

*Approaches to health, safety and environmental issues  
in Ghanaian industry*

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### *Acknowledgements*

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## *Introduction*

Occupational health, safety and environmental impact (HSE) have been increasing in importance within British industry ever since its birth. In Victorian times little concern was expressed about the conditions people worked under or the effluents from the industry. Today vanguard industries are setting internal goals of having no accidents leading to a loss of working time, and loss of life resulting from occupational hazards is considered morally indefensible.

The majority of countries have not experienced a comparable development of industry and their national governments usually have the aim of catching up. Considering the strategies which could be implemented to achieve this aim raises questions about what HSE standards should be applied. Companies and national governments could insist on applying the highest international standards, but this may slow and discourage needed development. Will governments with low standards be able to raise them in due course, and if so, when? Should governments set high standards which they do not have the resources to enforce, or lower standards which can be enforced?

Through travelling to Ghana, a developing country with a current industrialisation programme, and visiting a number of industries, information has been gathered which allows the main forces which have shaped HSE practices to be identified. There is relatively little published information about HSE practises in developing countries, so the identification of the driving forces can provide the basic parameters to be investigated in a more detailed research project.

Developments through the course of organising the project led to it becoming a joint venture between myself and Mr William Bannerman, a lecturer at the Chemistry Department of the University of Science and Technology in Ghana. Mr Bannerman conducted the research jointly with me in Ghana, and additional funding is being raised to allow the project to be extended to involve a comprehensive comparative study in the UK. Mr Bannerman will be travelling to the UK in the spring of 1999 to carry out this research. By studying comparative problems in a developed country and identifying the forces which have shaped the solutions there, it is hoped constructive suggestions can be made with respect to the situation in Ghana.

## *Methodology*

The study shall be conducted in two parts. The first phase, which has been completed this summer, is a study of a developing country. The study has involved gathering information about what the current HSE situation is, with respect to the problems faced and how the problems are approached, in the formal industries of the country. From this the main forces which have shaped the current HSE practices have been isolated.

The second phase of the study will consist of a comparative study in a developed country. Again this will involve gathering information on what the current HSE situation is, but will focus primarily on HSE problems comparable to those studied in the developing country.

The developing country chosen for the study was Ghana. The first African nation to achieve independence in 1957, and the subject of a industrialisation drive through the 1960s, Ghana was often a favourite for development researchers until the late 1970s when severe problems set in. Today, a decade of economic revitalisation, a free press, openness of opinions and English as the official language make Ghana a suitable and convenient country to study.

Only a relatively limited number of industries is available to study in Ghana. An attempt was made to cover a cross-section of the types and scales of industry in the formal economy. The authors' prior knowledge made chemical or process industries most attractive for study, and where possible these were selected.

The UK provides a suitable and convenient country for the comparative study. Mr Bannerman will be making a return trip during February and March of 1999 during which time this research will be done. The scope of studying HSE in British industry is very large and to make the task manageable and useful attention will be given to industries which are similar, or face similar problems, to those studied in Ghana.

Information was gathered in companies through interviews with management and engineers, observation, and access to internal and public company records. Further information was gathered from visits to relevant government bodies.

The companies chosen for study were:

Kumasi Brewery Limited, Kumasi.

Moderate size brewery supplying domestic market, 50 per cent owned by Heineken.

Intermediate Technology Transfer Unit, Suame Magazine, Kumasi.

Small scale artisan manufacturing industry.

Logs and Lumber Limited, Kumasi.

Domestic timber processed for international market, private Lebanese ownership.

Ashanti Goldfields Company Limited, Obuasi

Largest African gold mining company outside of South Africa, listed on stock exchanges worldwide.

Tema Oil Refinery Limited, Tema.

Imported oil distilled to supply the fuel needs of domestic market, 100 per cent government owned.

Lever Brothers (Ghana) Limited, Tema.

Fast moving consumer goods produced for domestic market, division of Unilever Ghana Limited.

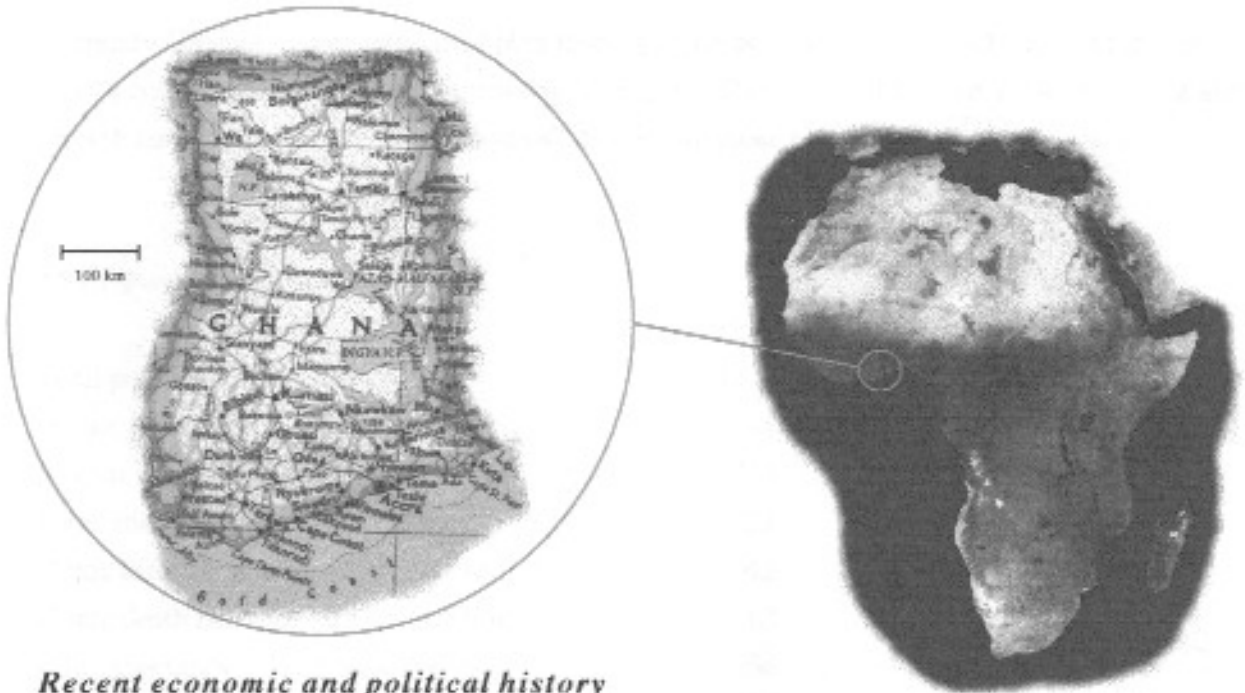
The government bodies visited were:

Factory Inspectorate Office at the Ministry of Employment and Social Welfare

Occupational Health Department at the Ministry of Health

Ghana Standards Board

## Ghana



### *Recent economic and political history*

Ghana gained independence from the British in 1957 and became a republic in 1960. Formerly known as the Gold Coast, Ghana took its name from an ancient West African kingdom which once covered some of the same ground as modern Ghana. Its borders are a product of the kingdoms conquered by the British and settlement of borders between the European powers competing this part of West Africa.

At the time of its independence Ghana had reserves of about US\$1 billion, a per capita income comparable to Spain and over sixty per cent literacy. This was achieved from Ghana's cocoa and gold exports; at the time Ghana produced one tenth of the world's gold supply. This wealth, along with international borrowing and foreign investment, was used to pursue a plan of rapid industrialisation over the 1960s. Political and economic problems were first experienced late in this decade and continued to get worse until the early 1980s. By 1983 public transport had ground to a halt, factories were running at one tenth capacity and hospitals were without supplies. The effectiveness and appropriateness of Ghana's development strategy has been discussed greatly, but it is still the projects undertaken during this period which provide the basis for the shape of modern Ghana and allow it to function.

A new military leader, J. J. Rawlings, now an elected president, took power in 1981. Rawlings has pursued a package of World Bank and International Monetary Fund inspired economic recovery programme, largely involving currency devaluation and a reduction in public spending. This has led to the condition of Ghana improving greatly, although the majority of the

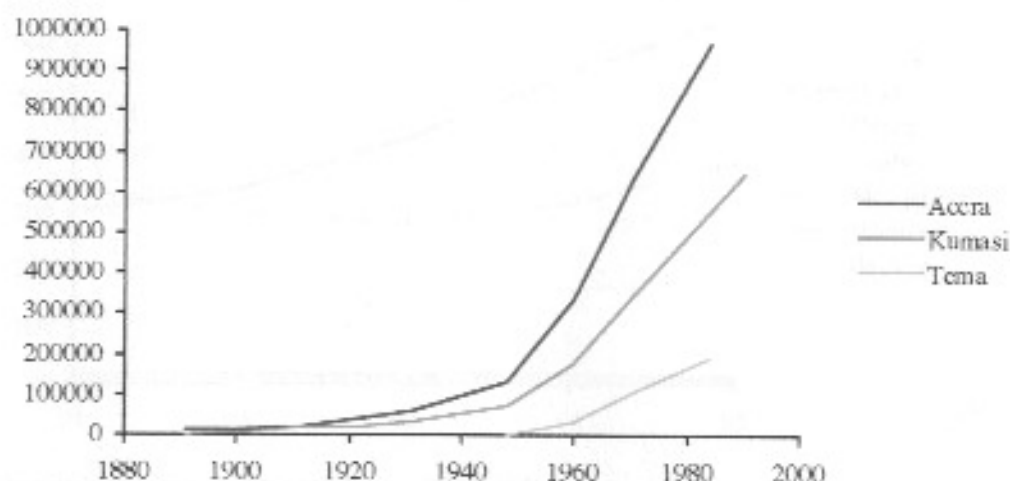
population have not received much benefit from the changes. The United Nations Development Programme describe the mood in Ghana today as "cautious optimism"<sup>1</sup>.

Currently Ghana has a development plan leading up to the year 2020, by which point it aims to be in a comparable position as present day Singapore. Over the past few years development and growth targets have not been met, and inflation is still close to thirty per cent per annum.

### *1993 Population data<sup>2</sup>*

Total population (millions)	16.9
Urban population (per cent)	34
Annual natural increase (per cent)	3.0
Population doubling time (years)	23
Crude birth rate (per 1000 population)	42
Crude death rate (per 1000 population)	12
Life expectancy at birth male (years)	54
Life expectancy at birth female (years)	58

In 1984 the labour force comprised about 55 per cent of the population and had been approximately constant over the previous two decades. In 1995, 40 per cent of the population who are over 15 years old had never been to school and only 6 per cent had secondary or higher education. In 1991 the official literacy rate was 51.2 per cent.<sup>3</sup>



### **Population size of Ghana's three largest cities 1891-1990<sup>4</sup>**

<sup>1</sup> The United Nations Development Programme in Ghana, UNDP, 1990

<sup>2</sup> 1994 World Population Data Sheet, Population Reference Bureau, Inc.

<sup>3</sup> The State of the Ghanaian Economy in 1995. The Institute of Statistical, Social and Economic Research, University of Ghana.

