+	-	-	-	+	+	+	+

There are process water and spindle oil inlets to all reactors

List of abbreviations

Block p Block polymers
D.F.A Distilled fatty acids mel.oleic acid
DBS Dodecylbenzenesulfonic acid
Fat Est Fatty acid ester
PE Polyethoxylates
Raw M Raw Materials
Sulf Sulfuric acid

There are many planned recirculations and connecting pipes labeled 'raw material'. This fact shows that KUTRILIN wantS a maximum on process flexibility in order to make it possible to produce a wide range of fine chemicals starting from different raw materials.

A very important equipment is the Thin Film Sulphonation Reactor where the sulphonation process could be performed in a controlled way to produce products of a higher purity.

The SO3 which should be used in the sulphonation processes is produced in KUTRILIN's existing sulfur burning unit for which they plan to add on a purification set to remove SO2, co-produced with SO3.

KUTRILIN having a vast and in-depth experience in the production of fine chemicals, including the sulphonation itself, they are going to utilize and invent, as the case may be, their own know-how with the help of the new equipment.

In short, the planned equipment to be used for the production of a great variety of fine chemicals is up-to-date, future oriented, highly flexible and apt to produce products of high purity.

6.2 FINANCIAL ASSESSMENT

6.2.1 General

Starting from the prices and costs as provided in Annex A of the offer of the engineering company BALDO, the tables were checked, the figures shown were accepted as rounded as illustrated in the printed numbers of the Table of Annex A.

Comparing prices of selected items with prices of other suppliers as shown in the following Table ' COMPARISON TABLE' it appeared that the prices contained in the offer of BALDO compared with those of other suppliers in Italy. Some items also compared with international prices and costs.

In regard of taxes and duties it is understood that in Italy no taxes and duties would be levied on export goods from Italy to Croatia.

6.2.2 Updating

To avoid the time delay and costs for a new bidding procedure which would allow an itemized update but no estimates for 1995 and 1996, two short cut methods were applied in order to get an estimate for possible price and cost changes from the reference date-to-date and up to mid-1996.

6.2.2.1 Updating by using industry estimates for price changes

Without a serious bidding procedure and a chance for a supplier to get a contract the suppliers are very hesitant to release price quotations. But it was possible to receive on a non-committal basis the necessary indications for the price changes of the equipment groups as shown in the Annex A, Table Summary of Original Quotations per Equipment Group.

COMPARISON TABLE

	BALDO	OTHER SUPPLIER	
COMPRESSOR	57,220,000	68,200,000	
SULPHONATION	1,086,999,000	1,310,000,000	
WATER TREATMENT PLANT	195,468,000	304,600,000	
REACTORS (6.3, 6.3, 2x10, 1 m3)		1,074,348,000	1,102,000,000
WELDED STAINLESS STEEL PIPES	186,245,000	228,265,950	
FT-IR SPECTROMETER	228,765,000	255,760,000	
TOTAL EQUIPMENT COMPARED	2,829,045,000	3,268,825,950	
TOTAL EQUIPMENT COST OF BALDO OFFER		4,634,301,000	

The equipment costs checked and compared amount to about 61% of the TOTAL EQUIPMENT COSTS of BALDO's offer.

For the checked items BALDO's offer is better by 15% (or 439,781,000 LIT).

The industry estimates for realistic price changes received for the time period from May 1993 to December 31st, 1994 the are shown below:

Group	Equipment name	Price change
101	Reactors	+12.5%
103	Store buildings	+12.0%
108	Fittings	+50.0% *
109	Fittings	+50.0% *
112	Thermo oil boiler and fittings	+9%
113	Compressor	+6%
115	Cooling Plant	+9%
120	Scales	+5%
122	Instrumentation	+6%
WWP	Waste water treatment plant	+11%
LC/IR	Process control	+8%
Lab.	Laboratory instrument	+4%
pH\Visc	pH-measurement + viscosimeter	+9%

* Due to nearly doubling of the prices of stainless steel from 3,600 lit/kg to 6,000 LIT/kg.

For the administrative costs, the financial costs the average percentage position of the corresponding investment items were applied as a satisfactory estimate approach.

The result of these price changes are shown in Annex B.

6.2.2.2 Updating by using inflation rates

The following inflation rates were used under this section:

a) From May 31st, 1993 to December 31st, 1994: 7.5% and
b) for the years 1995 to mid 1996 the inflation rate is expected to be lower than 1994 to: 6.0%

In ANNEX C the resulting price changes are shown for the new validity date of the ACCI, e.g. the December 31, 1994 applying 7.5 % and in ANNEX D a prognosis is made for mid 1996.

6.2.2.3 Updating by using industry estimates until December 31st, 1994 and inflation rates thereafter, until mid-1996.

This alternative is necessary and realistic as the industry, especially the steel industry would try to increase their prices in order to make up for the losses of the past years. Therefore, the industry estimates as shown under 2.2.2.1 and the inflation rates as given under para b) above were used. ANNEX E is illustrating this alternative.

7 - ENVIRONMENT

Chemical producing plants are always confronted with environmental problems. KUTRILIN is aware of these problems and is planning to reduce the emissions of hazardous materials. As the company is using a closed system of reactors and pipings and storage KUTRILIN is getting rid of its waste materials through water being used for the cleaning of reactors and pipes. Therefore, a modernisation of the waste water treatment is urgently needed and included in the investment program.

7.1 The planned Waste Water Treatment Plant

The original series of data on the pH, suspended solids, COD (Chemical Oxygen Demand), BOD (Biological Oxygen Demand), oil and grease (extracts made by CCl_4), detergents (anionic), sulfates and flow rate seem reliable for us. They practically fit to those data gained by us from two international plants making similar set of products. In these types of production the waste water of technological origin is small by volume (distilled water, water from the vacuum pumps, etc), the main problem is connected to the washing the reactors while changing from one product to the other (it is a price for multipurposing!). On the other hand washing the reactors may be needed in given intervals because of technological purposes (some sediment on the inner walls, etc, because of the high reaction temperature and high temperature difference between heating oil and reaction medium: 300°C and 200°C).

The treatment concept is normal industry practice, however, in the daily practice the addition of activated carbon would be advantageous.

