6.2 PRODUCTION

The production of the NATRON mill has been only a small percentage of its pre-war level. Only the waste paper plant, PM1 and the converting plants are operating, but only intermittently - one or two weeks in every two months. The wood handling, pulping lines and three of the paper machines have not been operated in several years.

Waste paper and purchased unbleached kraft pulp is used as raw material for PM1, producing corrugating raw materials mainly for own converting. Imported sack paper is used for sack and bag converting, and small quantities of liner is purchased. Corrugated board, sacks, bags and small quantities of PM1 paper is sold.. The production in 1991 and 1997 are shown in Table 6-1:

TABLE 6-1 Production

		1991	1997
Pulp	t	120.000	-
Paper	t	150,000	4,700
Corrugated board	t	32,000	2,300
Sacks and bags	t	35,000	2,400

Less than 3% of the original production capacity of the departments was used in 1997.

6.3 TECHNICAL STATE

6.3.1. Pulp Mill

The pulp production of the mill consists of two different kraft pulp process lines: the batch and the continuous (Kamyr) pulping processes, each of which has a chemical recovery section. The outline is shown in Fig 6/1, Pulping Line Block Diagram.

The design and operating conditions and technical specifications of the digesters are shown as follows.

(1) Batch Digesters

Capacity		
Design (t/d)	150 AD t/d Kraft pulp	
Actual operation (t/d)	150-172 AD t/d Kraft pulp	
Operating Condition	Chemical charge	410 kg/AD t pulp as A.A
	Steam consumption	2.25 t/AD t pulp
	Electric power consumption	44 kWh/AD t pulp

(2) Continuous (Kamyr) Digester

It was installed in 1983 as an expansion project.

Capacity	
Design (t/d)	200 AD t/d Kraft pulp
Operating condition	Cooking yield 48%
	Kappa No. 40-50
	Chemical Charge 365 kg/AD t pulp as A.A.
	Steam consumption 0.75 t/AD t pulp
	Electric power consumption 212 kWh/AD t pulp

(3) Recovery Section

The recovery section has the two lines corresponding to the chemical recovery for the batch and the continuous kraft pulping processes.

(4) Technical Condition

1) Wood Yard

This technical design of the wood handling plant is extremely poor, and even before the war unacceptable especially on winter. The chip conveyer has been damaged during the war.

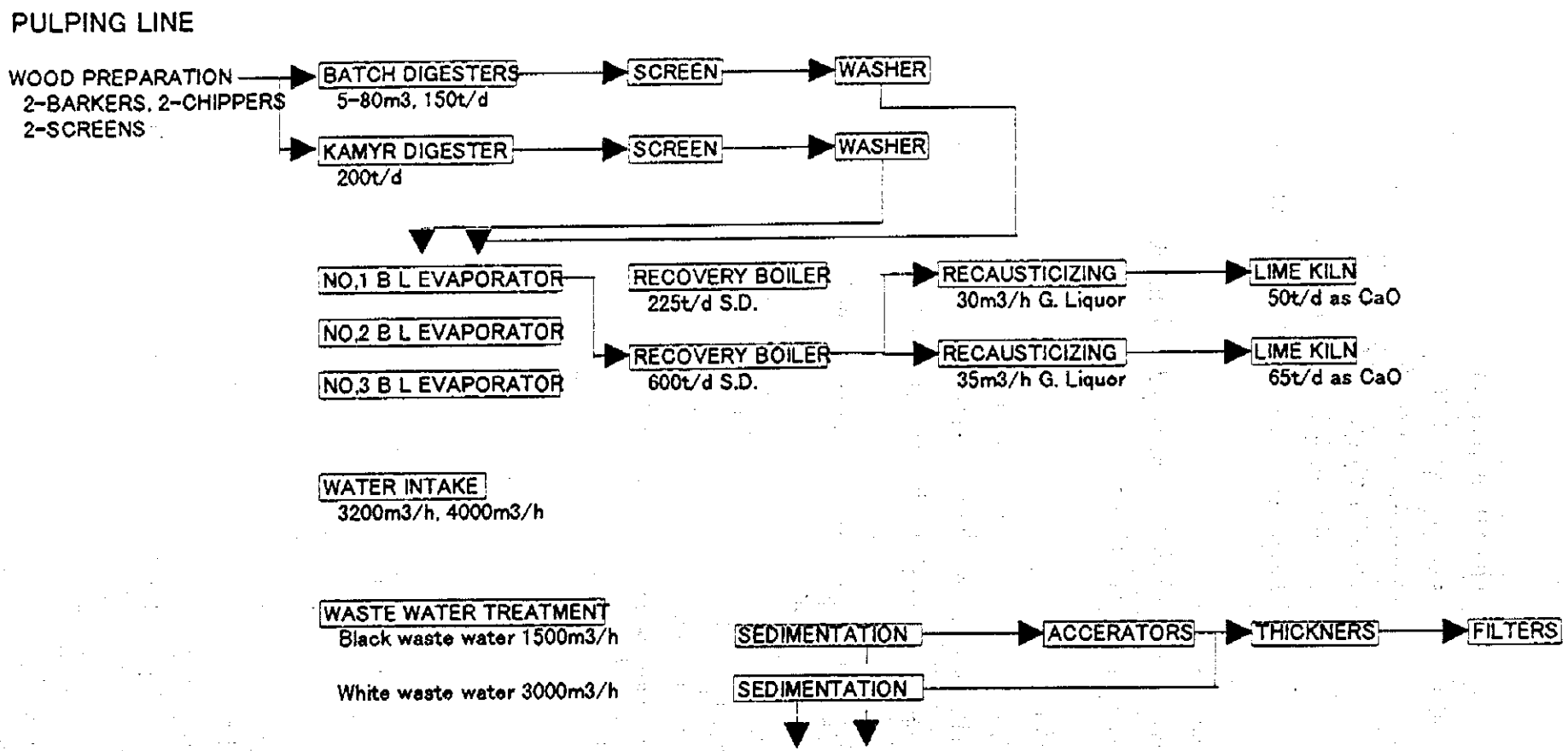
2) Kamyr Pulping Line

War damages and severe corrosion are clearly visible. Material for rebuilding the batch digesters is already available.

3) Recovery Section.

The recovery plants have been damaged during the war and severe corrosion has occurred. Because green liquor cooking is used in semichemical pulping, out of the caustisizing plant will not be started.

FIG 6/1
Pulping Line Block Diagram



6.3.2. Paper mill.

(1) Technical Description

1) Paper machine 1

Year of installation	1956	Supplier Voith
Year of modernisation	1982	Beloit

Annual capacity	60 000 t/a
Maximal speed	350 m/min
Paper width	4250 mm
Paper grades	Fluting Testliner Schrenz
Grammage	112 - 300 g/m2

At present the paper machine is operating only ¼ of the time. The reduction of operating time is due to low demand from the market and due to shortage of raw materials.

2) Paper machine 2

Year of installation	1957	Supplier Valmet
Year of modernisation	1979	Supplier Valmet

Annual capacity	22 000 t/a
Maximal speed	350 m/min
Paper width	3260 mm
Paper grades	Kraft paper
Grammage	60 - 200 g/m2

The paper machine has not been in operation since April 1992.

3) Paper machine 3

Year of installation	1962	Supplier ErWePa
Year of Modernisation	1980	Supplier ErWePa

Annual capacity	12 000 t/a
Maximal speed	250 m/min
Paper width	2860 mm
Paper grades	MG Paper bag paper wrapping paper
Grammage	40 - 190 g/m2

The paper machine was last time in operation August 1996. The machine is at present not in operation due to shortage of kraft pulp.

4) Paper machine 4

Year of installation	1965	Supplier Sano
Year of modernisation	1980	Supplier Beloit

Annual capacity	60 000 t/a
Maximal speed	400 m/min
Paper width	5450 mm
Paper grades	Sack paper Clupak paper
Grammage	60 - 90 g/m2

The paper machine was last time in operation April 1992.

5) Paper machine 5

Year of installation	1895	Supplier KMW
Year of modernisation	1970	Natron

Annual capacity	11 000 t/a
Maximal speed	150 m/min
Paper width	2150 mm
Paper grades	Fluting Schrenz
Grammage	100 - 130 gr/m2

The paper machine was last time in operation August 1996.

6) Waste Paper plant

Year of installation	1981	Supplier Beloit

Annual capacity	50 000 t/a
Waste Paper grades	OCC, mixed waste and own broke

The Waste Paper plant is in operation simultaneously with PM 1 for the supply of waste paper pulp.

(2) Technical Condition

The main problems of PMI are the heat recovery system, the electronics for the AC-drive, the building being in a bad shape due to the war and the absence of a proper fibre recovery system.

The main need of PM 3 for this machine is to grind the Yankee cylinder.

PM 4 is in a bad state as well as the heat recovery which has to be renewed, the Accuray system for the paper properties has to be updated, and the electronic system for the DC drives must be checked. The HC-refining system must be updated. The winder has to be changed out due to a low technical standard, to meet the future quality demands for sack paper. The building has to be properly repaired, which also is a necessity for the paper quality and the working environment. The wire section will need some additional de-watering elements.

For the other two paper machines, PM 2 and PM 5, the decision has been taken that they are not needed for future production, because at low technical condition and unsuitability to the production structure.

6.3.3. Converting Plants

Products consist of corrugated board and containers, and paper bags. Paper as the main raw material is self-produced or imported. Other materials - starch, adhesive, ink, wires and printing die, are also available. However, the production rate is far from normal, only 3 to 5 % of the pre-war production. Nevertheless it is considered that the demand for those products will steadily increase with post-war restoration. Product quality has to meet the customer's requirements. Better quality level is essential as an urgent measure.

(1) Corrugated board and containers

Before the war, the plant had the equipment and technology to produce unitary, interior, and shipping packages, though the individual production was small. Small quantities of board products for packaging and transporting purposes will be produced if the new corrugator is restarted on schedule in June, 1998. However, the present quality does not reach a level that satisfies the customer's.

An urgent measure is to improve the basic quality of corrugated board such as flute formation and adhesive strength.

(2) Paper bags

The large-sized paper bag producing facility is old-fashioned, but did not suffer from war damage. It has sufficient production capacity to meet customer's demand. However, there will be

no market for kraft paper bags until industries like cement, synthetic resin and feed material, are restarted.

The smaller paper bag making facility is still in good condition, and has sufficient production capacity. However, the product is simply made of kraft paper (unbleached), which does not serve the market. It is essential that a new product is developed.

6.3.4. Steam, Water and Power supply.

(1) Power Plant

The two small coal boilers of 25 tons of steam/ hour and the 8 mw generator generate the energy for the present production. This equipment is in a bad technical shape after 35 years of running without a proper maintenance. The remaining life will not be more than 2-3 years. The boilers are running at maximum risk. The other two boilers, of 80 and 100 tons/ hour have yet not been restarted. The big 100 ton/hour boiler is in good shape and its tube material has also been tested with positive results. The two remaining generators of 18 and 25 mw have not yet been run. They can both be restarted after proper servicing. One problem to investigate further is where to get spare parts. While the old Jugo turbine company does not exist any more, it can probably be solved through ABB who have taken over the company. Production must be much more energy efficient in the future - to get the coal usage reduced to European standards for pulp and paper production. With a future bark boiler, the energy balance should be well taken care of, even without the two small boilers.

(2) Fresh Water Treatment

Only the old fresh water treatment plant has been restarted, because it is sufficient for the present water needs. Restarting the new water treatment plant is mostly a matter of maintenance and should not meet with great difficulties. Then the old plant will not be necessary taking into consideration lover water usage for production.

The chemical water production plant for the boiler water needs some maintenance and the ion exchange gel needs to be changed. This is a rather heavy restart-up cost.

6.3.5 Electrical and Instrumentation

(1) Electrical Power System

The 35 kV utility connections used to be made from two networks, one from Zenica, the other from Doboj, each with 10 MVA capacity. However, the Doboj now belongs to "RS" and, due to the political situation, the power from this direction became unavailable. Now, the system is rearranged to 20 MVA capacity connected to Zenica network only. The Zenica power system is dependable.

1) Electrical Maintenance Facilities

The mill maintenance facilities are good. Motors can be hooked up in the maintenance shop test bench and tested for the motor characteristic.

The maintenance shop can re-wind motor windings of up to 50 kW. The larger motors can be rewound in a shop in Tuzla, 80 km away.

2) Damage Assessment

War damage in electrical systems is limited.

- Overhead 6kV cable interconnecting between station TS2/2 and TS13 snapped by direct hit grenade.
- Underground 6kV cable to PM4 machine and stock prep. is broken.
- PM4 drive control panels have some damages.
- A short length of Kamyr digester chip feed belt conveyer was burnt together with several low voltage cables.

Most of repair was necessary due to weather damage. The damage does not appear serious. This is partly because almost all motors and transformers are installed indoors.

- One of two 10 MVA utility line transformer is known to be weather damaged.
- PM4 drive control system, thyrister control, was known to be weather damaged. Will require certain restoration work including some replacement parts and services by the original manufacturer ANSALDO in Italy.

(2) Instrumentation System

1) General Instruments

Through out the mill, the processes have pneumatic instruments. Foxboro is the most common manufacturer of the pneumatic instruments, next being Taylor.

2) Instrument maintenance facilities

Well organized warehouses maintain good store of spare parts.

The maintenance shop has a set of good quality test and calibration instruments sufficient to maintain the existing pneumatic instruments.

3) Damage Assessment

Kamyr line causticizer area was repeatedly hit directly by grenades. The building structure and some equipment and piping were damaged. The instruments in the control room were irrepairably damaged. The control panel has to be rebuilt, and the instruments have to be replaced for re-starting the mill.

Except the above, the damage to instrumentation system is minimal.

The special instrument, paper machine scanner is delicate electronic device. Although it is not possible to access the damage at this stage, it is anticipated that certain repair replacement work, including original supplier's (Italy) services will be necessary.

6.3.6. Environmental

(1) Effluent Treatment

1) Technical Description

The plant was started in 1986.

Waste water to be treated is classed into the two kinds: white waste water (acid) from the paper machines area and black waste water (alkaline) from the pulp production lines (bath and continuous).

The design criteria of the waste water treatment plant are shown in the following figures, which were effective in 1976, but confirmed to have not been changed until the war.

Regulation values for Bosna River (3rd Category River)

Suspended solid (SS):	80	mg/lit. (Max.)
Total dissolved solid (TDS):	1500	mg/lit. (Max.)
Dissolved oxygen (DO):	4	mg/lit. (Min.)
BOD5:	7	mg/lit. (Max.)
pH:	6-9	
Colour:	none	
Smell:	none	

On the other hand, the wastewater treatment was designed as the following expected values of the treated water:

pH	6-9	
BODS:	30	mg/lit. (Ave.)
Suspended solid:	80	mg/lit. (Ave.)
Colour:	As little as possible	
Smell:	As little as possible	

The waste water treatment facilities have not been operated after the war. Water consumption and effluent flow is high compared with the production, 260 m^3/t paper. All the effluent is discharged to the river without any treatment.

The coal ash from the power plant is discharged to the river with the effluent. The quantity of ash discharged is around 140-400 kg/ t paper. Such high pollution will not be allowed in normal operation..

2) Technical Condition

The effluent treatment departments are in poor shape. The settling basins are full of rain water, with grass growing inside. The lakes and their driving mechanisms have been seriously corroded. Corrosion and poor maintenance is visible everywhere. The building for sludge presses and chemical dosage system is badly war damaged as well as the machinery. This must be corrected immediately, otherwise no investor will show any interest in NATRON. None of the equipment has so far been restarted after the war, meaning that the present production is taking place without any environmental protection. The European standards for effluent treatment has developed a lot in recent years, so it is possible that further treatment will have to be implemented in the years to come. The total water usage for the pulp and paper production must be reduced to less than half of the usage before the war. With that in mind, the effluent treatment plant should be big enough even for the suggested increased future production level.

(2) Emissions to Air

To prevent air pollution and odor, the mill has 1) exhaust gas treatment and condensate stripping plant, 2) waste gas incinerator and 3) water scrubber and electrostatic precipitator for chemical recovery boilers.

1) Design criteria and technical specifications Exhaust gas treatment and condensate stripping plant were designed as shown below.

Capacity

Exhaust gas treatment

For batch cooling line of pulp production of	150 AD t/d
For continuous cooking line of pulp production of	200 AD t/d
Condensate stripping 150 m^3/h as feed waste water	

In the chemical recovery boiler, the measurements were conducted in 1987. Dust and SO_2 emissions were then measured, calculated and analysed to check for the values in accordance with following standard values:

	German standard	Maglaj standard	Other area standard
Dust:	80 mg/m^3	50 mg/m^3	300 mg/m^3
SO_2:	1.7 mg/m^3	*	3 mg/m^3

2) Technical Condition

The exhaust gas treatment and condensate stripping facilities have never been operated since the war, because no kraft pulp has been produced.

The waste gas incinerator has been stopped because of some operational problems.

Odour control was not required in the regulations before the war.

(3) Ash Dumping

The ash from the coal boilers is constantly generated when coal is burnt. The amount is estimated to be about 140 - 400 kg/t paper, based on the coal burning rate and its ash content. The ash has been earlier dumped to a deposit site 2 km from the mill. The piping and pumping system has been damaged during the war and cannot be used before repairing.

6.3.7. Common Facilities.

The vehicles are in a bad shape and require investment.

Common areas like offices, laboratories, rest rooms, dressing rooms, are partly in a bad shape and will need some funds in the near future.

The tools and the machines in the mechanical departments are all there to secure the start up of the mill. The people need training to get a licence for welding pressure vessels and training for laser alignment of pumps and machines.

The test equipment and training seems to be sufficient on the electrical and instrument side.

The civil department people may have to be trained in using diamond drill and diamond saw equipment. Otherwise, they seem to have the sufficient training.

The maintenance management team also seems to have the skill and training for the big challenge of restarting the mill. They badly need a computer based planning system to handle the enormous scope of work and people needed for the restart of Natron. There is also a need for a computer based spare parts system.

The technical situation in the mill is, that all equipment can be restored and that there is nothing on the technical side preventing the restart of Natron.

The drawback of the restart program could be the large number of skilled people needed for maintenance. This has to be closely watched, and it may be necessary to start further training schooling.

The internal transport belongs to the commercial department. There are now 44 vehicles left of the 176 from before the war and another 27 are expected to be repaired shortly. Less than half of the vehicles from before the war must be enough. Maybe part of these activities should be leased out to some external contractor company.

The fire- and security- department also belongs to the commercial department as one unit with one responsible chief. The fire department consists today of four fire men on each shift. There was and still is three cars for the fire protection. They are equipped to fire fight with, foam, chemicals and water. The fire brigade participated in the protection of Maglaj and played a superior roll in this task.

For the future, an automatic fire warning system the mill had before war must be restored and the warning central alarm should be placed in the security room at the main gate for the security officers to handle alerting of the fire squad.

The security department today has four officers on each shift to guard two gates and to make some patrol duties. There is one main gate for vehicles and personnel, and one side gate only for personnel. This one could preferably be equipped with television cameras and monitored from the main gate. With the television guarding system and the radio communication system, there should be enough with two guarding officers on each shift.

The safety department for personnel protection has a safety engineer and a nurse only today. For the future, it might be necessary to add at least two overall experts for safety training and statistics.

The medical care has to be combined with the city hospital care of Maglaj.

6.4 ORGANIZATION AND PERSONNEL

6.4.1 Company Organisation

(1) Management Structure

The Supervisory Board of NATRON has seven members. The Vice President and three of the members are nominated by the Federal Ministry of Energy, Mining and Industry. Four members are nominated by the shareholders.

The members nominated by the Ministry are:

- Mujezinovic Aziz, Doctor of Technical Science, member of management team in steel factory in Zenica
- Backovic Enver, Doctor of Economic Science, Vice Governor of Narodna Banka (Nationl Bank) Bosnia and Herzegovina
- Gotovusa Enes, Law Graduate Secretary in Ministry for Energetic of Bosnia

The members nominated by the individual shareholders assembly are

- Mustabasic Ismet, engineer of electrotechnics with more than 21 years of working experience as an assistant of general Manager for electrical and instrument maintenance
- Omerasevic Menaf, engineer of electrotechnics with more tan 13 years of experience as a leader of instrument maintenance

- Omerasevic Menat, engineer of electrotechnics with more tan 13 years of experience as a leader of instrument maintenance
- Zachirovic Muhamed, economist with more than 15 years of working experience as a chief of economic Sector
- Duracivic Husein, engineer technologist with more than 15 years of experience as a chief of Production Sector

The General Manager is nominated by the Supervisory Board as contract basis, and he has the authority to nominate the Management team, consisting of seven members. They direct the main operational sectors of the company.

The Supervisory Board has official meetings twice a year. The Management team meets officially ones or twice a week., based on the need, without any regular schedule.

(2) Organisation

Currently the organisation is principally the same as before war, but because most of the mill departments are not operating, the function of the organisation does not correspond normal production conditions.

The organisation includes eight sectors. Organisation chart is attached, Fig. 6.2. Company Organisation, Present.

Two of the paper production department (wood handling, pulp mill) are not in operation.
The third department, paper mill, includes three groups, consisting of Group 1 (PM1, PM2 and PM3), Group 2 (PM4 and PM5) and Group 3 (recycled fibre handling). Only PM1 and the recycled fibre departments are in operation some 10 days every two months.
The converting plant is operated discontinuously.