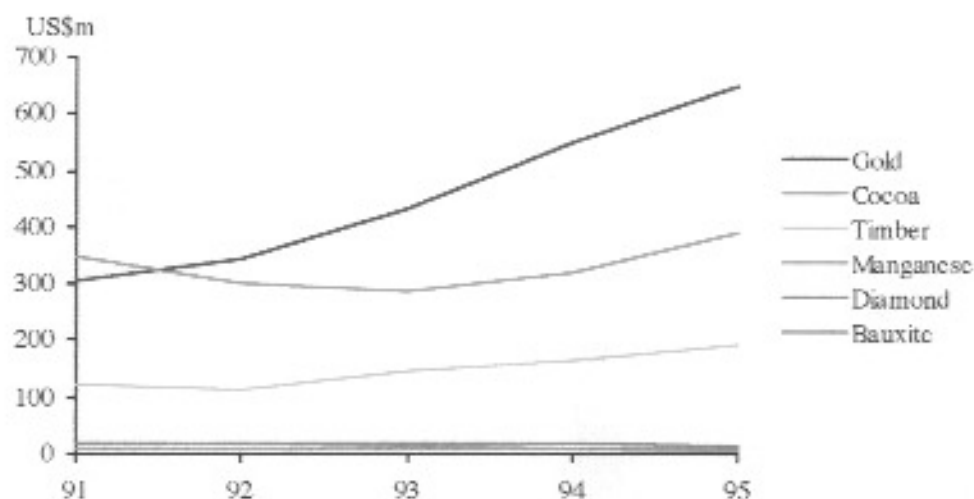
<sup>4</sup> The Ghanaian Factory Worker: Industrial Man in Africa, Margaret Peil, CUP, 1972.



## Economic indicators<sup>5</sup>

The Ghanaian unit of currency is the cedi (¢).

GDP (US\$ million)	6 061	1996
Real GDP growth per capita per annum (%)	4.3	1996
GDP per capita (US\$)	340	1996
Exchange Rate (official) ¢ per US\$1	2 325.00 1 754.39 344.83	17 July 1998 1996 1990
Total reserves minus gold (US\$ million)	480.4 828.7 409.7 218.8	1997 (November) 1996 1993 1990
Foreign debt (US\$ billion)	6.4	1997
Debt service ratio (capital and interest payments as % of exports)	23.1	1995
Imports of goods and services (US\$ million)	1 728	1996
Merchandise imports (US\$ million)	1 481	1997
Exports of goods and services (US\$ million)	2 393	1996
Merchandise exports (US\$ million)	1 752	1997
Consumer price index	605.8 473.7 162.3 100.0	1997 1996 1993 1990
Inflation (%)	27.9	1997



Ghana's main export earnings 1991-1995<sup>6</sup>

Pollution Control in a Developing Country, S. B. Akuffo, Ghana University Press, 1989.

The City of Kumasi: past, present and future, ed. K. Arhin and K. Afari-Gyau, Institute of African Studies, 1992

<sup>5</sup> MBendi information services (<http://www.mbendi.co.za>).

<sup>6</sup> The State of the Ghanaian Economy in 1995, The Institute of Statistical, Social and Economic Research, University of Ghana.

### *Results of Ghanaian Research*

Little post 1980 published work was found on HSE issues in developing countries. Consequently a strict list of research parameters was not developed before the study. Through the course of the research some of useful parameters to question companies about became apparent.

The results are presented as a portrait of each company. These cover its operations, the benefits derived by the local community, workers and nation, the HSE problems which the company faces and how the company approaches these problems.

## *Legislation*

The legislation which is most relevant to most industries in Ghana is the Factories, Offices and Shops Act, 1970. Most industries seemed to consider this Act as being of relatively little relevance to modern industry. Notable sections of the Act include,

8. 1) There shall be posted in a prominent position in every factory -
  - a) the prescribed abstract of this Act;
  - b) a notice of the address of the Chief Inspector and of the nearest Inspector and labour officer;
  - c) printed copies of any regulations made under this Act which are in force in the factory, or the prescribed abstracts thereof; and
  - d) every other notice or document required by this Act to be posted in the factory
  
10. 1) Where an accident in any factory, office or shop -
  - a) causes the death of a person employed therein; or
  - b) disables any such person for more than three days from earning full wages at work at which he was employed,the occupier shall forthwith send written notice of the accident, in the prescribed form and containing the prescribed particulars, to the Chief inspector or the Inspector for the district.
  
13. 1) Every factory, office and shop and all furniture, furnishings and fittings therein shall be kept in a clean state.
  
19. 1) Adequate and suitable sanitary conveniences conveniently accessible to persons employed shall be provided, maintained and kept clean in every factory, office and shop, and effective provision shall be made for their lighting and ventilation.
  
23. 1) Where in any factory process there is given off dust, fumes or other impurities of such a character or to such an extent as to be likely to be injurious or offensive to the persons employed, or any substantial quantity of dust of any kind, all practicable measures shall be taken to protect the persons employed against inhalation of the dust, fumes or other impurities and to prevent them accumulating in the workroom, and in particular, where the nature of the process makes it practicable, exhaust appliances shall be provided and maintained, as near as possible to the point of origin of the dust, fumes or other impurities, so as to prevent them entering the air of any workroom.
  
25. 1) Where in any factory or shop workers are employed in any process involving excessive exposure to wet or to any injurious or offensive substance, suitable protective clothing and appliances, including, where necessary, suitable gloves, footwear, goggles and head coverings, shall be provided and maintained for their use.
  
26. Noise and vibrations likely to affect the health of persons employed in any factory, office or shop shall be reduced as far as possible by appropriate and practicable measures.
  
27. No person shall in the course of his work be required to lift, carry or move any load so heavy as to be likely to cause injury to him.
  
31. 1) In every factory, office and shop there shall be provided and maintained appropriate means for fighting fire, which shall be so placed as to be readily available for use.
  
35. 1) All floors, steps, stairs, passages and gangways shall be of sound construction and properly maintained and shall, so far as is reasonably practicable, be kept free from any obstruction and from any substance likely to cause persons to slip.

38. 1) Every dangerous part of any machinery shall be securely fenced unless it is in such a position or of such construction as to be as safe to every person employed or working in the premises as it would be if securely fenced.

48. No person shall enter or remain in any chamber, tank, vat, pit, pipe, flue, or other confined space, or in any confined space in which dangerous fumes are likely to be present or the proportion of oxygen in the air is liable to have been substantially reduced, for any purpose unless he has been authorised to enter by a responsible person and either he is wearing a suitable breathing apparatus, or he is ensured of a supply of air adequate for respiration and to render harmless any fumes.

66. 1) If any person is killed or suffers bodily injury in consequence of an occupier or owner having contravened any provision of this Act or any regulation made thereunder, the occupier or owner shall be guilty of an offence and liable on conviction to a fine not exceeding two hundred cedis or to imprisonment not exceeding six months, or to both.

75. 1) An Inspector shall, for the implementation of this Act, have power -

- a) to enter, inspect and examine, by day or by night, a factory and every part thereof, when he has reasonable cause to believe that any person is employed therein, and to enter, inspect and examine by day any place which he has reasonable cause to believe, to be a factory, office or shop, and any part of any building of which a factory, office or shop forms part and in which he has reasonable cause to believe that explosive or highly inflammable materials are stored or used.

The Act is enforced by the Factory Inspectorate Office of the Ministry of Employment and Social Welfare. The Inspectorate is relatively small with not more than half a dozen staff and other limited resources. It would be impracticable for them to enforce the minutiae of the Act.

In addition to the Act, all of the British Standards have also been incorporated into Ghanaian law as mandatory standards which must be met. The Standards usually refer to product quality &c., but some relate specifically to safety standards in production. These standards are more specific and exacting than the Act, but there are so many Standards that any consistent enforcement of them would require considerable resources.

The nature of mining, and the importance it has in the Ghanaian economy, means that there is separate legislation for mining. The enforcement of this legislation is covered by the Ministry of Mines.

Trade Unions are legal in Ghana, and some are very active. However, none of the industries visited mentioned trade unionism as having an impact on their HSE policies.

### *Company name*

Ghana Breweries Limited (GBL)  
Kumasi Brewery, Kumasi

### *Summary of visit*

The Kumasi brewery had only recently introduced the position of safety officer, so in order to achieve a complete overview of the HSE situation many individuals involved in the different stage of the process had to be met. This led to the visit being longer than any of the other visits. The brewery is relatively small, and gave generous assistance to the study, leading to a thorough study of the brewery being achieved.

### *Persons met*

Martin Eson-Benjamin, Managing Director  
Peter Vogtlander, Brewing Manager  
Joe Yankey, Electrical Engineer/Safety Officer  
George Paddy, Brewery Accountant  
Assistant Brewer  
Packaging Manager  
Production Manager  
Nurse

### *Business overview*

Kumasi Brewery Limited (KBL) was founded in 1968 as a joint venture between Heineken and Unilever, with the additional support of Ghanaian interests. In October 1997 Heineken bought out Unilever's share to own a total of 50.3 per cent of the shares. In the spring of this year Heineken also bought the larger ABC Brewery, situated in Accra, and this, with KBL, now form the new company Ghana Breweries Limited (GBL). The changes resulting from this take over were not fully developed at the time of the visit, and it proved more satisfactory to view the Kumasi brewery as a single business than as part of a larger corporation.

The brewery produces two brands of lager, and two brands of non-alcoholic malt drink. Approximately 30 million litres of drinks are produced each year and are distributed by a work

force of around 300 permanent workers and 50 casual workers. In 1997 the company made a profit before tax of ¢2 336 million on a turnover of ¢27 327 million (£0.70m, £8.23m respectively).

The lager market in Ghana is small. Per capita consumption is under 4 litres per year and in 1997 the market shrank by 6 per cent. Over this year a strong advertising campaign and lower prices helped KBL to increase its market share over its main competitor Accra Brewery Limited.

KBL cites its values in the 1997 financial report as, "integrity, better shareholder value, excellent quality, highly motivated and empowered people, market leadership and social responsibility".

### *The benefits of the company to its Ghanaian stakeholders*

In 1997 KBL paid ¢637 million (£192 000) in tax to the Ghanaian government. KBL provides employment in Kumasi. Most people in management positions have worked there for 10 to 20 years because they feel the job gives them security, and because there are few opportunities to get a better job. Trained people will take unskilled work in the hope that they can get better positions in the future.