As to the outlet data concerned, we have made a parallel list of another international requirements to compare:

REQUIREMENTS	In CROATIA	REQUIREMENTS of similar plants in other countries
Ph	6.5-7.5	6-9
suspended solid	<20	<100-500
oil and grease	<100	<2-10!
detergents	< 10	<2-5
COD	<500	depends on the place of site
BOD	<200	
Sulfate	no data!!	<400

Our comment is that the requirements everywhere in the world are depending on the location of a plant. If the waste water would go to the municipal sewage, the allowed values are higher, if it goes to a river or to the sea, the requirements are more strict.

But in any case, the use of activated carbon is very useful in reducing the oil and grease content to good international standards and this would have also a lowering effect on the detergents content. There is no data on the sulfate output included in the list of requirements. But we understand that no facilities are easiliy able to meet with the requirement because the solubility of calcium sulfate would result in a value as high as 1500 ppm of sulfate. Therefore, a good solution of this problem would be a controlled outflow into another, sulphate free wasre water such as the municipal waste water

One must take into consideration that the detergent content makes the biggest problem in the waste water of chemical plants of this type. Soap made of fatty acids can be precipitated by adding sulfuric acid only if one lowers the pH to low values such as 3-5 pH; which is generally not the case. But, sulfates and sulphonates cannot be precipitated by changing the pH only, and therefore their concentration in the waste water is usually much higher than written in the technical-descriptions of the processes.

The plant foreseen is needed and would help to control the existing waste water problems.

ANNEX A - Table 1

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Proj	Pos	Principal items	Unit	Qty	Weight		Costs		Financial costs	Subtotal 9 plus 10	Admin. service	Total costs	Profit & continge	Price
					unit Kg	total Kg	unit Lit x 1000	total Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000
101	1(4)	Reactor R102/105 6 3m³	pcs	2	4.500	9.000	136.013	272.026	8.977	281.003	6.182	287.185	43.078	330.263
101	1(4)	Reactor R106 6 3m³	pcs	1	4.600	4.600	156.017	156.017	5.149	161.166	3.546	164.712	24.707	189.419
101	4(8)	Reactor R101 R104 10m³	pcs	2	7.300	14.600	198.246	396.492	13.084	409.576	9.011	418.587	62.788	481.375
101	8(13)	Reactor R201 1 m³	pcs	1	5.400	5.400	249.813	249.813	8.244	258.057	5.677	263.734	39.560	303.294
101	20(26-2)	Heat exchanger condens 10 m²	pcs	1	100	100	13.558	13.558	447	14.005	308	14.313	2.147	16.460
101	20(26-2)	Heat exchanger condens 20 m²	pcs	2	220	440	28.894	57.788	1.907	59.695	1.313	61.008	9.151	70.159
101	21(26-3)	Condensate tank 0 2 m³	pcs	3	50	150	2.010	6.030	199	6.229	137	6.366	955	7.321
101	39\2	Return coiler	pcs	3	60	180	5.200	15.600	515	16.115	355	16.470	2.470	18.940
101		Pilot Plant 100 l	pcs	1	3.800	3.800	162.863	162.863	5.374	168.237	3.701	171.938	25.791	197.729
101		Pression Transducer	pcs	5	40	200	4.163	20.815	687	21.502	473	21.975	3.296	25.271
101		High level switch	pcs	5	25	125	7.360	36.801	1.214	38.014	836	38.850	5.828	44.678
101		Vacuumeter	pcs	5	5	25	219	1.095	36	1.131	25	1.156	173	1.329
101		Temerature sensor for reactors	pcs	5	15	75	1426	7.130	235	7.365	162	7.527	1.129	8.656
101		Temerature sensor	pcs	8	4	32	782	6.256	206	6.462	142	6.604	991	7.595
101		Thermotransduer	pcs	5	6	30	828	4.140	137	4.277	94	4.371	656	5.027
		Packing+transport+insurance						44.000	1.452	45.452	1.000	46.452	6.968	53.420
		Total partial 101						**1.460.423**	**47.863**	**1.498.286**	**32.862**	**1.531.248**	**229.688**	**1.760.936**
101		Multitube film reactor	pcs	1			415.314	415.314	13.705	429.019	9.438	438.457	65.769	504.226
101	16\V4.51.	Accessories for multitube reactor	group	1			35.576	35.576	1.174	36.750	809	37.559	5.634	43.193
	P1.F3													
101	16V3	Emergency system	group	1			9.194	9.194	303	9.497	209	9.706	1.456	11.162
101	16V5\MX1	Start-up system including tank, mixer,	group	1			37.927	37.927	1.252	39.179	862	40.041	6.006	46.047
		feed pump												
101	11kl	Air compresssor, complete of motor	group	1			27.296	27.296	901	28.197	620	28.817	4.323	33.140
101		Air chilling group	group	1			74.704	74.704	2.465	77.169	1.698	78.867	11.830	90.697
101	[illegible]	Accessories for chilling group	group	1			56.890	56.890	1.877	58.767	1.293	60.060	9.009	69.069
101	V205	Charger of catalyst (300 l)	group	1			6.269	6.269	207	6.476	142	6.618	993	7.611
101		Neutralization mixer with accessories	group	1			37.352	37.352	1.233	38.585	849	39.434	5.915	45.349
101		Spare parts	group	1			43.783	43.783	1.445	45.228	995	46.223	6.933	53.156
101		Packing+transport+insurance						23.966	791	24.757	545	25.302	3.795	29.097
		Total partial item LC\R						**768.271**	**25.353**	**793.624**	**17.460**	**811.084**	**121.663**	**932.747**
		Ttoal item 101						**2.218.694**	**73.216**	**2.291.910**	**50.422**	**2.342.332**	**351.351**	**2.693.683**