(3) Manning

Before the war, when all the mill departments were operating normally and the production level of the was 120,000 tons of pulp and 150,000 tons of paper, of which 67,000 tons was converted to corrugated board, sacks and bags, mill employed some 4,500 people.

Now, when only the recycled fibre line and PM1 are operating intermittent (only one or two weeks in every two months) and the converting plants are operated only 5 % of capacity, the total manning has been reduced to some 1,595 and the working force to 627 (situation in February 1998). The difference, 968, is waiting for work. A rotation system has been applied between working and waiting personnel.

TABLE 6-2
Manning by Organisation Sectors

	Working	Waiting	Total
Management	8	3	11
Marketing, commercial	39	116	155
Production			
paper	118	156	274
converting	137	299	436
Energy and maintenance			
energy	79	38	117
maintenance	107	236	343
Economy	103	99	202
Development, investments	9	12	21
Law and Personnel	9	11	20
Quality and Social	26	1	27
Total	635	971	1606

The forestry sector, totalling 26 persons, has recently been cancelled.

6.4.2 Maintenance Organisation

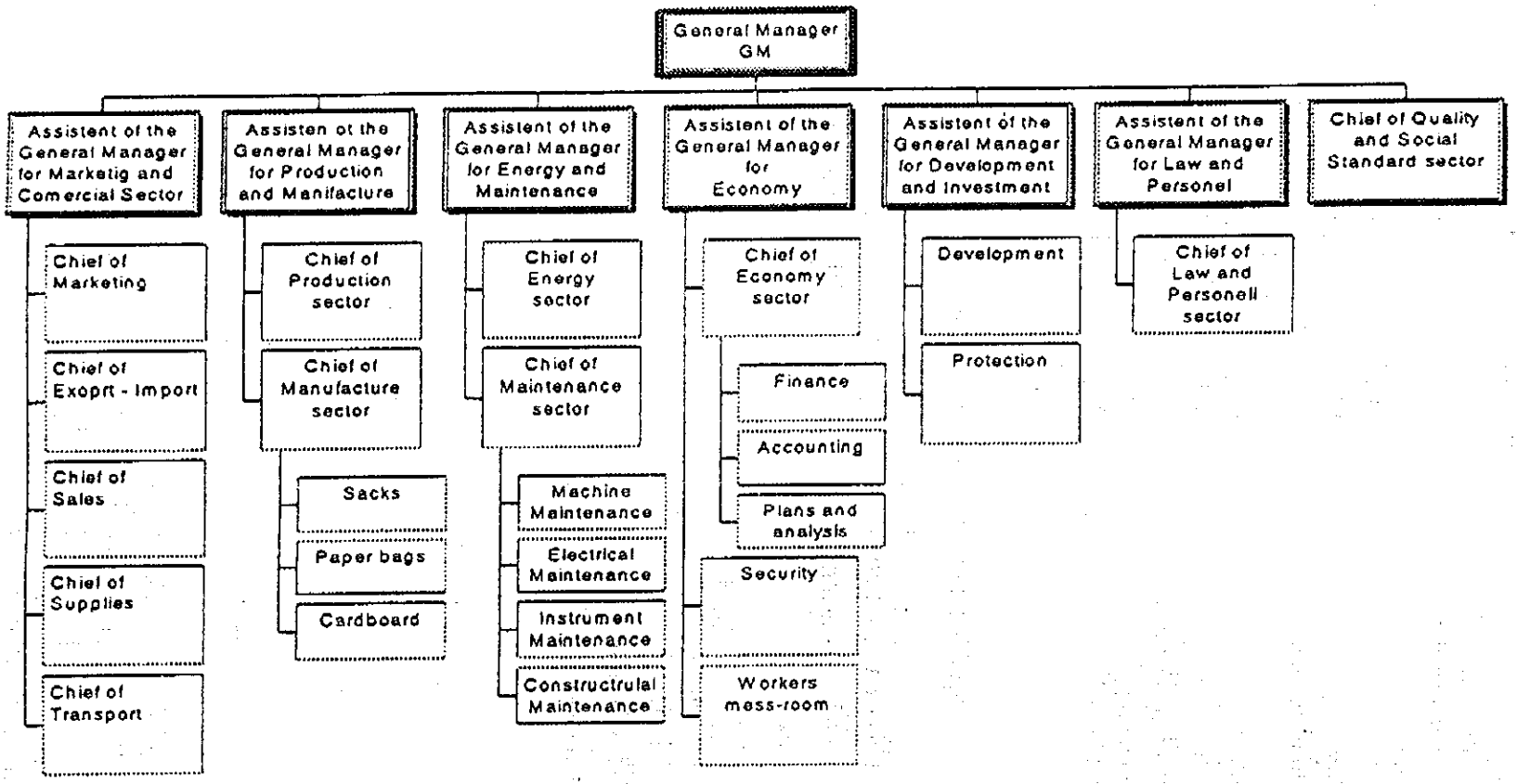
There are five main departments under the supervision of the maintenance director.

- Mechanical department.
- Electrical department.
- Instrument department.
- Civil department.
- External services department.

The organisation chart is attached, Fig. 6/3, Maintenance Organisation, Present.

FIGURE 6.2

Company Organization, Present



- Three different targets have been set for the maintenance department and its future standards:- Development of preventive maintenance.
- Quality development in workshops and repair activities.
- Continue to develop capacity and quality for external services department.

(1) Mechanical Workshops

The mechanical department is divided in two main lines. The one is for the field activities with small local workshops out in the production departments. There is an own department for preventive maintenance with its own manager in charge. The planning is all manually done as well as the spare part warehouse system. The documentation and work order systems are still working properly.

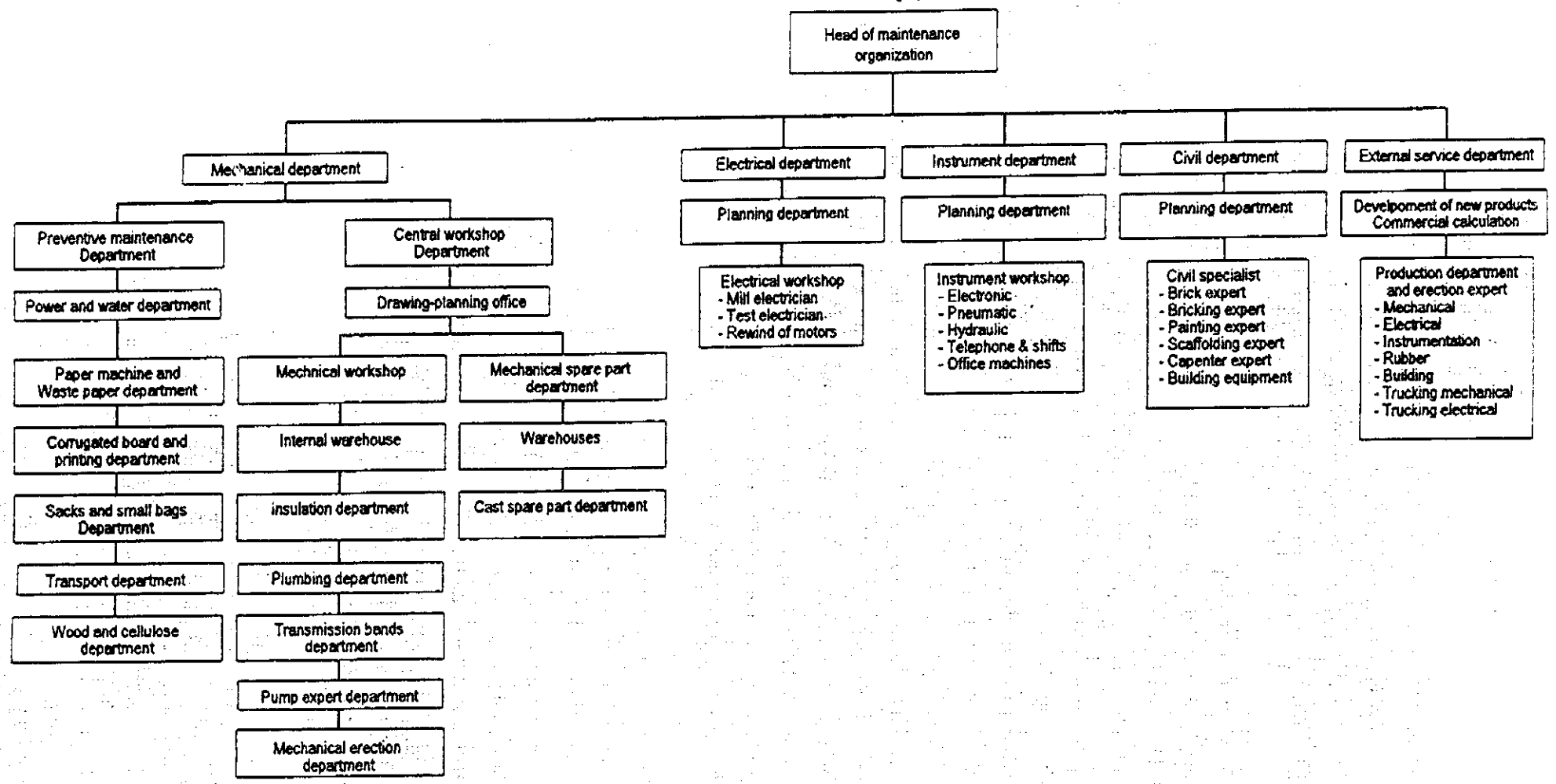
The second part of the mechanical department is the central workshop and all the special workshops as, cast, rubber, insulation, spare parts ,and so on, according to the organisation chart. There is also the drawing office where all the purchased machines and details has been measured and drawn. There are about 40,000 drawings stored today. The warehouses also belongs to this organisation. There is central warehouse for daily needs including bearings, as well as separated warehouses for different production departments. There are also special warehouses for lubrication grease, oils cast iron, rubber details and so on. The cast warehouse has also 6,000 wooden models for the cast spare part production. There are also warehouses for vehicles spares as well as small local ones for the different production departments.

(2) Electrical and Instrument Workshops.

The electrical and instrument departments have their own planning department, planning both the yearly shut downs and also the normal daily activities as well as all break downs. They also have their own spare parts warehouses close to the workshops. Both documentation and spares seems to be in a good physical order and the facilities for a restart of Natron is there. The test equipment for pneumatic instrumentation is all there, maybe old fashioned but functional and the people have the skills to use it. For the electrical department, there is a test bench for motors and there is also equipment and skills to re- wind motors up to 30 kW. For all bigger motors there is an external workshop in Tuzla some 30 kilometres away.

FIGURE 6.3

Maintenance Organization
at NATRON Maglaj



(3) Buildings and carpenter Workshops

The civil department has its carpenter workshop and small warehouses for bricks, paint, glass and so on. There is a lot going on in the building department workshops, as preparation of doors, windows and others for restoration of the mill owned houses after the war. The planning is also very much connected with the reconstruction of war damaged houses in- and out- side the mill area. One of the most important projects is to restart the environment department.

(4) External Services

The unusual part of the organisation is the department for external services. This part was developed long before the war when old Yugoslavia decided that all spare parts should be made within the country. So Natron decided to be a strong domestic spare part producer. A lot of products has been developed such as:

- Oil tanks up to 100 cubic meter.
- Waste paper press for stores.
- Spare parts for Natron mill including pump housing and other bigger constructions.
- Small oil tanks for family houses.
- Mechanical parts for mechanical construction.
- Rebuilding of houses.
- Windows.
- Mechanical erection work in other mills.

The biggest advantage with this activities today is that workmen skills is being kept in the mill, as well as that the employees from before the war, has a meaningful occupation.

(5) Maintenance Manning

There was an average of 830 people in the department in 1991. There were 499 mechanical fitters and experts, 100 electrical, 68 instrument, 68 civil, 45 garden and roads, and 50 people for external projects.

The present manning in the maintenance department equals the situation in 1997 and is as follows:

Mechanical maintenance	232
Electric maintenance	40
Instrument maintenance	34
Civil maintenance	36
Gardening, road maintenance	16
Total	358

From this total number 110 are disabled from the war, 84 are committed for external projects, 21 persons are on the stand by list and 143 persons are in working in the mill.

6.4.3 Employers Education and Training

About 64 % or the personnel is ranked to be at least qualified or over-qualified. 3 % or 52 has university level education. 80 % is in the age range of 30-50 years, which indicates considerable working experience. The qualification according to age structure is shown in Table 6-4. The total number of personnel has been reduced to 1,606 after defining the age and qualification structure., as shown in the Table.

TABLE 6-4

Qualification and Age Structure of Present Personnel

	Age years					
Qualification	25-30	30-40	40-50	50-60	over 60	total
Unqualified	1	181	207	113	-	502
Trainee	-	6	37	9	-	52
Low qualified	-	10	17	2		29
Qualified	15	262	97	41	3	418
High qualified	2	126	152	62	3	345
Middle qualified	8	92	71	24	1	196
Advanced specialist	-	5	22	16	1	44
University degree	1	21	23	1	1	47
Master	-	1	1	2	-	4
Doctor	-	-	-	-	1	1
Total	27	702	627	270	10	1,638

Now, when the mill is operating discontinuously, major part of the personnel is waiting for work and the company is making heavy losses, no training is conducted. Therefore, no progress has happened towards fulfilling the requirements of modern, export-oriented operations in market economy.

Regardless of the general, rather satisfactory qualification as shown in Table 6-4, the personnel is not able to meet the requirements of efficient and cost-effective operations. The management has not applied such an control and reporting system, which would allow the personnel to became familiar with the cost structure of the production.

Quality control is inadequate, partly because of equipment and facilities, partly because of lack of systematic procedures and know-how. The reporting and follow-up is completely unsatisfactory.

In addition to the special technical know-how needed to operate pulp and paper mill satisfactory, extensive training in all organisation levels is required, concerning

- management, who have to introduce proper control, follow-up and reporting system, and start systematic training of the personnel
- operating personnel, who have to be made familiar with the cost structure of the operations and their possibilities to improve production efficiency, product quality and profitability
- quality control personnel, who shall in the future be capable to adapt sufficient control methods and reporting system
- power plant personnel, who have to be trained to optimise plant operations

Because of discontinuous operation and other current problems the motivation of the personnel is low. Some of the skilled operators have left the company and Maglaj town or were killed during the war.

6.5 FINANCIAL STATE

6.5.1 Finance

Financial problem is most crucial matter for current NATRON. Such a bad financial situation is common among almost every Bosnian company. Under 10% operation of capacity makes small money and NATRON cannot procure enough raw materials by cash. Barter transactions began last summer. In January 1998, barter transactions accounted for 33% of all transactions. Payment of salary is delayed by two months i.e. last December's salary was paid at the end of February, of which half was raised from local banks. It is getting difficult to pay waiting employees even though their salary is so small (DM45/month).

Financial measures are very limited because local banks have only small and short-term loan at 3%/month interest rate, and NATRON cannot borrow from foreign banks because the Bosnian Central Bank does not approve.

6.5.2 Cash Flow Control

Finance division prepares fund statement every day, and monthly fund plan is circulated to management team. When a customer does not pay a bill, Natron files a suit in a court for distrain upon the customer's credit, or switches the transaction to a barter trade in a hurry.

6.5.3 Payment Term

Payment should be made by 30 days after transaction. If a buyer didn't pay, the buyer's bank accounts are frozen in all banks. On the other hand, the corresponding vender should pay fine of 1%/day to government. NATRON paid DM150 thousand in fines in 1995. Barter transaction might be preferred partly in order to avoid this severe fine.

6.5.4 Barter Transaction

Barter transaction is a complicated system. For example, in order to procure coal, Natron seeks a company which wants paper and has credit to the coal company. Market prices of paper and coal are valued at same day, and when whole party signs the contract, the transaction starts. Payment is completed by settlement of each bank account, and difference of the goods' market prices is settled by cash. Each party pays fee of 0.3% of sales amount to the bank. Sometimes the party is composed of 4 or 5 companies. When the bartered good is furniture, Natron has to seek a customer for the furniture.

6.5.5 Accounting Standard

In 1995, accounting standard of Bosnia was changed in conformity with US standard. But format of financial statements is too simple and detailed schedules of accounting items are not prepared enough, so it is difficult to understand Natron's financial situation by such financial statements. Unit price of material used is calculated by average method and final inventory is valued at acquisition cost, partly because current market prices fluctuate rapidly.

Definition of fixed asset is regulated only by one-year lifetime rule, and not by the amount. Fixed assets are depreciated by straight-line method with no scrap value in accordance with regulated life. Depreciation for idle facility is discontinued until operation is resumed.

6.5.6 Fixed Assets

All fixed assets owned by Natron are registered. Fixed assets are classified into fixed assets in use, and those out of use. Book value of fixed assets out of use at the end of 1997 is DM58,387 thousand, which is around 30% of total fixed assets (58,387/195,315 = 30%). No depreciation for fixed assets out of use is charged.

Every sale and purchase of fixed asset must be approved by Agency of privatization beforehand, and 70% of the sold amount will be taken by government from March 1998 (30% is to Natron). Agency of privatization also plans to sell Natron's surplus assets such as football stadium, farm, restaurants, hotel and transport equipment (trucks and buses) etc.

Forest of 32 thousand m2 is included in land account. After war, 85% of the forest is belonged to RS region, and it cannot be utilized partly because many mines are laid there. Book value for it of DM50 million was written off by deduction from retained earnings in 1997.

In 1991, property was insured for DM4.5 million, but after war, the premium has not been paid because of funds shortage.

6.5.7 Debts

Natron owes advanced countries i.e. Germany, UK, France, Italy etc. DM39 million at the end of 1997 at 7~11% interest rate with government guarantee for facility construction. It was borrowed 20 years ago and half is already paid back. After war, Natron doesn't pay both the

principal and interest, and hopes that Bosnian government will negotiate with Paris and London club about cancellation of the long-term debt. Natron received a deduction advice for 38.7373% of London Club loans in April 1998.

6.5.8 Related Business

Natron owns a restaurant. It earned DM143 thousand and the cost of material was DM111 thousand in the first half of 1997. Natron also has in-house restaurant and serves employees free lunches of which cost was DM686 thousand in 1997.

Natron has 940 apartments for employees, but about 200 in those are provided for refugees. The area of them is $35m^2$ ~ $100m^2$, average $64m^2$, and the rent/month is DM0.3 /m^2. An employee who worked over 10 years can permanently live in his apartment and can buy it at a deep discount from March 1998. 90% of the sold amount of the apartments will be taken to the Canton and will be appropriated for new houses building for refugees. 10% will be taken to Natron (the owners). After war, Natron has not maintained the apartments because of lack of funds.

Natron seeks to get external jobs actively such as maintenance and construction works by making use of its technical skill, and earned DM528 thousand including foreign works in the first half of 1997.

6.5.9 Audit

Supervisory board has strong authority to supervise and control General Director and management team. But every member has his own occupation and 4 employee representatives of the board are subordinates under management team. Supervisory board has authority of accounting audit too. In addition, 'financial police (governmental official)' comes to Natron suddenly, and investigates finance, accounting and tax for usually 15 days. Before war they came every year but they haven't come since 1995.

6.5.10 Taxes

Corporate income tax rate is 36% in 1996, and 30% in 1997. Corporate tax rate is reduced to 15% for investment. Import duty rate is 12%, but negotiable with government. There is no fixed property tax in BH.

7. PROPOSED DEVELOPMENT PROGRAM

7.1 OUTLINES FOR FUTURE PRODUCTION CONCEPT

The objectives of developing the future production concept is to

- find out a feasible balance between raw material supply, mill production potential and marketing opportunities, targeting full utilisation of the resources and mill facilities
- to get back to profits and gain cost competitiveness by improving the operating performance, effective maintenance measures and investments
- improve the value of the mill or of a part of it to a level where options for attracting a foreign investor partner are available or sale of the enterprise or part of it makes economic sense

When defining the future production of the Natron mill, the main technical fundaments have been considered:

- raw material supply
- markets
- existing technical facilities of the mill

Export markets of semichemical fluting have been discussed in Chapter 4 and raw material supply in Chapter 5. The main principles affecting the selection of the future production concept is summarised in the following.

Entering export markets is essential for restarting the mill because of low domestic demand. Domestic recycled fibre resources cover currently less than 10 % of paper production capacity.

- Softwood availability corresponds the capacity at one pulping line and two paper machines only.
- Hardwood is available in required quantities for the second pulping line, which can easily be converted for semichemical pulping. The pulp production corresponds the capacity of one paper machine.
- Sack paper of kraft pulp and semichemical fluting are most promising products for export.
- The mill has been designed and in suitable for production of sack paper, corrugated board raw materials and converted products. Changing to other grades cannot be recommended.

Based on the raw material base, market limitations and present technical facilities of the mill, the future production concept has been outlined as:

- softwood kraft pulp production with one pulping line (batch line), 66,000 t/a
- hardwood semichemical pulp production with one pulping line (continuous Kamyr line), 66,000 t/a
- combined chemicals recovery
- sack paper production with one paper machine (PM4), 57,000 t/a using kraft pulp

- fluting production with one paper machine (PM1), 73,000 t/a, using hardwood semichemical pulp
- MG paper production with one paper machine (PM3), 9000 t/a
- converting including 38,000 t/a corrugated board and 20,000 t/a sacks

In this concept no recycled fibre would be used in the future. Start-up of PM2, producing schrenz from recycled fibre has been considered, but this alternative has not been found profitable.