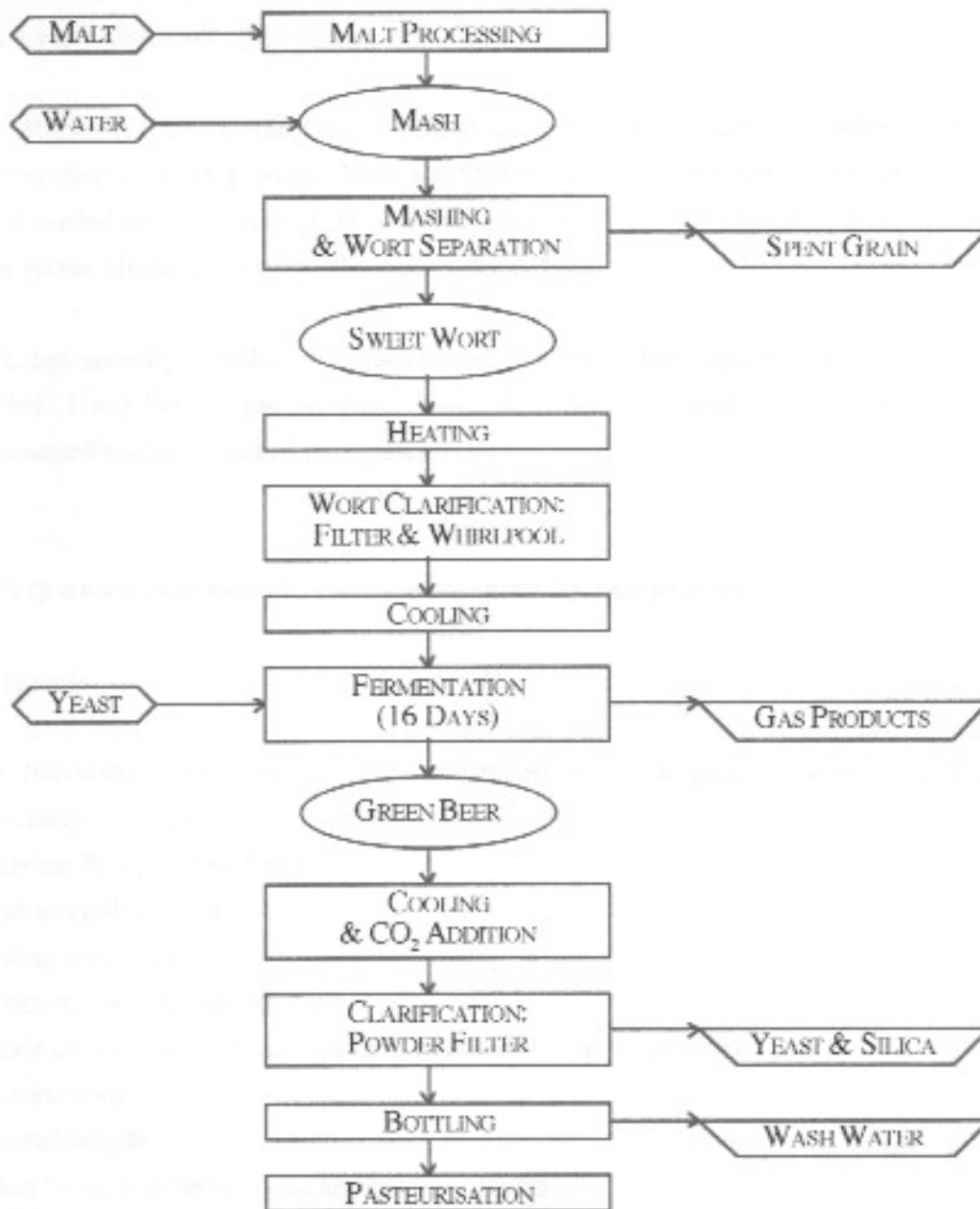
KBL provides money for the local economy through wages paid to employees. Typically these are the equivalent of £940 per year for a permanent worker, £210 per year for a casual worker and £4 600 per year for the top managers.

KBL sponsors about thirty local festivals each year through its Star brand of lager. For the promotion this gave to the tourism industry KBL was awarded a prize by the Ghanaian government in 1997.

Casual workers value their jobs at KBL. Legally they can only be employed for three months, but they will informally arrange to get consecutive casual jobs. Some casual workers have worked there for up to five years. The bottle packers do complain about their working conditions, but all workers are very disciplined out of fear of losing their jobs.

All workers receive workman's insurance which covers sick pay, and receive medical care for themselves and families in the KBL clinic.

*Processes involved*



A schematic outline of the lager making process is shown above. The process for producing the non-alcoholic malt drinks is similar, but does not involve the fermentation.

The process is batch-wise and the liquid is driven under pressure from carbon dioxide to avoid entry of air into the process which may occur with pumps. Malt is delivered to the brewery in 50 kg sacks. The malt is processed to remove any husk, then mixed with water mashed and heated. After periods of heating and agitation, the wort is filtered then passed through a whirlpool to removed all of the solid grain. After cooling the wort has other ingredients added

and is transferred to a fermenter. These stages of the brewing process are mainly automated. A steam utility is used for heating, and alcohol acts as an intermediate refrigerant for the cooling (the actual refrigerant being ammonia).

The interior of the fermenters are manually sterilised with formaldehyde before each use. During fermentation gaseous products leave the fermenter. Once fermentation is complete the beer is again cooled and carbon dioxide is added under pressure. The yeast is then removed using a filter formed from silica dust. The lager is then stored.

KBL has recently introduced a draught lager product, but currently nearly all of the lager is bottled. Used bottles are washed, have old labels removed, filled with lager, crowned, pasteurised and then packed into crates.

### *Safety and acute health issues generated by the process*

#### a) Hazards

The following operations or items associated with the process were identified as being potentially hazardous.

- Moving 50 kg sacks of malt
- Operating steam lines
- Filling the masher
- Cleaning the fermenters
- Floor of brew house is always wet, with hoses often lying across it
- Caustic soda
- Formaldehyde
- Maintenance in brew house and machine house
- Water on floor of beer bottling hall
- Broken glass in beer bottling hall
- Filling crown hopper
- Pressurised beer bottles

#### b) Risk

The risk posed by these hazards can be assessed by considering accident and medical records. On average over the first six months of 1998 there were 46 recorded accidents per month, of which 2 led to a lost time of 10.8 days. In comparison, an average of 5.8 home accidents were recorded, of which 0.7 led to lost time. All of the lost time injuries recorded in April and May of



this year were caused by pressurised beer bottles exploding in the hands of the beer bottling line operators leading to cuts to the body. This was typical of all months, and workers packing bottles from the bottling line into crates suffer the majority of these injuries.

Considering each of the identified hazards in turn,

- Moving 50 kg sacks of malt - currently these sacks are carried manually which poses a significant risk of workers getting a hernia.
- Operating steam lines - all valves on the steam lines are pneumatic so the risk of an operator mistakenly opening a steam valve are reduced. Operators also seemed to be aware of the hazard.
- Filling the masher - operators were aware of the danger of falling into the masher.
- Cleaning the fermenters - this is recognised as a hazardous procedure. A worker must climb a ladder into the fermenter from below and manually clean the fermenter with formaldehyde. To prevent asphyxiation the fermenter is purged with air for thirty minutes to displace the carbon dioxide before the cleaner enters. To reduce the risk of falling the cleaner is harnessed to the ladder. To make the task less cumbersome, the ladder can rotate around the inside of the fermenter.
- Floor of brew house is always wet, with hoses often lying across it - care must be taken when walking around the brew house. Hoses can be stored when not in use to prevent unused hoses lying across the floor.
- Caustic soda - a visual warning is painted onto the storage tank. After recent maintenance to remove the level indicator, the outlet to which it was attached was not blanked off until it was noticed by a senior manager. Had the tap on the outlet been accidentally opened caustic soda would have sprayed over the operator.
- Formaldehyde - suitable protective equipment is used by the cleaner.
- Maintenance in brew house and machine house - this is the area where maintenance to plant most frequently has to be carried out. Currently no permit to work system is implemented, although attempts are now being made to draw up a suitable system.
- Water on floor of beer bottling hall - makes the floor slippery. The risk from falling is greater than would normally be the case since there is often broken glass on the floor. To reduce the risk the official practice is to clear all broken glass from the floor, although some was evident during the visit.

- Broken glass in beer bottling hall - the main risk is from pressurised bottles exploding, especially at the packaging stage. Here the bottles have just undergone a thermal shock during pasteurisation, they receive knocks as they are moved from a conveyor to the crate, and are in close proximity with workers as the task is performed manually. Crate packers are obliged to wear the protective aprons, safety masks and gloves which are provided. Enforcement and use of this equipment has increased over recent years, although purchasing difficulties mean that inferior equipment currently has to be used. Uncomfortable working conditions in the hot dry season give workers an incentive not to use the protective equipment.

- Filling crown hopper - this was not recognised as a hazardous procedure, although it involves a worker standing on a wobbly scaffold platform and leaning over a hopper and filling it with crowns by hand.

### *Company approach to these issues*

The arrival of a new Brewing Manager, Peter Vogtlander, from Heineken six months prior to the visit has led to an assertive effort to improve the HSE practices in the brewery. At the time of the visit an effective health and safety system was being created. Rather than having a policy, certain health and safety practices are stipulated and enforced.

Before the arrival of Peter Vogtlander little active enforcement of safety practices was carried out. As a Dutch manager, he had been accustomed to working within European standards of health and safety practice. Arriving at KBL he found the practices unacceptable, and the conditions of work for the bottle packers "inhuman". However, he also found that practises could not be changed in the same way as they would be in Europe. This is due to both economic and practical reasons.

The brewery does not generate a great deal of money, therefore expenditure and investments must be carefully considered to ensure that they enhance the brewery's performance. With suitable investment the brewery could operate with around one sixth of the current number of employees. This would improve health and safety conditions as well since more of process would be automated, so fewer people would be exposed to the hazards. However, with the low cost of labour in Ghana such increases in productivity would have a pay back period too long to make them attractive. Further, potential political and economic instabilities increase the risk of long term investments and significant political problems would be faced if the majority of the work force were made redundant.

The fiscal restrictions also mean that minor expenditures, such as on safety equipment, are not made as freely as they would be in Europe. For example, not all employees are provided with safety boots, instead people will often work in flip-flops. Also items such as non-slip mats cannot be purchased.

Obtaining such safety equipment also presents a problem for the company; it is not just a question of contacting a local supplier as in Europe. At best equipment will have to be bought in the capital, Accra. Often it has to be imported specifically.

Major barriers to the introduction of changes lie in communication problems. The majority of the workforce, and all of those who are most frequently exposed to hazards, are illiterate and can only speak local languages. The local language, Twi, is not suitable for conveying detailed technical information. For example the closest corresponding word to "safety" is "carefulness". This makes the task of explaining hazards and safe systems of work difficult. Often hazard warnings have to be over stated with visual signs.

Despite these problems, a series of improvements was being introduced at the time of the visit. Prior to Peter Vogtlander's arrival management would not wear protective equipment in designated areas; this was one of the first things to be changed. Regular management safety meetings are now held, the role of a safety officer is being developed and a newsletter is in the pipeline. These initiatives are designed to develop a consciousness of safety within the brewery, rather than just obedience to the rules. Also some small expenditures can be made which will make a significant difference, such as improving transport methods for malt sacks and improving the use of protective equipment.

The electrical engineer, Joe Yankey, has taken on the additional role of safety officer. At present the management know about safety performance through safety meetings. At the time of the visit Joe Yankey was compiling data to present on safety notice-boards to increase knowledge amongst the workforce.