ANNEX A – Table 2

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Proj	Pos	Principal items	Unit	Qty	Weight		Costs		Financial costs	Subtotal 9 plus 10	Admin. service	Total costs	Profit & continge	Price
					unity Kg	total Kg	unity Lit x 1000	total Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000
103	5(8)	Stainless steel pipe NO 40	m	30			12	360	12	372	8	380	57	437
103	5(8)	Stainless steel pipe NO 50	m	80			15	1.200	40	1.240	27	1.267	190	1.457
103	6(10)	Welding arcs NO 40	pcs	33			10	330	11	341	7	348	52	400
103	6(10)	Welding arcs NO 50	pcs	26			14	364	12	376	8	384	58	442
103	7(12)	Telement NO 50	pcs	1			57	57	2	59	1	60	9	69
103	12(19)	Reducing weld elem d=32/40	pcs	2			13	26	1	27	1	28	4	32
103	12(19)	Reducing weld elem d=32/25	pcs	2			12	24	1	25	1	26	4	30
103	12(19)	Reducing weld elem d=50/25	pcs	1			16	16	1	17	0	17	3	20
103	12(19)	Reducing weld elem d=100/80	pcs	2			32	64	2	66	1	67	10	77
103	12(19)	Reducing weld elem d=100/65	pcs	4			32	128	4	132	3	135	20	155
103	12(19)	Reducing weld elem d=80/65	pcs	4			19	76	3	79	2	81	12	93
103		Packing+transport+insurance						200	7	207	5	212	32	244
103		**Total partial item 103**						**2.845**	**96**	**2.941**	**84**	**3.005**	**451**	**3.456**
103		Process piping for sulphonation unit	kg	300			105	31.500	1.043	32.543	718	33.261	5.005	38.266
103		Process valves for sulphonation unit	pcs	25			527	15.675	517	16.192	356	16.548	2.482	19.030
103		Process valves for emergency system	pcs	10			805	8.050	265	8.315	183	8.498	1.274	9.772
103		Process valves for start-up system	pcs	10			948	9.480	313	9.793	215	10.008	1.502	11.510
103		Process valves for chilling group	pcs	10			632	6.320	209	6.529	144	6.673	1.001	7.674
103		Spare parts	group	1			4.445	4.445	147	4.592	101	4.693	704	5.397
103		Packing+transport+insurance						2.433	80	2.513	55	2.568	385	2.953
103		**Total partial item 103**						**77.903**	**2.574**	**80.477**	**1.773**	**82.249**	**12.353**	**94.602**
103		**Total item 103**						**80.748**	**2.670**	**83.418**	**1.837**	**85.254**	**12.804**	**98.058**

ANNEX A - Table 3

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Proj	Pos	Principal items	Unit	Qty.	Weight		Costs		Financial costs Lit x 1000	Subtotal 9 plus 10 Lit x 1000	Admin. service Lit x 1000	Total costs Lit x 1000	Profit & continge Lit x 1000	Price Lit x 1000
					unity Kg	total Kg	unity Lit x 1000	total Lit x 1000						
108		Seamless steel pipes NO 100	m	50			138	6.900	228	7.128	157	7.285	1.093	8.378
108	1	Seamless steel pipes NO 80	m	593			94	55.742	1.839	57.581	1.267	58.848	8.827	67.675
108	1	Seamless steel pipes NO 65	m	80			70	5.600	185	5.785	127	5.912	887	6.799
108	1	Seamless steel pipes NO 50	m	840			48	40.320	1.331	41.651	916	42.567	6.385	48.952
108	1	Seamless steel pipes NO 20 316L	m	40			29	1.160	38	1.198	26	1.224	184	1.408
108	2	Pipe bends 90° NO 80 DIN 2605	pcs	62			71	4.402	145	4.547	100	4.647	697	5.344
108	2	Pipe bends 90° NO 65 DIN 2605	pcs	19			45	855	28	883	19	902	135	1.037
108	2	Pipe bends 90° NO 50 DIN 2605	pcs	170			21	3.570	118	3.688	81	3.769	565	4.334
108	2	Pipe bends 90° NO 100 DIN 2605	pcs	15			114	1.710	56	1.766	39	1.805	271	2.076
108	2	Pipe bends 90° NO 20 DIN 2605	pcs	20			18	360	12	372	8	380	57	437
108		Pipe bends 45° NO 50	pcs	33			15	495	16	511	11	522	78	600
108		Pipe bends 45° NO 80	pcs	4			48	192	6	198	4	202	30	232
108		Pipe bends 45° NO 100	pcs	1			75	75	2	77	2	79	12	91
108	3	Flanges DIN 2633 NO 80 with socket	pcs	274			84	23.016	760	23.776	523	24.299	3.645	27.944
108	3	Flanges DIN 2633 NO 65 with socket	pcs	10			69	690	23	713	16	729	109	838
108	3	Flanges DIN 2633 NO 50 with socket	pcs	431			58	24.998	825	25.823	568	26.391	3.959	30.350
108	3	Flanges DIN 2633 NO 25 with socket	pcs	12			39	468	15	483	11	494	74	568
108	3	Flanges DIN 2633 NO 20 with socket	pcs	6			34	204	7	211	5	216	32	248
108	6	Flanges DIN 2633 NO 100 with socket	pcs	17			97	1.649	54	1.703	37	1.740	261	2.001
108	11	Ball taps NO 80	pcs	3			530	1.590	52	1.642	36	1.678	252	1.930
108	11	Ball taps NO 100	pcs	9			673	6.057	200	6.257	138	6.395	959	7.354
108	11	Ball taps NO 50	pcs	24			258	6.192	204	6.396	141	6.537	981	7.518
108		Packing+transport+insurance						7.400	244	7.644	168	7.812	1.172	8.984
		Total item 108						**193.645**	**6.388**	**200.033**	**4.400**	**204.433**	**30.665**	**235.098**
109	1(1)	Stainless steel pipe NO 80	m	490			23	11.270	372	11.642	256	11.898	1.785	13.683
109	1(1)	Stainless steel pipe NO 50	m	1455			15	21.825	720	22.545	496	23.041	3.456	26.497
109	1(1)	Stainless steel pipe NO 40	m	210			12	2.520	83	2.603	57	2.660	399	3.059
109	2(2)	Welding arcs NO 80	pcs	20			25	500	17	517	11	528	79	607
109	2(2)	Welding arcs NO 50	pcs	67			14	938	31	969	21	990	149	1.139
109		Packing+transport+insurance						1.600	53	1.653	36	1.689	253	1.942
		Total item 109						**38.653**	**1.276**	**39.929**	**877**	**40.806**	**6.121**	**46.927**