7.2 PRODUCTION DEVELOPMENT PROGRAM

Because many mill departments have not been operated during the last few years, considerable investments and other measures are required in arranging the raw material supply, developing the marketing and bringing the technical condition of the mill to normal. Therefore a stepwise implementation, including Immediate Program, Short Term Program and Long Term Program, is recommended.

7.2.1 Immediate Program

The Immediate Program covers the second half of year 1998. The target of this program is to improve the present operations of the mill and to prepare steps for further development . Because of limitations in raw material availability and marketing, the production will be principally discontinuous as before. Main raw materials will be recycled fibre and purchased sack paper, and main sales products corrugated board, corrugating materials and sacks.

The main measures during the Immediate Program are rehabilitation and start-up of the effluent treatment plant , rehabilitation and start-up of the ash dumping system, and acquiring a compact boiler, intended to improve energy-efficiency (optional)

No major capital expenditures for the immediate program are required, but preparation of the Short Term Program should be started The total capital expenditures during the immediate program is estimated at DM 3.2 million, which includes an allocation for a compact boiler, DM 2 million. The investments are specified in Chapter 8.1.

7.2.2 Short Term Program

The Short Term Program covers year 1999 and the first half of year 2000. During this period the production of PM1 and converting will be increased. PM3 will be started producing MG paper and using purchased kraft pulp as raw material. The production is still discontinuous, restricted by the marketing possibilities and probably by the availability of recycled fibre. Extensive efforts in preparing the implementation plan for Long Term Program are needed. Rehabilitation and

start-up of the effluent treatment plant and the ash dumping system is essential during this period before any major production increase.

The total capital expenditures for the Short Term Program is estimated at DM 27.7 million, of which DM 1.9 million is needed to start the production and DM 25.8 million for preparing to start up the continuous operation of the pulp and paper mill in the next development stage. The investments are specified in Chapter 8.1.

7.2.3 Long Term Program

The normal, continuous production of the mill in accordance to the outlined production concept is planned to be started in mid-2000. Because the capacity of the recovery boiler is too high for one pulping line only, both of the pulping lines have to be started simultaneously.

The capacity limitation in various department require that the Kamyr digester has to be operated at least with minimum possible production rate, 60,000 ADt/a. The production will be increased to 66,000 ADt/a, limited by the capacity of PM1 after rebuilding the machine. The batch pulping line has to be with maximum possible production rate, 66,000 ADt/a, in order to secure the sufficient dry solids load of the recovery boiler. The pulp will be used on PM3 producing MG paper 9,000 t/a and on PM4 producing sack paper 57,000 t/a, which corresponds the practical capacity of these machines.
Restarting of PM2, producing schrenz of waste paper, has been investigated as an alternative. However, because of investments required and low product price this alternative seems to be not profitable.

The capacity limitations in pulping, chemical recovery, PM1, PM3 and PM4 in the Long Term Program are shown on the attached Fig. 7/1, Pulp Mill Block Diagram. The annual sales production is presented in Table 7-1.

Table 7-1
Annual Sales Production in Tons, Long Term Program

	Year						
	2	3	4	5	6	7	8
Schrenz Corr. Board	10,000	15,000	20,000	26,000	32,000	35,000	37,000
Semichemical Fluting		24,000	53,000	50,000	50,000	50,000	50,000
MG paper	4,800	7,000	7,500	8,000	8,400	8,400	8,400
Sacks and bags	5,000	8,000	10,000	13,000	16,000	18,000	20,000
Sack paper		23,000	28,000	28,000	31,000	35,000	37,000
Total sales:	19,800	77,000	118,500	125,000	137,400	146,400	153,400

The total capital expenditures during the Long Term Program is estimated at DM 108.6 million, of which DM 20.5 million is needed to start the mill and DM 88.1 million for further development. The investments are specified in Chapter 8.1

7.2.4 Survival Plan

If the partner or investor, needed to support the mill development towards restarting the pulp mills and PM4, is not found on time, the mill has to continue the operations without major investments. This "Survival Plan" can be considered to be an intermediate stage, which has to be followed with a more comprehensive development program.

The mill will continue the operations according to the Short term Program, increasing the production according to marketing possibilities. Exporting corrugating board raw materials seems to be not profitable, and therefore PM1 production is limited by domestic markets of corrugated board. The sales production of converted products and MG paper is expected to develop as in the Long Term Program.

The Survival Plan includes the following:

- PM1 will produce raw materials for corrugated board (fluting, schrenz, testliner) using domestic and imported waste paper and purchased kraft pulp as raw material. PM1 will be operated intermittently for several years.
- PM3 will produce MG paper of purchased kraft pulp
- The production of sacks will be continued, based on imported sack paper
- Effluent treatment and ash dumping have to be repaired and brought into operation
- Compact boiler will be installed

All these investments needed for the Survival Plan are included in the further development program, so that they will be fully utilised, if the Long Term Program is implemented in a later phase.

The annual development of sales production in the Survival Plan has been estimated at:

TABLE 7-6
Annual Sales Production in Tons, Survival Plan

	Year						
	2	3	4	5	6	7	8
Corr. Board	10,000	15,000	20,000	26,000	32,000	35,000	38,000
MG paper	5,000	8,000	10,000	13,000	16,000	18,000	20,000
Sacks and bags	4,800	7,000	7,500	8,000	8,400	8,400	8,400
Total sales	19,800	30,000	37,500	47,000	56,400	61,400	66,400

Figure 7.1

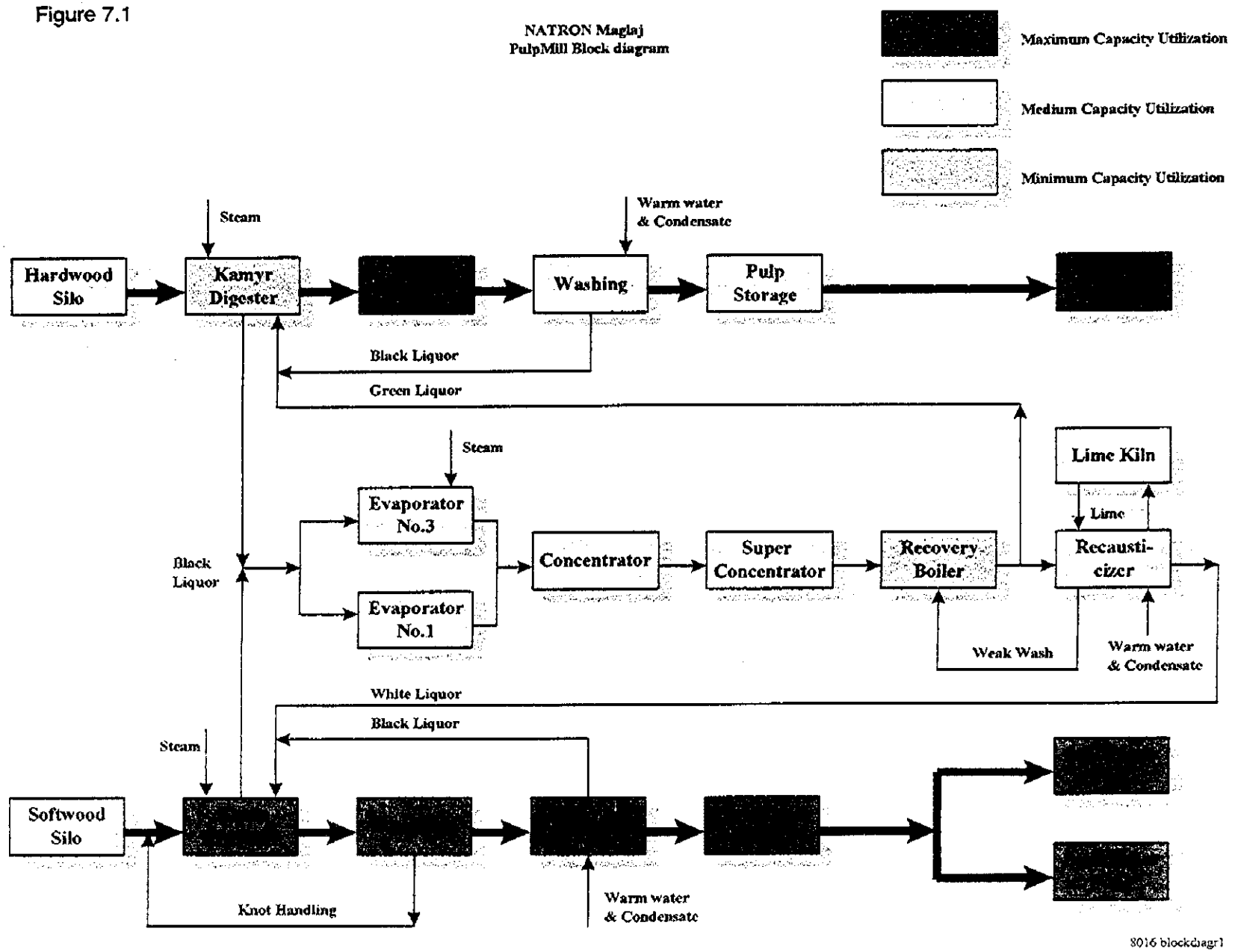
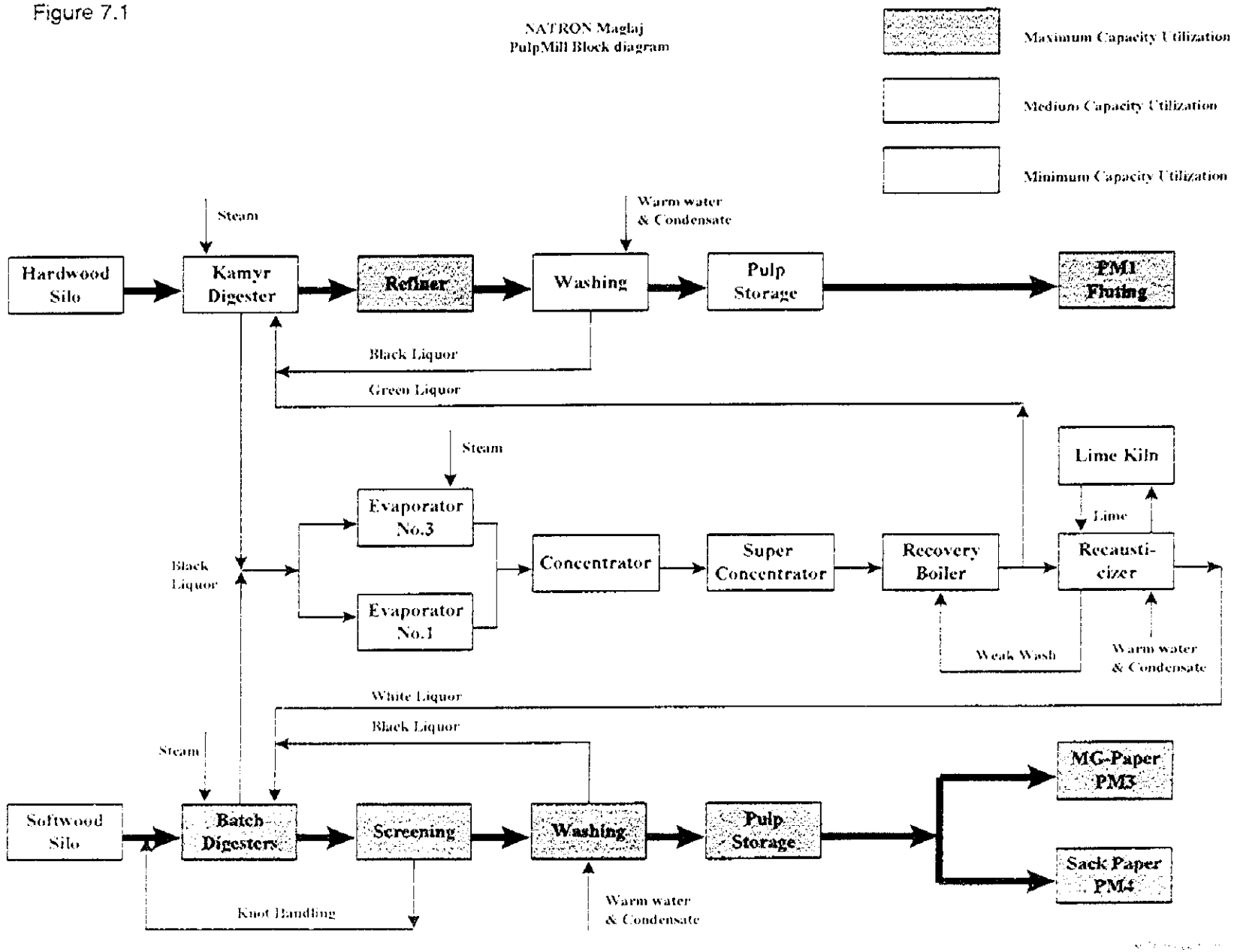

NATRON Maglaj
PulpMill Block diagram
Maximum Capacity Utilization
Medium Capacity Utilization
Minimum Capacity Utilization
Steam
Warm water
& Condensate
Hardwood Silo
Kamyr Digester
Washing
Pulp Storage
Black Liquor
Green Liquor
Steam
Lime Kiln
Lime
Evaporator No.3
Evaporator No.1
Black Liquor
Concentrator
Super Concentrator
Recovery Boiler
Recausti-cizer
Weak Wash
Warm water
& Condensate
White Liquor
Black Liquor
Steam
Softwood Silo
Knot Handling
Warm water
& Condensate
8016 blockdiagr1

Figure 7.1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PulpMill Block diagram
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Lime
Evaporator No.3
Black Liquor
Concentrator
Super Concentrator
Recovery Boiler
Recausti-cizer
Evaporator No.1
Weak Wash
Warm water
& Condensate
White Liquor
Black Liquor
Steam
MG-Paper PM3
Softwood Silo
Batch Digesters
Screening
Washing
Pulp Storage
Sack Paper PM4
Knot Handling
Warm water
& Condensate

Total capital expenditure for the Survival Plan is estimated at DM 13 million. The investments are specified in Chapter 8.1.

7.3 BASIC OPERATING CONCEPTS FOR CONVERTING PLANT

7.3.1 Urgent Reconstruction Program

NATRON had a basic idea regarding converting industry including corrugated board or bag manufacturing plants as a downstream process of an integrated paperboard mill. However the converting industries always keep in touch directly with consumers' market so that they can sense the needs quickly from market. Therefore, from the view point of the converting industry the paperboard industry should be considered as one of the material suppliers.

Now it is difficult to see a big leap in the market recovery and development though, it can be expected that the market for packaging industry will steadily recover and the demand for their products will grow. NATRON should promote sale into this market. And at the same time supplying those products in market acceptable "Quality, Price and Time of Delivery" will be quickly needed as "the most urgent reconstruction program". NATRON will have to achieve its object with the current facilities and workers.

7.3.2 Medium term reconstruction plan

Our fundamental concepts are addition and renewal of facilities for corrugated board and box production, and improvement of material handling system in keeping with production increment. Of course NATRON possibly need to change the layout of the plant. The concept "In a delivery-on-order industry, shipment is of primary importance" should be strictly secured and NATRON has to improve material handling efficiency all over the plant. From the safety and cost reduction point of view, an improvement should be done by eliminating pallets and lifters (pallet transportation system) out of the plant if practical and possible. To break off from a converting section belonging to a paper mill, NATRON should develop products to pack goods as a total packaging producer. To accomplish this objective, it needs an organization to develop its own technology for packaging and training of its employees.

7.3.3 Long term reconstruction plan

Even if the products have an advantage in quality, cost and delivery rather than others, it is still not enough condition to survive in the business race now. Customers' needs have been such diversified as POP effect expectable package, distribution cost decreasable package and specially functional package. In the next years we will be requested to cope with these requirements, develop necessary software with technology and provide appropriate services to our customers.

7.3.4 Corrugated board and boxes

(1) Urgent Reconstruction Plan

1) Introduction

When NATRON think about the postwar reconstruction and its competitiveness in the future, the highest priority should be given over the quality of products.

2) Quality control

The quality of corrugated boxes consists of fundamental quality and user quality.

Manufacturers have to find what is the necessary control for process management at the production site and be sure to perform such operation. All the workers in the production site are requested to understand "Quality First" concept and to give the essential characteristics binding with the products. (Introduction of TQC concept into operation)

Quality control system is built on the basis of daily operation data. Getting accurate data from manufacturing process in daily basis and quick information feedback to correct a malfunction of the process is the most important. (Plan - Do - Check - Action circle) To turn round this circle, an appointment of the quality control manager and improvement of workers' sense through training are essential.

3) Energy requirement

Converters must investigate these questions deeply.

How much is the cost for their energy per unit production ?

How is their competitiveness ? and

Is there any problems in the production program and delivery schedule management ?

Though such investigation has already been done in NATRON, we think investment effect should be studied more in detail. In Japan, even a converter located in the site of a paper mill generally has its own energy plant. Percentage of energy in the total production cost of NATRON is too high compared with Japanese converters.

Above stated are "the urgent reconstruction program" we suggest. As a premise, we would like to say that all NATRON members from officers to workers should primarily change to a more professional attitude.

(2) Mid-Long Term Reconstruction Plan

1) An addition and a renewal of equipment for corrugated board and box production

a. An addition of a flexo-graphic printer folder gluer

b. An addition of an autoplaten

c. A renewal of a flex-graphic printer slotter

2) An improvement of the material handling system in the site

An introduction of the material handling system without pallets and lifters

3) A new product development

a. Corrugated board having function such as water resistance, moisture proofness, antirust quality and freshness keeping

b. Cushioning materials such as molded pulp products, angle type corner pads and single faced corrugated board.

c. Color graphic printed corrugated board

(4) Qualification for ISO 9000 series

When NATRON is going to market its products in Europe, qualification for ISO 9000 series will be an essential condition. NATRON has to hold this qualification just as an identification card for its quality.

7.3.5 Sacks and Bags

(1) Introduction

Compared the production in 1997 with 1991 figures, larger sized and smaller sized paper bags sharply decreased to 6.7% and 7.3% respectively. Therefore without quick recovery of sales volume, the most urgent reconstruction program cannot be practical.

(2) Product Standard

When push on quality control, the standard of product is essential., though it is difficult to establish the product standard. Especially the most important function of the larger sized paper bags depends on their strength, because all these function including protection for their contents and leak proofing just depend on the strength of the bag.

NATRON should also refer to the standards of European countries and the USA and make a draft of its standard on the basis of them.

(3) Paper bags

Change their function from distribution to packaging

7.4 STEAM AND POWER SUPPLY

7.4.1 Power demand

The estimated power demand figures are as below. The numbers are when all the equipment is running at the highest planned capacity and considered as peak, not average, demand

Plant	Demand (MW)	
PM1	7.67	
PM3	1.13	
PM4	8.75	
SCP (Kamyr)	5.08	Includes chem. recovery
Kraft (Batch)	6.91	Includes chem. recovery
Conversion	0.80	

Power plant	3.77
Total:	34.12

7.4.2 Steam demand

The estimated steam demand figures are as below. The numbers are when all the equipment is running at the highest planned capacity and considered as peak, not average, demand.

Plant	Demand (t/h)	
PM1	37.8	
PM3	4.9	
PM4	31.1	
SCP (Kamyr)	18.1	Includes chem. recovery
Kraft (Batch)	40.1	Includes chem. recovery
Conversion	3.5	
Power plant	15.0	Estimate
Total:	150.5	
Best estimate recovery boiler steam	46.0	
Net coal boiler steam requirement	104.5	

7.5 ENVIRONMENTAL

Rehabilitation and start-up of the effluent treatment, the solid waste disposal, and the air pollution protection system is completed in this period before Long Term Program is commenced.

7.5.1 Effluent Treatment

Estimated effluent load assuming full production and allowed load after treatment will be as follows in consideration of the European standard (Table 7-7):

Table 7-7 Total load to external treatment

	Flow	BOD_5	COD	TSS
	m^3/d	t/d	t/d	t/d
Semich. Pulp	13,200	5.7		3.8
Kraft pulp	13,200	3.8		3.8
PM1	10,400	1.3		2.1
PM2	9,400	0.6		1.3
PM3	1,300	0.2		0.4
PM4	8,100	1.1		1.6
Total	56,000	12.7	38.1	13.0

Allowed load after treatment		BOD5	COD	TSS
Allowed specific load after treatment	kg/t paper	5	35	8
Allowed total load after treatment	t/d	2.3	16.4	3.7
	mg/l	41	293	66
Required reduction in external treatment	%	82	57	71

The total amount of effluent to be treated is calculated to be 56,000 m^3/d, that is 2,333m^3/h. The BOD and TSS are possible to reach the target values, but COD is very difficult to attain, without any additional equipment. Detailed study by the original manufacturer is required to reach a conclusion.

7.5.2 Solid Waste Disposal

The ash from the coal boilers will be damped in the damping place which is about 2 km far from the mill. It is sent through piping by slurry pumping.

The thickened sludge from effluent treatment should be damped to the damping place, however it should be considered for burned in the sludge boiler.

The barks discharged from debarking in wood handling plant should be also burned in the bark boiler.

7.5.3 Emission to air

The exhaust gas treatment for both batch cooking line and continuous cooking line and the condensate stripping are restarted to prevent air pollution and odor emission.

The old recovery boiler shall not be operated from the view point of preventing air pollution.

7.6 ORGANIZATION AND HUMAN RESOURCE DEVELOPMENT

7.6.1 Organization

According to the plan prepared by Natron mill management, the organization would be divided into three main units: 1) Production and Technical, 2) Independent Expertise Department, 3) Collective Activities.