#### *Environmental and long term health issues generated by the process*

- Handling silica dust
- Noise in machine house
- Effluents from production process

### *Company approach to these issues*

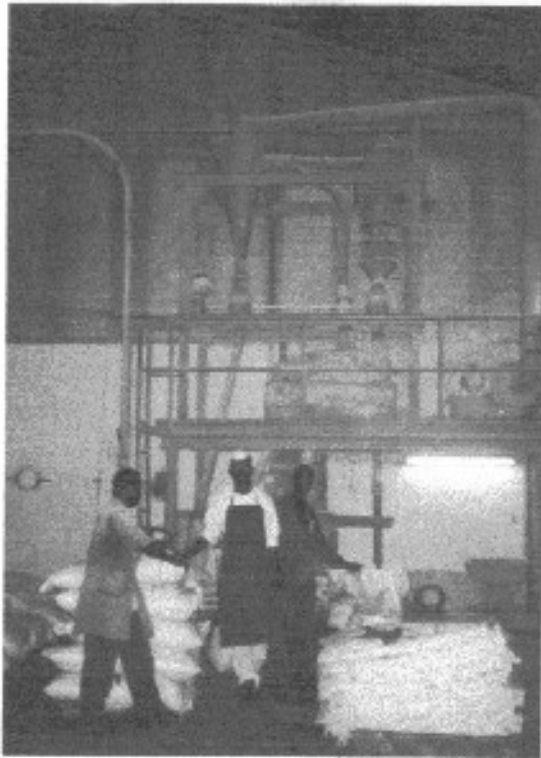
- Handling silica dust - long term exposure to dusts can lead to the development of silicosis. When emptying sacks of dust workers are required to wear dust masks. These masks were provided, but not systematically used.
- Noise in machine house - compressors and furnaces are the main source of noise. Most of the workforce in this area wear ear protection.
- Effluents from production process - spent grain is sold as animal feed; yeast/silica mixture is discarded; detergents are mainly recycled in bottle washing; gaseous emissions from fermentation are scrubbed before being released to atmosphere; boiler emissions are released to atmosphere. Liquid effluent is discharged straight into a river, which further downstream is used as drinking water.

Prior to the visit KBL had recently had an environmental loading audit carried out by a consultancy, and were costing various options to reduce the biological oxygen loading (BOD) of the effluent. KBL is not under pressure from either the Environmental Protection Agency or the local community, but wants to improve its performance to be ahead of any new legislation which may be introduced and to bring its standards more into line with Heineken's European operations.

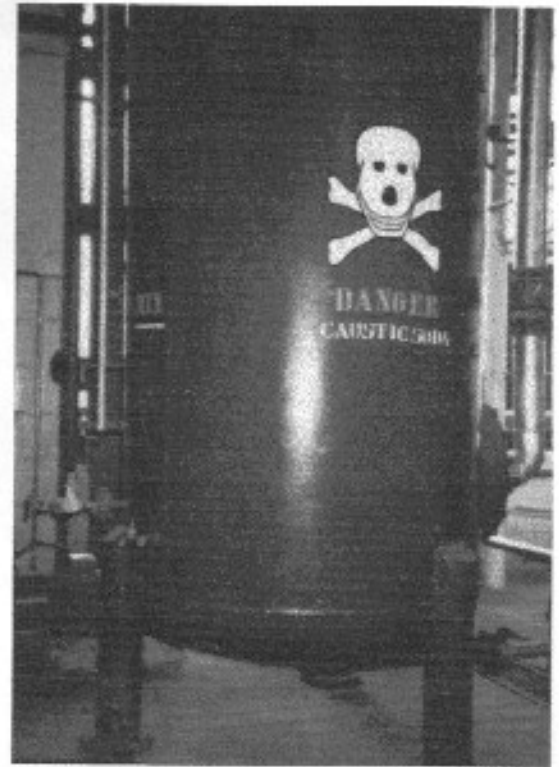
### *Images*



Typical safety signs; visual warning have to be used to overcome workers' illiteracy



**Malt processing;** sacks of malt are carried manually



**Caustic soda tank;** maintenance work was carried out without safety considerations



**Open fermenter before cleaning;** hoses snake across wet floor, ladder rung is loose



**Beer bottling line;** in the background is the crown hopper and scaffold platform



**Packing bottles into crates;** a variety of protective equipment is in use

### *Company name*

Intermediate Technology Transfer Unit (ITTU)  
Suame Magazine, Kumasi

### *Summary of Visit*

A brief visit was made.

### *Persons met*

Mr Crossman Hormenoo, Workshop Manager

### *Business overview*

Suame Magazine is an area of Kumasi which has been devoted since 1961 to the artisan repair and production of cars and car parts. It currently covers an area of 75 acres and provides employment for around 100 000 of Kumasi's residents.

The ITTU's aim is to develop and promote new products (metal sheet benders, potters wheels, brick maker etc.) and technologies (dated European equipment is provided to clients on a hire-purchase basis) which can be produced and used economically by the artisans within Suame Magazine. It is based around a workshop, and run by the Kwame Nkrumah University of Science and Technology in Kumasi. The ITTU hopes to make its operations self-financing, but currently still relies on a subsidy.

### *The benefits of the company to its Ghanaian stakeholders*

Suame Magazine provides an important service to all vehicle owners, not only in Kumasi but from all parts of the country as well as the neighbouring countries of Burkina Faso, Ivory Coast and Togo. Suame Magazine provides a livelihood for a large section of Kumasi's population, especially the young with little education.

The ITTU has made an impact by increasing the range of products and the level of technology used to make them. It has a workforce of about 10 people.

### *Processes involved*

All production and product development is labour intensive, using only basic machinery such as lathes, grinders drills etc. A small foundry is currently being developed which melts down broken up engine blocks and then makes casts in sand.

### *Safety and acute health issues generated by the process*

#### a) Hazards

There are few hazards which are specific to the activities carried out at the ITTU. The low level of technology gives rise to only the most common hazards; noise, moving parts of machines, hot materials, electricity &c.

#### b) Risk

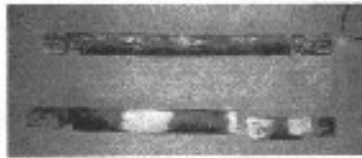
The risk posed by the hazards are mainly posed to the machine operator, certainly only to people in the workshop. Usually there will be two small injuries, such as cuts, in a month. The risks are somewhat reduced by the occasional use of protective equipment.

### *Company approach to these issues*

There is no health and safety policy. Economic survival is the main priority of all the enterprises in Suame Magazine. The workshop manager will encourage people to use protective equipment when they can, especially younger workers with less experience. The approach to health and safety is shaped by reaction to past accidents.



*Images*



**ITTU products;** (clockwise) sheet metal bender, press, replacement cast for broken part, potter's wheel



**Typical workshop scenes;** lathe and grinder

### *Company name*

Logs and Lumber Limited (LLL)

Kumasi

### *Summary of Visit*

The visit consisted of discussions with a number of managers and a tour of the site. LLL is a typical example of a large wood processor.

### *Persons met*

Mr Avedis Jeghalian, Managing Director

Mr Rober Sagoe, Personnel Manager

Mr Newton Akrofi, Insurance Manager

Sawmill Production Manager

Nurse

### *Business overview*

LLL is a privately owned by a Lebanese man. The company is involved in the production and export of wood products. Wood cutting started on the site during the 1950s, but was redeveloped after being bought by the present owner in 1968. LLL fells its own timber, usually a type of white hardwood locally called wawa, then either cuts it into planks or takes a veneer from the trunks. Planks are seasoned in a kiln and some are treated with a creosote, the veneer is further processed then bonded together to form plywood.

LLL has a turnover of around US\$12 million per annum, processes 2500 to 3000 cubic metres of wood each month and employs a workforce of about 1 200.

### *The benefits of the company to its Ghanaian stakeholders*

The company provides employment, and health care to its employees and their families. Wood exports are of major importance to the Ghanaian economy, but there are many relatively small producers which make up the wood industry diminishing their individual importance.

### *Processes involved*

All of the wood processed is felled in virgin Ghanaian forests, then transported to the site by lorry where trunks are cut with chain-saws to lengths which can be processed. The timber products are straight forward to produce; the trunks are cut into planks with large band saws which are then seasoned in kilns ready for shipping.

Plywood production is a slightly more involved process. Trunks are turned down in preparation for veneering. The veneer is cut into lengths which are treated. Following this the sheets are covered in glue and laid with grain in alternating directions, then processed through another machine which compacts the layers of veneer to produce plywood.

### *Safety and acute health issues generated by the process*

#### a) Hazards

The process necessarily involves the use of many cutting machines, and the movement of many heavy trunks.

#### b) Risk

Injuries from cutting machines or during the process of moving trunks are frequent. Typically there will be one serious injury per month ranging from broken bones and lacerations to death.

### *Company approach to these issues*

LLL's approach to safety is mainly determined by the enforcement of Government legislation. Workers are insured, which provides them with sick pay if they cannot work through accident or illness. Records are kept of all lost time accidents. These records are checked when factory inspectors visit, which is usually about once per year or after a serious accident. A small amount of generally old and worn protective equipment is used in the most dangerous situations.

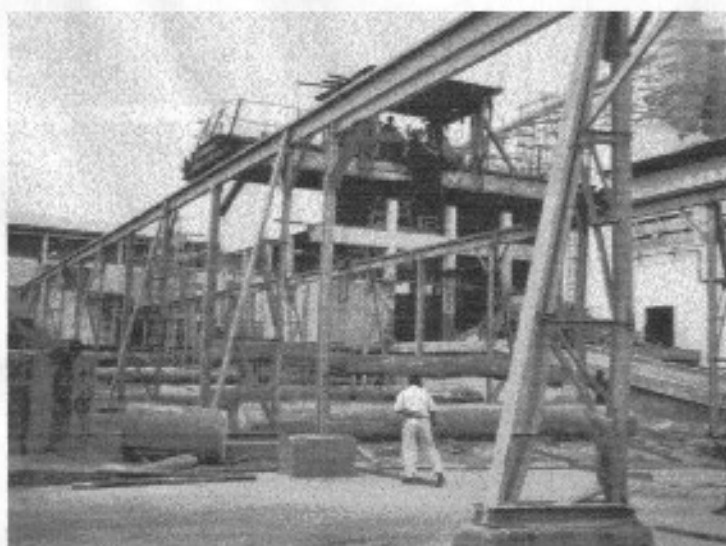
The processes involved are inherently hazardous. The low cost of labour means that much of the work done around the plant is manual. When there are many people working in a hazardous environment it is inevitable that accidents will occur. There is little protection for the workers from the hazards, for example the use of guards on cutting equipment was not widespread, so frequent accidents occur. The nurse reported that there were small machine cuts almost daily.

The situation is not considered to be problematic by anyone spoken to, partly because injury rates are higher in the bush where the trees are felled.