ANNEX A - Table 4

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Proj	Pos	Principal items	Unit	Qty.	Weight		Costs		Financial costs	Subtotal 9 plus 10	Admin. service	Total costs	Profit & continge	Price
					unity Kg	total Kg	unity Lit x 1000	total Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000
112	5 1 1	Kettle for oil heating	pcs	1			39.704	39.704	1.310	41.014	902	41.916	6.287	48.203
112	5 1 2	Centrifugal pump	pcs	2			4.119	8.238	272	8.510	187	8.697	1.305	10.002
112	5 1 3	Expansion discharge vessel	pcs	1			3.802	3.802	125	3.927	86	4.014	602	4.616
112	5 1 4	Discharge	pcs	1			5.914	5.914	195	6.109	134	6.244	937	7.181
112	5 1 5	Pump 135l/m³	pcs	1			4.436	4.436	146	4.582	101	4.683	702	5.385
112	5 1 6	Filter for thermal oil	pcs	1			264	264	9	273	6	279	42	321
112		Packing+transport+insurance						4.000	132	4.132	91	4.223	633	4.856
		Total partial						**66.358**	**2.189**	**68.547**	**1.507**	**70.056**	**10.508**	**80.564**
112	5 1 7	Vessel collector	pcs	1			1.214	1.214	40	1.254	28	1.282	192	1.474
112	5 1 10	Seamless steel pipe DN 32	Kg	130	\	130	3	390	12	386	8	394	59	453
112	5 1 10	Seamless steel pipe DN 40	Kg	45	\	45	3	135	4	134	3	137	20	157
112	5 1 10	Seamless steel pipe DN 50	Kg	120	\	120	3	360	11	356	8	364	55	419
112	5 1 10	Seamless steel pipe DN 80	Kg	170	\	170	3	510	16	505	11	516	77	593
112	5 1 10	Seamless steel pipe DN 100	Kg	150	\	150	3	450	14	445	10	455	68	523
112	5 1 11	Pipe elbow 90° DN 32	pcs	16			3	48	2	48	1	49	7	56
112	5 1 11	Pipe elbow 90° DN 40	pcs	12			3	36	1	37	1	38	6	44
112	5 1 11	Pipe elbow 90° DN 50	pcs	8			4	32	1	36	1	37	6	43
112	5 1 11	Pipe elbow 90° DN 80	pcs	12			9	108	3	108	2	110	17	127
112	5 1 11	Pipe elbow 90° DN 100	pcs	6			13	78	3	80	2	82	12	94
112	5 1 12	Flange DN 32	pcs	8			8	64	2	70	2	72	11	83
112	5 1 12	Flange DN 40	pcs	12			11	132	4	133	3	136	20	156
112	5 1 12	Flange DN 50	pcs	12			13	156	5	157	3	160	24	184
112	5 1 12	Flange DN 80	pcs	12			19	228	7	230	5	235	35	270
112	5 1 12	Flange DN 100	pcs	4			22	88	3	89	2	91	14	105
112	5 1 13	Thermal oil valve DN 25	pcs	2			69	138	5	143	3	146	22	168
112	5 1 13	Thermal oil valve DN 80	pcs	4			256	1.024	34	1.057	23	1.080	162	1.242
112	5 1 14	Backpressure valve	pcs	2			354	708	23	731	16	747	112	859
112	5 1 15	Impurities collector filter	pcs	2			316	632	21	653	14	667	100	767
112	5 1 16	Ball valve DN 32	pcs	4			175	700	23	725	16	741	111	852
112	5 1 16	Ball valve DN 40	pcs	5			204	1.020	34	1.056	23	1.079	162	1.241
112	5 1 16	Ball valve DN 50	pcs	5			253	1.265	42	1.308	29	1.337	201	1.538
112	5 1 17	Flexible metal pipe	pcs	4			245	980	32	1.012	22	1.034	155	1.189
112	5 2 1	Plate heat exchanger	pcs	1			16.848	16.848	556	17.404	383	17.787	2.668	20.455

ANNEX A - Table 4 continued

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Proj	Pos	Principal items	Unit	Qty.	Weight		Costs		Financial costs Lit x 1000	Subtotal 9 plus 10 Lit x 1000	Admin. service Lit x 1000	Total costs Lit x 1000	P. ofit & continge Lit x 1000	Price Lit x 1000
					unity Kg	total Kg	unity Lit x 1000	total Lit x 1000						
112	5 2 2 1	Centrifugal pump 70m³/h	pcs	2			7.393	14.786	488	15.274	336	15.610	2.341	17.951
112	5 2 2 2	Centrifugal pump 15m³/h	pcs	3			3.908	11.724	387	12.111	266	12.377	1.857	14.234
112	5 2 3	Deaerating vessel	pcs	1			750	750	25	775	17	792	119	911
112	5 2 4	Seamless steel pipe DN 50	Kg	21	\	21	3	63	2	62		62		62
112	5 2 4	Seamless steel pipe DN 65	Kg	156	\	156	3	468	15	463		463		463
112	5 2 4	Seamless steel pipe DN 80	Kg	715	\	715	3	2.145	68	2.123	47	2.170	326	2.496
112	5 2 4	Seamless steel pipe DN 100	Kg	195	\	195	3	585	19	579		579		579
112	5 2 4	Seamless steel pipe DN 125	Kg	385	\	385	3	1.155	37	1.143		1.143		1.143
112	5 2 5	Pipe elbow 90° DN 50	pcs	6			4	24	1	27		27		27
112	5 2 5	Pipe elbow 90° DN 65	pcs	16			8	128	4	133		133		133
112	5 2 5	Pipe elbow 90° DN 80	pcs	24			9	216	7	217	5	222	33	255
112	5 2 5	Pipe elbow 90° DN 10	pcs	8			13	104	3	106		106		106
112	5 2 5	Pipe elbow 90° DN 125	pcs	8			25	200	7	206		206		206
112	5 2 6	Flange DN 50	pcs	8			13	104	3	105		105		105
112	5 2 6	Flange DN 65	pcs	26			16	416	14	425		425		425
112	5 2 6	Flange DN 80	pcs	12			19	228	7	230	5	235	35	270
112	5 2 6	Flange DN 100	pcs	12			22	264	9	267		267		267
112	5 2 6	Flange DN 125	pcs	12			30	360	12	376		376		376
112	5 2 7	Thermal oil valve DN 50	pcs	2			137	274	9	282		282		282
112	5 2 7	Thermal oil valve DN 65	pcs	4			193	772	26	799	18	817	122	939
112	5 2 7	Thermal oil valve DN 80	pcs	4			256	1.024	34	1.057		1.057		1.057
112	5 2 8	Backpressure valve DN 65	pcs	1			328	328	11	339	7	346	52	398
112	5 2 8	Backpressure valve DN 80	pcs	2			354	708	23	731		731		731
112	5 2 9	Impurities collector filter DN 65	pcs	1			288	288	9	297	7	304	46	350
112	5 2 9	Impurities collector filter DN 80	pcs	2			354	708	23	731		731		731
112	5 2 10	Valve for straight pipe 65	pcs	4			193	772	26	799		799		799
112	5 2 10	Valve for straight pipe 100	pcs	4			319	1.276	42	1.318	29	1.345	202	1.547
112	5 2 10	Valve for straight pipe 125	pcs	8			447	3.576	118	3.694		3.694		3.694
112	5 1 11	Backpressure value DN 125	pcs	2			506	1.012	33	1.045	23	1.068	160	1.228
		Valve 3-way DN 50	pcs	32			3.015	96.480	3.184	99.664	2.193	101.857	15.278	117.135
		Valve 3-way DN 80	pcs	3			4.230	12.690	419	13.109	288	13.397	2.010	15.407
112		Packing+transport+insurance						2.315	76	2.391	53	2.444	367	2.811
		Total partial item 112						**183.287**	**6.039**	**189.033**	**3.913**	**192.946**	**27.264**	**220.210**
		Total item 112						**249.645**	**8.228**	**257.580**	**5.420**	**263.002**	**37.772**	**300.774**