The Production and Technical Unit would be headed by Assistant for General Manager and divided further into four sectors, either to profit centres or business units:

- Pulp and Paper Production, covering wood handling, pulping, plants, paper machines, power plants and environmental protection
- Paper Packaging, covering sack and bag production and plastic coating
- Cardboard Production, covering corrugated board and box production
- Maintenance Department, covering internal maintenance (mechanical, electrical, instrument, building) and supplying of external services

Each of these profit centres or business units include departments for supplies and preparation, quality control, sales, economics and personnel administration.

The Independent Expertise department would report directly to General Manager and be responsible of common quality and other control functions.
The Collective Activities Unit would include Commercial and Marketing Sector, Development Sector (investments, engineering, information), Economy Sector and Personnel Sector (law, personnel and public relations, fire protection and human resource development).
The organization chart is illustrated in Fig. 7/2, Company Organization, Proposed.

This plan can be considered to be the first step towards such an organization, which would best serve the future operations The final decision depends on the privatisation and the future company structure.

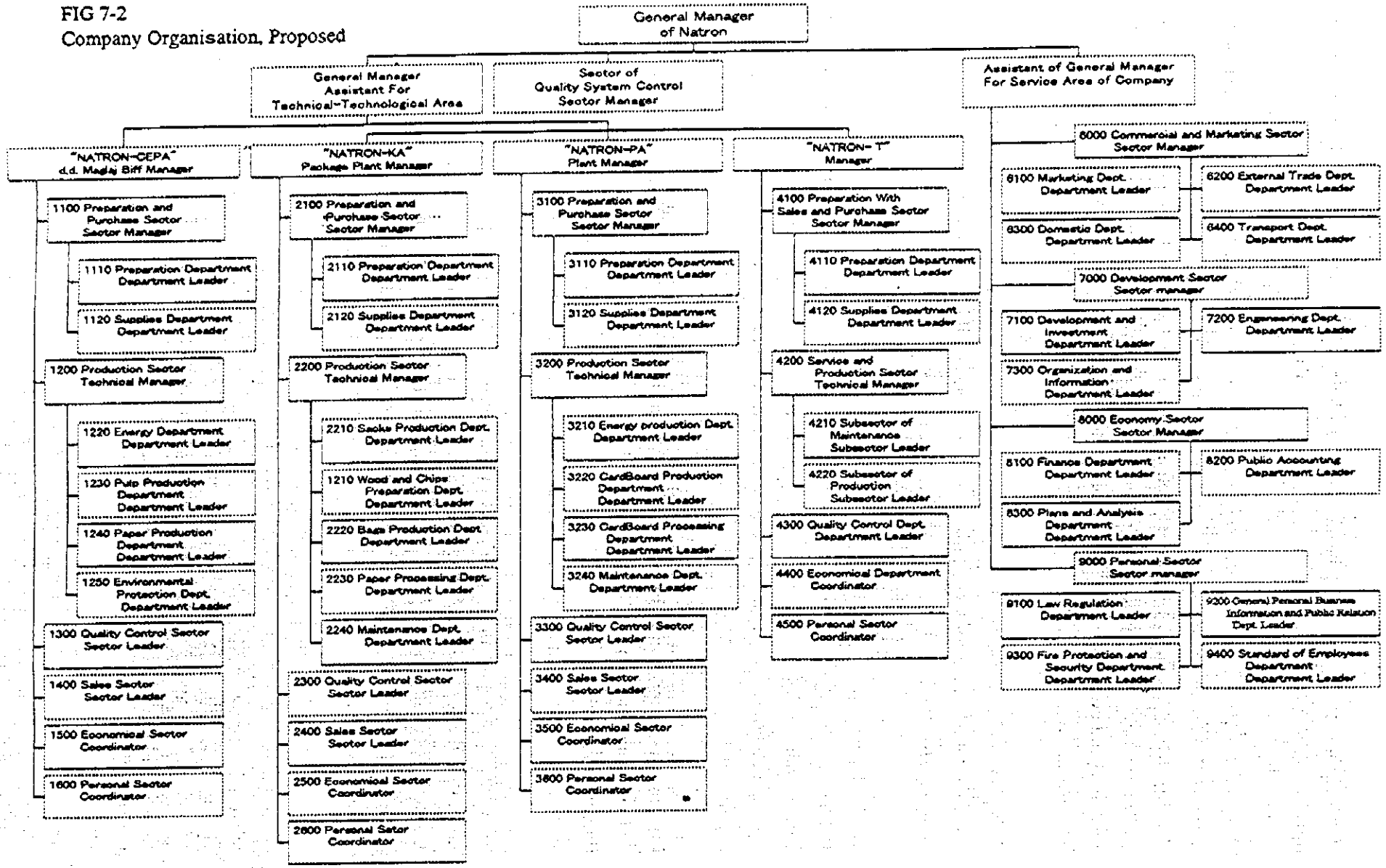
7.6.2 Manning

Before war, during the socialist system, when the mill was operating close to designed capacity corresponding sales production of 140,000 tons, the total manning of the mill was around 4,500. Cost competitiveness in the Western markets was probably not considered to be of major importance.

In open markets the labour force has in principle the freedom to move and select the country and their working place, and so the level of salaries and wages in BH tend to increase.
Entering to market economy requires cost-competitive operations, and this will create pressure to increase the productivity and reduce the number of personnel.

After implementing the production development plan as described above, the production will be higher than the pre-war level. The total manning needed to operate the mill according to the production plan after start-up in the future is estimated at 1,170. Even this number is higher than which would be used in similar mill in Western Europe or Scandinavia. Therefore the number of personnel is planned to be reduced gradually to 930, targeting to approach normal level. If in addition the waste paper plant and PM2 would be operated, the corresponding numbers would be 1,280 and 1,045.
The extra personnel (including disabled, war invalids, family members suffered during war), now supported by Natron, are expected after the start-up of the mill to be paid by public funds and not included in the costs of Natron in the future.

FIG 7-2
Company Organisation, Proposed



The list of future manpower requirement, after start-up of the mill, excluding the waste paper plant and PM2, in shown in Appendix 7-IV, Preliminary Manning List, and summarised below, Table 7-8):

Table 7-8
Manning list, After Start-up

General Manager and Secretary	7
Production and Technical Division	
Common Functions	81
Pulp and Paper Sector	
Wood Handling and Pulp Mill	239
Paper Mill	172
Sack and Bag Converting Sector	99
Corrugated Board Sector	117
Maintenance Sector	362
Independent Expertise Division	8
Common Administrative Division	
Common Functions	12
Marketing Sector	15
Development Sector	18
Economy Sector	12
Personnel Administration Sector	28
All total	1,170

In the Survival Plan, when the pulping lines and PM4 will not be started, the manpower requirement, after having reached normal situation, has been estimated at 500.

7.6.3 Training and Operations Improvement

(1) Technical Know-How

New processes and equipment will be installed to

- wood handling plant
- pulping and chemical recovery plant for semichemical pulp production
- power plant for bark burning
- effluent treatment plant
- process control and production control

The existing wood handling plant originates mainly from 1970's, is worn out and does not have sufficient capacity when entering export markets. Production of semichemical pulp requires some modifications in pulping and chemical recovery process. Burning of bark is recommended,

because it most probably is more profitable than transporting the bark to other mills. Treatment of effluent is required, if the mill is continuing and expanding production. The control of process and production is out-of-date. Technical training for mill personnel in these areas is recommended.

Training to operate and maintain the new plants and equipment includes training periods abroad, participating in installation of the plant and on-the-job training.
The training period abroad is preferably arranged in the supplier's plants during manufacture of equipment. Expediting of the deliveries will be connected to this period. Main operators from the departments in question, maintenance specialists (mechanical, electrical, instrument) and the corresponding designers from the Development Sector would participate in the journeys, guided by head of the department. The trainees and supplier's supervisors would arrange the on-the-job training during installation and commissioning.

(2) Production Management
The existing production management system originates from pre-war period, when economic decision-making was centralised in the country. Operations in the mills was production-oriented, while marketing in the mill level had no major priority and the lower level of the organization was not aware of costs, prices and profitability of the operations.

The development of production management includes acquiring tools, methods and follow-up systems for mill management to control the operations and main cost factors affecting the result of day-to-day financial result as follows:

- measurement and reporting system for the consumption of raw materials, main chemicals, heat and power
- reporting for production quantity, including analysis of time efficiency, material efficiency and production rate
- clear definition of job functions, authorisations and responsibilities in all organization levels
- reporting system for production costs and contribution margin for each product grade and each order separately, which helps to optimise order acceptance and production planning separately for each of the paper machines

Production and quality targets have to be defined clearly, based on annual budget, sales plan and quality requirements. Each organization level has to be aware of it's role, authorisation, responsibility and reporting system.

(3) Energy Management

Energy management includes following three important aspects, which all have to be considered when aiming to energy- and cost-effective operation in the framework set by local conditions such as mill energy demand, existing power plants, fuels available and fuel and power prices:

- energy supply
- energy generation
- energy consumption

The Natron mill has possibilities to buy, generate only own need or sell the electric power because of condensing turbines and condensers for the back pressure turbines. The selection of optimum power supply in various conditions can be calculated and used as instructions for power plant day-to-day operation. Special training of energy management and power plant operators is needed.

Efficient energy generation can be achieved by adjusting the operating parameters in the power plant at the most optimum way. Measurement devices, data collecting and reporting systems are required.

8. RESTARTING COSTS AND INVESMENT ESTIMATE

8.1 FIXED INVESTMENTS

8.1.1 Basis for the Estimates

This investment costs have been estimated partly on the discussion with the supplier partly by experiences of the study team.

The following cost items have not been included in the estimate:

- interest during construction
- cost escalation
- working capital
- local taxes and import duties
- financing costs
- value of the existing assets

The estimates have been based on the cost level of 1st quarter 1998, corresponding the following exchange rates:

1 DEM	=	70.5	JPY
1 DEM	=	0.550	USD
1 DEM	=	0.334	GPB
1 DEM	=	4.41	SEK
1 DEM	=	3.03	FIM

It will be necessary later on to prepare the maintenance, restarting and investment cost budget with the required accuracy after having carried out more detailed planning of the maintenance measures and preliminary engineering of the future installations.

The investment during the immediate program have been estimated at total 3.2 million DM

8.1.2 Short Term Production Program and Survival Plan

- The investment during the short term program have been estimated at total 27.7 million DM

If no investor is found, the short term production program should continue as a survival plan. The investment plan for the survival plan is DM 13 million.

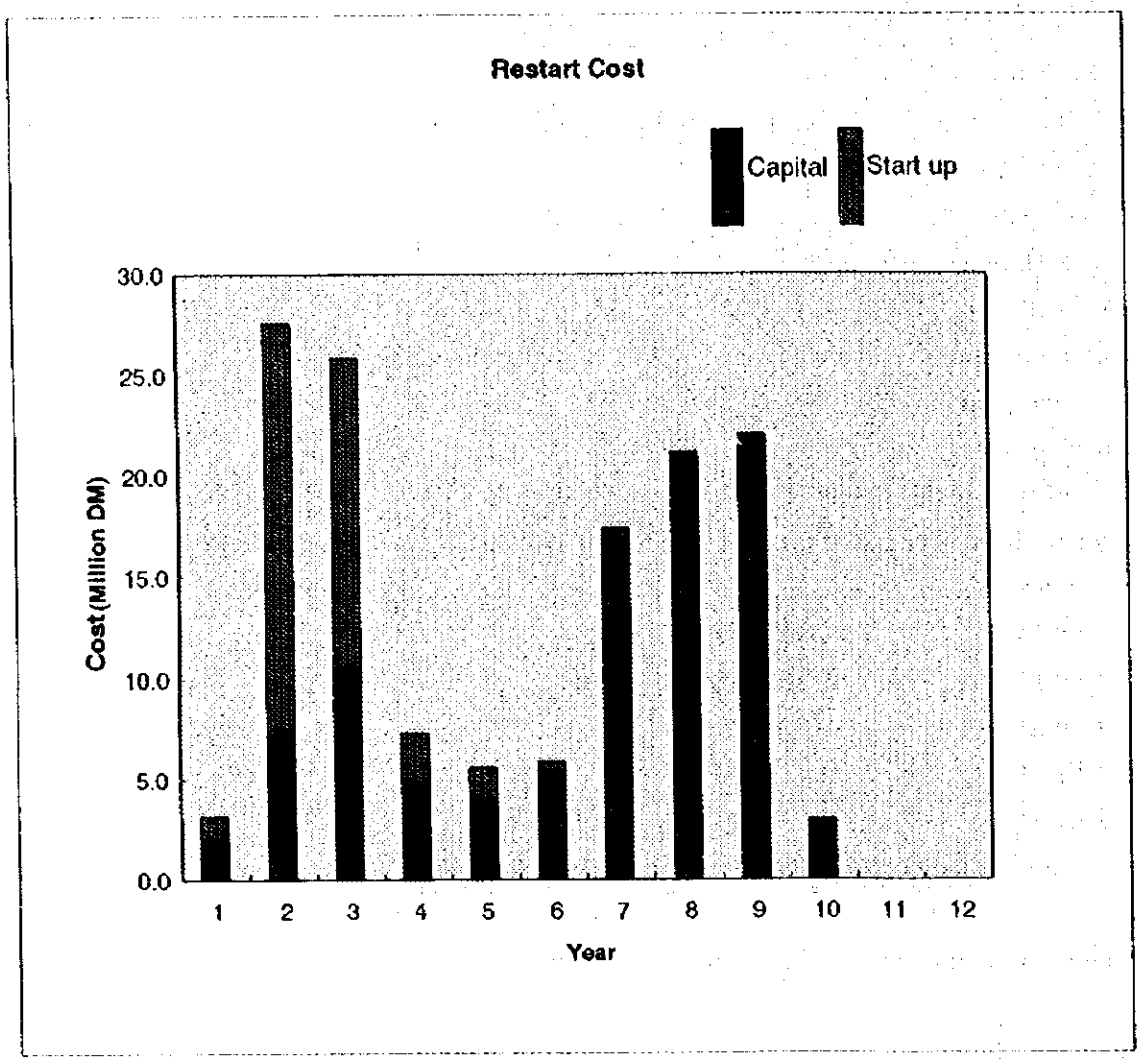
8.1.3 Long Term Production Program

- The costs during the long term program have been estimated at total DM 108.6 million.

The disbursement schedule of capital expenditures has been illustrated in Fig. 8/1. Main part of the investment requirement occurs in years 2-3 and 7-9.

The total investment including all the restarting and development phases are estimated at DM 139 million.

TABLE 8-1



8.2 TENTAIVE RESTARTING TIME SCHEDULE

Our proposed program to restart the operation at Natron is based on the assumption that finance can be arranged during 1998 that the rehabilitation can commence within shortest realistic time. Several of these activities overlap in time to reduce the total time of the project. The maximum labor requirement has also been considered to be able to primarily utilize the personnel available at the mill. The total rehabilitation will then be completed within 24 months and mill started up by the middle of year 2000. The overall time schedule is presented in Fig. 8/2 and the detailed schedules by departments in Appendix 8-I, Restarting Costs and Time Schedule by Department.

8.2 Tentative Time Schedule

Year	Year-1						Year-2												Year-3					
Department	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
Woodyard							Maintenance					Conveyer repair												
Kamyr pulp line													Maintenance			New refiner motor installation, Level indicators Heat exchanger, Flash tank pump, Spare screen								
Recovery island							Maintenance + repair instruments and bldg from war damage																	
Batch line							Maintenance		Installation of cold blow															
Recovery boiler Gotuvelken																Maintenance Installation super-concentrator								
Water treatment							Maintenance																	
Environment				Maintenance, Effluent + ash Maintenance, Industrial waste															Maintenance stripping column + treatment of gases					
Power plant													Maintenance			Generator parts								
Paper machine 1																Maintenance + heat recovery Dryer part extention + wire section & head box +scanner			Fibre recovery					
Paper machine 3							Maintenance																	
Paper machine 4																			Maintenance Installation of new winder HD Refiner + Heat recovery Installation of new scanner Clupak + Heat recovery					
Corrugated board + Bag plant																					Maintenance			

8.3 MANPOWER AND TRAINING REQUIREMENT FOR REHABILITATION

(1) Number of Personnel

The total manpower requirement to rehabilitate and start-up the mill is estimated to about 870,000 man-hours. The program is expected to be executed over a 22 months period. All the estimations have been made together with Natron maintenance management. To the estimated time, 20% was added in the maintenance plan. The wage has been based on 10 DM per hour. The need for maintenance material has been set to 1.2 - 1.5 times the amount of money for the maintenance, depending on how big the damages are in the different departments. To this, has been added another 10% for foreign expertise as help for a successful maintenance and restart of Natron.

The number of available skilled workers for this program is;

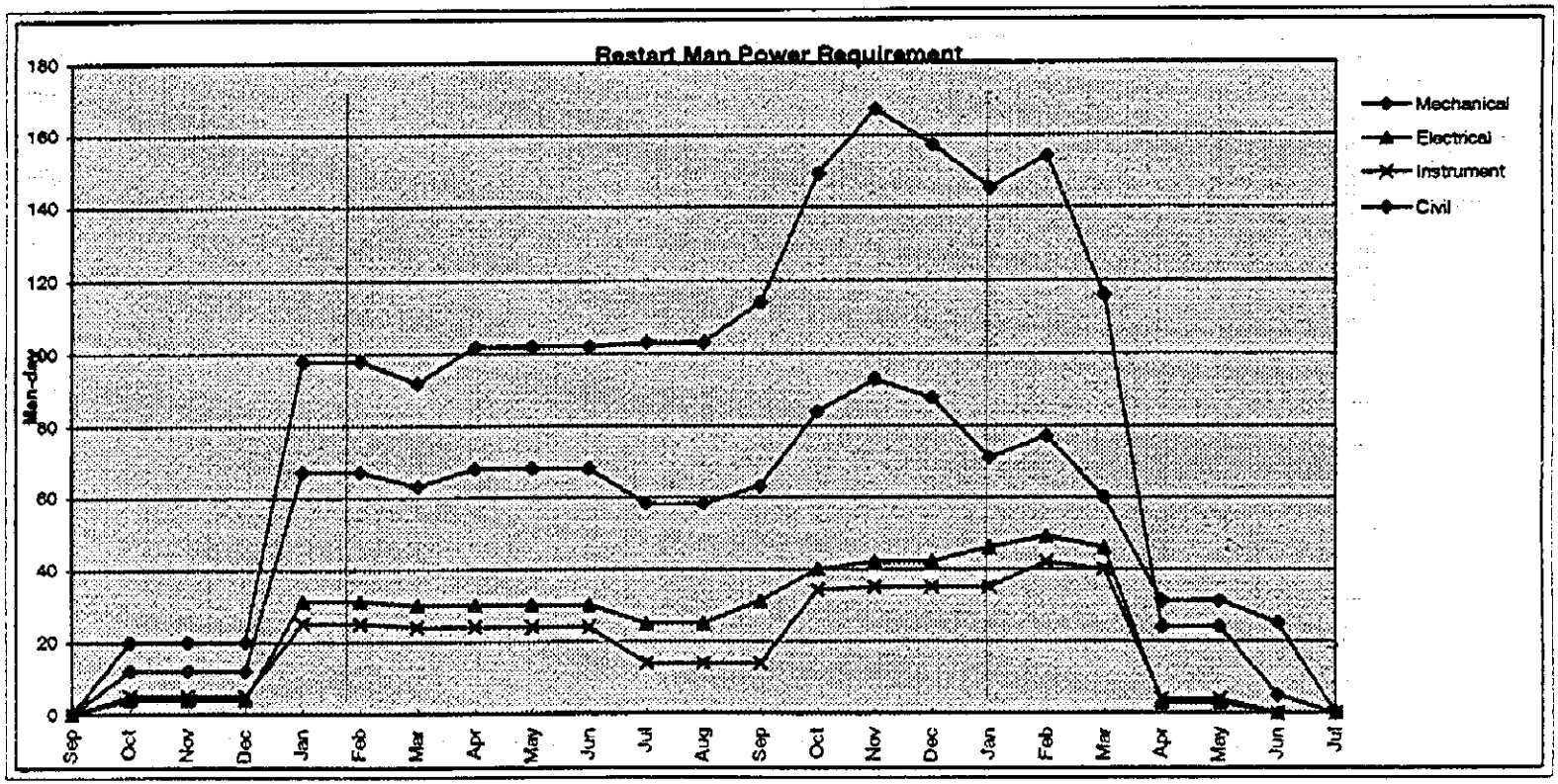
172 mechanics
24 electrician
21 instrument
31 civil
Total 248 craftsmen

(2) Training

The need of immediate training for the entire maintenance management team at Natron is critical. There is a tremendous need of training in modern planning, warehouse storage systems for spare parts, and also education in how to update and train the maintenance crew how to work with modern equipment and in a western style. To do this, the management team also needs to be trained how to handle computers. Laser alignment of pumps and motors as well as diamond drilling of concrete walls and floors and proper erection of bearings are some of the items for the crew to learn. The most important point is to get people to understand that there is no time or money to make any provisional repairs. The job must be right the first time. This is easy said, but it requires a lot of skill and morale to do.