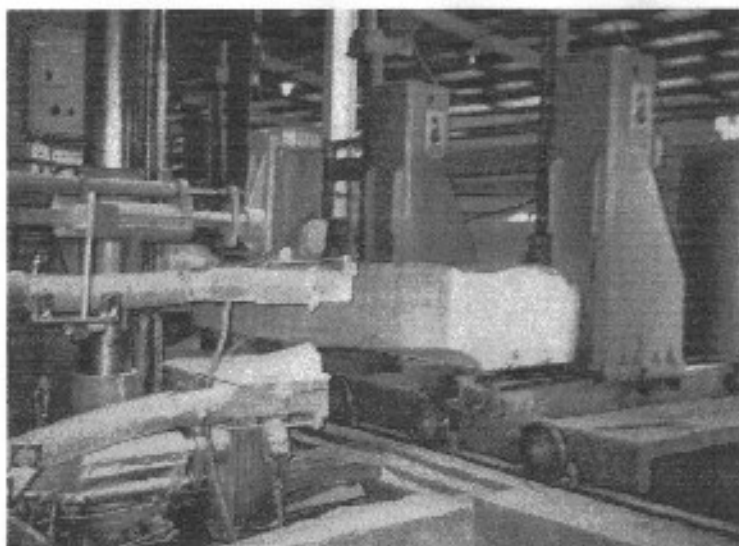
### *Images*



Trunks are brought from the bush to the site on articulated lorries

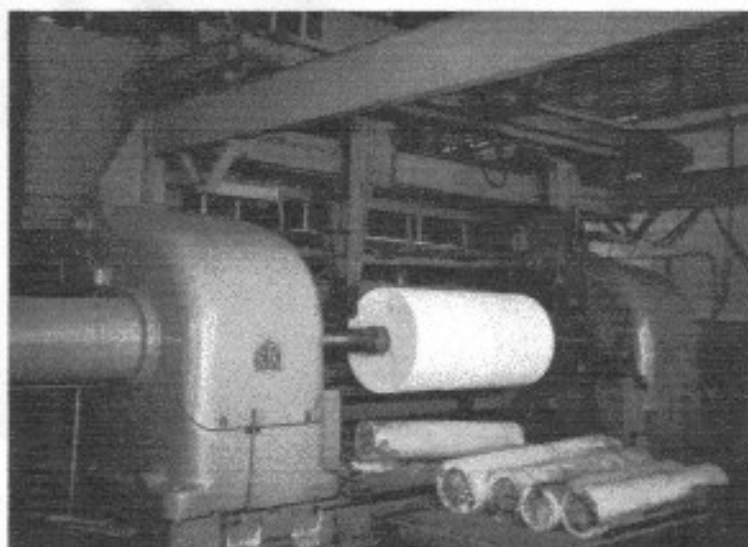


Cranes transport trunks which have been cut to length into the mill

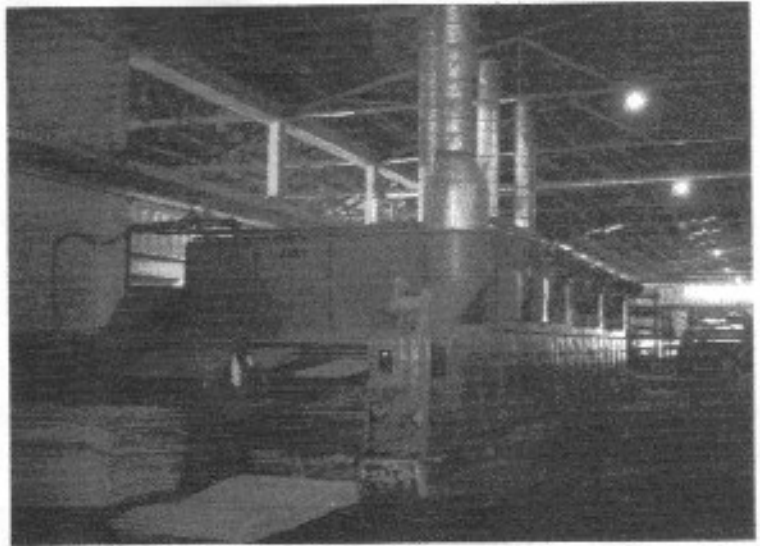


Some trunks are cut into planks with hand saws ...

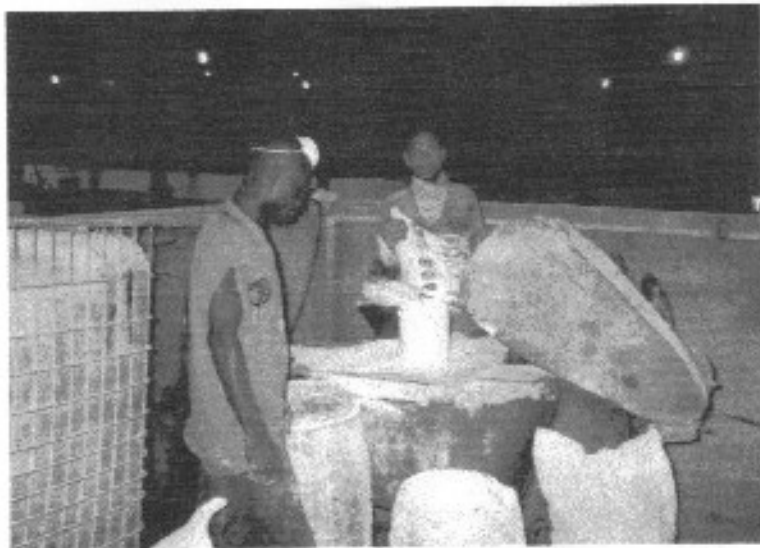
... the rest are prepared for veneering



A worker clears scraps from under the veneering machine



Veneer is processed before it can be bonded



Workers mix the glue used to bond the veneers

### *Company name*

Ashanti Goldfields Company Limited (AGC)

Obuasi

### *Summary of Visit*

AGC has an established loss control department and environmental unit. The size of the company and its operations made it difficult to study company practices in detail. More general observations were made during two visits.

### *Persons met*

Mr Sekyi, Senior Public Relations Officer

Mr I. K. Mensah-Brobbe, Loss Control Manager

Mr J. K. Boabeng, Safety Engineer

Environmental Supervisor

### *Business overview*

AGC is involved in gold mining operations and exploration. AGC is the largest African gold mining company outside South Africa. The company was floated on the London and Ghana Stock Exchanges in 1994, raising \$454 million, and in February 1996, it became the first African company to list on the New York Stock Exchange. The company is also listed on the Toronto Stock Exchange.

The company has around 10 000 employees, and has been strike-free since 1985. However the company has to contend with protests and riots by small independent miners. 45 per cent of AGC is owned by Lonrho Plc. The Ghanaian government is also a major shareholder. AGC has interests in many smaller companies.

While 1994 AGC output was 853 740 ounces, 60 per cent of Ghana's production, capacity has been increased above one million ounces per annum through the streaming of a sulphide treatment plant and a further biological treatment plant (the largest in the world), which now processes 40 per cent of Obusai throughput.

Gold production by Ashanti mines in 1996 amounted to 1 028 597 oz. Of the total production, 860 384 was from the Obuasi mine in Ghana. The underground operations are being expanded from 350 000 ounces per annum to 750 000 ounces per annum over five years. AGC's surface mining operations at Obuasi constitute the largest open cast gold mine in Africa, producing over half a million ounces of gold in 1995. A new shaft, the Stonewall Shaft, is being installed as production shifts from surface operations to underground in order to continue increasing production.

The 474 square mile Obuasi concession has been mined for one hundred years. There are currently twenty years worth of known reserves, and further reserves are found each year.

An extract from AGC Ltd audited accounts for the year ending December 31, 1997, is presented below.

	1996	1997	% change
Turnover (US\$ m)	531.3	458.7	+ 15.8
Operating profit (US\$ m)	78.9	81.4	- 3.1
Net profit before tax (US\$ m)	55.7	60.1	- 7.3
Gold production (ounces)	1 169 156	1 028 597	+ 13.7
Cash operating cost per oz (US\$)	254	252	+ 0.8
Average realised price per oz (US\$)	450	443	+ 1.6

### *The benefits of the company to its Ghanaian stakeholders*

Gold accounts for around half of Ghana's exports. AGC produces the majority of the gold in Ghana, making it one of the most important companies in the country. The company pays the government \$15m per annum for the right to mine the Obuasi concession. AGC also pays royalties to the local chiefs.

The degree of mechanisation in the mines means that the workers have to be relatively skilled. This, along with the need to counter the temptation workers have to steal gold, means that the 10 000 workforce are well paid by Ghanaian standards. AGC provides health care for its employees and family, a school for employees children, and other amenities. This makes working for AGC desirable for many Ghanaians.



### *Processes involved*

The largest task in gold production is mining the ore, although this is a relatively simple process, and is much the same for both surface and underground mining. Ore is blasted from the mine face and then transported to a gold extraction process. Also some tailings from previous, less efficient, mining operations are processed. The gold content of the ores ranges from 3 to 20 grams per tonne.

The type of processing required depends on the nature of the ore. Some ore contains gold in its free form. This ore can be crushed, and then leached with a dilute cyanide solution in which the gold dissolves. This "pregnant" solution is passed through a carbon adsorption column which removes the gold from solution. The carbon is stripped with alcohol elution, and the gold is electro-deposited onto steel wool cathodes. The gold is then smelted to produce bullion.

Some ores contain gold in an association with sulphur. Before the gold can be removed with cyanide solution, its association with sulphur must be broken. Two alternative processes can be used to achieve this. Traditionally it has been carried out at the Pompora Treatment Plant (PTP) where crushed ore is roasted at around 600 degrees Celsius. This oxidises the sulphur, thus freeing the gold. The roasting also has the effect of subliming arsenic trioxide which occurs naturally in the rock. An arsenic removal plant (ARP) has recently been installed to deal with this problem. A new biological oxidation process at the Sulphide Treatment Plant (STP) has been brought on line over the past few years. Biological oxidation avoids subliming the arsenic, but involves the use of large amounts of acid to control the pH.

### *Safety and acute health issues generated by the process*

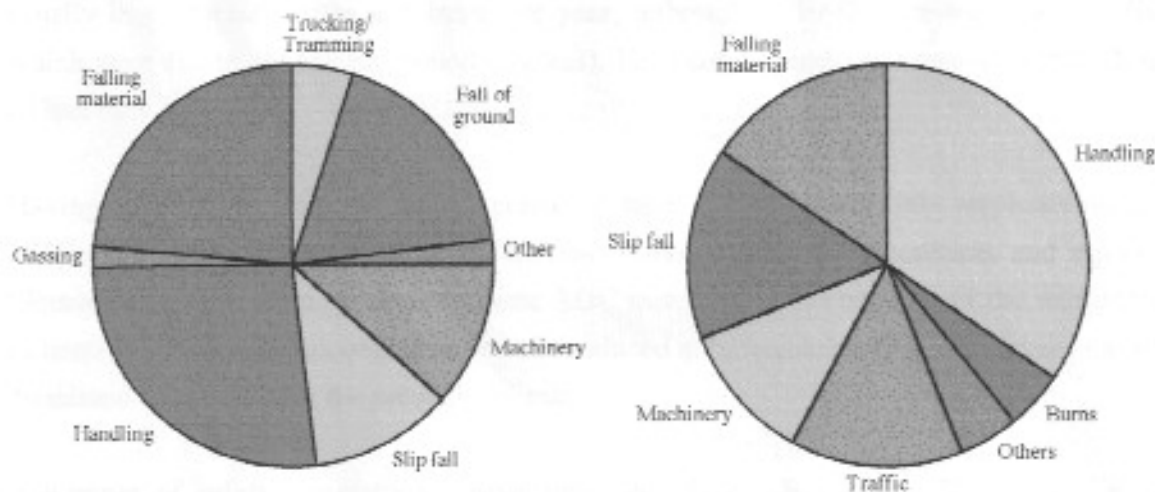
#### a) Hazards

There are many hazards associated with mining, more with underground mining than surface mining. Underground mines face the danger of falling rock, working in dark confined spaces in the presence of heavy machinery. Blasting produces a poisonous atmosphere in the blast area. Power cuts have severe consequences as lighting and ventilation systems are electrically powered. Explosives are regularly used and handled.