ANNEX A - Table 5.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Proj	Pos	Principal items	Unit	Qty	Weight		Costs		Financial costs	Subtotal 9 plus 10	Admin. service	Total costs	Profit & continge	Price
					u.ry Kg	total Kg	u.ry Lit x 1000	total Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000
113	1(1)	Compressor unit 2 m³\1" about	pcs	1	1.250	1.250	57.220	57.220	1.888	59.108	1.300	60.408	9.061	69.469
113	2(2)	Compressed air drier	pcs	1	200	200	5.880	5.880	193	6.053	133	6.186	928	7.114
113		Packing+transport+insurance						2.000	66	2.066	45	2.111	317	2.428
		Total item 113						**66.080**	**2.147**	**67.227**	**1.478**	**68.706**	**10.306**	**79.011**
115	5.3.1	Cooling tower	set	1	4.250	4.250	66.010	66.010	2.178	68.188	1.500	69.688	10.453	80.141
115		Packing+transport+insurance						2.500	83	2.583	57	2.639	396	3.035
		Total partial item 115						**68.510**	**2.261**	**70.771**	**1.557**	**72.327**	**10.849**	**83.176**
115	5.3.2.1	Centrifual pump 400 m³/h	set	2			10.937	21.874	722	22.596	497	23.093	3.464	26.557
115	5.3.2.2	Centrifual pump 380 m³/h	set	2			15.192	30.384	1.003	31.387	691	32.078	4.812	36.890
115	5.3.4	Seamless steel pipe DN 200 DIN 2448	Kg	496	\	496	3	1.488	48	1.536	33	1.569	229	1.798
115	5.3.4	Seamless steel pipe DN 250 DIN 2448	Kg	6.500	\	6.500	3	19.500	625	20.125	430	20.555	2.998	23.553
115	5.3.4	Seamless steel pipe DN 300 DIN 2448	Kg	560	\	560	3	1.680	54	1.734	37	1.771	258	2.029
115	5.3.5	Pipe elbow 90° DN 200 DIN 2605	pcs	1			134	134	4	138	3	141	21	162
115	5.3.5	Pipe elbow 90° DN 250 DIN 2605	pcs	22			200	4.400	145	4.545	100	4.645	697	5.342
115	5.3.5	Pipe elbow 90° DN 300 DIN 2605	pcs	6			298	1.788	59	1.847	41	1.888	283	2.171
115	5.3.6	Flange DN 200 DIN 2633 with socket	pcs	14			62	868	29	897	20	917	137	1.054
115	5.3.6	Flange DN 300 DIN 2633 with socket	pcs	2			137	274	9	283	6	289	43	332
115	5.3.7	Gate valve DN 200 DIN 2633	pcs	8			1.164	9.312	307	9.619	212	9.831	1.475	11.306
115	5.3.9	Backpressure valve DN 200	pcs	4			992	3.968	131	4.099	90	4.189	628	4.817
115	5.3.10	Pipe reductor DN/DN 300/200 DIN 2616	pcs	2			184	368	12	380	8	388	58	446
115	5.3.10	Pipe reductor DN/DN 200/150 DIN 2616	pcs	4			66	264	9	273	6	279	42	321
115	5.3.11	Suction bucket DN 300	pcs	2			2.846	5.692	188	5.880	129	6.009	901	6.910
115		Packing+transport+insurance	pcs					10.500	347	10.847	239	11.086	1.663	12.749
		Total partial item 115						**112.494**	**3.692**	**116.186**	**2.542**	**118.728**	**17.709**	**136.437**
		Total item 115						**181.004**	**5.953**	**186.957**	**4.099**	**191.056**	**28.558**	**219.613**
120	5.24	Electromechanical scale	pcs	3			9.670	29.010	957	29.967	659	30.626	4 594	35.220
120		Packing+transport+insurance						580	19	599	13	612	92	704
		Total item 120						**29.590**	**976**	**30.566**	**672**	**31.238**	**4.686**	**35.924**