8. 3 Man-day based on 48 hour a week work

	Year 2																Year 3											
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mechanical	0	20	20	20	98	98	92	102	102	102	103	103	114	149	167	157	145	154	116	24	24	5	0					
Electrical	0	4	4	4	31	31	30	30	30	30	25	25	31	40	42	42	46	49	46	3	3	0	0					
Instrument	0	5	5	5	25	25	24	24	24	24	14	14	14	34	35	35	35	42	40	4	4	0	0					
Civil	0	12	12	12	67	67	63	68	68	68	58	58	63	84	93	88	71	77	60	31	31	25	0					
Total	0	41	41	41	221	221	209	224	224	224	200	200	222	307	337	322	297	322	262	62	62	30	0	0	0	0	0	0



9. PRODUCTION COSTS AND CASH FLOW ANALYSIS

9.1 BASIS FOR THE CALCULATION

The profitability of the restarting project has been calculated as Internal Rate of Return (IRR), which illustrates the average interest which the project is able to pay for the invested capital during the calculation period. In other words, IRR is the factor, which gives zero present value for the cash flow, when used in discounting the future annual cash flows during the life time of the investment to the present moment. It illustrates the financial profitability, which do not necessarily reflect the value of the project to Bosnian society. Therefore, a separate socio-economic analysis has been prepared (Chapter 10.5).

When calculating the IRR in this chapter (technical approach), the terminal value of the mill and financing activity have not been considered. Working capital, interest, depreciation, repayments and terminal value have not included in the IRR calculation. Those are included in IRR by financial approach shown in Chapter 10.

9.2 VARIABLE COSTS

The costs of raw materials and chemicals are based on consumption per ton of product and unit prices.

The costs of energy include purchased fuel and purchased electric power. In addition to the purchased energy, Natron mill will after the start-up of the pulping lines in the future use own bark from softwood and black liquor as fuel. The fuel consumed includes the energy used in back pressure generation, which has been priced according to the fuel consumed. Condensing power generation is based on purchased fuel, and therefore the price of condensing power equals the price of purchased power.

Water consumption will be reduced. The costs of water, effluent, operation materials and packaging materials have been estimated according to experience.

The summary of costs is given below, separately for pulp (Table 9-1), paper (Tables 9-2 and 9-3) and converted products (Table 9-4):

TABLE 9-1
Variable Costs of Pulp

Variable costs of pulp

	Recycled fibre	Unbleached kraft pulp	Semi-chemical pulp, excl. debarking	Semi-chemical pulp, incl. debarking
	DM/ADt	DM/ADt	DM/ADt	DM/ADt
Raw materials	169	403	115	115
Chemicals	0	44	31	28
Purchased fuels	0	3	11	4
Purchased power	26	33	36	36
Other variable costs	27	21	16	16
	222	504	209	199

TABLE 9-2
Variable Costs of Corrugated Board Materials

Variable costs of corrugated board materials

	Testliner	Fluting of recycled fibre	Schrenz	Semichem. fluting, excl. debarking	Semichem. fluting, incl. debarking
	DM/t	DM/t	DM/t	DM/t	DM/t
Pulp (variable costs)	405	235	236	223	212
Chemicals	87	19	40	5	5
Purchased fuels	50	47	47	44	44
Purchased power	50	47	47	44	44
Other variable costs	28	28	28	28	28
Total	619	375	398	344	333

TABLE 9-3
Variable Costs of Sack Paper and MG Paper

Variable costs of sack paper and MG paper

	Sack paper	MG paper, purch. pulp	MG paper, own. pulp
	DM/t	DM/t	DM/t
Pulp (variable costs)	535	795	535
Chemicals	66	49	49
Purchased fuels	52	52	52
Purchased power	83	53	53
Other variable costs	36	41	41
Total	772	991	730

TABLE 9-4
Variable Costs of Converted Products

Variable costs of converted products

	Corr. board recovered fibre	Corr. board virgin fibre	Corr. board schrenz + virgin fibre	Sacks, purch. paper	Sacks, own paper
	DM/t	DM/t	DM/t	DM/t	DM/t
Paper (variable costs)	478	633	535	1398	770
Chemicals	59	59	59	34	34
Purchased fuels	7	6	6	2	2
Purchased power	18	10	10	10	10
Other variable costs	40	40	40	10	10
Total	603	748	651	1454	826

9.3 FIXED COSTS

(1) Personnel

The personnel costs have been calculated by estimating the number of personnel required to operate the mill and salaries and wages per person with 80 % added for social costs of the company.

Before war the number of personnel was some 4,500. In the Long Term Program, after restarting the mill with two pulping lines, three paper machines, the converting plant, the power plant and

other departments, except waste paper plant, the number of personnel is estimated at 1,170 (specified in Appendix 7-III). Later on, when approaching normal conditions comparable with other mills on Western Europe the personnel is expected to be reduced further. The target has been set at 930. In the optional alternative, when four paper machines - including PM4 - and the waste paper plant is in operation, the corresponding number of personnel is estimated at 1,280 and 1,045.

If the pulping lines are not started, and the mill continues production according to the Survival Plan, the number of personnel will be reduced gradually to 500.

The personnel costs per person are currently some 20 % of the pre-war level., and are assumed to grow gradually to the pre-war level, corresponding to 1800 DM/person per year in operation and maintenance, when reaching continuous operation of the mill. The escalation of personnel costs is presented in the cash flow analysis, Tables 9-10, 9-11 and 9-12.

According to the Long Term Program the salaries and wages are anyhow increasing considerably, up to 10 - 40 % per year. Therefore incentives or bonuses can be recommended only in the future, when the salaries and wages have reached the pre-war level and when the capacity of the mill has been fully utilised.

(2) General Administration

General administration costs cover such items as insurance, telecommunications, computer services, license fees, payments for various external services, office materials, business trips, housing and other general costs. The estimate is based on the information collected from the mill and on experiences.

When having reached normal operation and normal manning level of the mill, the fixed costs in these scenarios are estimated (Table 9-5):

TABLE 9-5
Fixed Costs

	Excl. PM2	Survival Plan
	1000 DM/a	1000 DM/a
Personnel	21,600	11,700
Maintenance materials	10,000	2,000
Replacement investment	7,000	1,000
General administration	6,500	2,500
Total	45.100	17,200

9.4 SALES PRICES

The sales income has been calculated using the estimated mill net prices. Weighed average trend prices have been used for sack paper and fluting, considering the delivered prices, market distribution, sales commission and transport costs. The delivered trend prices and market distribution are based on the separate market study.

Other product prices have been estimated mainly on the basis of mill information.

Table 9-6
Product Prices, Mill Net

	DM/t
Sack Paper	1090
Semichemical fluting	672
Schrenz	352
Corrugated board	1320... 1620
Sacks	1720
MG Paper	1150

The price of corrugated board depends on the fibre competition at fluting and liner, which will be changed during mill development.

9.5 CASH FLOW

The annual production, sales income, costs and cash flow in the three alternative production scenarios are presented in Tables 9-9, 9-10 and 9-11 in the next pages. Without using waste paper and PM2 the IRR in the Long Term Program will be 36.9%. When using waste paper and producing schrenz on PM2 the IRR will be 28.2%.

The Survival Plan is not a normal investment project, because the production development is not depending on the investments. Therefore the IRR for this plan has not been presented. The production of converted products and MG paper can be increased practically without any investments, by only increasing the running time, which do not depend on capital expenditure but only marketing possibilities.

The IRR figures in the Long Term Program are high, compared with normal expansion projects or green field projects in pulp and paper industry. The reason is, that the investment costs used in the calculation do not include any capital allocation for the existing facilities in the mill. Main part of the plant and equipment is already available, and the only capital costs included in the calculation are maintenance, restarting and essential replacement and development investments.

The dependence of the IRR on changes in various parameters has been illustrated in the attached Figures 9/1 and 9/2. Product prices and production rate have the highest importance in project profitability. The IRR is sensitive to the prices of raw material and total fixed costs, too.

The Break Even in the three production alternatives, is illustrated in the Figures 9/3, 9/4 and 9/5. In the Short Term Program, corresponding the estimated production in year 2, the production is still lower than break even, and the operating profit will be negative. In the Long Term Program and in the Survival Plan the production is twice as high as the break even.

9.6 RISKS

Main risks of the project are, that the important assumptions used in the estimates will not be fulfilled on time:

- marketing possibilities
- availability of financial resources

Local markets are essential for production of converted products. Development of local markets depends on the future political and economical situation in Bosnia-Herzegovina and in other former Yugoslavian areas. Stabilisation of the political situation and developing normal relationship within the new states in the region is essential for favourable economical growth and market development. The assumption concerning local market development is based on forecast growth in GNP.

Export markets for sack paper, semichemical fluting and MG paper, as well as possibilities to produce competitive quality exist, and so no special risks in production or marketing of these grades needs to be considered. However, existence and availability of transport facilities in Bosnia-Herzegovina and in other former Yugoslavian region, including roads, railways and harbours, are essential for exporting from Maglaj.

Outside financing is essential to implement the outlined long term development program. The financing institutions might be more interested to allocate funds for the program, if Natron has a partner with strong technical, commercial and financing background involved to the development of the enterprise. The support of the Government, considering taxation, duty regulations, social welfare of unemployed extra personnel and infrastructure conditions in the country, is important. Favourable development of political and economical conditions as well as possibilities for profitable and competitive production are essential prerequisites for having the partner interested to be involved in Natron. An evident risk of political disturbances or even war would prevent to implement the program as planned.

Only minor capital expenditure would be required to implement the Survival Plan, and a partner would not necessarily be needed. Moreover, this plan does not meet the national economical targets regarding employment (including mill, forestry and transport operations), usage of wood and coal resources and utilisation of the existing technical facilities now available in Natron.

Table 9-9

Production and Sales Margin, excl. PM2

	unit	Year 1	2	3	4	5	6	7	8	9	10	11	12
Sales Production, units per annum													
Schrenz	t												
Corrugated board, recycl. fibre	t		10,000	8,000									
Corrugated board, own NSSC fluting	t			7,000	20,000	26,000	32,000	35,000	38,000	38,000	38,000	38,000	38,000
Sacks of purchased paper	t		5,000	4,000									
Sacks of own pulp, own paper	t			4,000	10,000	13,000	16,000	18,000	20,000	20,000	20,000	20,000	20,000
Sack paper of own pulp	t			23,000	28,000	28,000	31,000	35,000	37,000	37,000	37,000	37,000	37,000
Semichemical fluting	t			24,000	53,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
MG paper from purchased pulp	t		4,800	4,000									
MG paper form own pulp	t			3,000	7,500	8,000	8,400	8,400	8,400	8,400	8,400	8,400	8,400
Production total	t		19,800	77,000	118,500	125,000	137,400	146,400	153,400	153,400	153,400	153,400	153,400
Net Sales Income, 1000 DEM per annum, excl. PM2	DM per unit												
Schrenz	352												
Corrugated board, recycl. fibre	1320		13,200	10,560									
Corrugated board, own NSSC	1620			11,340	32,400	42,120	51,840	56,700	61,560	61,560	61,560	61,560	61,560
Sacks of purchased paper	1720		8,600	6,880									
Sacks of own pulp, own paper	1720			6,880	17,200	22,360	27,520	30,960	34,400	34,400	34,400	34,400	34,400
Sack paper of own pulp	1090			25,070	30,520	30,520	33,790	38,150	40,330	40,330	40,330	40,330	40,330
Semichemical fluting	672			16,128	35,616	33,600	33,600	33,600	33,600	33,600	33,600	33,600	33,600
MG paper, purchased pulp	1150		5,520	4,600									
MG paper, own pulp	1150			3,450	8,625	9,200	9,660	9,660	9,660	9,660	9,660	9,660	9,660
Net sales income total			27,320	84,908	124,361	137,800	156,410	169,070	179,550	179,550	179,550	179,550	179,550
Sales Margin, 1000 DEM per annum, excl. PM2													
Schrenz	-46												
Corrugated board, recycl. fibre	717		7,172	5,737									
Corrugated board, own semich. fluting	872			6,103	17,438	22,669	27,900	30,516	33,131	33,131			
Corrugated board, own semich. fluting	877										33,338	33,338	33,338
Sacks of purchased paper	266		1,330	1,064									
Sacks of own pulp, own paper	894			3,575	8,937	11,618	14,299	16,087	17,874	17,874	17,874	17,874	17,874
Sack paper of own pulp	318			7,308	8,897	8,897	9,850	11,121	11,756	11,756	11,756	11,756	11,756
Semichemical fluting	328			7,878	17,396	16,412	16,412	16,412	16,412	16,412			
Semichemical fluting	339										16,950	16,950	16,950
MG paper, purchased pulp	159		765	637									
MG paper, own pulp	420			1,259	3,148	3,358	3,526	3,526	3,526	3,526	3,526	3,526	3,526
Sales margin total			9,266	33,561	55,816	62,953	71,987	77,661	82,699	82,699	83,445	83,445	83,445

Table 9-9

Fixed Costs 1000 DEM per annum, excl. PM2	DM per person per annum 8th year onwards	Year 1	2	3	4	5	6	7	8	9	10	11	12
Personnel													
production	21600		4,536	7,646	9,176	10,705	12,010	13,219	14,472	14,472	14,472	14,472	14,472
maintenance	21600		2,268	3,910	4,592	4,914	5,184	5,346	5,400	4,320	4,104	4,104	4,104
administration	43200		907	2,160	2,592	3,024	2,938	2,916	3,024	3,024	3,024	3,024	3,024
personnel for mill operation total			7,711	13,716	16,459	18,643	20,131	21,481	22,896	21,816	21,600	21,600	21,600
Personnel costs	% of max.	25	35	50	60	70	80	90	100	100	100	100	100
Maintenance materials			1,000	3,500	5,500	6,500	8,500	9,500	10,000	10,000	10,000	10,000	10,000
Replacement investments							3,000	5,000	7,000	7,000	7,000	7,000	7,000
General administration			2,500	3,000	6,200	6,500	6,500	6,500	6,500	6,500	6,500	6,500	6,500
Fixed costs total			11,246	20,266	28,219	31,713	38,211	42,571	46,496	45,416	45,200	45,200	45,200
Contribution Margin, 1000 DEM per annum, excl. PM2			-1,980	13,295	27,597	31,240	33,776	35,090	36,203	37,283	38,245	38,245	38,245
Fixed Investments 1000 DEM, excl. PM2													
Restarting costs		1,200	20,300	15,400	2,500	1,600	400	400	200				
Development investments		2,000	7,400	10,500	4,800	4,000	5,400	17,000	21,000	22,000	3,000		
Fixed investments total		3,200	27,700	25,900	7,300	5,600	5,800	17,400	21,200	22,000	3,000		
Cash Flow, 1000 DM per annum, excl. PM2		-3,200	-29,680	-12,605	20,297	25,640	27,976	17,690	15,003	15,283	35,245	38,245	38,245
IRR (years 1 - 12)	%		36,9										

Table 9-9

	Year 1	2	3	4	5	6	7	8	9	10	11	12
Personnel number, excl. PM2												
production	450	600	708	708	708	695	680	670	670	670	670	670
maintenance	200	300	362	362	325	300	275	250	200	190	190	190
administration	50	60	100	100	100	85	75	70	70	70	70	70
personnel for mill operation total	700	960	1170	1170	1133	1080	1030	990	940	930	930	930

Table 9-10

Production and Sales Margin, Incl. PM2

		Year 1	2	3	4	5	6	7	8	9	10	11	12
Sales Production, units per annum													
	unit												
Schrenz	t			4000	5,000	6,000	9,000	11,000	11,000	11,000	11,000	11,000	11,000
Corrugated board, recycl. fibre	t		10,000	8,000									
Corrugated board, own NSSC	t			7,000	20,000	26,000	32,000	35,000	38,000	38,000	38,000	38,000	38,000
Sacks of purchased paper	t		5,000	4,000									
Sacks of own pulp, own paper	t			4,000	10,000	13,000	16,000	18,000	20,000	20,000	20,000	20,000	20,000
Sack paper of own pulp	t			23,000	28,000	28,000	31,000	35,000	37,000	37,000	37,000	37,000	37,000
Semichemical fluting	t			24,000	53,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
MG paper from purchased pulp	t		4,800	4,000									
MG paper form own pulp	t			3,000	7,500	8,000	8,400	8,400	8,400	8,400	8,400	8,400	8,400
Production total	t		19,800	81,000	123,500	131,000	146,400	157,400	164,400	164,400	164,400	164,400	164,400
Net Sales income, 1000 DEM per annum													
	DEM per unit												
Schrenz	352			1,408	1,760	2,112	3,168	3,872	3,872	3,872	3,872	3,872	3,872
Corrugated board, recycl. fibre	1320		13,200	10,560									
Corrugated board, own NSSC	1320			9,240	26,400	34,320	42,240	46,200	50,160	50,160	50,160	50,160	50,160
Sacks of purchased paper	1620		8,100	6,480									
Sacks of own pulp, own paper	1620			6,480	16,200	21,060	25,920	29,160	32,400	32,400	32,400	32,400	32,400
Sack paper of own pulp	1090			25,070	30,520	30,520	33,790	38,150	40,330	40,330	40,330	40,330	40,330
Semichemical fluting	672			16,128	35,616	33,600	33,600	33,600	33,600	33,600	33,600	33,600	33,600
MG paper, purchased pulp	1150		5,520	4,600									
MG paper, own pulp	1150			3,450	8,625	9,200	9,660	9,660	9,660	9,660	9,660	9,660	9,660
Net sales income total			26,820	83,416	119,121	130,812	148,378	160,642	170,022	170,022	170,022	170,022	170,022
Sales Margin, 1000 DEM per annum													
Schrenz	-46			-182	-228	-273	-410	-501	-501	-501	-501	-501	-501
Corrugated board, recycl. fibre	717		7,172	5,737									
Corrugated board, own semich. fluting	854			5,979	17,084	22,209	27,334	29,897	32,460	32,460			
Corrugated board, own semich. fluting	859										32,657	32,657	32,657
Sacks of purchased paper	266		1,330	1,064									
Sacks of own pulp, own paper	894			3,575	8,937	11,618	14,299	16,087	17,874	17,874	17,874	17,874	17,874
Sack paper of own pulp	318			7,308	8,897	8,897	9,850	11,121	11,756	11,756	11,756	11,756	11,756
Semichemical fluting	328			7,878	17,395	16,412	16,412	16,412	16,412	16,412			
Semichemical fluting	339										16,950	16,950	16,950
MG paper, purchased pulp	159		765	637									
MG paper, own pulp	420			1,259	3,148	3,358	3,526	3,526	3,526	3,526	3,526	3,526	3,526
Sales margin total			9,266	33,255	55,234	62,220	71,011	76,541	81,527	81,527	82,262	82,262	82,262

Table 9-10

Fixed Costs 1000 DEM per annum, incl. PM2	DEM per person per annum 8th year onwards	Year 1	2	3	4	5	6	7	8	9	10	11	12
Personnel													
production	21600		4,158	8,186	10,472	12,217	13,738	16,848	16,632	16,632	16,632	16,632	16,632
maintenance	21600		1,890	3,984	4,821	5,065	5,357	6,156	5,616	4,536	4,320	4,320	4,320
administration	43200		907	1,512	2,592	3,024	3,110	3,456	3,240	3,240	3,240	3,240	3,240
personnel for mill operation total			6,955	13,682	17,885	20,306	22,205	26,460	25,488	24,408	24,192	24,192	24,192
Personnel costs	% of max.	25	35	50	60	70	80	90	100	100	100	100	100
Maintenance materials			1,000	4,000	6,000	7,000	9,000	10,000	11,000	11,000	11,000	11,000	11,000
Replacement investments							3,000	5,000	7,000	7,000	7,000	7,000	7,000
General administration			2,500	3,000	6,200	6,700	6,700	6,700	6,700	6,700	6,700	6,700	6,700
Fixed costs total			10,490	20,712	30,145	34,076	40,985	48,250	50,288	49,208	48,992	48,992	48,992
Contribution Margin, 1000 DEM per annum			-1,224	12,543	25,090	28,144	30,026	28,291	31,239	32,319	33,270	33,270	33,270
Fixed investments 1000 DEM													
Restarting costs		1,200	21,200	15,700	2,500	1,600	400	400	200				
Development investments		2,000	9,200	12,900	4,800	4,000	5,400	17,000	21,000	22,000	3,000		
Fixed investments total		3,200	30,400	28,600	7,300	5,600	5,800	17,400	21,200	22,000	3,000		
Cash Flow, 1000 DM per annum		-3,200	-31,624	-16,057	17,790	22,544	24,226	10,891	10,039	10,319	30,270	33,270	33,270
IRR (years 1 - 12)	%		28.2										

Table 9-10

Year		1	2	3	4	5	6	7	8	9	10	11
Personnel number, incl. PM2												
production	450	550	758	808	808	795	780	770	770	770	770	770
maintenance	200	250	367	372	335	310	285	260	210	200	200	200
administration	50	60	70	100	100	90	80	75	75	75	75	75
personnel for mill operation total	700	860	1195	1280	1243	1195	1145	1105	1055	1045	1045	1045