The ore processing introduces more hazards, mainly involving the use of dangerous chemicals.

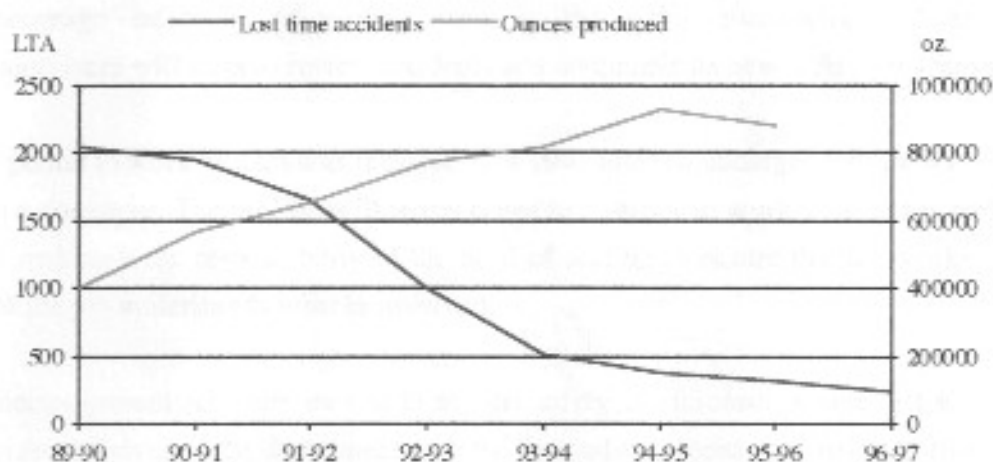
## b) Risk

In 1997 there were a total of 177 lost time accidents underground and 64 on the surface. The breakdown of how these accidents occurred is shown below.



Breakdown of accident type; a) underground

b) surface



Gold production and lost time accidents 1989/90-1996/7

### *Company approach to these issues*

Over the past seven years the management of AGC has put a much greater emphasis on health and safety issues. Factors which have given rise to this emphasis include pressure from international lenders and the need to increase productivity and production. Safety comes under the remit of the Loss Control Department which was set up in 1993, and currently has nine

senior and six junior staff. Prior to the Loss Control Department there was a single safety officer whose main function was to investigate accidents.

Inspectors from the Ministry for Mines visit Obuasi every Tuesday, and they will also investigate any accident which causes death or more than fourteen days of lost time. There are usually less than ten deaths at Obuasi per year, although in 1997 there were twelve (five of which were due to one falling ground incident). The Loss Control Department aims to eliminate all lost time accidents.

Having operated the mine for a long period of time with relatively little emphasis on safety, AGC have encountered difficulties in making workers use new procedures and equipment. Illiteracy and alcoholism are also problems AGC face; around 60 per cent of the workforce are illiterate. Since random alcohol tests were introduced in November 1997, 50 workers have been dismissed for being over the prescribed limit.

A number of safety programmes have been introduced. For every 50 workers a safety representative is elected. The safety representative must identify problems in their areas and report them to the Loss Control Department who then follows them up. The representative also carries out monthly inspections of their area using a check list. This system also aims to encourage safety consciousness amongst the junior management. Every few months supervisors will meet to review accidents and communicate new safety programmes.

A permit to work system was introduced in 1991 after an underground fire was caused by work on a conveyor. The problems illiteracy poses to a permit to work system are partially overcome by making it the responsibility of the head of section to ensure that the worker who will carry out the job understands what is involved.

Encouragement schemes are run to nurture safety consciousness amongst all of the workers. Prizes are given to the department with the best safety record each quarter. Bonuses will be cut if lost time accidents occur in a section. Individuals are charged for any damage they cause to vehicles and workers are punished for not using the correct protective equipment (correct use of which is said to be around 85 per cent).

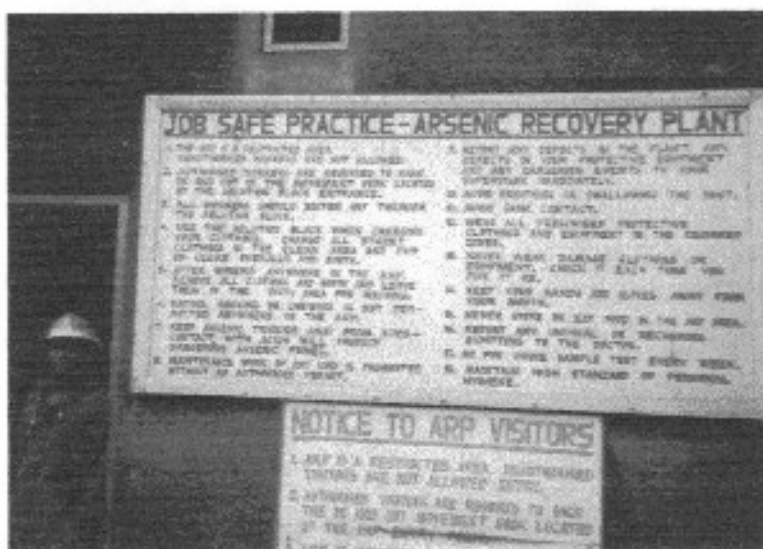
*Images*



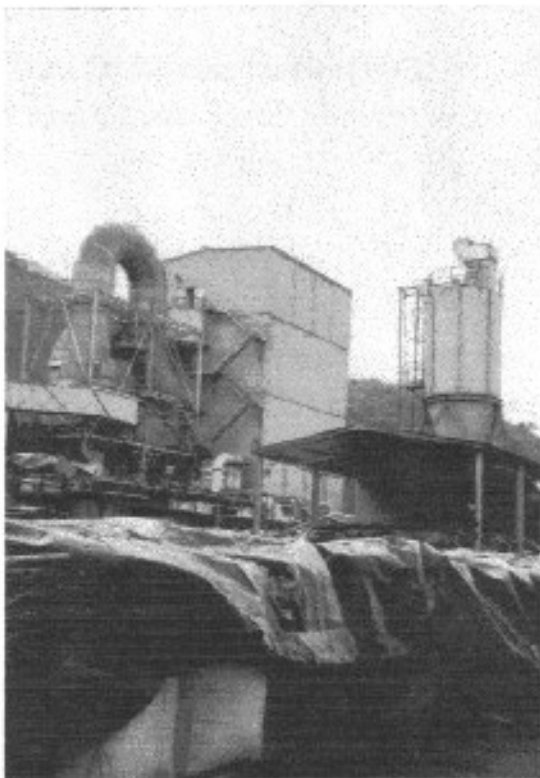
**Safety signs at entrance to PTP**



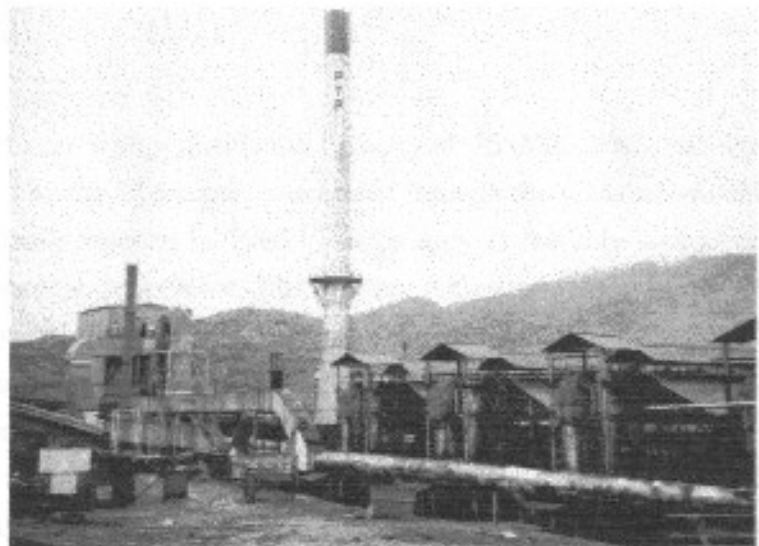
**Roasters at the PTP**



**Entrance to ARP; workers take nothing across the boundary of the ARP and shower on leaving to help prevent any arsenic escaping from the area**



**ARP;** sacks of removed arsenic trioxide can be seen in the foreground awaiting removal



**View of PTP;** until recently the landscape downwind of the stack was bare as a result of arsenic poisoning

### ***Company name***

Tema Oil Refinery Limited (TOR)

Tema, Ghana

### ***Summary of Visit***

TOR has a very active safety department, centred around their fire station. The majority of the visit was spent with the Safety Officer and with the Environmental Officer.

### ***Persons met***

Dr Aidoo, Deputy Managing Director (Operations)

Mr Robert Morose, Head of Safety

Dr Addison, Occupational Physician

Environmental Officer

### ***Business overview***

TOR is a topping and reforming refinery with a distillation capacity of 45 000 barrels per day (bpd). The refinery is entirely owned by the Ghanaian government through the Ghana National Petroleum Company and was originally opened in 1963. The refinery is the sole source of supply to Ghana, thus giving it a strategic importance. The refinery typically runs on imported Bonny Light/Brass River crudes from Nigeria and produces gasoline, kerosene, gas oil and low sulphur straight fuel oil for markets in Ghana and neighbouring states. The refinery also produces excess fuel oil which it occasionally sells to Europe and the USA.

The distillation capacity was upgraded from 25 000 bpd to 45 000 bpd in 1997 and the heat exchanger and pumping facilities were replaced or modified. The upgrade was financed and constructed by a South Korean consortium led by Sunkyong. However during start-up following the upgrade, a major fire broke out. The refinery has only recently been brought back on-line.

TOR employs around 300 people.

### *The benefits of the company to its Ghanaian stakeholders*

TOR is of great importance to Ghana's economy, infrastructure and daily livelihood of all Ghanaians. Perhaps it is for this reason that it is still wholly government owned when over the last decade the government has pursued a policy of privatising all nationalised industries. As TOR's motto says, "We have kept Ghana moving for 35 years".

### *Processes involved*

Crude oil is shipped to Tema port, then pumped down a pipeline to the refinery 8 km away where it is stored. The crude oil is then distilled into its components and each is sent to its respective storage unit. Since TOR is the only supplier for Ghana, large stores of crude and product must be kept to allow any changes in crude supply, product demand or refining capacity to be absorbed.