ANNEX A - Table 6.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Proj	Pos	Principal items	Unit	Qty	Weight		Costs		Financial costs	Subtotal 9 plus 10	Admin. service	Total costs	Profit & continge	Price
					unity Kg	total Kg	unity Lit x 1000	total Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000
122	FE FT-103	Mass flowmeter Spindle oil	group	1	100	100	22.808	22.808	753	23.561	518	24.079	3.612	27.691
122	FE FT-106	Mass flowmeter Rx	group	1	100	100	22.808	22.808	753	23.561	518	24.079	3.612	27.691
122	FE FT-102	Mass flowmeter TENZILIN 063	group	1	100	100	22.808	22.808	753	23.561	518	24.079	3.612	27.691
122	FE FT-101	Mass flowmeter BLOCK POLIMERS	group	1	100	100	22.808	22.808	753	23.561	518	24.079	3.612	27.691
122		Computer interface	pcs	2	30	60	4.493	8.986	297	9.283	204	9.487	1.423	10.910
122		Packing+transport+insurance						500	17	517	11	528	79	607
		Total partial item 122						**100.718**	**3.326**	**104.044**	**2.287**	**106.331**	**15.950**	**122.281**
122	FCV-103	Flow contr valve Spindle oil	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	FCV-106	Flow contr valve Rx	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	FCV-104	Flow contr valve H2SO4	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	FCV-105	Flow contr valve NaOH	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	FCV-102	Flow contr valve TENZILIN 063	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	FCV-101	Flow contr valve BLOCK POLIMERS	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	TCV 101-1	Control valve DN 50	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	TCV 104-1	Control valve DN 50	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	TCV 106-1	Control valve DN 80	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	TCV 101-2	Control valve DN 80	pcs	1			2.740	2.740	90	2.830	62	2.892	434	3.326
122	TCV 104-2	Control valve DN 50	pcs	1			2.740	2.740	90	2.830	62	2.892	434	3.326
122	TCV 106-2	Control valve DN 50	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	TXV 101-2	ON/OFF valve DN 100	pcs	1			4.470	4.470	148	4.618	102	4.720	708	5.428
122	TXV 104-2	ON/OFF valve DN 100	pcs	1			4.470	4.470	148	4.618	102	4.720	708	5.428
122	TXV 106-2	ON/OFF valve DN 100	pcs	1			4.470	4.470	148	4.618	102	4.720	708	5.428
122	TXV 101-1	ON/OFF valve DN 25	pcs	1			2.770	2.770	91	2.861	63	2.924	439	3.363
122	TXV 104-1	ON/OFF valve DN 25	pcs	1			2.770	2.770	91	2.861	63	2.924	439	3.363
122	TXV 106-1	ON/OFF valve DN 25	pcs	1			2.770	2.770	91	2.861	63	2.924	439	3.363
122	TCV 102-1	Control valve DN 65	pcs	1			2.655	2.655	88	2.743	60	2.803	420	3.223
122	TCV 102-2	Control valve DN 65	pcs	1			2.655	2.655	88	2.743	60	2.803	420	3.223
122	TCV 103-1	Control valve DN 50	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	TCV 103-2	Control valve DN 50	pcs	1			1.990	1.990	66	2.056	45	2.101	315	2.416
122	TCV 105-1	Control valve DN 65	pcs	1			2.655	2.655	88	2.743	60	2.803	420	3.223
122	TCV 105-2	Control valve DN 65	pcs	1			2.655	2.655	88	2.743	60	2.803	420	3.223
122	TXV 102	ON/OFF valve DN 80	pcs	1			8.690	8.690	287	8.977	197	9.174	1.376	10.550
122	TXV 103	ON/OFF valve DN 65	pcs	1			6.920	6.920	228	7.148	157	7.305	1.096	8.401
122	TXV 105	ON/OFF valve DN 80	pcs	1			8.690	8.690	287	8.977	197	9.174	1.376	10.550
122		Solenoil Valves explosion proof	pcs	7			4.664	32.648	1.077	33.725	742	34.467	5.170	39.637
122		Gecos						*to be defi	**********	0	**********	**********	**********	*********
122		Packing+transport+insurance						3.000	99	3.099	68	3.167	475	3.642
		Total partial item 122						**121.648**	**4.019**	**125.667**	**2.760**	**128.427**	**19.262**	**147.689**

ANNEX A - Table 6 continued

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Pro.	Pos	Principal items	Unit	Qty	Weight		Costs		Financial	Subtotal	Admin	Total	Profit &	Price
					unity	total	unity	total	costs	9 plus 10	service	costs	contingc	
					Kg	Kg	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000
122	FY-TY	IPP transducer	pcs	12	2	24	920	11040	364	11404	251	11655	1748	13403
122		Packing+transport+insurance						500	17	517	11	528	79	607
		Total partial item 122						11540	381	11921	262	12183	1827	14010
122	A1	Local panel for sulphonation unit	pcs	1			40225	40225	1327	41552	914	42466	6370	48836
122	A2	Mass flow control sys for sulph unit	pcs	1			86197	86197	2845	89042	1959	91001	13650	104651
122	A3	Gas automatic flow control for sulph unit	pcs	1			34479	34479	1138	35617	784	36401	5460	41861
122	A4	Dilution air automatic flow control	pcs	1			25860	25860	853	26713	588	27301	4095	31396
122	A5	Instrumentation for emergency system	group	1			17240	17240	569	17809	392	18201	2730	20931
122		Instrumentation for start-up system	group	1			4310	4310	142	4452	98	4550	683	5233
		Instrumentation for chilling group	group	1			20113	20113	664	20777	457	21234	3185	24419
122		Control took for SO2 SO3 column	pcs	1			22986	22986	759	23745	522	24267	3640	27907
122		Spare parts	group	1			15713	15713	519	16232	357	16589	2488	19077
122		Packing+transport+insurance						8601	284	8885	195	9080	1362	10442
		Total partial item 122						275724	9100	284824	6266	291090	43663	334753
		Total item 122						509630	16826	526456	11575	538031	80702	618733
WWP		Chem Phis Treatment plant	group	1			117783	117783	3887	121670	2677	124347	18652	142999
WWP		Flotation unit	group	1			161000	161000	5313	166313	3659	169972	25496	195468
WWP		Sand filteration	group	1			19902	19902	657	20559	452	21011	3152	24163
		Packing+transport+insurance						6500	215	6715	148	6863	1029	7892
		Total partial item WWP						305185	10072	315257	6936	322193	48329	370522
LC IR		Liquid Chromatograph	pcs	1			136950	136950	4519	141469	3112	144581	21687	166268
LC IR		(spare parts included)												
LC IR		FT-IR Spectrometer	pcs	1			228765	228765	7549	236314	5199	241513	36227	277740
LC IR		(spare parts included)												
		Packing+transport+insurance						1500	50	1550	34	1584	238	1822
		Total partial item LC IR						367215	12118	379333	8345	387678	58152	445830