Table 9-11 Production and Sales Margin, Survival Plan

		Year 1	2	3	4	5	6	7	8	9	10	11	12
Sales Production, units per annum													
	unit												
Schrenz	t												
Corrugated board, recycl. fibre	t		10,000	15,000	20,000	26,000	32,000	35,000	38,000	38,000	38,000	38,000	38,000
Corrugated board, own NSSC fluting	t												
Sacks of purchased paper	t		5,000	8,000	10,000	13,000	16,000	18,000	20,000	20,000	20,000	20,000	20,000
Sacks of own pulp, own paper	t												
Sack paper of own pulp	t												
Semichemical fluting	t												
MG paper from purchased pulp	t		4,800	7,000	7,500	8,000	8,400	8,400	8,400	8,400	8,400	8,400	8,400
MG paper form own pulp	t												
Production total	t		19,800	30,000	37,500	47,000	56,400	61,400	66,400	66,400	66,400	66,400	66,400
Net Sales Income, 1000 DM per annum, Survival Plan													
	DEM per unit												
Schrenz	352												
Corrugated board, recycl. fibre	1320		13,200	19,800	26,400	34,320	42,240	46,200	50,160	50,160	50,160	50,160	50,160
Corrugated board, own NSSC	1620												
Sacks of purchased paper	1720		8,600	13,760	17,200	22,360	27,520	30,960	34,400	34,400	34,400	34,400	34,400
Sacks of own pulp, own paper	1720												
Sack paper of own pulp	1090												
Semichemical fluting	672												
MG paper, purchased pulp	1150		5,520	8,050	8,625	9,200	9,660	9,660	9,660	9,660	9,660	9,660	9,660
MG paper, own pulp	1150												
Net sales income total			27,320	41,610	52,225	65,880	79,420	86,820	94,220	94,220	94,220	94,220	94,220
Sales Margin, 1000 DM per annum, Survival Plan													
Schrenz	-46												
Corrugated board, recycl. fibre	717		7,172	10,757	14,343	18,646	22,949	25,101	27,252	27,252	27,252	27,252	27,252
Corrugated board, own semich. fluting	872												
Corrugated board, own semich. fluting	877												
Sacks of purchased paper	266		1,330	2,128	2,660	3,458	4,256	4,788	5,320	5,320	5,320	5,320	5,320
Sacks of own pulp, own paper	894												
Sack paper of own pulp	318												
Semichemical fluting	328												
Semichemical fluting	339												
MG paper, purchased pulp	159		765	1,115	1,195	1,275	1,338	1,338	1,338	1,338	1,338	1,338	1,338
MG paper, own pulp	420												
Sales margin total			9,266	14,001	18,198	23,379	28,543	31,227	33,910	33,910	33,910	33,910	33,910

Table 9-11

Fixed Costs 1000 DM per annum, Survival Plan

	DEM per person per annum 8th year onwards	Year 1	2	3	4	5	6	7	8	9	10	11	12
Personnel													
production	21600		3,024	4,104	4,666	5,443	6,221	6,998	7,776	7,776	7,776	7,776	7,776
maintenance	21600		1,512	1,836	1,944	1,966	1,901	1,944	2,160	2,160	2,160	2,160	2,160
administration	43200		756	972	1,037	1,210	1,382	1,555	1,728	1,728	1,728	1,728	1,728
personnel for mill operation total			5,292	6,912	7,646	8,618	9,504	10,498	11,664	11,664	11,664	11,664	11,664
Personnel costs	% of max.	25	35	50	60	70	80	90	100	100	100	100	100
Maintenance materials			1,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000	2,000
Replacement investments				500	1,000	1,400	1,500	1,500	1,500	1,500	1,500	1,500	1,500
General administration			2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500	2,500
Fixed costs total			8,827	11,962	13,206	14,588	15,584	16,588	17,764	17,764	17,764	17,764	17,764
Contribution Margin, 1000 DM per annum			439	2,039	4,992	8,791	12,959	14,639	16,146	16,146	16,146	16,146	16,146

Fixed Investments 1000 DM, Survival Plan

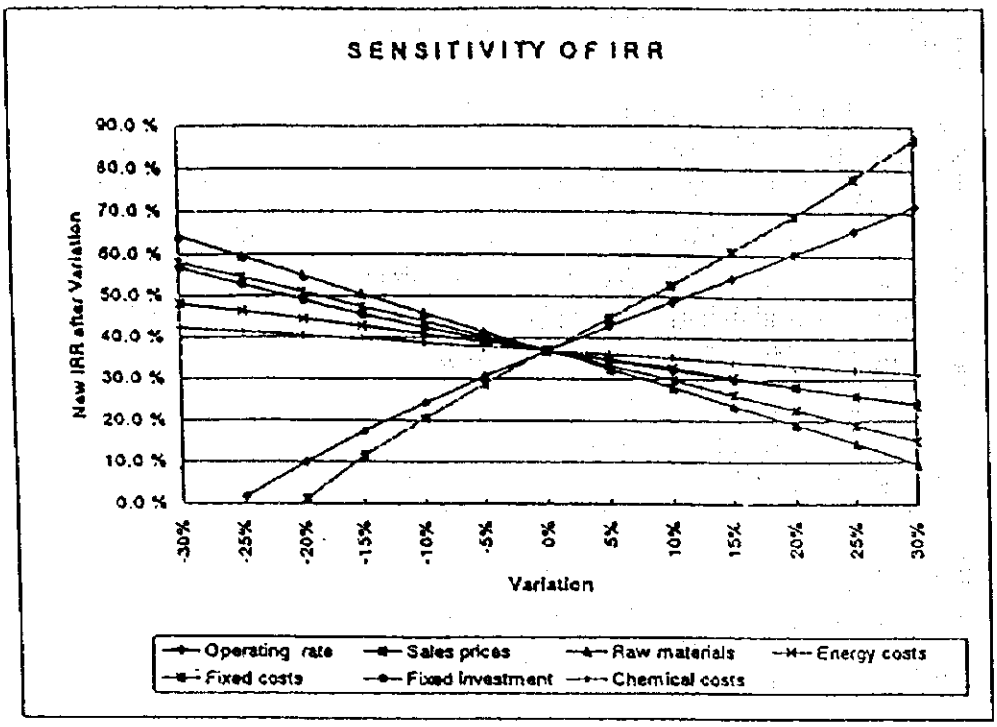
Restarting costs		1,200											
Development investments		2,000	4,200	800	2,900	1,900							
Fixed investments total		3,200	4,200	800	2,900	1,900							
Cash Flow, 1000 DM per annum,		-3,200	-3,761	1,239	2,092	6,890	12,959	14,639	16,146	16,146	16,146	16,146	16,146

Table 9-11

Personnel number, Survival Plan

	1	2	3	4	5	6	7	8	9	10	11	12
production		400	380	360	360	360	360	360	360	360	360	360
maintenance		200	170	150	130	110	100	100	100	100	100	100
administration		50	45	40	40	40	40	40	40	40	40	40
personnel for mill operation total		650	595	550	530	510	500	500	500	500	500	500

FIG 9-1



SENSITIVITY OF IRR

Cash Flow, excl. PM2

Variation	-30%	-25%	-20%	-15%	-10%	-5%	0%
			New IRR after Variation				
Operating rate		1.6 %	10.0 %	17.4 %	24.3 %	30.7 %	36.9 %
Sales prices			1.2 %	11.5 %	20.5 %	28.8 %	36.9 %
Raw materials	64.2 %	59.5 %	54.8 %	50.3 %	45.6 %	41.3 %	36.9 %
Energy costs	48.0 %	46.3 %	44.5 %	42.7 %	40.8 %	38.9 %	36.9 %
Chemical costs	42.2 %	41.3 %	40.4 %	39.5 %	38.7 %	37.8 %	36.9 %
Fixed costs	58.0 %	54.5 %	50.9 %	47.4 %	43.9 %	40.4 %	36.9 %
Fixed investment	56.9 %	52.7 %	48.9 %	45.5 %	42.4 %	39.5 %	36.9 %

Variation	0%	5%	10%	15%	20%	25%	30%
Operating rate	36.9 %	42.8 %	48.7 %	54.5 %	60.2 %	66.0 %	71.7 %
Sales prices	36.9 %	44.8 %	52.7 %	60.6 %	69.2 %	77.8 %	86.9 %
Raw materials	36.9 %	32.4 %	28.0 %	23.5 %	18.9 %	14.2 %	9.3 %
Energy costs	36.9 %	34.8 %	32.7 %	30.5 %	28.3 %	26.0 %	23.6 %
Chemical costs	36.9 %	36.0 %	35.1 %	34.2 %	33.2 %	32.3 %	31.4 %
Fixed costs	36.9 %	33.3 %	29.8 %	26.2 %	22.5 %	18.8 %	14.9 %
Fixed investment	36.9 %	34.4 %	32.1 %	29.9 %	27.9 %	26.0 %	24.2 %

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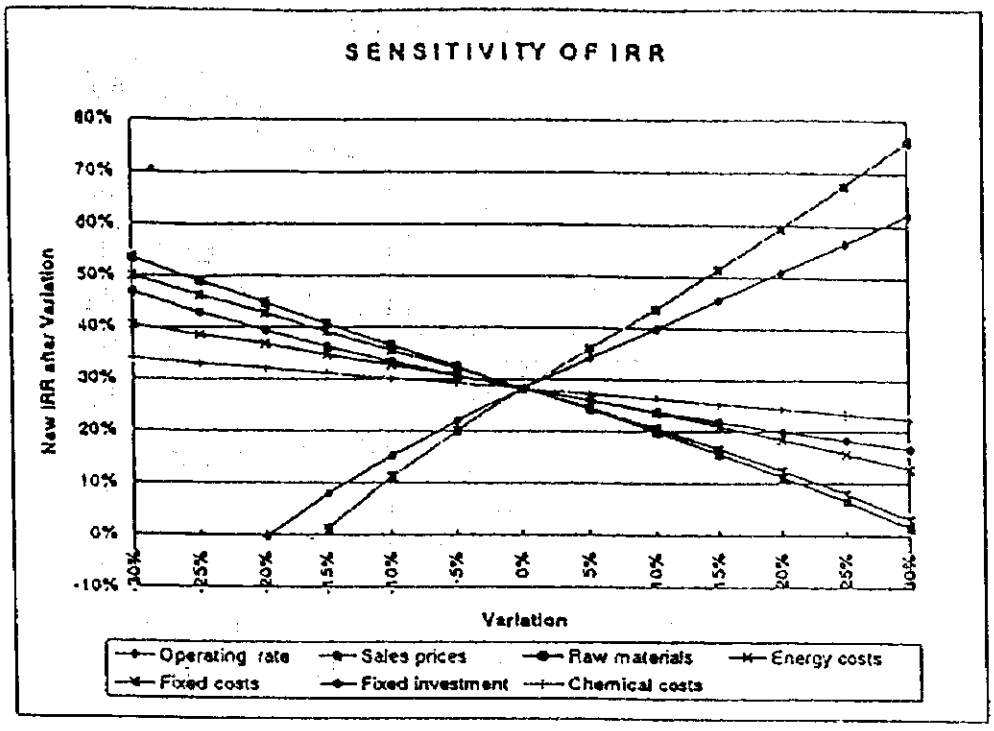
FIG 9-2



SENSITIVITY OF IRR

Cash Flow, Incl. PM2

Variation	-30%	-25%	-20%	-15%	-10%	-5%	0%
			New IRR after Variation				
Operating rate			-0.4 %	7.9 %	15.2 %	21.9 %	28.2 %
Sales prices				1.1 %	11.2 %	20.0 %	28.2 %
Raw materials	53.4 %	49.0 %	44.8 %	40.6 %	36.5 %	32.3 %	28.2 %
Energy costs	40.4 %	38.6 %	36.6 %	34.6 %	32.5 %	30.4 %	28.2 %
Chemical costs	33.9 %	32.9 %	32.0 %	31.0 %	30.1 %	29.1 %	28.2 %
Fixed costs	49.9 %	46.3 %	42.7 %	39.1 %	35.5 %	31.9 %	28.2 %
Fixed investment	46.8 %	42.9 %	39.4 %	36.2 %	33.3 %	30.6 %	28.2 %

Variation	0%	5%	10%	15%	20%	25%	30%
Operating rate	28.2 %	34.2 %	39.9 %	45.6 %	51.2 %	56.7 %	62.1 %
Sales prices	28.2 %	36.0 %	43.8 %	51.5 %	59.4 %	67.6 %	76.0 %
Raw materials	28.2 %	24.0 %	19.8 %	15.5 %	11.0 %	6.4 %	1.5 %
Energy costs	28.2 %	25.8 %	23.4 %	20.9 %	18.3 %	15.6 %	12.7 %
Chemical costs	28.2 %	27.2 %	26.2 %	25.2 %	24.3 %	23.3 %	22.3 %
Fixed costs	28.2 %	24.4 %	20.5 %	16.5 %	12.2 %	7.8 %	3.0 %
Fixed investment	28.2 %	25.9 %	23.7 %	21.6 %	19.9 %	18.1 %	16.4 %

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FIG. 9/3
Break Even, Short Term Programme
2nd year

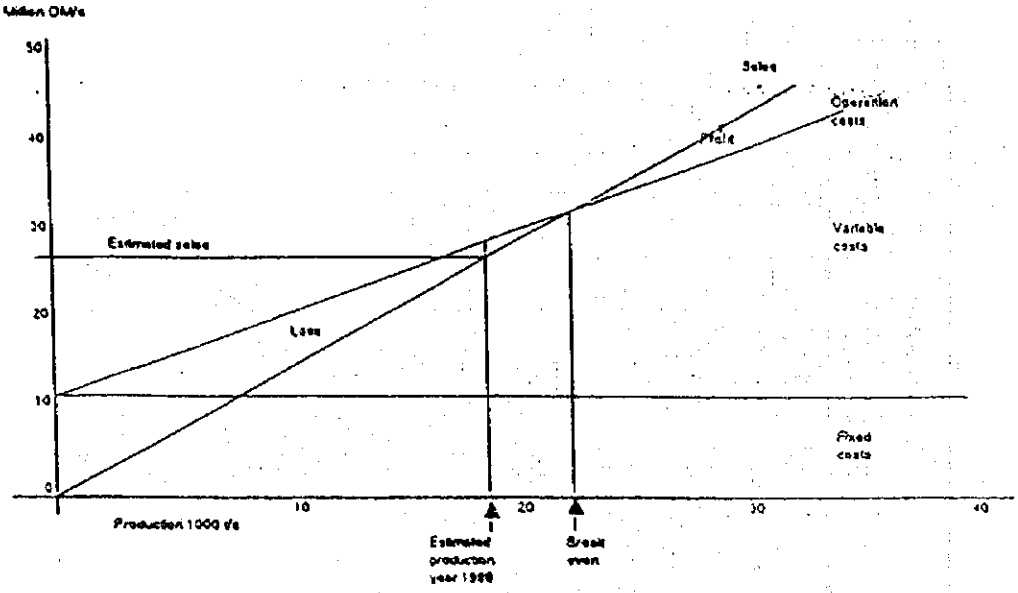


FIG. 9/4
Break Even, Long Term Programme

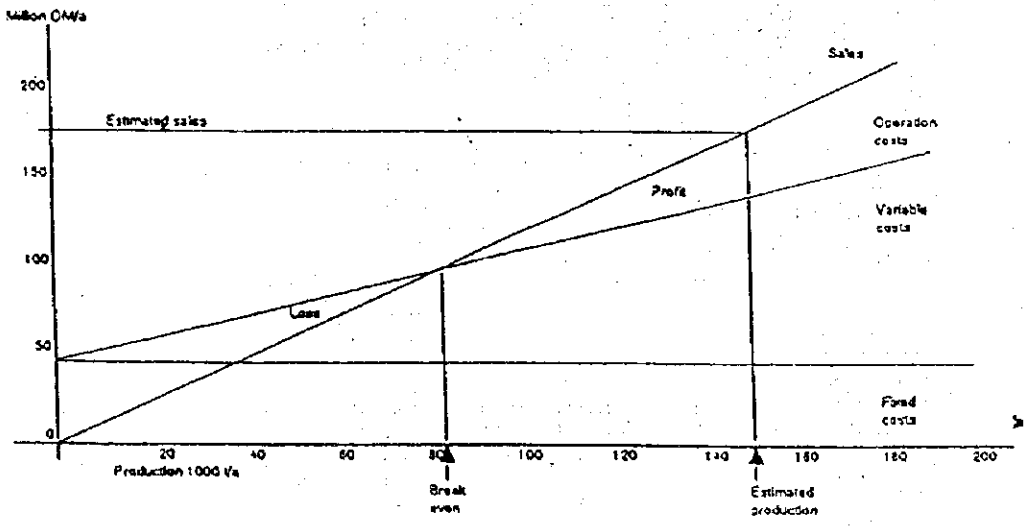
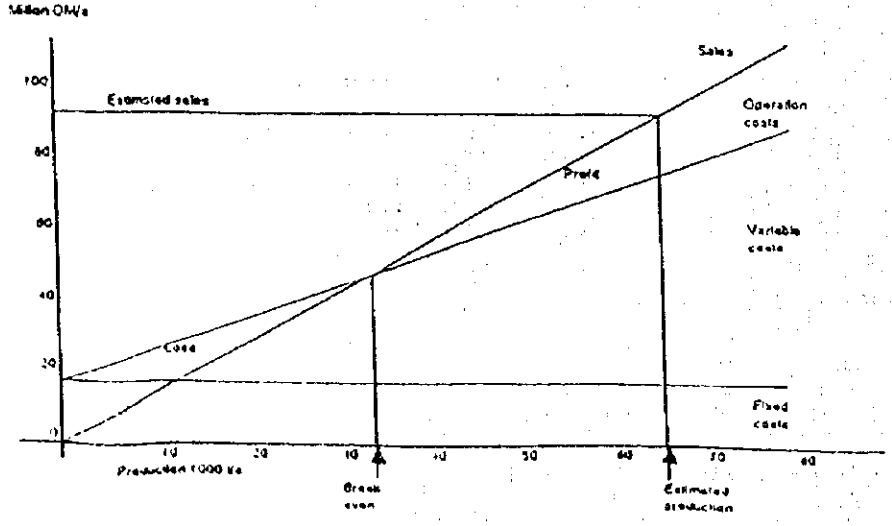


Fig. 9/5
Break Even, Survival Plan



10. FINANCIAL ANALYSIS

10.1 OBJECTIVE OF FINANCIAL ANALYSIS

Pro forma financial statements (income statements, balance sheets, and cash flow statements) are prepared in order to estimate Natron's future operating results, financial position, external financing required, and comprehensive feasibility of the proposed development program (hereafter, the program).

10.2 PRECONDITIONS FOR PREPARING PRO FORMA STATEMENTS

(1) Forecast Data and Period

Main data such as product mix, unit price and unit cost of products, production and sales volume, development investments (fixed assets), and payroll cost etc. are in accordance with the program described in the preceding chapters. Forecast period is also same as the program, that is 12 years from 1998 to 2009.

(2) Depreciation

Overall average useful life of planned development investments (fixed assets) in the program is estimated at 15 years. Remaining useful life of the existing fixed assets is functionally estimated at 12 years on average with proper repairing and replacement activities. This is the reason why period of the program is determined for 12 years.

(3) Interest Rate

Interest rate on long-term loan from some international financial institutions is assumed at 8% based on the current German interest rates.

(4) Corporate Tax and Dividend

5 years exemption from 1998 to 2002 is assumed based on Bosnian government's industrial supporting policy. Tax rate from 2003 is set at 30%.

Dividends are assumed to be paid after 5 years, from the same year which the corporate taxation starts. Dividend payout ratio on net income is assumed at 50%.

(5) Financing Measures

Financing sources are assumed that around 80% of the necessary fund is financed by long-term loans and 20% is by equity (investment in capital stock). Considering difficulties to finance short-term loan in Bosnia, it is assumed that funds are mostly raised by long-term loan. Repayment of long-term loan is assumed to be deferred for 2 years after borrowing. All external funds raised are paid off by the end of the 12th year (2009).

(6) Terminal Value

Terminal value = Book value at end of 2009 - Fixed assets at end of 2009

= 228,223 - 159,729 = DM68,494 thousand

10.3 FORECAST PROCEDURES OF PRO FORMA STATEMENTS

10.3.1 Income Statements (Table 10.3.1)

(1) Interest expense '98 = Total loan balance '97 * 8%

Surplus money after full repayment of short-term loan accrued in each year of the program is assumed to be temporarily invested in marketable securities at 3% interest income rate.

(2) 30% of inventories (approximately DM3 million), and DM1 million of fixed asset at end of 1997 are assumed to be written-down in 1998 due to obsolescence.

(3) Long-term loan of DM39 million from Paris and London Clubs at end of 1997 is assumed to be taken over by the Bosnian government in 1998.

10.3.2 Balance Sheets (Table 10.3.2)

(1) Future financial structure is assumed to get close to that of an European standard pulp and paper company gradually as the production will increase.

(2) Retained earnings '98 = Retained earnings '97 + Net income after dividends '98

10.3.3 Cash Flow Statements (Table 10.3.3)

(1) Major Uses and Sources of Funds

Natron needs investment of DM139,100 thousand for 12 years, but needs only DM83,000 thousand for new external funds, around 60% of investment required, owing to earnings by recovery of production after 2000.

(2) Internal Rate of Return (IRR)

The comprehensive profitability of the program can be computed as IRR. The calculated IRR is compared to Natron's opportunity cost of capital. If the project's IRR exceeds the cost of capital, the project is attractive, otherwise it is rejected. The cost of capital is computed as a weighted average cost of debt and equity (WACC).

IRR on investment (IRROI) is calculated by adding up present value of yearly cash flows by operating and investing activities (free cash flow, FCF). Namely IRROI is not influenced by financing means or capital structure. It shows objective profitability of the project (entity perspective).

IRR on equity (IRROE) is calculated by adding up present value of all cash flows, including financing activities except equity investment and dividend. It shows profitability from the shareholders viewpoint (equity perspective), so it is compared to cost of capital for shareholders.