### *Safety and acute health issues generated by the process*

#### a) Hazards

Dr Addison has lined the hazards encountered at TOR as,

- Fire and explosion
- Physical hazards
  - Noise
  - Heat and cold
  - Vibrations
  - Electricity
  - Radiations (ionising and non-ionising)
- Chemical hazards
  - Acids and alkalis (sulphuric acid, sodium hydroxide, ammonia)
  - Aromatic hydrocarbons (benzene, toluene, xylene)
  - Tetra ethyl lead
  - Carbon disulphide
  - Carbon tetrachloride
- Biological hazards
  - Bacterial infections

- Viral infections
- Fungal infections
- Parasitic infections
- Poisonous bites (snakes and scorpions)

#### b) Risk

If an explosion or fire is allowed to occur, it is likely to be very serious; to life, plant and, if supply of TOR's products is disrupted, to the people and economy of Ghana. This risk is associated directly with the first three hazards highlighted, and also the fourth in that a power cut can easily lead to situations where fires and explosions can occur if it is not responded to immediately.

Workmen are at risk of radiation exposure during weld checks. A small number of people are at risk, but a high accidental exposure is likely to cause death. Workmen are at risk of poisoning during handling of tetra ethyl lead, added to petrol to increase the octane level. Tetra ethyl lead can be absorbed through the skin, so any spill which has contact with a worker is likely to cause death.

#### *Company approach to these issues*

Perhaps because of its unique position in Ghana's economy, TOR has an atypical approach to its business. A visitor is struck by the general degree of informality, such as two visitors having to share one visitor's badge, but also by the tight safety policy which is enforced. TOR does not have the short term need to increase productivity and economic competitiveness as non-government owned companies do, but the nature of the hazards and the importance of TOR to the economy mean that an effective safety policy must be implemented.

TOR's current written safety policy was produced in 1993, and was the first such policy TOR has had. The policy covers general safety, security and emergency procedures. The safety department is centred around TOR's fire station, located centrally within the plant. The head of the safety department has held the position since 1990. Prior to this he spent 13 years in TOR's security department.

The safety department actively enforce the safety policy, and they are very much involved in and aware of what is happening on site. Work permits for all maintenance tasks are renewed daily. All work involving an open flame is overseen by a member of the fire department.



A degree of safety has also been built into the plant. All storage containers are surrounded by bunds which are designed to contain the volume of the tank. Three pumps are installed to supply sea water through the sprinkler system in case of fire, one of the main purposes of which is to cool storage vessels. A backup supply of water is stored on site. Hydrants and fire-fighting equipment are located at many places in the most dangerous areas of the plant. Wastewater passes through an oil separation system to prevent any hydrocarbon leaks finding a source of ignition outside of the plant. Sections of the plant are classified on a scale of 0 to 2 depending on the likelihood of an explosive atmosphere being present, although areas are not demarcated.

TOR employs mainly a reactive response to the hazards involved in their operations. Less emphasis is put on developing a safety consciousness amongst the workforce. Nearly all of the workforce are said to be literate which enables an effective permit to work system to operate, and all of the workforce go through a two week induction course. There is little structure for communication of safety issues within the company, the regular safety committee meetings outlined in the safety policy do take place. There is no worker incentive scheme run to encourage work to be carried out safely.

Safety boots are provided to all of the workforce, and replaced yearly. Other personal protective equipment is issued to workers. Contractors often present a problem as they are not used to using permit to work systems. Also, it is often the case that a contractor worker will be paid less for the job than the safety equipment would cost which he should be using. TOR does not issue safety equipment to contractors lest they steal it.

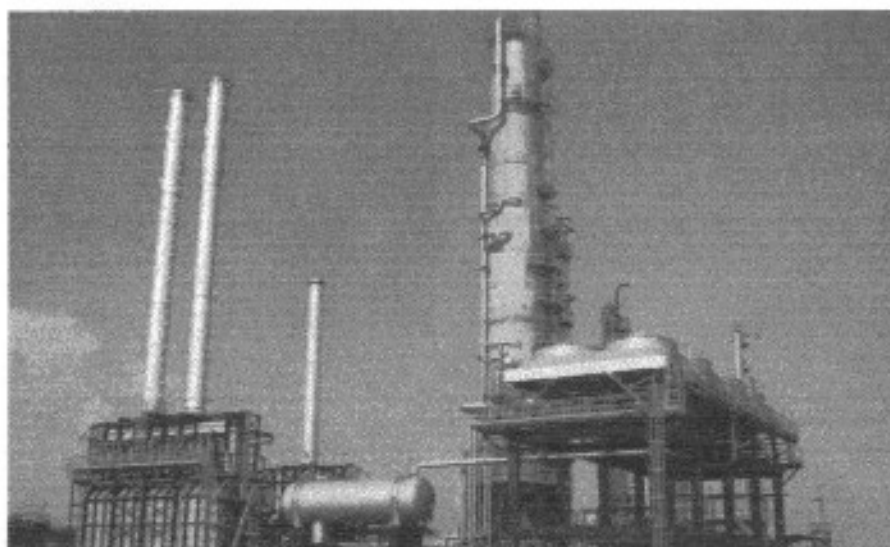
Those who work with radiation wear two radiation badges. One gives a daily exposure, the other monthly. The monthly counter is sent to government laboratories to be read, but TOR does not receive the results. Tetraethyl lead used to be transported in drums which gave rise to the possibility of spills when they were emptied, recently a system was introduced where it is transferred through hoses. Before the new system was introduced, workers who handled tetraethyl lead had half yearly medical check-ups.

TOR's products are transported around the country by road tankers operated by the distribution company. These are often in poor condition. Before tankers can come on site they must show that they can start first time, and that their brakes work. This is intended to ensure that in case of an emergency the site can be cleared without delay.

There have been two fires in TOR's recent history, one in 1988 and one in 1997. The 1997 explosion and fire claimed two lives, caused US\$10 million of damage, and put the refinery off line for almost a year. The explosion occurred during start up after a retrofit had been carried

out. A hazard and operability (HAZOP) study had been carried out on the new plant. However, the full impact of the changes on associated parts of the plant were not fully considered. A vessel containing hot hydrocarbon was filled by a pump after the retrofit, rather than by gravity pressure as it was before. The operator had not anticipated the vessel filling faster than it had before and allowed it to overflow. The relief pipe was the same diameter as the inlet pipe, so it was inevitable that a pressure build up occurred in the vessel. A leak occurred, which then found a source of ignition.

### ***Images***



**A view of the refinery**

### ***Company name***

Unilever Ghana Limited,  
Lever Brothers (Ghana), Tema, Ghana

### ***Summary of Visit***

A relatively brief visit was carried out to the Lever Brothers plant in Tema, a division of Unilever Ghana Limited. All of the time was spent with the Safety Engineer and the doctor.

### ***Persons met***

Mr Gershon Odum, Safety/Environmental Engineer  
Dr K. Sarkodie, Occupational Health Physician

### ***Business overview***

Lever Brothers (Ghana) was established in 1958 and manufactures cooking oils, margarines, soaps and detergents, predominately for the domestic market. It is a division of Unilever Ghana Limited. Unilever's has this corporate statement,

Our purpose in Unilever is to meet the everyday needs of the people everywhere - to anticipate the aspirations of our consumers and customers and to respond creatively and competitively with branded products and services which raise the quality of life.

Our deep roots in local cultures and markets around the world are our unparalleled inheritance and the foundation for our future growth. We will bring our wealth of knowledge and international expertise to the service of local consumers - a truly multi-local multinational.

Our long-term success requires a total commitment to exceptional standards of performance and productivity, to working together effectively and to a willingness to embrace new ideas and learn continuously.

We believe that to succeed requires the highest standards of corporate behaviour towards our employees, consumers and the societies and world in which we live.

This is Unilever's road to sustainable, profitable growth for our business and long-term value creation for our shareholders and employees.

The Lever Brothers division employs 800 to 900 people, mainly on a permanent basis although seasonal market variation means some employment needs to be casual. A Senior Secondary Certificate (SSC, similar to GCSE) is usually needed to work at Lever Brothers.

Detergents are the main business of the Group contributing 42 per cent to 1997's turnover. Lever Brothers food products have a 30.5 per cent share of the market, although they have to compete against large inflows of uncustomed imports. A section of the 1997 financial report is shown below converted into sterling (the company is the core operations without subsidiaries which make up the group),

	1997	1996
Company turnover (£ m)	57.0	60.9
Operating profit (£ m)	6.3	6.9
Net profit before tax (£ m)	6.9	5.2

### *The benefits of the company to its Ghanaian stakeholders*

Unilever is a major employer providing incomes and health benefits to many families.

Unilever's products are used by all Ghanaians. If Unilever improve its products without increasing their price, then the quality of life of Ghanaians' will improve.

### *Processes involved*

The main ingredients are palm oil and caustic soda. The products from fractionating palm oil can be used for margerines and, when used with caustic soda, soap production.

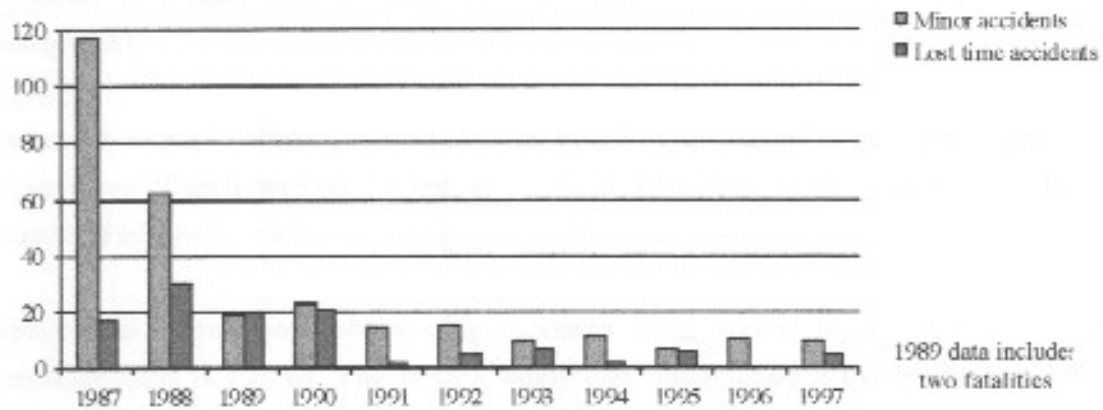
### *Safety and acute health issues generated by the process*

#### a) Hazards

The processes carried out at Lever Brothers tend not to give rise to any hazards which are notably different from what would be expected in all industries.

## b) Risk

It can be seen that the accident risk to workers in the plant has decreased significantly over the past eleven years.



**Lever Brothers (Ghana), Injury accident statistics 1987-1997**

### *Company approach to these issues*

Unilever state that they apply a consistent standard across all of their operations, world-wide. This is very much in evidence at their Lever Brothers plant in Tema. The safety engineer reported that the application of these standards is not always economical due to the lost labour cost and small fines in Ghana, but they believe that having a consistent policy is also important for public relations which will affect the future competitiveness of the company.

Like most plants in Ghana, Lever Brothers dates from the period of industrialisation during the 1960s. Unlike many plants built then, it has been well maintained and good housekeeping is in place. Demarcation lines, of various types, run throughout the plant. Unilever's safety policy is clearly on display. Clean protective equipment is used consistently by workers, visitors are given safety shoes and smocks to wear when touring the plant. The factory has currently been running for 288 days without an accident leading to lost time.