ANNEX A - Table 8.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Proj	Pos	Principal items	Unit	Qty	Weight		Costs		Financial costs	Subtotal 9 plus 10	Admin service	Total costs	Profit & continge	Price
					unit Kg	total Kg	unit Lit x 1000	total Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000	Lit x 1000
Lab	1	Impeller set RS 11	pcs	1			2 384	2384	79	2 463	54	2 517	378	2 895
Lab	2	FLUID Labor stirrer FL 200L	pcs	1			3 988	3988	132	4 120	91	4 211	632	4 843
Lab	2	Option G3	pcs	1			717	717	24	741	16	757	114	871
Lab	2	Option MB	pcs	1			7 740	7740	255	7 995	176	8 171	1 226	9 397
Lab	3	VISCOMON L-measuring unit	pcs	1			8 529	8529	281	8 810	194	9 004	1 351	10 355
Lab	4	Printer HP-Deskjet 500	pcs	1			1 719	1719	57	1 776	39	1 815	272	2 087
Lab	5	Electrically operated stand	pcs	1			2 569	2569	85	2 654	58	2 712	407	3 119
Lab	6	Tension jack	pcs	1			279	279	9	288	6	294	44	338
		Packing+transport+insurance						1 500	50	1 550	34	1 584	238	1 822
		Total item Lab.						**29.426**	**972**	**30.397**	**668**	**31.065**	**4.662**	**35.727**
pH		Electrodes pH measurement	pcs	3			736	2.208	73	2.281	50	2 331	350	2.681
pH		pH meter mod 71xIP65+accessories	pcs	3			7 878	23.634	780	24 414	537	24.949	3.742	28 691
122		Packing+transport+insurance						500	17	517	11	528	79	607
		Total item pH						**26.342**	**870**	**27.212**	**598**	**27.808**	**4.171**	**31.978**
Viscos		Viscosimeter						*to be defin	**********	**********	**********	**********	**********	**********
		Packing+transport+insurance						500	17	517	11	528	79	607
		Total item Viscos						**500**	**17**	**517**	**11**	**528**	**79**	**607**
Contr	10	Loop and Logic Controller System												
Contr		Series 9000												
Contr	11	SE 9116-00	group	2	10	20	24 730	49.460	1 632	51 092	1 124	52.216	7 832	60 048
Contr	12	SE 9021-LLLLL-0	group	12	1	12	2 576	30.912	1 020	31 932	702	32.634	4 895	37 529
Contr	13	SE 9021-NNNXX-0	group	12	1	12	2 576	30.912	1 020	31 932	702	32.634	4 895	37 529
Contr	14	Supervisory Station+Printer+	group	1	35	35	102 700	102 700	3 389	106 089	2 334	108 423	16 263	124 686
		Conf Service								0		0		0
Contr	20	UDC 3000 Digital Controller		7	1	10	2 471	17 297	571	17 868	393	18 261	2 740	21 001
Contr	21	DC3002-0-40B-1-00-XXXX-EN	pcs							0		0		0
		Packing+transport+insurance						4.500	149	4.649	102	4.751	713	5.464
		Total partial item LCIR						**238.781**	**7.781**	**243.562**	**5.357**	**248.919**	**37.338**	**286.257**

ANNEX A – Original Offer , SUMMARY

1 Proj.	2 Pos.	3 Principal items	9 Equipment total Lit x 1000	10 Financial costs Lit x 1000	11 Subtotal 9 plus 10 Lit x 1000	12 Admin. service Lit x 1000	13 Total costs Lit x 1000	14 Profit & continge Lit x 1000	15 Packaging Transportation Insurance	16 Price Lit x 1000
101		Reactors	2,218,694	73,217	2,291,911	50,422	2,342,333	351,350	29,097	2,722,780
103		Store room	80,849	2,668	83,517	1,837	85,354	12,803	2,953	101,110
108		Fittings	193,645	6,390	200,035	4,401	204,436	30,665	1,942	237,043
109		Fittings	38,653	1,276	39,929	878	40,807	6,121	8,984	55,912
112		Thermo oil boiler and fittings	249,360	8,229	257,589	5,667	263,256	39,488	7,667	310,411
113		Compressor unit	65,080	2,148	67,228	1,479	68,707	10,306	2,428	81,441
115		Cooling plant	180,349	5,952	186,301	4,099	190,400	28,560	15,784	234,744
120		Scale	29,590	976	30,566	672	31,238	4,686	704	36,628
122		Instrumentation	509,630	16,818	526,448	11,582	538,030	80,704	15,398	634,132
WWP		Waste Water Treatment Plant	305,185	10,071	315,256	6,936	322,192	48,329	7,892	378,413
LC\IR		Process control	367,215	12,118	379,333	8,345	387,678	58,152	1,822	447,652
Lab.		Laboratory Instr.	29,425	971	30,396	669	31,065	4,660	1,822	37,547
pH.visc		pH measurement+viscosimeter	26,841	886	27,727	610	28,337	4,250	1,214	33,801
Contr.		Automation	235,780	7,781	243,561	5,358	248,919	37,338	5,464	291,721
		Subtotal	4,530,296	149,501	4,679,797	102,955	4,782,752	717,412	103,171	5,603,335
		Available sum	104,005	3,432	107,469	2,364	109,833	16,475	0	126,308
		Grand total	4,634,301	152,933	4,787,266	105,319	4,892,585	733,887	103,171	5,626,472

ANNEX B - Industry Update to December 1994

1	2	3	9	10	11	12	13	14	15	16
Proj.	Pos.	Principal items	Equipment total Lit x 1000	Financial costs Lit x 1000	Subtotal 9 plus 10 Lit x 1000	Admin. service Lit x 1000	Total costs Lit x 1000	Profit & continge Lit x 1000	Packaging Transportation Insurance	Price Lit x 1000
101		Reactors	2,496,031	82,369	2,578,400	56,725	2,635,125	395,269	29,097	3,059,490
103		Store room	90,551	2,988	93,539	2,058	95,597	14,340	2,953	112,889
108		Fittings	290,468	9,585	300,053	6,601	306,654	45,993	1,942	354,594
109		Fittings	57,980	1,913	59,893	1,318	61,210	9,182	8,984	79,376
112		Thermo oil boiler and fittings	271,802	8,969	280,772	6,177	286,949	43,042	7,667	337,658
113		Compressor unit	68,985	2,276	71,261	1,568	72,829	10,924	2,428	86,181
115		Cooling plant	196,580	6,487	203,068	4,467	207,535	31,130	15,784	254,449
120		Scale	31,070	1,025	32,095	706	32,801	4,920	704	38,425
122		Instrumentation	540,208	17,827	558,035	12,277	570,311	85,547	15,398	671,256
WWP		Waste Water Treatment Plant	338,755	11,179	349,934	7,699	357,633	53,645	7,892	419,170
LC\IR		Process control	396,592	13,088	409,680	9,013	418,693	62,804	1,822	483,319
Lab.		Laboratory instr.	30,602	1,010	31,612	695	32,307	4,846	1,822	38,975
pH.visc		pH measurement+viscosimeter	28,183	930	29,113	640	29,754	4,463	1,214	35,431
Contr.		Automation	257,000	8,481	265,481	5,841	271,322	40,698	5,464	317,484
		Available sum	104,005	3,432	107,469	2,364	109,833	16,475	0	126,308
		Grand total	5,198,811	171,561	5,370,372	118,149	5,488,521	823,283	103,171	6,414,974