10.4 FINANCIAL APPRAISAL OF THE PROGRAM

10.4.1 Financial Analysis (Table 10.4.1)

(1) Profitability

The long-term program of full-scale production starts from July 2000, after when the whole mill sustains high profitability.

Return on invested capital (ROIC) is stable at around 7%, and gross margin is at a high level at around 46%. This shows that Natron has potential to increase its ROIC by saving on fixed costs and/or raise turnover ratios of working capital and fixed assets still more.

(2) Efficiency

Efficiency ratios of asset turnover and fixed asset turnover get higher steadily as production recovers.

(3) Solvency

The solvency gets better after 2000, shown in increases of ratios such as interest coverage and debt service coverage, and decrease of assets to equity and debt to equity.

10.4.2 Feasibility of the Program

(1) Internal Rate of Return (IRR) (Table 10.3.3, 10.3.6)

IRR and the Corresponding Cost of Capital

Types of IRR	Basic Plan		Survival Plan	
	IRR	**Cost of Capital**	IRR	Cost of Capital
IRROI before tax	**27.1%**	**13.9%**	36.8%	14.5%
IRROI after tax	22.9%	13.8%	33.6%	14.5%
IRROE after tax	39.8%	15%	44.3%	15%

IRROI before tax of 27.1% exceeds by far the WACC of 13.9%. Even if all additional funds are financed by equity, the IRROI has yet enough advantage over the cost of capital of 15% for equity.

IRROI after tax of 22.9% gets closer to the WACC after tax of 13.8%, but it still has sufficient room over 13.8% and 15%. It also shows that the importance of government's supporting policy for taxation.

IRROE after tax of 39.8% also greatly exceeds the investors' expected return of 15%.

Therefore, the program can be appraised as satisfactorily feasible.

IRR of the survival plan is higher than the basic plan, 36.8% and its WACC is 14.5%, mainly because it needs less investments of DM13 million and fewer employees of 500

persons, and achieves only a reduced equilibrium. Therefore it has less social significance.

(2) Break-even Analysis (Table 10.4.2-1, 10.4.2-2)

The projected sales of whole mill under the full-scale production (from 2007 to 2009) is DM179,550 thousand, and break-even sales in the period is only DM97,259 thousand. As a result its margin of safety of 45.8% is also satisfactory to potential investors.

(3) Reasons for the Program's Results

1) Small investment required

The program makes use of NATRON's existing plant by limited repairs and investment of DM139.1 million. It needs about DM1 billion to build similar scale of mill afresh, so the investment required equals to only 1/7 compared with new establishment.

2) Export-oriented marketing policy

3) Improvement of production process

4) Plentiful labor force

(4) Essential Points to the Program

1) Financing first three years

It is crucial for Natron to raise funds required from international finance institutions etc. in order to weather the first three years.

2) Tie-up with strategic investors

It should be better to make a technical tie-up with a strategic investor (advanced pulp and paper company) especially in order to produce new products such as fluting by hardwood semi-chemical (SC) pulp.

10.4.3 Sensitivity Analysis

(1) Sensitivity of IRROI (Table 10.4.3-1)

Sensitivity of IRROI before tax is tested by varying four factors listed below between minus 30% and plus 30% with the terminal values changed by each case of variations.

1) Sales prices

2) Operating rate (sales volume)

3) Fixed costs

4) Investments (restarting costs plus development investments)

By the test, sensitivity to the four factors is ranked as an order of sales prices, operating rate (sales volume), fixed costs and investments. Especially the sensitivity to sales prices is remarkably high. When sales price falls down by 5%, IRROI decreases to 14.7% which is almost same as its WACC 13.9%. Natron should control prices as a first priority.

Second, Natron should be sensitive to the operating rate, and try to maintain it constantly at least. Even in the range of increase of fixed costs by 15% and investment by 30%, IRROI are 17.1% and 16.8% respectively, so those can be kept above WACC of 13.9%.

(2) Sensitivity of IRROE (Table 10.4.3-2)

Sensitivity of IRROE to eleven varieties of interest expense rates between 0% and 20% with interest income rates between 0% and 9%, is tested. By the test, even if the interest expense rate grows up to 20% with interest income rate 9%, IRROE is 19.5%, and still over the investors' cost of capital 15% by 4.5 points. It shows that the program is very attractive for equity investors.

10.5 ECONOMIC APPRAISAL OF THE PROGRAM

The feasibility and significance of the program for the Basic Plan should be promoted by the socio-economic appraisal. The socio-economic advantages are:

(1) Employment

The program employs about 1,000 persons at a normal salary. By the survival plan, employees required are 500, so its effect on employment is limited to the extent.

(2) Export Promotion

The export proportion for each product and the foreign currency which can be acquired in 2005 are estimated as follows:

(Basic Plan) (in DM1,000)

Products	Unit Price	Quantity	Amount	Export %	Foreign Currency
Corrugated board	DM1,620	38,000t	61,560	5%	3,078
Sacks & bags	DM1,720	20,000t	34,400	20%	6,880
Sack paper	DM1,090	37,000t	40,330	100%	40,330
SC fluting	DM672	50,000t	33,600	100%	33,600
MG paper	DM1,150	8,400t	9,660	90%	8,694
Total	-	153,400t	179,550	(65.5%)	92,582 (51.6%)

(3) Utilization of Domestic Natural Resource

The program utilizes a large quantity of domestic wood. It brings Natron procurement advantage, and contributes to promotion of a main domestic industry i.e. forestry. The annual consumption of wood after 2004 is estimated as 355,364m^{3}sob (soil over bark) for softwood, and 151,643m^{3}sob for hardwood.

In the survival plan the pulping lines do not start, so no wood is directly needed.

(4) Inter-industry Contribution

The program utilizes a good deal of coal, electric power, machinery, parts and transport means etc. This contributes to many types of domestic industries and regional economy. It also contributes to paper using industries through its products.

(5) Environmental Protection

The program includes proper anti-pollution and resource-saving investments such as waste water treatment, ashes dumping and a compact boiler. So it does little harm to the Bosnian environment, and contributes to its resource-saving.

Table 10.3.1 Pro Forma Income Statements (in DM 1,000)

	1997	1 1998	2 1999	3 2000	4 2001	5 2002	6 2003	7 2004	8 2005	9 2006	10 2007	11 2008	12 2009
Sales	18,564	22,277	27,320	84,908	124,361	137,800	156,410	169,070	179,550	179,550	179,550	179,550	179,550
Cost of sales	14,851	17,821	18,054	51,347	68,645	74,847	84,423	91,409	96,851	96,851	96,105	96,105	96,105
Gross margin	3,713	4,455	9,266	33,561	55,816	62,953	71,987	77,661	82,699	82,699	83,445	83,445	83,445
Fixed costs	11,059	14,445	11,246	20,266	28,219	31,713	38,211	42,571	46,496	45,416	45,200	45,200	45,200
Depreciation	5,871	5,938	6,251	6,848	9,874	10,167	10,480	11,227	12,494	13,927	14,760	14,860	14,860
Restarting costs (Repair & maintenance)	0	1,200	20,300	15,400	2,500	1,600	400	400	200	0	0	0	0
EBIT (Earnings Before Interest & Taxes)	-13,217	-17,128	-28,531	-8,953	15,223	19,473	22,896	23,463	23,509	23,356	23,485	23,385	23,385
Devaluation of inventories	0	3,000	0	0	0	0	0	0	0	0	0	0	0
Devaluation of fixed assets	0	1,000	0	0	0	0	0	0	0	0	0	0	0
Profit on released loan from Paris Club	0	39,000	0	0	0	0	0	0	0	0	0	0	0
Interest expense -net-	0	593	1,701	3,701	4,858	4,463	3,599	3,003	2,681	2,618	2,683	1,529	309
Corporate tax (30%, after 5 years)	0	0	0	0	0	0	5,789	6,138	6,249	6,222	6,241	6,557	6,923
Net income	-13,217	17,279	-30,232	-12,654	10,366	15,010	13,508	14,322	14,580	14,517	14,561	15,299	16,153
Dividend (50%, after 5 years)	0	0	0	0	0	0	6,754	7,161	7,290	7,258	7,281	7,649	8,077
Net income after dividend	-13,217	17,279	-30,232	-12,654	10,366	15,010	6,754	7,161	7,290	7,258	7,281	7,649	8,077
Development investments (Fixed assets)		2,000	7,400	10,500	4,800	4,000	5,400	17,000	21,000	22,000	3,000	0	0
Depreciation (Useful life: 15years)		67	247	350	160	133	180	567	700	733	100		
			133	133	133	133	133	133	133	133	133	133	133
				493	493	493	493	493	493	493	493	493	493
					700	700	700	700	700	700	700	700	700
						320	320	320	320	320	320	320	320
							267	267	267	267	267	267	267
								360	360	360	360	360	360
									1,133	1,133	1,133	1,133	1,133
										1,400	1,400	1,400	1,400
											1,467	1,467	1,467
												200	200
Total depreciation of develop. invest.		67	380	977	1,487	1,780	2,093	2,840	4,107	5,540	6,373	6,473	6,473
Depreciation of existing fixed assets	5,871	5,871	5,871	5,871	8,387	8,387	8,387	8,387	8,387	8,387	8,387	8,387	8,387
Total Depreciation	5,871	5,938	6,251	6,848	9,874	10,167	10,480	11,227	12,494	13,927	14,760	14,860	14,860

Table 10.3.2 Pro Forma Balance Sheets (in DM 1,000)

	1997	1 1998	2 1999	3 2000	4 2001	5 2002	6 2003	7 2004	8 2005	9 2006	10 2007	11 2008	12 2009
Assets:													
Cash	216	446	546	3,396	4,974	5,512	6,256	6,763	7,182	7,182	7,182	7,182	7,182
Marketable securities	0	0	0	0	2,618	14,510	15,194	6,768	0	0	7,214	18,823	30,840
Accounts receivable	5,391	5,569	5,464	12,736	18,654	20,670	23,462	25,361	26,933	26,933	26,933	26,933	26,933
Inventories	9,813	6,813	5,464	8,491	12,436	13,780	15,641	16,907	17,955	17,955	17,955	17,955	17,955
Prepaid expenses	676	700	800	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total current assets	16,096	13,528	12,274	25,623	39,683	55,472	61,553	56,798	53,070	53,070	60,284	71,893	83,910
Net fixed assets	195,315	190,377	191,526	195,179	190,105	183,938	178,858	184,631	193,137	201,210	189,450	174,589	159,729
Total assets	211,411	203,905	203,801	220,802	229,788	239,410	240,411	241,429	246,207	254,280	249,733	246,482	243,639
Liabilities & Shareholders' equity:													
Short-term loan	298	576	993	877	0	-0	-0	-0	3,861	865	0	-0	-0
Accounts payable	2,376	2,673	2,708	7,702	10,282	11,227	12,663	13,711	14,528	14,528	14,416	14,416	14,416
Accrued expenses	638	700	800	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total current liabilities	3,312	3,950	4,501	9,579	11,282	12,227	13,663	14,711	19,388	16,393	15,416	15,415	15,415
Long-term loan	7,115	20,692	45,269	59,846	56,763	50,430	43,240	36,050	28,860	32,670	21,820	10,920	0
Loan from Paris Club	39,000	0	0	0	0	0	0	0	0	0	0	0	0
Total liabilities	49,427	24,642	49,770	69,425	68,045	62,657	56,903	50,761	48,248	49,063	37,236	26,335	15,415
Capital	160,371	160,371	165,371	175,371	175,371	175,371	175,371	175,371	175,371	175,371	175,371	175,371	175,371
Retained earnings	1,613	18,892	-11,340	-23,994	-13,628	1,382	8,136	15,297	22,587	29,845	37,126	44,776	52,852
Total shareholders' equity	161,984	179,263	154,031	151,377	161,743	176,753	183,507	190,668	197,958	205,216	212,497	220,147	228,223
Total liabilities & equity	211,411	203,905	203,801	220,802	229,788	239,410	240,411	241,429	246,207	254,280	249,733	246,482	243,639
Cost of capital before tax		13.9%											
Cost of capital after tax		13.8%											
Balance of bank loan	298	576	993	877	0	-0	-0	-0	3,861	865	0	-0	-0
Borrowing of long-term loan		15,000	26,000	16,000						11,000			
Repayment of long-term loan		-1,423	-1,423	-1,423	-1,423	-1,423							
					-1,660	-1,660	-1,660	-1,660	-1,660	-1,660	-1,660	-1,690	-1,690
						-3,250	-3,250	-3,250	-3,250	-3,250	-3,250	-3,250	-3,250
							-2,280	-2,280	-2,280	-2,280	-2,280	-2,300	-2,300
											-3,660	-3,660	-3,680
Total repayment		-1,423	-1,423	-1,423	-3,083	-6,333	-7,190	-7,190	-7,190	-7,190	-10,850	-10,900	-10,920
Balance of long-term loan	7,115	20,692	45,269	59,846	56,763	50,430	43,240	36,050	28,860	32,670	21,820	10,920	0
Balance of total loan	7,413	21,268	46,262	60,723	56,763	50,430	43,240	36,050	32,721	33,535	21,820	10,920	-0
Interest expense (8%)		-593	-1,701	-3,701	-4,858	-4,541	-4,034	-3,459	-2,884	-2,618	-2,683	-1,746	-874
Interest income (3%)		0	0	0	0	79	435	456	203	0	0	216	565
Interest expense -net-		-593	-1,701	-3,701	-4,858	-4,463	-3,599	-3,003	-2,681	-2,618	-2,683	-1,529	-309

Table 10.3.3 Pro Forma Cash Flow Statements (in DM 1,000)

	1 1998	2 1999	3 2000	4 2001	5 2002	6 2003	7 2004	8 2005	9 2006	10 2007	11 2008	12 2009
EBIT (Earnings Before Interest & Taxes)	-17,128	-28,531	-8,953	15,223	19,473	22,896	23,463	23,509	23,356	23,485	23,385	23,385
Depreciation	5,938	6,251	6,848	9,874	10,167	10,480	11,227	12,494	13,927	14,760	14,860	14,860
(Increase) decrease in accounts receivable	-178	105	-7,272	-5,918	-2,016	-2,792	-1,899	-1,572	0	0	0	0
(Increase) decrease in inventories	0	1,349	-3,027	-3,945	-1,344	-1,861	-1,266	-1,048	0	0	0	0
(Increase) decrease in prepaid expenses	-24	-100	-200	0	0	0	0	0	0	0	0	0
Increase (decrease) in accounts payable	297	35	4,994	2,580	945	1,436	1,048	816	0	-112	0	0
Increase (decrease) in accrued expenses	62	100	200	0	0	0	0	0	0	0	0	0
Working capital (changes in current accounts	157	1,489	-5,305	-7,284	-2,414	-3,216	-2,117	-1,804	0	-112	0	0
Corporate tax (30%, after 5 years)	0	0	0	0	0	-5,789	-6,138	-6,249	-6,222	-6,241	-6,557	-6,923
Net cash provided by operating activities:	-11,033	-20,791	-7,410	17,813	27,226	24,371	26,435	27,951	31,061	31,893	31,688	31,322
Investment in fixed assets	-2,000	-7,400	-10,500	-4,800	-4,000	-5,400	-17,000	-21,000	-22,000	-3,000	0	0
Net cash used in investing activities:	-2,000	-7,400	-10,500	-4,800	-4,000	-5,400	-17,000	-21,000	-22,000	-3,000	0	0
Increase (decrease) in short-term loan	278	416	-116	-877	-0	0	-0	3,861	-2,995	-865	-1	0
(Increase) decrease in marketable securities	0	0	0	-2,618	-11,892	-684	8,426	6,768	0	-7,214	-11,609	-12,017
Long-term loan	15,000	26,000	16,000	0	0	0	0	0	11,000	0	0	0
Repayment of long-term loan	-1,423	-1,423	-1,423	-3,083	-6,333	-7,190	-7,190	-7,190	-7,190	-10,850	-10,900	-10,920
Interest expense -net-	-593	-1,701	-3,701	-4,858	-4,463	-3,599	-3,003	-2,681	-2,618	-2,683	-1,529	-309
Equity finance	0	5,000	10,000	0	0	0	0	0	0	0	0	0
Dividend (50%, after 5 years)	0	0	0	0	0	-6,754	-7,161	-7,290	-7,258	-7,281	-7,649	-8,077
Net cash provided by financing activities:	13,262	28,292	20,760	-11,435	-22,688	-19,227	-8,929	-6,532	-9,061	-28,833	-31,688	-31,322
Net increase (decrease) in cash:	230	101	2,850	1,578	538	744	506	419	0	-0	-0	0
Cash at beginning of year	216	446	546	3,396	4,974	5,512	6,256	6,763	7,182	7,182	7,182	7,182
Cash at end of year	446	546	3,396	4,974	5,512	6,256	6,763	7,182	7,182	7,182	7,182	7,182
IRR on Investment (IRROI) before tax	27.1%											
Net Cash Flows (Free Cash Flows before tax)	-13,033	-28,191	-17,910	13,013	23,226	24,760	15,573	13,199	15,283	35,133	38,245	106,739
IRR on Investment (IRROI) after tax	22.9%											
Net Cash Flows (Free Cash Flows)	-13,033	-28,191	-17,910	13,013	23,226	17,891	8,534	6,146	8,276	28,088	31,230	99,724
IRR on Equity (IRROE) after tax	39.8%											
Net Cash Flows	230	-4,899	-7,150	1,578	538	7,498	7,667	7,709	7,258	7,281	7,649	76,571

Note: Each net cash flow in 2009 includes terminal value of 68,494

Table 10.3.4 Pro Forma Income Statements -Survival Plan- (in DM 1,000)

	1997	1 1998	2 1999	3 2000	4 2001	5 2002	6 2003	7 2004	8 2005	9 2006	10 2007	11 2008	12 2009
Sales	18,564	22,277	27,320	41,610	52,225	65,880	79,420	86,820	94,220	94,220	94,220	94,220	94,220
Cost of sales	14,851	17,821	18,054	27,609	34,027	42,501	50,877	55,593	60,310	60,310	60,310	60,310	60,310
Gross margin	3,713	4,455	9,266	14,001	18,198	23,379	28,543	31,227	33,910	33,910	33,910	33,910	33,910
Fixed costs	11,059	14,445	8,827	11,962	13,206	14,588	15,584	16,588	17,764	17,764	17,764	17,764	17,764
Depreciation	5,871	5,938	6,144	6,311	6,434	6,594	6,684	6,758	6,791	6,824	6,858	6,891	6,924
Restarting costs (Repair & maintenance)	0	1,200	0	0	0	0	0	0	0	0	0	0	0
EBIT (Earnings Before Interest & Taxes)	-13,217	-17,128	-5,705	-4,272	-1,443	2,196	6,275	7,881	9,355	9,322	9,288	9,255	9,222
Devaluation of inventories	0	3,000	0	0	0	0	0	0	0	0	0	0	0
Devaluation of fixed assets	0	1,000	0	0	0	0	0	0	0	0	0	0	0
Profit on released loan from Paris Club	0	39,000	0	0	0	0	0	0	0	0	0	0	0
Interest expense -Net-	0	593	1,701	1,627	1,591	1,720	1,522	1,201	839	456	25	-411	-854
Corporate tax (30%, after 5 years)	0	0	0	0	0	0	1,426	2,004	2,555	2,660	2,779	2,900	3,023
Net income	-13,217	17,279	-7,407	-5,900	-3,034	475	3,327	4,676	5,961	6,206	6,484	6,766	7,053
Dividend (50%, after 5 years)	0	0	0	0	0	0	1,663	2,338	2,981	3,103	3,242	3,383	3,527
Net income after dividend	-13,217	17,279	-7,407	-5,900	-3,034	475	1,663	2,338	2,981	3,103	3,242	3,383	3,527
Development investments (Fixed assets)		2,000	4,200	800	2,900	1,900							
Depreciation (Useful life: 15years)		67	140	27	97	63							
			133	133	133	133	133	133	133	133	133	133	133
				280	280	280	280	280	280	280	280	280	280
					53	53	53	53	53	53	53	53	53
						193	193	193	193	193	193	193	193
							153	153	153	153	153	153	153
								73	73	73	73	73	73
									33	33	33	33	33
										33	33	33	33
											33	33	33
												33	33
													33
Total depreciation of develop. invest.		67	273	440	563	723	813	887	920	953	987	1,020	1,053
Depreciation of existing fixed assets	5,871	5,871	5,871	5,871	5,871	5,871	5,871	5,871	5,871	5,871	5,871	5,871	5,871
Total Depreciation	5,871	5,938	6,144	6,311	6,434	6,594	6,684	6,758	6,791	6,824	6,858	6,891	6,924

Table 10.3.5 Pro Forma Balance Sheets -Survival Plan- (in DM 1,000)