This situation, comparable to a European factory, has only been arrived at relatively recently. A large reduction in accident rates has been achieved over the last seven years; prior to 1991 there was not a commitment to safety within the management.

Since 1991 a significant safety program has been implemented to improve the safety record, and to increase the safety awareness of the workforce. Safety results must be reported to Unilever's

international headquarters quarterly, and a 10 per cent reduction in accident rate is expected from Lever Brothers each year.

The first line of action taken in improving safety standards is hazard elimination. This is achieved through educating the workforce to become aware of hazards, and then motivating the workforce to report them. Hazards are also spotted through regular audits carried out by management.

If a hazard cannot be eliminated then the risk posed by the hazard is reduced by provision and enforced use of protective equipment, and through educating workers as to the nature of the hazard and how/why the protective equipment should be used.

Departmental committees hold weekly meetings from which reports are circulated. The attendance these is rotated. The factory safety committee, chaired by the Technical Director, meets monthly and is comprised of people from the departmental committees.

Competitions are used to promote awareness and an active safety consciousness amongst the workforce. After a week of a new safety slogan being publicised a randomly chosen worker is tested on what it is and means, having the chance to win a parcel of products. Forty nominated workers are also tested each month on safety activities. Every six months a prize is given to the department which has had the best housekeeping and safety record. Yearly there is a health, safety and environment week in which activities are intensified, and management are involved.

There are few negative incentives used, limited only to drivers having to pay for damage resulting from their accidents.

Audits based on the International Safety Ratings System are carried out each year, these have been a driving force in reducing the number of accidents. Managers also carry out monthly hazard checks.

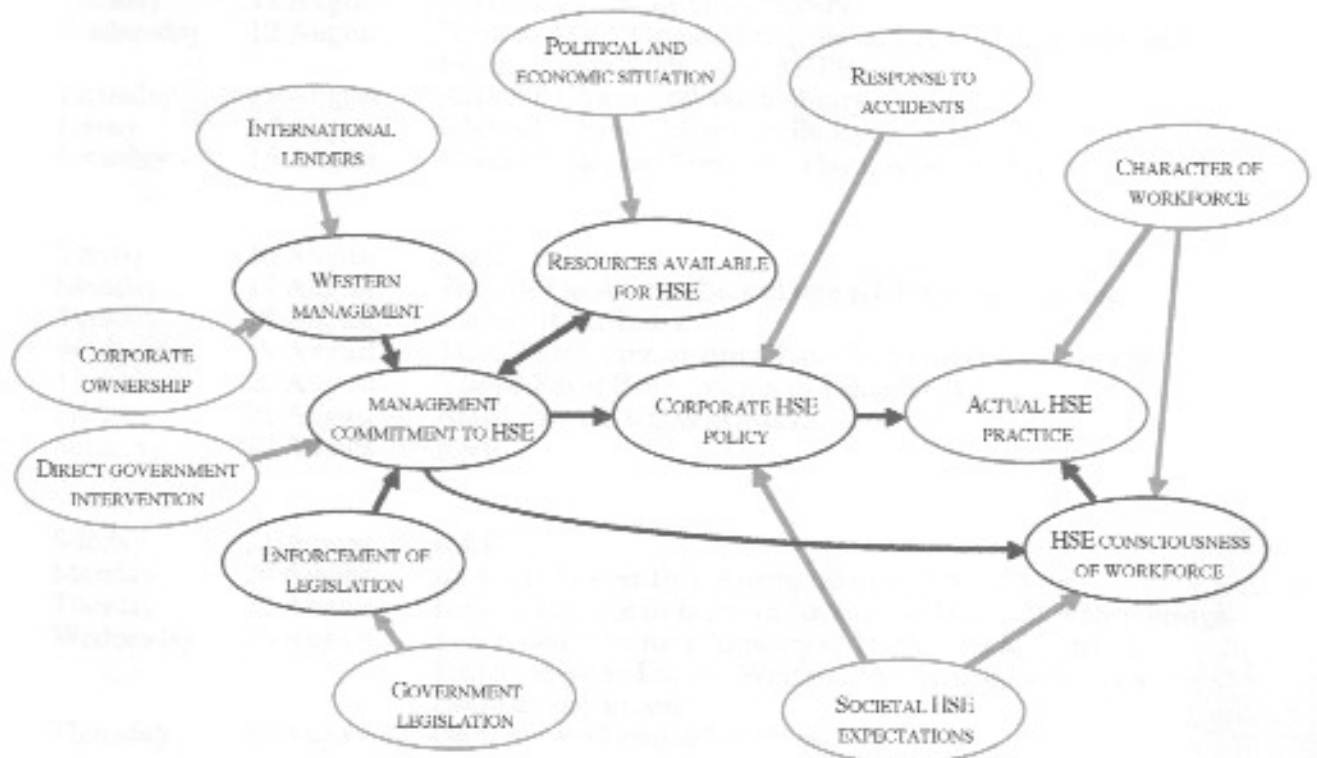
Safety shoes are given to every worker. Contractors are contractually obliged to provide their workers with suitable protective equipment. Non-disposable protective equipment will be replaced upon presenting the worn out item. This prevents theft, and also enables what has damaged the protective equipment to be identified.

A detailed work permit system is in place. An ex-army fireman who now works for Lever Brothers deals with fire issues. Emergency procedures have been prepared in case of a major incident.

## Conclusions

There is a broad range of approaches to HSE practised by companies in Ghana. There is a minimum standard which is enforced by government bodies. Some companies would not look out of place in Britain. Standards higher than this minimum are usually a result of contact with Western companies, a product of increases in productivity where aspects of HSE are incorporated into a loss control strategy, and special circumstances.

From the information gathered a schematic representation of the factors and their relationship to each other can be constructed. Red represents external forces, blue the intermediate stages these forces act through, and green the actual HSE actual situation realised in the company.



### *Itinerary*

Thursday	30 July	Arrived Kotoka International Airport, Accra, 1930. Met by GBL rep., spent night at GBL guest-house.
Friday	31 July	Met GBL MD, travelled to Kumasi on STC. Found way to Queen's Hall, KNUST.
Saturday	1 August	R&R. Went to Kumasi Cultural Centre.
Sunday	2 August	R&R. Met WB in the evening.
Monday	3 August	Went to KBL., met BM and others.
Tuesday	4 August	Spent day at KBL.
Wednesday	5 August	Spent day at KBL., reported back to BM.
Thursday	6 August	Visited ITTU at Suame Magazine. Called in to see Executive Secretary of CEDEP.
Friday	7 August	Used KNUST Chemistry Dept. library facilities.
Saturday	8 August	Visited the fascinating Fort Kumasi, then went to the tourist trap that is Bonwire, "home of kente cloth".
Sunday	9 August	Went to Lake-side, Lake Bosumtwi. Given dubious history of lake by a local, and made to pay for it, despite our protests!
Monday	10 August	AM: Went to LLL. PM: KNUST Pharmacy Dept. library.
Tuesday	11 August	KNUST Pharmacy Dept. library.
Wednesday	12 August	Went to AGC, Obuasi. Interviewed Loss Control Dept. and Environmental Unit, visited PTP.
Thursday	13 August	KNUST Ghana Collection library.
Friday	14 August	KNUST Ghana Collection library.
Saturday	15 August	Visited Biological Treatment Plant, AGC in Obuasi.
Sunday	16 August	R&R.
Monday	17 August	Travelled to Accra, checked into KNUST guest-house.
Tuesday	18 August	Visited TOR, Tema.
Wednesday	19 August	TOR, Tema, then visited Ghana Standards Board, Accra.
Thursday	20 August	Visited Lever Bro. division of Unilever, Tema.
Friday	21 August	R&R, saw the sights of Accra.
Saturday	22 August	R&R.
Sunday	23 August	R&R.
Monday	24 August	Re-visited Lever Bro. Attempted to visit Ministries.
Tuesday	25 August	Drove to see the impressive Akosombo Dam and Adomi bridge.
Wednesday	26 August	Succeeded in visiting Ministry of Health and Ministry of Employment and Social Welfare. 1630 arrived at Kotoka International airport.
Thursday	27 August	0800 arrived London Heathrow.

AGC - Ashanti Goldfields Company Limited, BM - Brewing Manager, CEDEP - Centre for the Development of People, GBL - Ghana Breweries Limited, ITTU - Intermediate Technology Transfer Unit, KBL - Kumasi Brewery Limited, KNUST - Kwame Nkrumah University of Science and Technology, LLL - Logs and Lumber Limited, MD - Managing Director, PTP - Pompora Treatment Plant, R&R - Rest and recreation, STC - State Transport Company, TOR - Tema Oil Refinery Limited, WB - William Bannerman



### *The experience*

Prior to travelling to Ghana I had read about third world countries, seen images of them on television and film and met people who have travelled to them. I thought that I had a good idea of what living in these countries is like. However, being there I experienced emotions and sensations which these media did not prepare me for. Writing this, I wonder how I can even start to express my feelings. The accounts of so many other travellers did not express them to me.

I think that I was only one of four whites on the Ghana Airways flight. I know that I was the only one in economy class. Shanty towns greeted me on my journey from the airport to the Ghana Breweries Ltd guest-house. Emaciated locals would congregate like moths around the intermittent single strip lights which illuminated the blackness.

At the guest-house the steward, a latter-day manservant, is introduced to me. He gives me the first of many complementary Star lagers. Turning on the television I watch President Jerry Rawlings give a speech celebrating Emancipation Day. On this day in 1834 chattel slavery was abolished by the British; meanwhile my steward prepares dinner for me.

Near the equator the morning breaks early and quickly. Leaving the guest-house I observe two Ghanaians sweeping the previous day's dust off the street with worn-out kitchen brooms. Here it is more advantageous to do it this way than to buy a proper broom which would allow one person to do a better job than both of these.

And so within twelve hours of arriving in Africa I have witnessed the perversities of capitalism in the third world. The following month would allow bring many more of such situations my way. I filled my journal with them. To recount them all here would take too long, this task is saved for a separate publication.

Perhaps the most enduring memory will be of the determination many Ghanaians have to better their circumstances and to enjoy their lives. It was a privilege for me to be able to work closely with one such Ghanaian, William Bannerman, during my trip. As a student studying chemistry at KNUST he founded a student branch of the Ghana Chemical Society. He is now a Lecturer in the Chemistry Department and has become the main source of dynamism in the Society. Currently he is learning French from scratch in order to start studying for a PhD in France next year.

I found that I had to learn a number of lessons in order to achieve my objectives in Ghana. Peter Vogtlander, the Dutch Brewing Manager at Ghana Breweries Ltd's Kumasi brewery, characterized the approach to work in Ghana as 'relationship orientated', whereas in Europe it is 'task orientated'. Low wages and under-employment mean that in Ghana time is not money. Being a European with aspirations to carry out a lot of research in a short period of time I found Ghana very frustrating at times. To survive I had to develop a patience and understanding of other people's situations which I hope will stay with me for some time.

In conclusion I have had a fantastic experience. Ghana is not a country many would visit on holiday. However, visiting it has allowed me to see first hand what we so often read about; how NGOs work, the aftermath of British colonialism, and how wonderful the people are.