ANNEX C - Update by inflation to 31 Dec. 1994

1	2	3	9	10	11	12	13	14	15	16
Proj.	Pos.	Principal items	Equipment total Lit x 1000	Financial costs Lit x 1000	Subtotal 9 plus 10 Lit x 1000	Admin. service Lit x 1000	Total costs Lit x 1000	Profit & continge Lit x 1000	Packaging Transportation Insurance	Price Lit x 1000
101		Reactors	2,385,096	73,217	2,458,313	50,422	2,508,735	351,350	31,279	2,891,364
103		Store room	86,913	2,668	89,581	1,837	91,418	12,803	3,174	107,395
108		Fittings	208,168	6,390	214,558	4,401	218,959	30,665	2,088	251,712
109		Fittings	41,552	1,276	42,828	878	43,706	6,121	9,658	59,485
112		Thermo oil boiler and fittings	268,062	8,229	276,291	5,667	281,958	39,488	8,242	329,688
113		Compressor unit	69,961	2,148	72,109	1,479	73,588	10,306	2,610	86,504
115		Cooling plant	193,875	5,952	199,827	4,099	203,926	28,560	16,968	249,454
120		Scale	31,809	976	32,785	672	33,457	4,686	757	38,900
122		Instrumentation	547,852	16,818	564,670	11,582	576,252	80,704	16,553	673,509
WWP		Waste Water Treatment Plant	328,074	10,071	338,145	6,936	345,081	48,329	8,484	401,894
LC\IR		Process control	394,756	12,118	406,874	8,345	415,219	58,152	1,959	475,330
Lab.		Laboratory Instr.	31,632	971	32,603	669	33,272	4,660	1,959	39,891
pH.visc		pH measurement+viscoalmeter	28,854	886	29,740	610	30,350	4,250	1,305	35,905
Contr.		Automation	253,464	7,781	261,245	5,358	266,603	37,338	5,874	309,814
		Subtotal	4,870,068	149,501	5,019,569	102,955	5,122,524	717,412	110,909	5,950,845
		Avilable sum	104,005	3,432	107,469	2,364	109,833	16,475	0	126,308
		Grand total	4,974,073	152,933	5,127,038	105,319	5,232,357	733,887	110,909	6,077,153

ANNEX D - Industry Update to December 1994, combined with inflation estimate for 1995 and mid-1996

1	2	3	9	10	11	12	13	14	15	16
Proj.	Pos.	Principal items	Equipment total Lit x 1000	Financial costs Lit x 1000	Subtotal 9 plus 10 Lit x 1000	Admin. service Lit x 1000	Total costs Lit x 1000	Profit & continge Lit x 1000	Packaging Transportation Insurance	Price Lit x 1000
101		Reactors	2,645,793	87,311	2,733,104	60,128	2,793,232	418,985	30,843	3,243,060
103		Store room	95,984	3,167	99,151	2,181	101,333	15,200	3,130	119,663
108		Fittings	215,527	7,112	222,639	4,898	227,537	34,131	2,059	263,726
109		Fittings	43,021	1,420	44,440	978	45,418	6,813	9,523	61,754
112		Thermo oil boiler and fittings	288,111	9,508	297,618	6,548	304,166	45,625	8,127	357,918
113		Compressor unit	73,124	2,413	75,537	1,662	77,199	11,580	2,574	91,352
115		Cooling plant	208,375	6,876	215,252	4,736	219,987	32,998	16,731	269,716
120		Scale	32,934	1,087	34,020	748	34,769	5,215	746	40,731
122		Instrumentation	572,620	18,896	591,517	13,013	604,530	90,680	16,322	711,532
WWP		Waste Water Treatment Plant	359,081	11,850	370,930	8,160	379,091	56,864	83,656	519,611
LC\IR		Process control	420,388	13,873	434,261	9,554	443,814	66,572	1,931	512,318
Lab.		Laboratory Instr.	32,438	1,070	33,509	737	34,246	5,137	1,931	41,314
pH.visc		pH measurement+viscoalmeter	29,874	986	30,860	679	31,539	4,731	1,287	37,556
Contr.		Automation	272,420	8,990	281,410	6,191	287,601	43,140	5,792	336,533
		Available sum	104,005	3,432	107,437	2,364	109,833	16,475	0	126,308
		Grand total	5,289,689	174,560	5,464,248	120,213	5,584,462	837,669	184,652	6,606,783

ANNEX E - Update by inflation to Mid-1996

1	2	3	9	10	11	12	13	14	15	16
Proj.	Pos.	Principal items	Equipment total Lit x 1000	Financial costs Lit x 1000	Subtotal 9 plus 10 Lit x 1000	Admin. service Lit x 1000	Total costs Lit x 1000	Profit & continge Lit x 1000	Packaging Transportation Insurance	Price Lit x 1000
101		Reactors	2,528,202	73,217	2,601,419	50,422	2,651,841	351,350	33,397	3,036,588
103		Store room	92,127	2,668	94,795	1,837	96,632	12,803	3,365	112,800
108		Fittings	220,658	6,390	227,048	4,401	231,449	30,665	2,213	264,327
109		Fittings	44,045	1,276	45,321	878	46,199	6,121	10,237	62,557
112		Thermo oil boiler and fittings	284,146	8,229	292,375	5,667	298,042	39,488	8,737	346,266
113		Compressor unit	74,159	2,148	76,307	1,479	77,786	10,306	2,767	90,858
115		Cooling plant	205,508	5,952	211,460	4,099	215,559	28,560	17,986	262,105
120		Scale	33,718	976	34,694	672	35,366	4,686	802	40,854
122		Instrumentation	580,723	16,818	597,541	11,582	609,123	80,704	17,546	707,373
WWP		Waste Water Treatment Plant	347,758	10,071	357,829	6,936	364,765	48,329	8,993	422,087
LC\IR		Process control	418,441	12,118	430,559	8,345	438,904	58,152	2,076	499,133
Lab.		Laboratory Instr.	33,530	971	34,501	669	35,170	4,660	2,076	41,906
pH.visc		pH measurement+viscosimeter	30,585	886	31,471	610	32,081	4,250	1,383	37,715
Contr.		Automation	268,671	7,781	276,452	5,358	281,810	37,338	6,226	325,375
		Subtotal	5,162,272	149,501	5,311,773	102,955	5,414,728	717,412	117,804	6,249,944
		Avilable sum	104,005	3,432	107,469	2,364	109,833	16,475	0	126,308
		Grand total	5,266,277	152,933	5,419,242	105,319	5,524,561	733,887	117,804	6,376,252