	1997	1 1998	2 1999	3 2000	4 2001	5 2002	6 2003	7 2004	8 2005	9 2006	10 2007	11 2008	12 2009
Assets:													
Cash	216	446	546	1,664	2,089	2,635	3,177	3,473	3,769	3,769	3,769	3,769	3,769
Marketable securities	0	0	0	0	0	0	2,673	7,670	13,343	20,610	28,050	35,634	43,395
Accounts receivable	5,391	5,569	5,464	6,242	7,834	9,882	11,913	13,023	14,133	14,133	14,133	14,133	14,133
Inventories	9,813	6,813	5,464	4,161	5,223	6,588	7,942	8,682	9,422	9,422	9,422	9,422	9,422
Prepaid expenses	676	700	800	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total current assets	16,096	13,528	12,274	13,067	16,145	20,105	26,705	33,848	41,667	48,934	56,374	63,958	71,719
Net fixed assets	195,315	190,377	188,433	182,922	179,388	174,693	168,009	161,251	154,460	147,636	140,778	133,887	126,963
Totalassets	211,411	203,905	200,707	195,989	195,533	194,799	194,714	195,099	196,127	196,570	197,152	197,845	198,682
Liabilities & Shareholders' equity:													
Short-term loan	298	576	1,073	2,044	743	1,345	0	0	0	0	0	0	0
Accounts payable	2,376	2,673	2,708	4,141	5,104	6,375	7,632	8,339	9,046	9,046	9,046	9,046	9,046
Accrued expenses	638	700	800	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000	1,000
Total current liabilities	3,312	3,950	4,581	7,186	6,847	8,720	8,632	9,339	10,047	10,047	10,047	10,047	10,047
Long-term loan	7,115	20,692	19,269	17,846	20,763	17,680	16,020	13,360	10,700	8,040	5,380	2,690	0
Loan from Paris Club	39,000	0	0	0	0	0	0	0	0	0	0	0	0
Total liabilities	49,427	24,642	23,850	25,032	27,610	26,400	24,652	22,699	20,747	18,086	15,426	12,736	10,047
Capital	160,371	160,371	165,371	165,371	165,371	165,371	165,371	165,371	165,371	165,371	165,371	165,371	165,371
Retained earnings	1,613	18,892	11,486	5,586	2,552	3,027	4,691	7,029	10,009	13,113	16,355	19,738	23,265
Total shareholders' equity	161,984	179,263	176,857	170,957	167,923	168,398	170,062	172,400	175,380	178,484	181,726	185,109	188,636
Total liabilities & equity	211,411	203,905	200,707	195,989	195,533	194,799	194,714	195,099	196,127	196,570	197,152	197,845	198,682
Cost of capital before tax		14.5%											
Cost of capital after tax		14.5%											
Balance of bank loan	298	576	1,073	2,044	743	1,345	0	0	0	0	0	0	0
Borrowing of Long-term loan		15,000			6,000								
Repayment of long-term loan		-1,423	-1,423	-1,423	-1,423	-1,423							
					-1,660	-1,660	-1,660	-1,660	-1,660	-1,660	-1,660	-1,690	-1,690
								-1,000	-1,000	-1,000	-1,000	-1,000	-1,000
Total repayment		-1,423	-1,423	-1,423	-3,083	-3,083	-1,660	-2,660	-2,660	-2,660	-2,660	-2,690	-2,690
Balance of long-term loan	7,115	20,692	19,269	17,846	20,763	17,680	16,020	13,360	10,700	8,040	5,380	2,690	0
Balance of total loan	7,413	21,268	20,342	19,890	21,506	19,025	16,020	13,360	10,700	8,040	5,380	2,690	0
Interest expense (8%)		-593	-1,701	-1,627	-1,591	-1,720	-1,522	-1,282	-1,069	-856	-643	-430	-215
Interest income (3%)		0	0	0	0	0	0	80	230	400	618	842	1,069
Interest expense -Net-		-593	-1,701	-1,627	-1,591	-1,720	-1,522	-1,201	-839	-456	-25	411	854

Table 10.3.6 Pro Forma Cash Flow Statements -Survival Plan- (in DM 1,000)

	1 1998	2 1999	3 2000	4 2001	5 2002	6 2003	7 2004	8 2005	9 2006	10 2007	11 2008	12 2009
EBIT (Earnings Before Interest & Taxes)	-17,128	-5,705	-4,272	-1,443	2,196	6,275	7,881	9,355	9,322	9,288	9,255	9,222
Depreciation	5,938	6,144	6,311	6,434	6,594	6,684	6,758	6,791	6,824	6,858	6,891	6,924
(Increase) decrease in accounts receivable	-178	105	-778	-1,592	-2,048	-2,031	-1,110	-1,110	0	0	0	0
(Increase) decrease in inventories	0	1,349	1,303	-1,062	-1,366	-1,354	-740	-740	0	0	0	0
(Increase) decrease in prepaid expenses	-24	-100	-200	0	0	0	0	0	0	0	0	0
Increase (decrease) in accounts payable	297	35	1,433	963	1,271	1,256	707	707	0	0	0	0
Increase (decrease) in accrued expenses	62	100	200	0	0	0	0	0	0	0	0	0
Working capital (changes in current accounts)	157	1,489	1,959	-1,691	-2,143	-2,129	-1,143	-1,143	0	0	0	0
Corporate tax (30%, after 5 years)	0	0	0	0	0	-1,426	-2,004	-2,555	-2,660	-2,779	-2,900	-3,023
Net cash provided by operating activities:	-11,033	1,928	3,997	3,300	6,648	9,405	11,493	12,449	13,486	13,367	13,246	13,123
Investment in fixed assets	-2,000	-4,200	-800	-2,900	-1,900	0	0	0	0	0	0	0
Net cash used in investing activities:	-2,000	-4,200	-800	-2,900	-1,900	0	0	0	0	0	0	0
Increase (decrease) in short-term loan	278	497	971	-1,302	602	-1,345	0	0	0	0	0	0
(Increase) decrease in marketable securities	0	0	0	0	0	-2,673	-4,997	-5,673	-7,267	-7,440	-7,584	-7,761
Long-term loan	15,000	0	0	6,000	0	0	0	0	0	0	0	0
Repayment of long-term loan	-1,423	-1,423	-1,423	-3,083	-3,083	-1,660	-2,660	-2,660	-2,660	-2,660	-2,690	-2,690
Interest expense -Net-	-593	-1,701	-1,627	-1,591	-1,720	-1,522	-1,201	-839	-456	-25	411	854
Equity finance	0	5,000	0	0	0	0	0	0	0	0	0	0
Dividend (50%, after 5 years)	0	0	0	0	0	-1,663	-2,338	-2,981	-3,103	-3,242	-3,383	-3,527
Net cash provided by financing activities:	13,262	2,373	-2,079	24	-4,201	-8,863	-11,196	-12,152	-13,486	-13,367	-13,246	-13,124
Net increase (decrease) in cash:	230	101	1,118	425	546	542	296	296	0	0	0	0
Cash at beginning of year	216	446	546	1,664	2,089	2,635	3,177	3,473	3,769	3,769	3,769	3,769
Cash at end of year	446	546	1,664	2,089	2,635	3,177	3,473	3,769	3,769	3,769	3,769	3,769
IRR on Investment (IRROI) before tax	**36.8%**											
Net Cash Flows (Free Cash Flows before tax)	-13,033	-2,272	3,197	400	4,748	10,830	13,497	15,004	16,146	16,146	16,146	77,819
IRR on Investment (IRROI) after tax	33.6%											
Net Cash Flows (Free Cash Flows)	-13,033	-2,272	3,197	400	4,748	8,948	11,132	12,197	13,350	13,360	13,370	61,673
IRR on Equity (IRROE) after tax	44.3%											
Net Cash Flows	230	-4,899	1,118	425	546	2,205	2,634	3,277	3,104	3,242	3,383	61,673

Note: Each net cash flow in 2009 includes terminal value of 61,673

Table 10.4.1 Ratio Analysis

	1997	1 1998	2 1999	3 2000	4 2001	5 2002	6 2003	7 2004	8 2005	9 2006	10 2007	11 2008	12 2009
Profitability ratios:													
Return on invested capital (ROIC %)	-7.8%	-9.2%	-16.3%	-4.5%	6.8%	8.3%	6.9%	7.0%	7.0%	6.9%	6.7%	6.8%	6.8%
Return on equity (ROE %)	-8.2%	9.6%	-19.6%	-8.4%	6.4%	8.5%	7.4%	7.5%	7.4%	7.1%	6.9%	6.9%	7.1%
Return on assets (ROA %)	-6.3%	8.5%	-14.8%	-5.7%	4.5%	6.3%	5.6%	5.9%	5.9%	5.7%	5.8%	6.2%	6.6%
Gross margin (%)	20.0%	20.0%	33.9%	39.5%	44.9%	45.7%	46.0%	45.9%	46.1%	46.1%	46.5%	46.5%	46.5%
Profit margin (%)	-71.2%	77.6%	-110.7%	-14.9%	8.3%	10.9%	8.6%	8.5%	8.1%	8.1%	8.1%	8.5%	9.0%
Efficiency ratios:													
Asset turnover (*)	0.09	0.11	0.13	0.38	0.54	0.58	0.65	0.70	0.73	0.71	0.72	0.73	0.74
Fixed-asset turnover (*)	0.10	0.12	0.14	0.44	0.65	0.75	0.87	0.92	0.93	0.89	0.95	1.03	1.12
Solvency ratios:													
Interest coverage (*)	-	-28.9	-16.8	-2.4	3.1	4.4	6.4	7.8	8.8	8.9	8.8	15.3	75.7
Debt service coverage (*)	-	-8.5	-9.1	-1.7	1.9	1.8	1.7	1.8	1.8	1.8	1.3	1.4	1.5
Current ratio (*)	4.9	3.4	2.7	2.7	3.5	4.5	4.5	3.9	2.7	3.2	3.9	4.7	5.4
Acid test (*)	1.9	1.7	1.5	1.8	2.4	3.4	3.4	2.7	1.8	2.1	2.7	3.5	4.3
Assets to equity (*)	1.31	1.14	1.32	1.46	1.42	1.35	1.31	1.27	1.24	1.24	1.18	1.12	1.07
Debt to equity (%)	30.5%	13.7%	32.3%	45.9%	42.1%	35.4%	31.0%	26.6%	24.4%	23.9%	17.5%	12.0%	6.8%

Notes:
ROIC = EBIT/Invested capital = EBIT(1 - Tax rate)/(Interest-bearing debt(D) + Equity(E))
ROE = Net income/Shareholders' equity = Net income/Sales * Sales/Assets * Assets/Equity
ROE = Profit margin * Asset turnover * Financial leverage = Net income/Assets(ROA) * Financial leverage
ROE = ROIC + (ROIC - Interest rate-after tax) * D/E = ROIC - (ROIC - ii) * Financial leverage
Gross margin = Gross margin/Sales
Profit margin = Net income/Sales
Fixed-asset turnover = Sales/Fixed-asset
Interest coverage = EBIT/Interest expense
Debt service coverage = EBIT/(Interest + Principal repayment/(1-Tax rate))
Current ratio = Current assets/Current liabilities
Acid test = (Current assets - Inventory)/Current liabilities

Table 10.4.2-1 Margin of Safety -Sales Mix from 2007 to 2009 (in DM 1,000)-

Products	Corrugated board by own SC fluting		Sacks of own pulp & paper		Sack paper of own Kraft pulp		SC fluting by own SC pulp		MG paper by own Kraft pulp		TOTAL
	Amount	unit @	Amount	unit @	Amount	unit @	Amount	unit @	Amount	unit @	
Sales(units)	38,000t		20,000t		37,000t		50,000t		8,400t		153,400t
Sales(DM)	61,560	1,620	34,400	1,720	40,330	1,090	33,600	672	9,660	1,150	179,550
											(@1,170)
Variable cots	28,222	743	16,526	826	28,574	772	16,650	333	6,134	730	96,106
(% of Sales)	46%		48%		71%		50%		63%		54%
											(@ 626)
Contribution margin	33,338	877	17,874	894	11,756	318	16,950	339	3,526	420	83,444
(% of Sales)	54%		52%		29%		50%		37%		46%
											(@ 544)
Sales mix	34%		19%		22%		19%		5%		100%
Fixed costs	9,040		9,040		9,040		9,040		9,040		45,200
Break-Even (DM)	16,699		17,392		30,986		17,920		24,752		97,259
Break-Even (units)	10,308t		10,112t		28,428t		26,667t		21,523t		83,094t

Margin of Safety ratio = (179,550 - 97,259) / 179,550 = 45.8%

Notes: SC is Semichemical, MG is Machine glazed

Table 10.4.2-2 Break-Even Point -Whole Mill-

Volume (thou-t)	F.costs (thouDM)	V.costs (thouDM)	Total C. (thouDM)	T.Sales (thouDM)
0	45,200	0	45,200	0
20	45,200	12,530	57,730	23,409
40	45,200	25,060	70,260	46,819
60	45,200	37,590	82,790	70,228
80	45,200	50,120	95,320	93,638
100	45,200	62,651	107,851	117,047
120	45,200	75,181	120,381	140,456
140	45,200	87,711	132,911	163,866
160	45,200	100,241	145,441	187,275
180	45,200	112,771	157,971	210,684
200	45,200	125,301	170,501	234,094
Break-Even Point of Whole Mill =				
83,094t	45,200	52,059	97,259	97,259

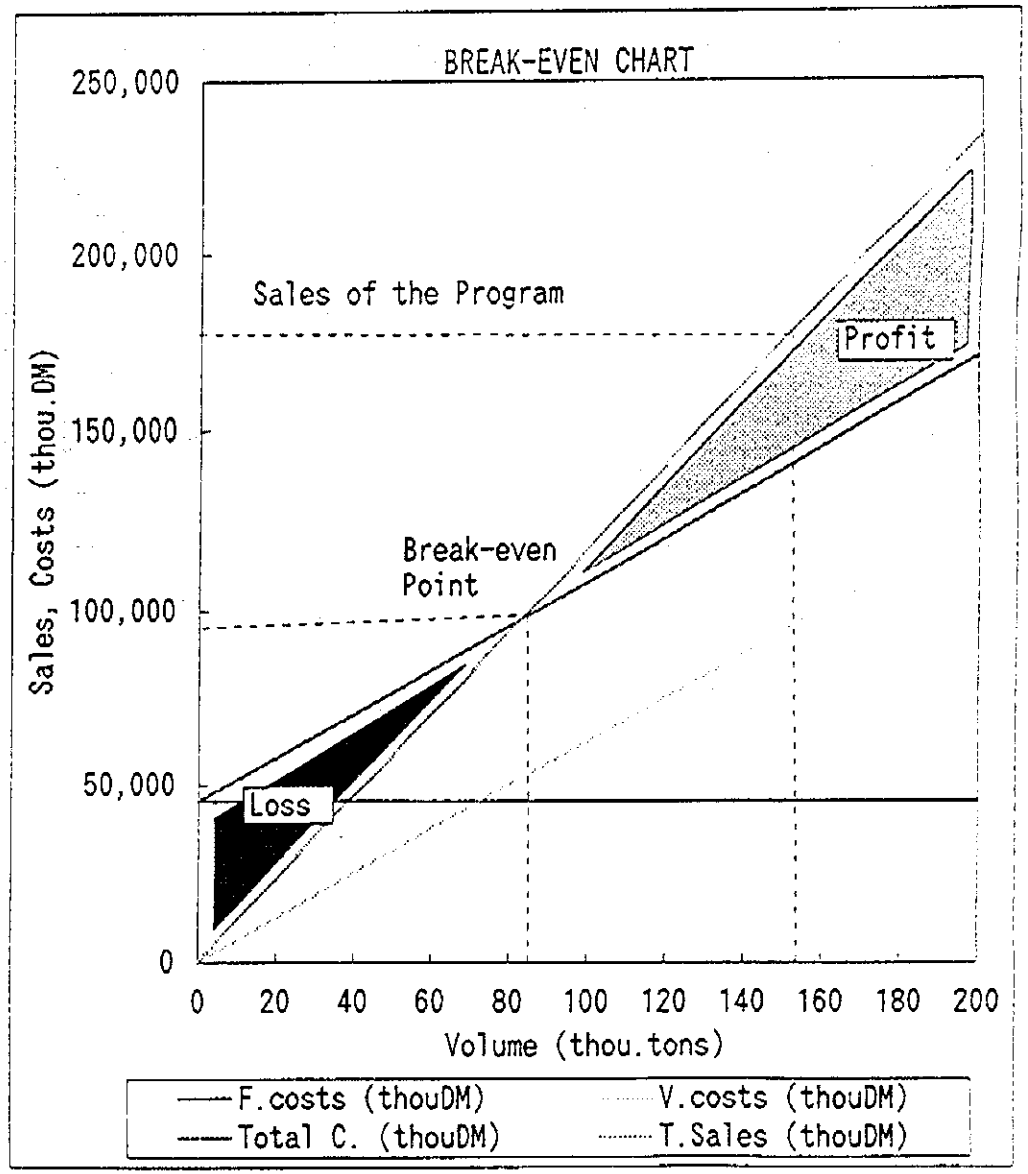


Table 10.4.3-1 SENSITIVITY OF IRROI BEFORE TAX

Variation	-30%	-25%	-20%	-15%	-10%	-5%	0%	5%	10%	15%	20%	25%	30%
Sales prices					-8.2%	14.7%	27.1%	37.5%	47.3%	57.1%	67.2%	78.0%	89.5%
Operating rate			0.4%	10.0%	16.7%	22.2%	27.1%	31.5%	35.6%	39.5%	43.2%	46.8%	50.3%
Fixed costs	46.4%	43.0%	39.8%	36.5%	33.4%	30.2%	27.1%	23.9%	20.6%	17.1%	13.3%	9.2%	4.2%
Investment	38.8%	36.7%	34.6%	32.6%	30.7%	28.9%	27.1%	25.3%	23.6%	21.9%	20.2%	18.5%	16.8%

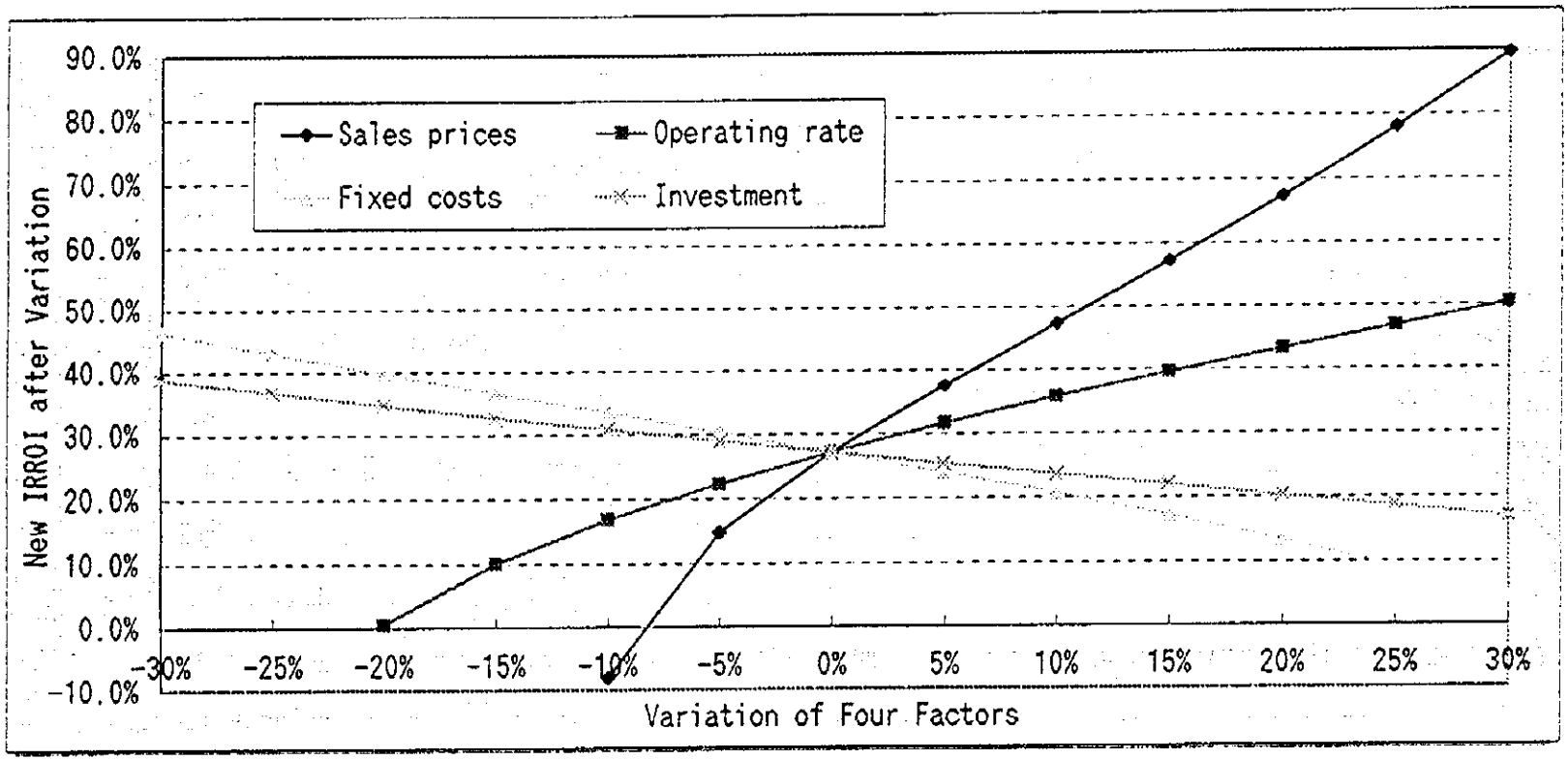


Table 10.4.3-2 SENSITIVITY OF IRROE AFTER TAX

Variation of Interest expense rate (with Interest income rate	20% 9%	18% 8%	16% 7%	14% 6%	12% 5%	10% 4%	8% 3%	6% 2%	4% 1%	2% 0%	0% 0%)
IRROE after tax	19.5%	26.3%	30.7%	33.9%	36.4%	38.3%	39.8%	41.0%	42.0%	42.7%	43.4%